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COMBINED ARMS TACTICS IN THE GREAT WAR BASED ON NEW TECHNOLOGIES: THE TANKS IN 1918

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The Narrative of the Tank Corps

This paper will deal with the British Tank Corps in the latter half of 1918. During this period, the tide of the war was seen to have turned with the Franco-American victory at the Second Battle of the Marne, in July 1918, and the "Black Day of the German Army", the British victory at Amiens in August – although many historians would state that it was, in fact, the heavy losses (without achieving victory) which the Germans sustained in their Spring Offensives that proved the decisive point.[1] The shift in the tide, confirmed at the Marne and east of Amiens, was then carried through to victory by the Allied Hundred Days offensive in which the 59 divisions of the British Expeditionary Force (B.E.F.), including the 15 battalions of the Tank Corps, played the leading role – taking 188,740 prisoners and 2840 guns.[2] The leading British role in the successful Allied offensives, and the greater impact that the British tanks played on the psyche of the German soldiers, if not their commanders, recommends a concentration on the British tanks in the combined arms attacks of period of August – November 1918. While it is true that the French deployed a larger number of machines in some of their 1918 offensives – usually the diminutive Renault FT-17s, it was the English tanks, and their successes, that caught the attention of the German press.[3] Further, it was (primarily) the theories of the British tank proponents (many of whom had some affiliation with the

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[1] Tim Travers, *How the War Was Won,* (London: Routledge, 1992) (www.web.a.ebscohost.com) Chapters 5 and 6 – The Germans are assessed to have sustained 1,000,000 casualties in their offensive period in the first half of 1918, and 760,000 during the period of Allied offensives from July to the Armistice.

[2] J. Terraine, *To Win A War: 1918, The Year of Victory*, (London: Papermac, 1986), p. 258

[3] C. Williams-Ellis, *Tank Corps,* (New York: George H. Doran, 1923), pp. 406-407

Tank Corps) that were the focus of the German theorists, notably (then Major) Heinz Guderian, in the interwar period.[4] The subsequent success of the German theories, such as *Stosskraft* ("dynamic punch" – as delivered by massed tanks)[5], the combined arms *Panzer* divisions that they created, and the stunning victories of these divisions in the first half of the Second World War did much to retroactively enhance the standing of the Tank Corps, and its champions, in the world of scholarship – as will be seen.

The scholarship regarding the Tank Corps, as the organization was formalized in 1917, could be seen as starting almost at its creation. From the moment of the premature commitment of the 49 Mark Is (of which 9 actually reached their objectives), in an effort to break the deadlock on the Somme in September, 1916, there emerged several camps regarding the proper usage and, in some instances, even the utility of the tanks.[6] These rival groups have great relevance to the study of the history of the British tanks, as they subsequently wrote histories, published memoirs and, in certain circumstances, carried on with their rivalries (in the press or through their own writings) in the post-war period. These groups may be defined as the tank proponents, the large (and largely neutral) B.E.F. chain of command group (committed to victory through the combination of all technology and innovations available to assist the infantry) and a small anti-tank group, generally officers at the General Headquarters (GHQ), in France, or in the War Office, who resented the diversion of resources away from the maximum infantry/artillery effort on the Western Front. This latter group was not as influential as might be supposed from the later reading of the tank pioneers, who might see anyone who did not fully embrace

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[4] C. Barnett, Ed., *Hitler's Generals*, (New York: Grove Weidenfeld, 1989), pp. 443-445

[5] *Ibid.*

[6] S. Bidwell and D. Graham, *Fire-Power: British Army Weapons and Theories of War 1904-1945*, (Winchester: Allen and Unwin, 1985), p. 135

their views as an opponent, and some resistance might be seen as a natural response to the interaction with the tank pioneers, not all of whom were blessed with great charisma. In one instance, the failure to embrace the tank during the War (or more accurately, seeming to try to thwart its development) had career implications for a Chief of the Imperial General Staff (CIGS).[7]

As stated, the largest group, but the most variable in its outlook, would be the traditionalists who populated the higher chains of command within the British Army – including the most senior commanders, such as Field Marshal Haig, General Robertson, and most of the formation commanders. Their views on the utility, and role of the tanks, would seem to have fluctuated based on their most recent experiences with them. While virtually all observers would agree with Liddell Hart's observation regarding the folly of the "premature use of an immature instrument (only 49 vehicles delivered and with partly-trained crews)" at Flers-Courcelette on 15 September, 1916, throwing away the potential shock effect of this secret weapon if had been used en masse, most commanders would have grasped at any means to break the trench deadlock on the Western Front.[8] While most wished to see the tanks succeed, several of the formation commanders, such as the General Officer Commanding (GOC) 51st Highland Division (Maj.-Gen. Harper) in particular, were unimpressed with the contribution of the few score of tanks available at the Second Battle of Arras in 1917.[9] In this instance, the contribution of the tanks consisted of 60 machines – Mark I survivors of the Somme and the "bogus" Mark IIs,

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[7] D. Lloyd George, *War Memoirs*, Volume IV, (London: Nicholson and Watson, 1933), p. 2422. One of many sources of friction between Lloyd George and General Robertson (who, as Prime Minister, Lloyd George manoeuvred out the CIGS position in 1918) was the latter rescinding an order for 1000 Tanks made in 1916. This was later overruled by Lloyd George, then Secretary of State for War – after it was brought to his attention by Lt.-Col. Stern.

[8] B.H. Liddell Hart, *History of the First World War*, (London: Pan Books, 1972), p. 260

[9] A.J. Smithers, *A New Excalibur: The Development of the Tank 1909-1939*, (London: Leo Cooper, 1986)

also intended for training and, reportedly, equipped with weaker armour than the Mark Is, but just as capable of bogging down in the muddy terrain in which they were committed.[10]

It was this action that created a parallel perception in the chain of command of the Imperial German Army. While the German soldiers were concerned with the tanks from the point of their introduction, this concern waned with this engagement, where it was seen how few and ineffective the tanks were (being penetrated by both the new armour piercing tungsten-cored "K-rounds", for their numerous machine guns, and forward-deployed batteries of artillery.[11] The German High Command, notably Ludendorff, felt the tanks to be a peripheral weapon (and, fortunately for the Allies, did not aggressively initiate a German tank-building program).[12] In this sense, the narrative of the conventional German commanders echoed that of the British, and it was left to the junior officers (such as Guderian and von Thoma) to champion the armoured forces in the interwar period.[13]

Returning to the British senior leadership, it was their views, in which the technical capabilities of the tanks, aircraft and, especially, the artillery, served to assist the infantry advances as part of a combined-arms team, which held sway. They operated in a war in which the generals were "demigods" who waged the War largely as they saw fit.[14] While not necessarily harbouring antipathy towards the pro-tank faction, an adversarial relationship was seen to develop, especially when the initiatives of the pro-

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[10] *Ibid*.
[11] *Ibid*.
[12] Williams-Ellis, pp. 404-406
[13] Barnet, Ed., pp 443-445
[14] A.J.P. Taylor, *The Second World War: An Illustrated History*, (Harmondsworth: Penguin Books, 1976), p. 22

tank faction, generally toward force expansion or increased tank production, were not supported. Liddell Hart noted that it should "be said to the credit of those who, on the General Staff, opposed the tank, that if they had not the ingenuity to devise means of beating the Germans they were fertile in the devices to beat the sponsors of the tank."[15] Further, as senior ranking officers, they had the capacity to re-assign the generally junior officers of the Tank Corps, or Tank Board, that disagreed with them or proved noisome.[16] Part of the perceived adversarial relationship might stem from the attempts that Field Marshal Haig and Lt.-Gen. Kiggell made, in the winter of 1917-1918, to find additional infantry replacements in the wake of the unsuccessful Passchendaele offensive. Lloyd George was appalled with the outcome of Passchendaele and feared, probably with good reason, that the arrival of fresh troops in France would be the signal for a Fourth Battle of Ypres. Overall, the infantry strength in France had fallen by 126,000 between January 1917 and January 1918 and there remained 449,000 men suitable for transfer to France within the United Kingdom (they were largely withheld).[17]

Denied drafts from Britain, Haig and Kiggell were soon "scheming to reduce the size of the Tank Corps in order to fill gaps in the ranks of the Infantry."[18] Specifically, they wished to cut the Tank Corps, which stood at 24,000 men in 13 battalions in France, to a reduced strength of 16,000.[19] In the end, Kiggell was replaced by General Lawrence and General Robertson was replaced by General Wilson as the new CIGS, who immediately ordered an expansion of the Tank Corps to 25 battalions. Thus, the pro-tank

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[15] Liddell Hart, p. 262

[16] *Ibid*.

[17] Terraine, p. 50 Many of these replacements were hurriedly sent to France in the aftermath of Fifth Army's catastrophic defeat in the German 'Michael' offensive (March-April 1918).

[18] K. Macksey, *The Tank Pioneers*, (London: Jane's Publishing, 1981), p. 32

[19] *Ibid*.

faction was strengthened considerably at the expense of those perceived as having an antipathy to it. The shortfall in infantry in France was addressed by reducing each British division from 12 to 9 infantry battalions and the number of divisions fell to 61 (importantly, the Dominions were not compelled to reduce the size of their divisions). Further, the cherished Cavalry Corps was reduced to three divisions in order to provide replacements.[20]

However, as the officers of the General Staff had the most political influence and the most prestige as "demigods" in the eyes of the press and the public, it would be fair to say that it was their writings and memoirs that carried the most weight in the immediate post-war period.[21] This influence waned as the suffering on the front lines, and the human and economic impacts came to be realized – leading to scholarship that was much more critical of the generals in the latter half of the 1920s. This was the beginning of the 'Lions Led By Donkeys' era, where discussions regarding the general lack of competence of GHQ and the resultant sacrifice of thousands of brave soldiers in generally hopeless attacks (such as Passchendaele) took hold. This was also the period where some more general histories began to make their appearance, such as Winston Churchill's *The World Crisis*, which provided good balance and scope in the view of the tanks and the challenges its proponents faced (Churchill was a tank proponent himself). Here we find that the some of the challenges faced by the Tank Board in securing natural resources and the production of its tank programme was not, necessarily, due to conniving members of

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[20] Spencer Tucker and Priscilla Mary Roberts, *Encyclopedia of World War I,* (Santa Barbara, CA: ABC-CLIO, Inc., 2005), p. 504

[21] It should be noted that not all of these authors were antagonistic to the Tank Corps by any means. The innovative, and highly successful, GOC Australian Corps, Lt.-Gen. Monash, provided a very balanced account in which the tanks played a prominent, but not pre-eminent, role. See: J. Monash, *The Australian Victories in France in 1918*, (New York: E.P. Dutton and Company, 1920)

GHQ in France, but also the result of inter-service rivalries – the Royal Navy in 1917, after Churchill's departure to the Ministry of Munitions, pushed exorbitant claims for steel plate at the expense of the Tank Corps (and the Army, as a whole).[22]

Commencing in the 1920s, and extending into the 1940s because of the scale of the work, came the multi-volume *Official Histories* of which those of the United Kingdom and Australia are, perhaps, the most influential. Edmonds' British history, had significant influence because of his ability to access the high command, and classified primary source material, in its compilation.[23] Bean's Australian history is, probably, more useful as a source as he was not beholden to GHQ and could, therefore, be more objective / critical regarding the high command.[24] Very important to this work is the depth of detail in Bean's recurrent analyses, particularly regarding the attrition that occurred within the B.E.F. and the trends, based on progressive tactical theories and successful tactical experience, which led to the emergence of elite divisions, which were heavily used to lead most of the assaults in 1918, because of their reliability.[25]

The easiest group to identify was that of the pro-tank faction (or 'tank pioneers' as many historians have called them), which can generally be seen as comprising the members of the embryonic Tank Corps, members of the Tank Board and members of the

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[22] W.S. Churchill, *The World Crisis 1916-1918*. Volume II, (London: Thornton Butterworth Ltd., 1927) p. 296

[23] Of relevance to this research - J.E. Edmonds, *Military Operations: France and Belgium 1918*. Volumes II/IV/V, (London: His Majesty's Stationery Office, 1939/1947). Brig-Gen. Edmonds wrote the core of the 14 volumes concerned with British operations on the Western Front – 1914-1918. Other officers were employed to write the histories of the other services and several of the other campaigns.

[24] K.S. Inglish, "Bean, Charles Edwin (1879-1968)", Australian Dictionary of Biography (Volume 7, 1979), (www.anu.edu.au)

[25] C.E.W. Bean, *The Official History of Australia in the War of 1914-1918*. Volumes IV and V, (Sydney: Angus and Robertson Ltd., 1943). In Bean's estimation, the British Guards, the 5 divisions of the Australian Corps, the four divisions of the Canadian Corps, the New Zealand Division and a few British divisions, such as the 5th Division (on the Italian Front) would have filled this role – he returns to this subject several times, based on the formations' changing readiness (resulting from their employment and casualties – i.e. their refit requirements). The first such sequence (looking forward from the end of 1917) commences in Volume IV, pp. 947-948.

B.E.F. who had been won over in successful combined arms operations with the tanks. The latter group could be perceived as fluctuating depending on the time frame / circumstances of the War. For example, the GOC British Fourth Army in 1918, General Rawlinson, was an active supporter for the inclusion of tanks, in all of his offensives – particularly after the highly successful set-piece action at Hamel in July 1918, involving the 4th Australian Division and 60 tanks from V (5th) Tank Brigade, specifying future operations (Amiens) on that model.[26] However, like the other army commanders in the B.E.F., he was cool to the idea of reducing the infantry divisions (already reduced in their establishments from 12 to 9 infantry battalions in 1917), due to a shortage of replacements, in order to expand the Tank Corps in 1918.[27] To this list might be added tank enthusiasts, such as Maj. Clough Williams-Ellis, who had served primarily in the infantry (Welsh Guards), but (using a rugby analogy in his *Tank Corps* in 1920) wrote that the tanks "whose legacy was still to be determined…had taken the team from the 25-yard line to over the opponents' goal line."[28]

This group, as previously stated, included relatively junior officers as its champions – including Bvt. Colonel (later Maj.-Gen.) Fuller, the Tank Corps Brigadiers, and Liddell Hart (who had been a Captain, prior to his active war ending as a result of injuries sustained in a German gas attack in 1916). The initial works of this group might be found in the War Office Files, such as the Minutes of the Tank Board, or Fuller's proposals regarding the structure and force employment of the tanks. Of these, the most ultimately influential was Fuller's Plan 1919, which was expounded in his "Tank

[26] Rawlinson to GHQ, 17 July 1918 (No. 220(G), para 10), WO 158/241, PRO
[27] Bidwell and Graham, pp. 135-139
[28] Williams-Ellis, p. xv

Operations for 1918", after initial written record (reportedly as a result of a dream) in his Diary.[29] Fuller's Plan called for:

> A massive offensive to totally destabilize the German line by creating a major, and relatively deep, break-in - then rolling up the German forces on the flanks. This would create a breach too wide to fill and produce the long sought after breakthrough. The general idea was that the British should telegraph their offensive intentions across a ninety-mile area so as to induce the Germans to commit their every reserve. Then, a force of the newly conceived (but not, yet, produced) Medium D tanks would sweep into the enemy positions from each flank of the threatened zone. These tanks, with far superior mobility to any of their predecessors, would rapidly drive over the enemy trenches and continue into the rear areas so has to play havoc upon the enemy's centres of communication. The medium tanks were to be assisted in this endeavour by aircraft operating in a ground-attack role. Once the enemy's command structure had been paralysed and his forces fragmented, the heavy tanks, supported by motorized infantry and artillery would push several attacks in depth into the central 50 miles of the battlefield area. This would serve to eliminate the main enemy formations. Thereafter, the medium tanks, followed by the motorized infantry and towed artillery, would exploit into the enemy rear areas and roll up the forces on the flanks.[30]

The works of the tank pioneers, in the immediate post-war period, seemed based on discussion regarding the potential of the tanks. The blunter discussions regarding the missed opportunities caused by the high command's mishandling of the tanks, such as "the numbers of tanks manufactured under the reduced programme of 1917 sufficed to bring victory, but they could not bring back the dead (in reference to the tanks' abilities to reduce casualties)", waited until their views were in the ascendancy.[31] This

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[29] J.F.C. Fuller, Diary, 24 May 1918, TC Archives 1362, Bovington

[30] *Ibid*.

[31] Liddell Hart, p. 262 – This book was originally published as the *Real War, 1914-1918*, in 1930. In fact, the challenges in getting tank production untracked in 1917, as well as the limited overall manpower available to B.E,F. over the Winter of 1917-1918, were the largest impediments to large-scale tank operations in 1918. Nor was all of this friction from outside agencies – Lt. A.G. Stern, Chair of the Tank Supply Committee, whose grasp of technical matters was not beyond reproach, ordered the inclusion of petrol-electric drive trains (which the French were developing for their St. Chamond tanks) into the British heavy tanks, something of a retrograde step from the epicyclical drives the British were developing, and which were not ready at the time than the other components of the Mark IV were complete. See - D. Fletcher, *Landships*, (London: Her Majesty's Stationery Office, 1984), pp. 21-22

ascendancy came with the 'Lions Led by Donkeys' phase of Great War historiography, commencing a decade after the War and probably reaching its apex in the 1950s and early-1960s.

Before moving on from the specific discussion of the tank pioneers, one other scholastic resource should be mentioned – the individual after action reports (referred to as Tank Battle Sheets) and War Histories produced by the Tank Corps and placed into the Archives at Camp Bovington, home of the Royal Armoured Corps.[32] Like the War Office's Unit/Formation War Diaries, many of these documents were classified as 'Secret' in the immediate post-war period and were only released to the Official Historians – or years later to scholars, which was also seen as tying the official historians to the high command's orthodoxy (if they were to get access to these valuable research materials).[33] This had ramifications for the general thrust of subsequent historical works on the tanks. The initial dialogue was between the tank pioneers and the high command, and its apologists, opposed by the tank pioneers and theorists and could be quite emotional. The later release of the primary documents brought scholarly research more into balance and, it would be fair to say, reduced the primacy of the tank theorists, from the 1970s onwards. However, it would be accurate to view the theories of Liddell Hart

[32] The Archives capture virtually all of the remaining After Action Reviews (notably the Tank Battle Sheets made by the individual tank commanders after each action). In the period after the War, much of the data in these Tank Battle Sheets appears to have been incorporated into the War Histories (including the Battle Graphs showing individual tank dispositions in selected engagements) of the 1st (limited data), 2nd, 3rd Light, 4th, 5th, 6th Light, 8th, 10th, 13th, 14th and 15th Battalions. The "Light" Battalions actually having "Medium" Tanks, the remainder the "Heavy" Tanks, such as the Marks I, IV and V. Several of the War Diaries and Brigade directions/instructions are preserved, as well. Unfortunately, it appears that most of the Adjutants who created detailed War Histories, then discarded the Tank Battle Sheets on which they were based. Most of the remaining Tank Battle Sheets are either those based on specific, famous engagements, such as the action of the Whippet 'Musical Box' or are from the unit(s) that did not create detailed War Histories prior to disbandment – the lack of staff effort involved, while perhaps not appreciated by the chain of command of the time, certainly proving beneficial to later scholars.

[33] K.S. Inglish, (www.anu.edu.au)

and Fuller as reaching their apex in popularity in the years after the Second World War, when the successful mechanized operations of the major combatants seemed to confirm their theories and, by extension, their views regarding the Tank Corps. Certainly, Fuller's Plan 1919 seemed to become less of a 'dream' and more of a missed opportunity (with the advantage of hindsight), in the sense that more resources were not provided to tank development in order to realize the dream, in later years. Admittedly, perception and popularity are hard to quantify, but market value is a potentially more precise indicator; while preparing, as editor, *A Guide to the Battlefields of Europe* in the early 1960s, David Chandler noted that he was able to enlist the assistance of 19 distinguished historians, but that Liddell Hart had slipped through his net as it emerged that his rate per words was forty times the remuneration being offered by the publisher (but which was acceptable to the other 19).[34]

Some of the initial scholarly works in more recent years, able to access the primary sources, could be seen as a reaction to the primacy of the pro-tank faction, by relying on the analysis of primary documents and statistics to show that the British high command was not worse than those of the other nations. Included in this group would be Haig biographers such as E.K.G. Sexsmith or W. Reid.[35,36] This is also the tact of J. Terraine, notably in *To Win a War*, where the performance of the British Army, measured in terrain captured and especially the haul of prisoners and guns, is favorably compared to that of the larger French Army (despite the alleged mishandling of the Tank Corps), and considerably outstrips the American Expeditionary Force, which was a close third in

[34]D.G. Chandler, Ed., *A Guide to the Battlefields of Europe*, (Ware: Wordsworth Editions Ltd., 1998), p. xix

[35] E.K.G. Sexsmith, *Douglas Haig*, (London: Weidenfeld and Nicholson, 1976)

[36] W. Reid, *Architect of Victory: Douglas Haig*, (Edinburgh: Birlinn Ltd., 2007)

contingent size.[37] Further, the beneficial casualty ratio of 1918, as compared to the German defenders, is highlighted, as is the efforts that the British took to conserve manpower, especially amongst the elite divisions, which were leading most of the offensives.[38] The casualties amongst the tanks, due to improved German anti-tank tactics and mechanical breakdowns, which could not sustain operations much beyond 48 hours, are also stressed.[39]

Running parallel to these studies are studies of the other components that constituted the combined arms offensives in 1918. These included the infantry (the Australian and Canadian Corps that were most commonly associated with the tanks in the successful offensives in 1918 – largely because they fought better in small groups and had become outstanding infantry), the artillery (which had seen massive technological and force structure increases during the war), and the aircraft of the Royal Flying Corps which cooperated in sighting targets for the guns, through wireless communications, in addition to some ground support.[40] These documents, also accessing much primary material, are very useful scholarly research. As with the study of the works of the tank pioneers, many historians will advise some caution in dealing with these highly specialized works, which, in accentuating their subject, may (unconsciously) downplay the role of other arms.

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[37] Terraine, p. 258

[38] *Ibid*., pp. 115-120 – Unlike Passchendaele, Haig called off the Amiens offensive once enemy resistance had been noticeably stiffened with reinforcements (despite the objections of the French Supreme Commander), thereby conserving British Fourth Army for further offensive action elsewhere. British casualties were 20,000, less than the benchmark figure of German prisoners at 21,000.

[39] *Ibid*., pp. 116-117

[40] Bidwell and Graham, pp 138-139 and 143-145

The counter, to a degree, to the pro-GHQ position might be found in the works of D. Winter and, especially, Dr. Tim Travers.[41] Dr. Travers' position, most concisely espoused in *How the War Was Won*, is that there was something of a breakdown at GHQ during the Hundred Days and that the army commanders within the B.E.F. were left to carry on with their own conduct of the offensives, grabbing any available resources, including the 'penny packets' of remaining tanks as they went along.[42] As a result, there was no opportunity to mass the tanks for another Amiens, a relatively inexpensive victory, compared, even, to some that would follow.[43] Further, it is his view that casualties, in gaining the victory in 1918 (won by innovative commanders such as Rawlinson and the Dominion Corps GOCs, and a lack of German reserves [lost in the Spring offensives] to counter their continuous tactical penetrations) were, actually, higher in 1918 than in 1917 – the Canadian Corps sustaining casualties of 29,725 in 1917 and 49,152 in 1918.[44] Probably the most contentious assertion is that, while the B.E.F. was gaining victories in 1918 by "wearing down the Germans through the application of ever larger amounts of traditional or semi-traditional technology", better control and coordination of the available tank assets (resulting in fewer local attacks, but permitting more Amiens-type offensives) could have reduced casualties in doing so.[45] That is to say, "there was a viable mechanical alternative to man-power oriented forms of warfare."[46]

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[41] D. Winter, *Haig's Command: A Reassessment,* (London: Viking, 1991). This book is something of a reaction to the Haig apologists and biographers. The objectivity of the British official historian, Edmonds, is, also, questioned, in the sense that he was too lenient on GHQ.

[42] Travers, Chapter 5

[43] *Ibid*., Chapters 5 and 6

[44] *Ibid*.

[45] *Ibid*., Chapter 6

[46] *Ibid*.

The reaction to this view, by some recent historians, has been to concentrate on the technical limitations of the tanks, particularly with regards to endurance – both the mechanical durability and endurance of the crews (working in truly trying operating conditions of excessive heat and toxic fumes)[47] – and vulnerability to German artillery fire. J.P. Harris is seen to concur with Travers' view that the Tank Corps' contribution to victory was as part of a combined arms team, but is somewhat more critical of the tank proponents, particularly Fuller and Liddell Hart, in overstating their case.[48] Meanwhile, D. Childs comes to the conclusion that the tanks were, in general, peripheral in an 'infantry support role, limited by capabilities, not deliberate design.'[49] On the subject of the loss of control by GHQ, some modern scholars would argue that this was positively beneficial, because it allowed the local commanders, such as General Byng, GOC-in-C British Third Army, to set the tempo of operations and, therefore, better sustain overall forward momentum.[50]

It is hard to argue with the validity of the most recent viewpoint(s). It is the position of this paper that the tanks were a key element in the victory of 1918, by greatly facilitating the (very coordinated, and reliant on technology) break-in battles centred,

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[47] See also: Maj. L.R. Brewster (R.A.M.C.), "The Medical Aspect of Tanks", 30 Oct 18, TC Archives (No File Number), Bovington – Symptoms including severe headache (lasting up to 48 hours), giddiness, breathlessness, palpitations, vomiting, mental confusion and cases of collapse, unconsciousness and convulsions. These symptoms were noted as commencing after 3-6 hours of being closed up in an operating Mark I or Mark IV. It was noted the problems had increased after the introduction of the Mark V and (the larger, infantry Lewis Gun squad-carrying) Mark V Star (pp. 5-7), which were employed in 1918. -- The Mark V Stars had some technical issues, which resulted in more exhaust being released in the interior of the machine (Terraine, p. 109). The summary of the participation of the Mark V Star Battalions at Amiens, given in the next chapter, shows the greater mechanical reliability of these newer machines, but the more continuous running of these vehicles increased crew exhaustion – as Maj Brewster notes – leading to little practical change in endurance.

[48] T. Travers, "Review: J.P. Harris, 'Men, Ideas, and Tanks'", Albion: A Quarterly Journal Concerned With British Studies, Volume 28 No. 4 (Winter, 1996), pp. 726-727

[49] D. Childs, *Peripheral Weapon? The Production and Employment of British Tanks in the First World War*, (Bridgeport: Greenwood, 1999), p. 150

[50] J. Boff, *Winning and Losing on the Western Front – The British Third Army and the Defeat of Germany in 1918*, (Cambridge: Cambridge University Press, 2012), pp. 6-7, 203 and 226

primarily, on the B.E.F.'s elite divisions. This had the result of ensuring that the attack forces were shielded and sustained for future operations at varying points of the line. However, the tanks were not the war-winning weapons in and of themselves, and would not have been, even if better-handled by the high command in 1918 – especially as it was likely that Fuller's Plan 1919 would have remained more "dream" than reality, had the War continued into the following year. In coming to this conclusion, it will be necessary to examine the Tank Corps' role in the victory at Amiens (which came closest to the ideal of the tank pioneers), and then analyzing this success, with the backdrop of a few examples drawn from the Hundred Days. In general, this view is analogous to the employment of technology through to the modern day in the limited wars being fought in South-West Asia, where the professional, but numerically capped Coalition forces must, also be shielded from excessive casualties. The difference being that this was done almost solely for military reasons in 1918 (to maintain the forces that could bring the conflict to a successful conclusion), whereas political considerations (regarding the maintenance of support on the home front) in order to continue the conflict is the main underlying reason of today.

At Amiens, we see a signal success, Ludendorff's 'Black Day of the German Army', won at a steep price (in excess of 50% in losses) to the tanks, making them less able to sustain their part in the operations on the subsequent days of the offensive. This effectually led to a narrowing of the offensive onto the axis most likely to promise success by the second day of the offensive – the Canadian Corps sector.[51] This ran

[51] See footnote 107 (*Second's – Out*, War Diary – Notes, 2nd Battalion, Tank Corps, (Week ending 4 August – Compiled 1919) p. 48, RH 86 / TC 2 Bn, Bovington) regarding the planned concentration of the 5th Tank Brigade's forward battalions towards the Australian Corps' southern flank as they approached the final objective line on 8 August.

contrary to Fuller's theories regarding the mobility of the tanks facilitating a widening of any breaches made in the German front – as did their inability to press deeply into the German rear areas. The narrowing of the penetration into the German lines eventually led to the cessation of the offensive as the Germans were able to concentrate their reserves to the threatened point. The follow-on analysis will see a continuation of this trend in selected, smaller operations, primarily drawing on examples from the British Fourth, Third and First Armies during the Hundred Days. During these operations, the tanks, with one brigade generally allocated to each army, were able to assist in the combined arms battle with a series of break-ins, but had not the strength, nor tactical/operational stamina to sustain deeper penetrations. They continued, however, to limit the casualties to the attacking infantry – albeit at a significant cost to themselves.[52] These battles were not individually decisive, but had the desired effect when incorporated into a larger plan (of multiple such offensives) – ultimately leading to an Allied victory that did not seem probable only six months earlier.[53]

[52] See Boff, pp. 141-143
[53] *Ibid*., p. 7

Amiens: Vindication of the Tank Corps in the Combined Arms Offensive

It is important to note that J.F.C Fuller actually felt that the limited offensive of the 4th Australian Division, supported by 60 tanks, at the Battle of Hamel on 4 July, 1918 was necessary "to reinstate the credit of the Tank Corps" as a prelude to its later offensive operations.[54] This was so because of the lack of success that the relatively few available tanks found in the unsuitable terrain encountered at the second Battle of Arras and at Passchendaele. As many observers have pointed out, the initial success of the tank-infantry attack at Cambrai in November, 1917 had been rendered uncertain by the loss of the ground that had been gained to the German counter-attacks that swiftly followed Fortunately for the Tank Corps, the responsibility for the debacle was not placed upon them, rather, they were held to have proved their enduring value.[55] After all, 378 tanks and 4000 tank-men had assisted 6 divisions to achieve, at a cost of 6000 casualties, more than 3000 guns with 120,000 gunners had helped dozens of divisions at Passchendaele achieve with the loss of 400, 000 men.[56] However, their employment in defence during the German offensives in Spring 1918 (with the exception of the small victory in the first tank-vs-tank battle at Villers-Brettoneux, 24 April 1918) had not been memorable, the 2nd Battalion, Tank Corps, losing 70% of its machines in two days of fighting, for example.[57]

Hamel was basically an operation in which Lt-Gen. Monash, the new G.O.C. Australian Corps, sought to flatten out a small German salient east of Amiens. Monash was in a seemingly enviable position in that his troops were, along with the other

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[54] J.F.C. Fuller, *Tanks in the Great War, 1914-1918*, (New York: E.P. Dutton and Company, 1920), pp. 304-305

[55] D. Orgill, *The Tank*, (London: William Heinemann, Ltd., 1970), p. 38

[56] These figures – particularly those regarding casualties at Passchendaele – are highly disputed. Some historians would see them as being inflated to discredit GHQ and, particularly, Haig.

[57] B.H. Liddell Hart, *The Tanks*, Volume I, (London: Cassell, 1959)

Dominion and British Guards divisions, the best available to the Allies in 1918.[58] Further, each of Monash's five divisions was still composed of twelve infantry battalions and thus had a superior ability to sustain themselves in the attack than their British, French, or German counterparts, which contained only nine battalions. However, there was a problem in that one basis of Australian superiority was the fact that all of their troops were volunteers. As recruitment in Australia dwindled, it was no longer likely that the divisions could be maintained at full strength, particularly as there were additional Australian forces to be maintained in Palestine. This, and their high degree of training and experience, had the effect of making Monash's troops virtually irreplaceable.

In looking for ways to minimize casualties, Monash was willing to cooperate with the tanks after some liaison with the local tank commander – Brig.-Gen. Courage of V (5th) Tank Brigade. Monash was one of the few Australian commanders who had not been at Bullecourt (the Second Battle of Arras) and thus did not hold any prejudices against the tanks. Further, Monash's engineering experience served to make him more willing to accept the use of mechanical means to ensure victory.[59] In fact, he developed a policy (largely a refinement of the plan used at Cambrai) in which 'the infantry did as little fighting as possible, instead marching to take positions that had been won by the other arms'.[60] The refinements to the Cambrai plan included a heavier emphasis on smoke to obscure enemy observation and counter-fire, and also hide from the enemy the fact that gas was not being employed – thereby keeping the Germans masked while the assault

[58] Bean's analysis has been discussed – as was Bidwell and Graham's narrative (pp.138-139) on why the tanks worked mostly with the Dominion divisions in their discussion of the findings of the British Army's Kirke Committee in 1932.

[59] A.J. Smithers, *Sir John Monash*, (London, Leo Cooper, 1973), p. 209

[60] P. Firkins, *The Australians in Nine Wars*, (New York: McGraw-Hill, 1971), p. 132

troops advanced unhindered.[61] In any event gas at this time was often used primarily in a counter-battery role so as to kill the limber horses and limit the mobility and effectiveness of the enemy artillery (particularly when the gunners had to operate while masked). Also, the number of infantry taking part was limited to that necessary to support the tanks (with the added benefit that fewer were put at risk) – only eight battalions for a 6000-yard front.[62] Aircraft were also employed in several capacities, such as providing covering noise, to mask the noise of the approaching tank engines from the enemy, and strafing of the enemy rear areas.

When the attack went in, it turned out that the meticulous planning and coordination of all arms that Monash had carried out had reaped great rewards. The Hamel salient was pinched out in a matter of 93 minutes and 1500 prisoners taken at the cost of 900 casualties.[63] Of the tanks, 60 of the new Mark Vs had gone forward and none had been lost – although three had been hit.[64] In fact, the attack had been so successful that Monash's operational order was distributed throughout the B.E.F. as a blueprint for future operations.[65] The tanks benefitted from this uniform, positive exposure and now gained a place of prominence in planning for future attacks. The stage was now set for what was to be perceived as the greatest victory of the Tank Corps in the Great War at Amiens on 8 August 1918 – what General Ludendorff later described as the 'Black Day of the German Army'.

Operational planning for the Battle of Amiens followed along much the same lines as that of Hamel before it. This was not surprising, given the success of the

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[61] G. Serle, *John Monash*, (Melbourne: Melbourne University Press, 1982), p. 332
[62] *Ibid.*
[63] Terraine, pp. 87-89
[64] *Ibid.*
[65] Rawlinson to GHQ, 17 July 1918 (No. 220(G), para 10), WO 158/241, PRO (from footnote 26)

previous operation and the fact that several of the same key players – Rawlinson, Monash and the Tank Corps, were to take part. As with the previous operation, the plan reflected a compromise between the radical theories of the pro-tank faction and the more conventional theories of the neutral group, officers in GHQ who had sought to reduce the strength of the Tank Corps being much in decline.

As the potential for renewed offensive activity began to emerge in late spring of 1918, several officers within the Tank Corps began to postulate on what its organization and role should be in the coming battles. Some officers who were to emerge in the post-War era, such as Maj.-Gen. Q. Martel, looked forward to a time when squadrons of tanks would emerge to defeat the enemy in epic battles of manoeuvre, before retiring to rest and refit in some safe 'harbour'. Given the current state of tank development, even with the Marks V, VIII and Medium As coming on line, fighting of this nature was to remain far in the future – not being realized until 1941, in the Western Desert. A potentially more practical, and certainly more (eventually) well-publicized proposal, was Fuller's Plan 1919, but this had not been finalized, let alone widely communicated by the time of the Amiens offensive.[66]

However, his less ambitious notes for tank operations in 1918 had been distributed and called for:

> Operations along a sufficiently wide base of 25,000 yards (so that German forces on the flanks of the break-in could not interfere with its exploitation), and for the division of the tank force into three echelons – the Advance Guard tanks, the Trench Clearing tanks, and the Exploiting tanks. The first echelon was to contain the Mark V Stars, lengthened heavy tanks with room to carry an infantry section equipped with Lewis guns. They were to precede the main attack force (the Trench Clearing

[66] See J.F.C. Fuller, Diary, 24 May 1918, TC 1362, Bovington. Specifically – J.F.C. Fuller, "The Tactics of the Attack As Affected by the Speed and Circuit of the Medium D Tank", 24 May 1918, TC 1362, Bovington.

> tanks and dismounted infantry), crushing lanes through the wire, and rapidly punch through the main defence zone to deposit their passengers on the far side to act as cut-off teams against both reinforcement of, and retirements from, the enemy's front line defenses.[67] In some ways, this was the 'mechanical barrage' often alluded to in GHQ directives concerning the tanks. These tanks, once finished unloading, would act as a mobile counter-attack force.
> The Trench Clearing (Mark V) tanks were to advance in two waves, the first to clear the tranches, with the aid of the infantry "fighting their way forward under the Tank's protection" (i.e. attain the first objective line), the second to push on to relieve the Advance Guard on the second objective line. Once there, this force could reorganize while the Medium B tanks exploited as mechanical cavalry, hopefully in conjunction with motorized infantry, to the last objective line and beyond. Fuller estimated a requirement for 1400 tanks for this attack – which the Tank Corps seemed destined to possess by the autumn of 1918.[68]

The circumstances of Amiens were not what Fuller had envisioned – not at all surprising when one considers that he was theorizing about a general, rather than a specific, situation. While the full extent of the battle was to cover close to the frontage that Fuller had recommended, the French First Army was responsible for just over a third of it. No tanks were, initially, available to this command as the French armoured force was still fully occupied in Champagne.[69] For the 16,000 yards that were covered by British Fourth Army (under Gen. Rawlinson), there existed a force of 414 combat tanks in the reinforced 4th (Brig.-Gen. Hankey) and 5th (Brig.-Gen. Courage) Tank Brigades – as well as the 10th Tank Battalion (drawn from II Tank Brigade) and 3rd and 6th (Light) Tank Battalions (III Brigade), almost the full combat potential of the Tank Corps then in

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[67] *Ibid*. Ideally these tanks were to move forward under cover of darkness, with the rear echelons attacking at first light. Daylight assaults were supportable under cover of a smokescreen.

[68] *Ibid*.

[69] French Sixth and Tenth Armies had employed 493 tanks in the initial assaults southwest of Soissons in July (Terraine, p. 95)

France.[70] This was considerably less than the over 900 that Fuller would have thought necessary.

To General Rawlinson, formulating the Army's operational plan, this did not present a problem as he was calculating the required numbers of tanks based on previous usage and reckoned on needing eight battalions (he had eleven).[71] To the pro-tank group, including Monash (post-Hamel) as something of an associate member, Rawlinson was on the right track with his insistence that "As in the case of the attack of July 4th, it is proposed to employ as many tanks as possible, so as to save casualties to the infantry, and also to make full use of any supply tanks that may be available, so as to reduce the infantry carrying parties."[72]

Inevitably, however, some aspects of Fuller's theories were to be sacrificed in order to account for the lesser number of tanks. The Advance Guard echelon was dispensed with completely, although, as shall be seen later, not with much regret by the actual combat commanders within the Tank Corps. The first wave of the Trench-Clearing tanks comprised those battalions allotted to the assault divisions.[73] These tanks were to carry forward through the first two objective lines, Green and Red, before reforming. The second wave of Trench Clearing tanks were those allotted to the follow-up divisions that were to push to the final objective – the (Dotted) Blue Line, thus reaching the Outer

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[70] Terraine puts the number of tanks in existence, at this juncture, at 1,184, but nowhere near this total were with the tank brigades in France, this total including those vehicles in the workshops, with the new units being formed, supply and support machines, and obsolescent models employed for training purposes.

[71] Rawlinson to GHQ, 17 July 1918 (No. 220(G), para 10), WO 158/241, PRO. Based on a perceived requirement for 6 tanks per 1000 yards of frontage, per objective line, with an additional requirement for 36 tanks to secure the south flank of the attack and two battalions of Medium-A Whippets to cooperate with the cavalry in an exploitation role.

[72] *Ibid*.

[73] From north to south, these were – 47th, 12th, 18th and 58th British; 3rd, elements of the 4th, and 2nd Australian; and 2nd, 1st and 3rd Canadian. Of these, the British 47th and 12th Divisions, with more static (northern flank protection) tasks, were to receive no tank support.

Amiens Defence Line and ending the threat posed by the Germans to the vital rail centre.[74] This wave included the Mark V Star tanks that were to carry Lewis Gun teams forward to consolidate on the Blue Line. The Exploiting tanks echelon was retained in reduced form, with the 3rd and 6th Light Battalions attached to the Cavalry Corps (Lt.-Gen. Kavanagh) – the 17th Armoured Car Battalion was separately deployed with this group. The remaining two infantry divisions, whom the officers of the Tank Corps would have been more happy to see cast in the exploitation role (i.e. rather than the cavalry) were not assigned, as they were being held in GHQ reserve.[75]

A force that closely approximated the motorized infantry force that Fuller proposed was formed in the Canadian sector, Brutinel Force, consisting of 10 motorized machine gun companies, as well as a battalion of cyclists. However, rather than following in the wake of the advancing tanks, this combined arms force (it was later augmented by a section of heavy tanks) was to be deployed well to the fore to ease the advance of the Canadian Corps on its exposed southern flank – the French XXXI Corps on its right was not planning to advance until 45 minutes after the British zero-hour (having no tanks, a preparatory barrage was deemed necessary).

Ideally, the attacking force should have been organized in greater depth to permit more reserves to sustain the attack as it penetrated more deeply into the enemy positions. However, to do so would have of necessity reduced the frontage of the attack unacceptably. The influx of more divisions, even if available, may not have served to

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[74] The divisions in this wave were the 5th and 4th(-) Australian Divisions, as well as 4th Canadian Division.

[75] These last two divisions were the 1st Australian (recently returned from detached duty at Hazebrouck) and 32nd British (prepared to support the Canadian Corps) Divisions. Monash would have also been happier with infantry working with tanks in the exploitation role, writing later that, despite the professionalism of the cavalry formations, the results did not match the efforts made to employ them (J. Monash, *The Australian Victories in France in 1918*, (New York: E.P. Dutton and Company, 1920), p. 74)

fully alleviate this problem. It must be remembered that with the gradual decline in the quality of the British Army brought on my Passchendaele and the German Spring offensives of 1918, the divisions already allocated in the centre represented bulk of those remaining to the B.E.F. which could be fully assured of launching, and sustaining, successful offensive operations.[76] Further, significant measures were necessary to conceal the presence of the attacking force, at the size available, in the open terrain east of Amiens.

As at Hamel, in preparing for the offensive, the infantry sub-units were trained with the tank units with which they were paired, with later beneficial effects. Of all the forces involved, it was the Australian Corps that had the most experience in training with tanks and, thus, were to emerge as the most proficient at cooperating with them.[77] Liaison also extended to the upper echelons, where the tank brigade headquarters helped plan the division of their assets among the Corps to which they were attached.

In other areas of planning, the Amiens offensive was unusually well-organized. The British artillery had gained considerable experience from the operations of 1917 and had received, and retained, the full measure of German innovations in artillery handling at the Cambrai counter-attack and in the 'Michael', 'Mars', and Aisne ('Achilles') offensives.[78] The emphasis on surprise, facilitated by the presence of the tanks, allowed for the preliminary bombardment to be dispensed with altogether (they could rely on the

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[76] Care must be taken to not over-emphasize this fact. Many of the British divisions performed well during the Hundred Days, such as the 46th Division at the St. Quentin Canal (Terraine, pp. 162-174). The efficiency of their more 'progressive' (Bidwell and Graham) Corps HQs served as a force multiplier.

[77] This was certainly the perception of elements of the Tank Corps – See *Second's – Out*, War Diary – Notes, 2nd Battalion, Tank Corps, (Week ending 4 August – Compiled 1919) p. 48, RH 86 / TC 2 Bn, Bovington [footnote 104].

[78] E. von Ludendorff, *Ludendorff's Own Story*, (Freeport: Nobel Press, 1919), p. 239 – These innovations were attributed to the coordination of the artillery under the direction of Colonel Bruchmuller (working most closely with von Hutier's Army(s) on both the Eastern (1917), then Western (1918), Fronts).

'mechanical barrage' of the advancing tanks to deal with the German wire and machine guns). Instead, there was to be a hurricane bombardment at Zero-Hour using off-the-map registration.[79] Special attention was given to counter-battery work and the concentration of firepower against strong points was made possible by the quantitative superiority enjoyed by Fourth Army, which had secretly massed over 2000 guns in the sector.[80] Smoke was to be used too, in order to handicap the German machine gunners and spotters. Further, the follow-up forces were set in motion at zero-hour to sustain the momentum of the attack – another lesson learned from the new German offensive tactics.

Aircraft were also to be used effectively, by helping to mask the build-up from German aerial observation through the application of a campaign of air superiority in the sector – which was easy to achieve given the Allied numerical advantage of 1904 to 365 in aircraft.[81] On the day of the attack, the front lines were to be "buzzed" in order to mask the sounds of the approaching tanks and the German lines of communication were to be attacked.

Another method by which surprise was anticipated was the emphasis placed upon security in the rear areas – particularly concerning the arrival of the Tank Corps and the Canadian Corps in the Amiens sector. It was accomplished through strict traffic and noise control measures, emphasizing night approach marches, and the remediation of vegetation as the tanks passed through.[82] For the other key component in the attack, the Australian Corps, this was not necessary as they were already deployed in the area from

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[79] This was the Bruchmuller method, the British had approximated some of these effects (i.e. dispensing with the preliminary registration) as early as the Battle of Cambrai in November, 1917 (Bidwell and Graham, p. 92)

[80] C. Bishop and I.C. Drury, Ed., *Battles of the 20th Century*, (London: Aerospace Publishing, 1989) p. 48

[81] Terraine, p.109. Most of the Allied aircraft (1100) were French, the bulk just transferred from Champagne.

[82] Monash, pp. 104-105

which the offensive was to be launched. In the case of the powerful Canadian Corps, regarded by the Germans as an "omen of a coming attack", this required a deception campaign be mounted in Flanders, at Mount Kemmel, involving (false) wireless traffic and the establishment of casualty clearing stations, and two detached battalions.[83]

In sum, despite the fact that its offensive role was defined by a commander (Rawlinson) who was not an active member of the pro-tank group, the Tank Corps must still have been pleased with the plan of operations and its part in it. There was the added advantage that the Corps headquarters involved in delivering the main blow, the Canadian and Australian Corps, were both highly proficient and had a proven track record when it came to coordinating successful set-piece attacks.[84] A further bonus was that, as at Cambrai, the terrain to the east of Amiens was perfect for tanks being "either dead flat or gently rolling; in that summer of 1918 its chalky soil was also as hard as a billiard table after a dry, hot spell."[85] The only potentially troublesome area was to be found in the Canadian sector. Here, the marshy-banked River Luce meandered closely behind the German front lines.

With their officers having been given the opportunity to provide input to the operational plan, there still remained the issue of organization of the units and sub-units of the Tank Corps in order to most efficiently carry out their tasks. Basically, from the brigade level downwards, the Tank Corps tended to follow a triangular organization until it reached the section level – where there were four, rather than three, vehicles. Thus, there were to be found 12 vehicles in each company, with three companies being grouped

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[83] Liddell Hart, *History of the First World War,* p. 428

[84] *Ibid*., p. 319 and Terraine, p. 85

[85] G. Brook-Shepherd, *November 1918: The Last Act of the Great War*, (London, Collins and Sons, Ltd., 1981), p. 48

together to form a battalion. The potential problem was at the upper echelons. It was becoming usual for a tank brigade to be grouped with an infantry corps for an attack. While the tank brigade would consist of three tank battalions, there were usually four, or more, divisions in a corps. This meant that if both the assault and follow-up divisions were to receive tank support – allowing for what was called the proper "roulement" of vehicles to sustain the attack – unit integrity would be compromised from the start.[86] The sub-unit distribution of the tanks would appear to present no difficulties in that a tank battalion had three companies – one for each of the battalions of an infantry brigade. However, it should be remembered that, in 1918, the tanks were most likely to be deployed with the Australians and Canadians, who still maintained the four-battalion (or square) brigade organization.[87] This caused problems for sub-unit integrity. The differences by which the Australians, highly proficient pro-tank forces, and the Canadians, highly proficient forces with a more conventional (neutral) outlook, dealt with the issue potentially provides insight into the effectiveness and proper usage of the tanks, which will be touched on later. The solution to the issue of matching tank battalions to divisions was resolved, for the purposes of this particular attack, by attaching the two tank battalions recently arrived in France, the 14th and 15th Battalions, to the 4th and 5th Tank Brigades – increasing them to a strength of four heavy battalions each.[88]

During the days leading up to the offensive, the Fourth Army faced the daunting task of massing for the attack in basically open country that offered little cover from

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[86] The options for which, involving recommended reorganizations once past the objective(s) were laid out by Capt. Charteris. – See Capt. Charteris to Capt. Williams-Ellis, "Preliminary Remarks on Fourth Army Operations", 10 August 1918, TC 2 RH.86 / TC 2497, Bovington

[87] Bidwell and Graham, pp. 138-139

[88] This was possible only in the Australian and Canadian sectors, where the greatest success was anticipated. This allocation did not account for the 1st Australian Division, but this formation was held in GHQ Reserve.

enemy observation. The ultimately successful security measures were enhanced by activity along the Australian sector. Here, the Australians continued a policy of systematic patrolling and trench raids designed to gain sections of the enemy trenches, referred to as "peaceful penetration", which the higher command felt would keep their morale high at the expense of that of the Germans.[89] Also, the Australians were forced to expand their frontage in order to cover the Canadian Corps' sector whose units, as part of the security arrangements, were not to enter their attack positions until only hours before zero-hour.[90] This expansion of the Australian frontage, and the logically assumed diffusion of their strength signalled a defensive intent to German intelligence, quite the opposite of what was actually to transpire.[91] Still the Germans in the frontline perceived indications of the impending storm, but their reports were largely dismissed as 'phantoms' by the high command. When the barrage came crashing down at 0420 hours on 8 August, surprise, in essence, was complete.[92]

The examination of the tanks and the victory of 8 August will first look at the flanking forces where the tanks were, numerically, far fewer – actually non-existent in the French XXXI Corps sector. Afterwards, the major successes in the centre, where the bulk of the tanks were concentrated, will be discussed, including their somewhat different employment in the Australian and Canadian sectors.

On the north edge of the offensive zone was the British III Corps (Lt.-Gen. Butler). This Corps consisted of four divisions in August, 1918. Of note concerning its

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[89] Firkins, p. 136

[90] Monash, p. 117. As he felt a relief prior to 8 Aug to be "too risky", the 13th Australian Brigade was detailed to cover the entirety of Canadian Corps' Start Line until only hours before H-Hour.

[91] Terraine, p. 108

[92] Monash, p. 122. Lt.-Gen. Monash singles out the surprise artillery barrage as the most devastating component of the attack, the "artillery dominating the battle and landscape".

quality was the fact that it had been heavily engaged in the defensive fighting, before Amiens, in the closing stages of the 'Michael' offensive and had suffered accordingly. As the flow of replacements brought across the Channel in 1918 was not at a sufficient level to counterbalance both the losses incurred in the defensive battles and the previous, from 1917, shortfall in the ranks of the infantry, its divisions were understrength. Also, having taken casualties, many of the billets that were filled contained green replacements. This situation was only made worse by a heavy raid made by 27 (Württemberg) Division on its sector on 6 August, largely in retaliation for Australian "peaceful penetrations" further south.[93]

The role of III Corps, as allotted by Fourth Army Headquarters, in some ways, accounted for this situation. Lt.-Gen. Butler's divisions were assigned the task of attacking the German forces opposite in order to create a left echelon linking, and protecting, the north flank of the Australian Corps to the adjacent, on the left, Third Army, which was not participating in the attack. As a smaller advance was anticipated in this area, only one tank unit, the 10th Battalion, was allotted to the Corps. The terrain in this sector was also more rugged that further south and certainly not ideal for the employment of tanks. The 10th Tank Battalion's strength on 1 August was 48 Mark Vs and 4 Mark IV Supply Tanks, as well as 658 personnel, all ranks.[94] As was the standard for operations, 36 tanks (3 companies) were to be engaged.[95] And, like most the Tank Corps, its vehicles had arrived in the area of operations by train (arriving at Poulainville,

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[93] Monash, p. 116. The G.O.C. Australian Corps was extremely concerned that the Australian prisoners taken in a trench raid in their sector the night of 6 August might have compromised the impending operation – as he considered surprise the most vital factor (p. 97). Fortuitously for the Allies, this was not the case as German prisoners stated that they were unaware of an impending attack.

[94] *War History of the 10th Battalion, Tank Corps, 2 July 1917 – 5 January 1919*, p. 14, RH 86 / TC 10 Bn 7101, Bovington

[95] *Ibid.*

on 4 trains, between 2250hours / 2 August and 0830hours / 3 August).[96] Two of the tanks suffered mechanical problems on the march to the assembly area, but by (in essence) having 8 tanks in an operational reserve, the companies were at full strength on the morning of the attack.[97]

In the attack, the intent appears to have been to uniformly spread the tanks across the frontage of 18th and 58th Divisions, which were the closest to the Australian Corps and, hence, expected to advance the furthest in order to protect the north flank.[98] More effective coordination may have been problematical given that the infantry had, first, to recapture the ground lost on the 6th of August and therefore "exact [start line] positions were difficult to obtain."[99] This situation had been exacerbated by the German trench raid of 6 August, which had disrupted the planned forward reconnaissance by the (dismounted) tank commanders.[100] Of the 36 tanks taking part in the attack, 6 suffered mechanical breakdowns before reaching the start line, but the remainder advanced with the infantry into the heavy mist that blanketed the region in the early hours of 8 August.[101] An examination of the radio logs from the III Corps War Diary indicated that there was a more substantial loss of command and control in this sector than further south. The War Diary records that by 0625hours there were still no situation reports coming in from the any of the divisions, but the Australian Corps "report our attack apparently going well north of the SOMME."[102] The first problems did not become apparent until 1050hours when a pigeon message from a tank reported, "Infantry needs

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[96] *Ibid*.
[97] *Ibid.*
[98] Monash, p. 73
[99] *War History of the 10th Battalion, Tank Corps, 2 July 1917 – 5 January 1919*, p. 14, RH 86 / TC 10 Bn 7101, Bovington
[100] *Ibid.*
[101] *Ibid*.
[102] III Corps War Diary, 8 August 1918, WO 95/680, PRO

help on left" and gave its requirement for petrol.[103] Given the state of communication (relying on pigeons) and the natural confusion inherent in operations, it was not possible to coordinate help in these situations – nor were there any reserves to provide that help, in any case. By 1550hours, reports were being radioed back and stated that the tank(s) were unable to go to Chipilly for 58th Division, "it is too far to go, ground being very bad."[104] Chipilly was a major spur of a ridge north of the Somme given to III Corps as an objective in order to have key terrain on which to anchor the left flank. The Germans, however, retained control of the spur and were able to bring enfilading fire on the Australians to the south from defilade positions. This caused grief to Monash's left- hand brigade, whose supporting tanks lost 6 of their remaining 9 vehicles to direct hits between the Green and Red Lines.[105] The attack in the III Corps sector gained about two miles with losses that are generally given as about 1500. Of the tanks, 17 rallied at day's end – putting first day casualties at 53%, that is 19 of 36 machines.[106]

In many ways operations on III Corps' sector resembled the earliest tank attacks with its fairly wide deployment of the tanks, complete lack of reserves, and less than meticulous planning – although there were very significant mitigating circumstances here, with the attack having to be conducted in two phases. Also, the tanks were employed in less than ideal terrain and suffered the near-standard 50% first day losses. The requirement to secure the flank, on the narrower frontage (which was only partially achieved) helps underline Fuller's concern with making the frontage as wide as possible – it was difficult for the tanks in the Exploitation Wave to accompany the reserve infantry

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[103] *Ibid*.
[104] *Ibid*.
[105] Monash, p. 126
[106] *War History of the 10th Battalion, Tank Corps, 2 July 1917 – 5 January 1919,* p. 15, RH 86 / TC 10 Bn 7101, Bovington. Three tanks were subsequently salvaged for operations on 9 August.

to any depth (after accounting for mechanical breakdowns enroute), if they were taking losses from flanking fire before passing through the Trench Clearing echelon.[107]

The examination of the tanks' role in the French XXXI Corps sector is unnecessary given that it possessed no tanks. However, this lack of tanks had ramifications further north. This was because General Debeney, commanding French First Army decided to compensate for his lack of tanks with a preparatory barrage of 45 minutes duration – meaning that the French were not to advance until the Canadian attack was well under way. Overall, this led to the Canadian right flank dragging many of the German units, to the south, eastwards as it advanced. This amounted to increasing the opposition to the Canadian attack while, conversely, lessening that against the French, whose tardy advance largely gained another measure of surprise over the remaining Germans. However, tanks still played a factor in facilitating XXXI Corps' attack. This took the form of the tanks that were cooperating with Brutinel Force, which was protecting the Canadians' southern flank. On two occasions, this Force slipped into the French sector to quell remaining knots of German resistance impeding the French advance.[108]

By day's end, the French had advanced about five miles. Like the British III Corps, the First Army was intended for a supporting role in this offensive (with the French Army still actively engaged on the Marne). Still, they had largely achieved their

[107] Of the two battalions of Mark V Stars, the 15th Battalion (5th Tank Brigade / Australian Corps) endured the most losses – 5 x Direct Hits (*War History of the 15th Battalion, Tank Corps,* Battle Graphs and After Action Reports of Operations - 8 August 1918, pp. 21-29, RH 86 / TC 15 Bn 406.9, Bovington). It appears these battalions advanced based on the axis of the rail line (i.e. in the centre of the main attack, rather than nearer the flanks).

[108] *War History - 5th Battalion, Tank Corps,* 1919, p. 23, RH 86 / TC 5 Bn, Bovington

objectives, even if the earlier Canadian advance had served to distract the Germans opposite them.

It was in the centre, where the bulk of the Tank Corps had massed with the Dominion divisions that the tanks played the greatest role and, by far, the most substantive gains were achieved. As a result of the Hamel operation, it was in the Australian sector that the greatest optimism in the Tank Corps prevailed as "all ranks were delighted at the thought of an attack with the Australian Corps and the results in every way justified the hopes, not only in the battle itself, but also in the assistance given beforehand and the attitudes of the Infantry commanders."[109] Here, the plan was to place as many tanks as possible in the second (Reserve) wave so as to sustain the attack to the Blue Line – over seven miles behind the German front. The bulk of the 8th Battalion (36 Mark Vs) and the 15th Battalion (36 Mark V Stars), complete, were assigned to the follow-up infantry. In order to further gain the desired "roulement", the tanks in the first wave were to rally in order to be available for the Blue Line assault. Another lesson that had been learned was the provision for massing tanks, and the accompanying infantry, in the important sectors. In this case, 5th Tank Brigade's orders instructed that, "tanks of all three companies [2nd Battalion] and those of 'A' Company, 13th Battalion, were to converge on Harbonnieres after the capture of the 2nd Objective."[110] Further, as the attack progressed, the tanks of 5th Brigade were to drive towards the south of the sector in approaching the final objective – that is towards the Canadian Corps and accompanying

[109] *Second's – Out*, War Diary – Notes, 2nd Battalion, Tank Corps, (Week ending 4 August – Compiled 1919) p. 48, RH 86 / TC 2 Bn, Bovington

[110] *Ibid*.

4th Tank Brigade – allowing for a greater concentration of resources along the axis of attack (the East Amiens Rail Line) on the second day.[111]

Despite the great success of the day, with the Australians advancing to the Blue Line by 1330hours, the leading tank battalions were to suffer more than the usual first day casualty levels. The 13th Battalion was down to 8 tanks by day's end (although 4 were subsequently repaired sufficiently to take part in operations on the 9th).[112] This Battalion was most susceptible to flanking fire from the north (III Corps sector). Next in line to the south (although largely used in a follow-up role) the 8th Battalion sent 36 Mark Vs and 6 Mark IV Supply tanks into action and had 23 disabled.[113] This was largely the result of the German artillery, especially near the Red Line at approximately 1030hours (after the mist had burned off), "German Field guns could be plainly seen in the open deliberately laying their guns on the tanks…[they were] well-handled [and] caused a considerable number of casualties to the tanks and personnel.[114] While 13 had fallen prey to the German artillery, 9 had suffered mechanical trouble while one had struck a land mine.[115] The 2nd Battalion, meanwhile, on the right of the 5th Brigade attack, only managed to push 5 tanks through to Harbonnieres for the planned mass attack, but subsequently scraped together 14 tanks by the end of the day.[116]

The 15th Battalion's Mark V Stars of the follow-up wave, concerned with securing the Blue Line, were, of course, operating under different conditions. This Battalion, fulfilling something of the motorized infantry role, was solely concerned with the capture

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[111] *Ibid*. p. 52
[112] *War History - 13th Battalion, Tank Corps,* RH 86 / TC 13 Bn 466/467, Bovington
[113] War Diary – 8th Tank Battalion, 8 August 1918, RH 86 / TC 8 Bn 5074, Bovington
[114] *Ibid.* p. 40
[115] *Ibid*.
[116] *Second's – Out,* War Diary – Notes, 2nd Battalion, Tank Corps, (8/9 August – Compiled 1919) p. 52, RH 86 / TC 2 Bn, Bovington

of the Blue Line. For this operation, it was expected to be operating on the entire Australian Corps' frontage between Proyart and the rail bridge south of Harbonnieres, although most closely grouped towards the centre. Four brigades of infantry were to be on the point of attack at this time. In order to provide a consistent coverage of the front and, subsequently, support to the infantry, the Battalion abandoned the standard unit organization of three 12-tank companies in favour of four 9-tank groups (Groups A1, A2, B and C).[117] What effect this change might have had on sub-unit effectiveness in heavy combat was, fortunately, not put to the test as the German infantry had been routed and most of the gun lines overrun by the time that the Battalion came up.[118] The increased mechanical reliability of the new Mark V Stars, as well as the lack of opposition in the later stages of the attack, where, for the A Groups, "only Machine Gun fire was experienced between the RED and BLUE lines", is attested to by the Battalion casualty returns – five tanks ultimately hit by shellfire.[119]

In the Australian sector as a whole, except on the far left, where the British had fallen behind, the Blue Line had been taken. Of equal importance were the relatively low casualty returns from the infantry, less than 3000. Further proof of success took the form of over 7900 German prisoners of war (POWs) and 173 captured guns.[120] The only concern for the Australians was how to extemporize an advance over open ground in fluid conditions – something that had not happened on the Western Front (at least for the Allies) since 1914.

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[117] *War History of the 15th Battalion, Tank Corps*, Battle Graphs and After Action Reports of Operations - 8 August 1918, pp. 21-29, RH 86 / TC 15 Bn 406.9, Bovington

[118] *Ibid*.

[119] *Ibid.*

[120] Terraine, p. 111

In the minds of Rawlinson and some of those at GHQ, it was the attack of the powerful, and relatively fresh, Canadian Corps that was to be the centerpiece of the operation. This was borne out by the fact that the Canadians were required to carry out the longest advance of the day – 8 miles. These expectations were certainly understandable given the position that the Canadian Corps had come to occupy in 1918. As it was the policy of the Canadian government that the Corps was to be employed only as a coherent whole, that is, not broken up to provide 'stiffening' for four British corps, the Corps had seen no fighting in the defensive battles of the spring.[121] This was because the plugging of gaps in the lines usually required divisions and brigades, not a complete corps.[122] Also, sensing that the Arras hinge was the key to the entire B.E.F.'s position, Haig retained the Canadian Corps and British Guards Division here to thwart what was anticipated to be the major German attack. The Germans, for their part, did covet Arras, but were loath to attack into such a strong defence until decisive superiority was achieved, and this never came to pass. Thus, the Canadians entered the August battle with large full-strength divisions and a further 10,000 reserves waiting in the depots. [123]

What the Canadians did not have, though, was much recent experience with the employment of tanks. In fact, in some circles, there was, at best, wary confidence in the tanks as "they were so easily stalled, and they were so slow, and they drew fire."[124] This, coupled with the fact that their right hand brigades faced the prospect of an obstacle crossing (the River Luce) under fire, led them to employ 4th Tank Brigade in a more up-

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[121] Terraine, p. 107
[122] *Ibid*.
[123] *Ibid*.
[124] Brig.-Gen. D. Ormond quoted from D.G. Dancocks, *Spearhead To Victory*, (Edmonton: Hurtig Publishers, 1987), p. 294. Brigadier Ormond had last worked with the tanks at the Second Battle of Arras (Vimy Ridge), the same engagement at which both the Australian Divisions and the 51st Highland Division found the performance of the tanks, particularly the Mark IIs, to be underwhelming (i.e. at Bullecourt).

front role, with less emphasis on reserves. This was in some ways justified by the larger frontage that was to be covered by the Canadian Corps. Tanks were employed in the conventional method of pairing tank battalions with infantry divisions. In this case, the groupings were 14th Battalion/2nd Division, 4th Battalion/1st Division, 5th Battalion/3rd Division and, as follow-up, 1st Battalion (Mark V Stars)/4th Division.[125] In the allocation of companies within the divisions, a policy of two-up, one-back appears to have been followed. Again to account for the required "roulement", first wave tanks, after the infantry had begun consolidating on their respective objectives, were to "continue to follow up the advance and assist the detachments going through to the final objective."[126] While planning for concentration of forces on strong points was not as well defined as in the Australian sector, such a policy was practised by the combat units, as witnessed by the statement of numerous individuals who observed groups of burned-out tanks around defended localities that had been overrun. A specific example would be at Le Quesnel, where 9 tanks had been hit deploying for an attack.[127]

In the Canadian sector, as elsewhere, the barrage came crashing down with devastating effect at 0420 hours. So complete was the shock of the attack that, coupled with very effective counter-battery versus the outnumbered German guns, the "hostile reaction was practically non-existent."[128] An occurrence in the Canadian sector, as elsewhere, was the presence of a heavy ground mist that did not burn off until 0900hours, which had the added effect of rendering ground attack impossible by the Allied air forces

[125] War Diary and History of IV Tank Brigade, 8 August 1918, RH 5 / 4 T Bde 967-75, Bovington

[126] Operational Order – 14th Tank Battalion, Tank Corps, 6 August 1918, RH 86 / TC 14 Bn 419, Bovington

[127] 4th Canadian Division War Diary, 9 August, WO 95/3882, PRO

[128] H.M. Jackson, *The Royal Regiment of Artillery, Ottawa, 1855-1952*, (Ottawa: 30th Field Regiment, R.C.A., 1952), p. 146

until that time.[129] The mist was especially heavy in the vicinity of the Luce and had a detrimental effect on the support that the tanks could provide – given visibility was occasionally as short as 5 metres. In fact, the lack of visual communication within 2 Canadian Division's boundaries "meant that any resistance had to be overcome by the infantry."[130] The one exception to this trend was at Morgemont Wood, before the Green Line, where the advance of the 14th Battalion, C.E.F., was checked by an enemy strong point of 8 machine guns. As the infantry's ammunition was depleted, a stalemate could have resulted if a tank had not arrived to "crush the nest out of existence."[131] The mist was recorded as being so bad farther south within the sector that two tanks lost their bearings and collided head on before reaching the Green Line.[132] The fog also had the potential to increase casualties as the attacking units attempted to remain close to the barrage, sometimes too close, to make use of its noise in order to keep their proper bearings.[133]

The mist also had one overriding advantage for the attackers. This was that the lack of visibility greatly inhibited the defenders' knowledge of what was going on, reducing the volume and effect of the defensive fire considerably. This was particularly important to 3rd Canadian Division as it meant that the Luce crossings, particularly at Thennes and Domart, could go forward with much less difficulty than first expected.[134] Once the Canadians were across the Luce, and the mist began to burn off, they were

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[129] J.E. Edmonds, *Military Operations: France and Belgium 1918*. Volume IV – 8 August to 26 September: The Franco-British Offensive, (London: His Majesty's Stationery Office, 1947), p. 40

[130] Dancocks, *Spearhead to Victory*, p. 45

[131] R.C. Featherstonhaugh, *14th Battalion, C.E.F., 1914-1925* (Montréal: Gazette Printing Company, 1927), p. 219

[132] J. Toland, *No Man's Land*, (New York: Doubleday, 1980), p. 363

[133] Edmonds, p. 40

[134] 3rd Canadian Division War Diary, 17 August 1918, WO 95 / 3840, PRO

fortunate to find that they were traversing fields of standing crops, which largely hid them from the view of the enemy – although the tanks still presented a big target.[135] Once the mist burned off, the surviving enemy guns began to range in on the tanks and losses began to mount. Still, the infantry overcame most of these guns and the advance continued. "If a machine gun post gave trouble, the infantry laid down whilst a tank tackled it; in most cases the crew surrendered as the machine came near or fled."[136] Of the specific tank units, the 14th Battalion, operating immediately south of the rail-line, encountered the greatest initial opposition. This took the form of shelling while on the Start Line and compelled the tanks to begin the attack at zero minus 10 minutes.[137] This Battalion seems to have been singularly unfortunate in regard to the rare interferences of the enemy artillery, in the Number 7 Section, 'B' Company, was bracketed by a German battery while returning to the rallying point (upon consolidation).[138] In the heavy fighting in the vicinity of Weincourt and Guillaucourt, where the tanks of the 14th Battalion played a major role in the success of the operation by making a flank approach that brought them into the midst of the German infantry, "which broke and ran in all directions", the tanks helped the infantry to push on towards the Blue Line by 1330hours.[139] The high speed manoeuvring required to bring this about, however, brought a rapid deterioration of the interior conditions of the tanks involved and compelled the crews to temporarily evacuate their vehicles.[140] The Battalion eventually rallied 22 of its 36 combat tanks.[141]

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[135] Fetherstonhaugh, p. 330
[136] Edmonds, p. 65
[137] *History of the 14th Battalion, Tank Corps,* 1919, pp. 12-13, RH 86 / TC 14 Bn 419, Bovington
[138] Diary of 2nd Lt. Robertson, 1918, RH 86 / TC 14 Bn 419, Bovington
[139] *History of the 14th Battalion, Tank Corps,* 1919, pp. 12-13, RH 86 / TC 14 Bn 419, Bovington
[140] *Ibid*.
[141] *Ibid*.

Next in line to the south, the 4th Battalion went into action with 1st Canadian Division. Unlike the other battalions, use was made of the fourth (reserve) sections of each company in order to augment strength for the attack on the Green Line.[142] This was likely due to the fact that this Battalion was detailed to make the longest advance of the day at close to 9 miles. Generally, the actions in its boundaries seemed to be more routine than for the 14th Battalion, yet, curiously, its vehicle casualties were higher with only 12 of 42 tanks rallying for operations with 1st Canadian Division on 9 August.[143] Of course, the additional distances covered allowed greater scope for mechanical difficulties to develop.[144]

The 5th Tank Battalion, like the 4th, pushed forward to the Blue Line suffering almost identical tank losses – it, too, was able to put only 12 tanks into action on the 9th of August.[145] This Battalion also saw some more than routine action, detaching a section of 'B' Company to cross the southern boundaries and, in concert with the motorized machine guns of Brutinel Force, easing the advance of the French.[146] Unfortunately, detailed information was not maintained by the 1st Battalion (or little remains within the Tank Corps archives), so its notable actions can only be deduced from the infantry accounts. In general, the Battalion achieved its objective of consolidating, along with 4th Canadian Division, on the Blue Line. An exception to this was found on the extreme

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[142] *War History - 4th Battalion, Tank Corps,* 1919, p. 20, RH 86 / TC 4 Bn, Bovington

[143] *Ibid*. p. 21. Only 6 tanks made to the (Dotted) Blue Line (the final objective) on 8 August, with four held in reserve on the Red Line. There were reports of up to 11 machines assisting the infantry with mopping up strong points near the Red Line.

[144] *Ibid*. pp 20-22. There is an apparent anomaly in the numbers, in that only 2 vehicles are listed as having mechanical trouble on 8 August (p. 22). The reports say the Canadians requested assistance for 2nd Canadian Brigade – so might indicate that more machines were available, but the provision of one company of 12 tanks was the standard operating procedure. Also quite probable is the limiting factor of crew endurance, "many men were seriously affected by Petrol Fumes during the approach march" prior to the attack (p. 20).

[145] *War History - 5th Battalion, Tank Corps,* 1919, p. 24, RH 86 / TC 5 Bn, Bovington

[146] *Ibid*. p. 23

right where the French were considerably behind the Canadians, thus exposing their right flank, and making it impossible to occupy Le Quesnel. It can be assumed, in the absence of hard data that its overall tank losses were considerably less than the other elements of the Brigade, based on the accounts of the other Mark V Star battalion, the 15th in the Australian sector.

A negative point that emerged from the Canadians' more heavy employment of tanks in the initial stages of the advance seems to have been the relative dearth of vehicles to assist the follow-up troops, beginning with the attack on the Red Line. The Black Watch of Canada, in their situation report from the Red Line, reported only 4 tanks from the engaged company having made it that point.[147] The 10th (Canadians) Battalion, C.E.F., fighting its way forward from the Red Line, theoretically had 3 tanks (one section) from 4th Battalion, Tank Corps, assigned to it for its advance. Only one appeared and it was quickly dispatched to aid a company on the left that was heavily engaged, but apparently ran out of petrol.[148] The loss of tank support was particularly exasperating, as the long and speedy advance of the Canadians to this point had put them beyond the range of friendly artillery support. In a desperate attempt to provide some fire support, the artillery attempted to fire at extreme range and, in one of its few failings on the day, sent a series of 'shorts' onto the advancing 10th Battalion, ultimately inflicting 40% of the casualties that the unit suffered.[149]

Despite these problems, the Canadians had advanced 8 miles and attained all of their objectives, except at Le Quesnel, where they were subject to flanking fire. Their

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[147] C.B. Topp, *42nd Battalion, Royal Highlanders of Canada, 1914-1919*, (Montréal: Gazette Printing Company, 1931), p. 213

[148] D.G. Dancocks, *Gallant Canadians*, (Calgary: The Calgary Highlanders Regimental Funds Foundation, 1990), p. 176

[149] *Ibid*.

casualties were about 3500 (slightly more than the Australians suffered) and they took 5100 POWs and 161 guns (somewhat less than the Australians did).[150] These discrepancies, given the somewhat different employment of tanks by the two formations, ultimately seem to provide some scope for the analysis of the effectiveness and potential of the tanks in the attack in 1918 – at least for break-in offensives.

The last element of tank operations on 8 August to be examined is that of the Medium A (Whippet) tanks, of III Brigade, which were participating in the attack in an exploitation role with the Cavalry Corps. In some ways, as Fuller was always ready to point out when creating his plans, this arrangement was likely made to appease the cavalrymen at GHQ. The concept of pairing tanks that were designed for exploitation with the traditional arm employed in that role would have appeared, to some, to have made sense at that time. In practice, this was not the case in that the cavalry, moving up behind the follow-up infantry, soon (but temporarily) cantered ahead of the relatively slow 'Whippets'. However, with the large, and vulnerable, target the cavalry presented, any scattered machine gun fire would serve to cause problems. As Brereton Greenhous asserts, "you can't have a cavalry charge until you have captured the enemy's last machine gun", and the cavalry's tactical mobility was much devalued as a result.[151] Generally, except for fits and starts by the cavalry, the exploitation was at the pace of the 'Whippets' who, once through the opposition, had to wait, in accordance with their orders, for the cavalry (now held back until the machine guns were out of action) to come up – inhibiting the pace of their advance. This situation is well described in the reports

[150] Terraine, p. 111
[151] B. Greenhous, *Dragoon*, (Ottawa: Campbell Corporation, 1983), p. 243

on the action of 'C' Company of the 3rd (Light) Tank Battalion, cooperating with 7th Cavalry Brigade, during the advance from the Green Line,

> From the E. of CAYEUX the Cavalry went forward very quickly with the Tanks following as fast as possible. As soon as the crest of the ridge was topped and the descent into the Valley N. of BEAUCOURT begun, very heavy machine gun fire was opened on them from the neighbourhood of BEAUCOURT and the woods surrounding. The 7th Dragoon Guards attempted to push forward into the Woods, but were driven back by machine gun fire, and both Cavalry Regiments took cover in the Valley N. of BEAUCOURT, the 6th (Inniskilling) Dragoons being mixed up with the Royal Canadian Dragoons on their right. No. 11 Section pushed on out of the Valley and succeeded in masking the enemy fire from the Wood, and compelled them to retire; the 7th Dragoon Guards then being able to advance to take possession. In the meantime No.11 Section proceeded towards BEAUCOUT, and it seems probable that, had the Cavalry kept in close touch with this Section, they might have succeeded in getting forward as, at the time, the enemy had not got his machine guns in position. They did not, however, follow the Tanks, and a fleeting opportunity was lost.[152]

In the later stages of the advance to the Blue Line, the Whippets came to start working with the forward infantry patrols in clearing villages. The casualties that the Whippets suffered appeared to be somewhat less than those of the first wave heavy tanks. This was likely the combination of being more mobile, presenting a smaller target, and being employed in the exploitation, rather than assault, role. For actions on 9 August, the 3rd (Light) Battalion was able to mass 24 of its original 48 tanks to assist in the attack, with more vehicles left in reserve.[153] By this time, however, although detailed to operate with the cavalry, the Whippets appear to have been employed as replacements for the heavy tanks to offset losses of the previous day.

Subsequent operations in this sector did not live up to the promise offered on the first day. The attempts made, by Canadian Corps HQ, to push the allotted divisions from

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[152] *History of the 3rd Battalion, Tank Corps,* 1919, p. 71, RH 86 / TC 3 Bn, Bovington
[153] *Ibid*. p. 73

GHQ reserve forward were temporarily thwarted by wrangling over jurisdiction from the staff at GHQ. Meanwhile, Crown Prince Rupprecht was rapidly shifting the bulk of his reserves to augment German Second Army and plug the gap in the lines. In this endeavour, he was aided by Allied tardiness in renewing the attack. This stemmed from an almost complete lack of experience with operations in open county, coupled with the problems of bringing the guns back into range and re-establishing the basically static system of communications (field phones) relied upon during the years of trench warfare. The tanks apparently increased this problem, mulching numerous land-line cables with their treads on trips to and from the rally points.

The advance on the 9th was thus delayed until 1300hours, giving the enemy time to recover. The 145 tanks remaining, organized now as composite companies where – on 8 August – there had been battalions, were deployed well to the fore and suffered losses during the daylight approach march from their rally points to the attack position. The 15th Tank Battalion, for example, supporting the Australians in covering the left flank of the (main) Canadian attack on 9 August, sent 12 machines into action – one was hit before passing forward of its own lines; five more were hit, and 2 lost to mechanical breakdowns, once past the Start Line.[154] Overall, a decision was made to concentrate more tanks in the areas that offered potential success, meaning that the 13th Tank Battalion was temporarily transferred from the Australian to the Canadian sector, where the largest gains of the day were made – 3 miles. Another important gain on 9 August was made by III Corps, assisted by 10th Tank Battalion, which took the Chipilly spur,

[154] *War History of the 15th Battalion, Tank Corps,* Battle Graphs and After Action Reports of Operations - 9 August 1918, pp. 30-35, RH 86 / TC 15 Bn 406.9, Bovington

easing the pressure on the Australians' left flank in a head-on assault.[155] Here 20 tanks supported the 58th and 12th Divisions encountering some heavy fighting – losing 6 tanks and expending 1251 6-pounder rounds and 45, 780 rounds of small arms ammunition.[156]

Daylight attacks continued on 10-11 August, but the pace of the advance began to slow. The dwindling tank forces continued to take casualties and there was skepticism within the Tank Corps about the feasibility of commending attacks in broad daylight. After the experience of 9 August, Lt Bion, commanding a composite section of four tanks, felt that the orders he was issuing to renew the attack "were not orders, they were death sentences."[157] Fighting strength for the tanks had dropped to 85 by 10 August and, by 11 August, only 38 vehicles were sent into action – 30 of these with IV Brigade which was still cooperating with Canadian Corps in spearheading the attack.[158] In order to conserve the dwindling effective tank strength, which was falling not only due to losses but as a result of crew exhaustion, Brig.-Gen. Hankey arranged with Canadian Corps for the "Tanks to go behind the Infantry and not to go in front until the Infantry was hung up" – something of an antithesis to Fuller's formula.[159]

The chances of the infantry being hung up were increasing, as the near-panicked reaction of the German High Command to send almost all available reserves to the sector had paid dividends in that 10 fatigued British divisions (in the front lines) were now facing 12 German divisions – a ratio that was extremely favourable to the defence.[160] On the Australian sector, it was noted that the "enemy's resistance had notably stiffened"

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[155] *War History of the 10th Battalion, Tank Corps, 2 July 1917 – 5 January 1919,* p. 15, RH 86 / TC 10 Bn 7101, Bovington

[156] *Ibid*.

[157] W.R. Bion, *The Long Weekend, 1897-1919*, (Abingdon: The Fleetwood Press, 1985), p. 253

[158] IV Tank Brigade Report on Operations – Amiens, 24 August 1918, p. 7, RH 5 / TC IV Bde, Bovington

[159] *Ibid*.

[160] Bishop and Drury, Ed., p. 49

with heavy fighting occurring for possession of the villages at the front.[161] The Canadians seemed to be drawing much of the Germans' attention, with a series of counter-attacks being developed in their sector. Even in their more restricted role, however, the tanks continued to give useful support by virtue of the mobile firepower they represented. A German battalion counter-attack of the 119th Division "broke down under infantry and Tank Machine Gun fire. The … battalion was practically wiped out."[162]

Given the increasing resistance, coupled with the exhaustion of the attacking formation, the offensive began to wind down. On 12-13 August, first Lt.-Gen. Currie, then Gen. Rawlinson, pushed for the suspension of the attack. Despite the objections of Marshal Foch, Field Marshal Haig was won over and the attack suspended by 15 August – thus conserving the assault troops for further use. The Tank Corps had only sent 6 tanks into action on 12 August.[163] Final casualties to the Fourth Army were still under 20,000.[164] German losses had been considerably in excess of this figure, not only in the form of POWs, but also in the area of battle casualties, which had been heavy on the first day and increased sharply in the later stages of the battle as a result of their counter-attacks into the teeth of the Allied advance.

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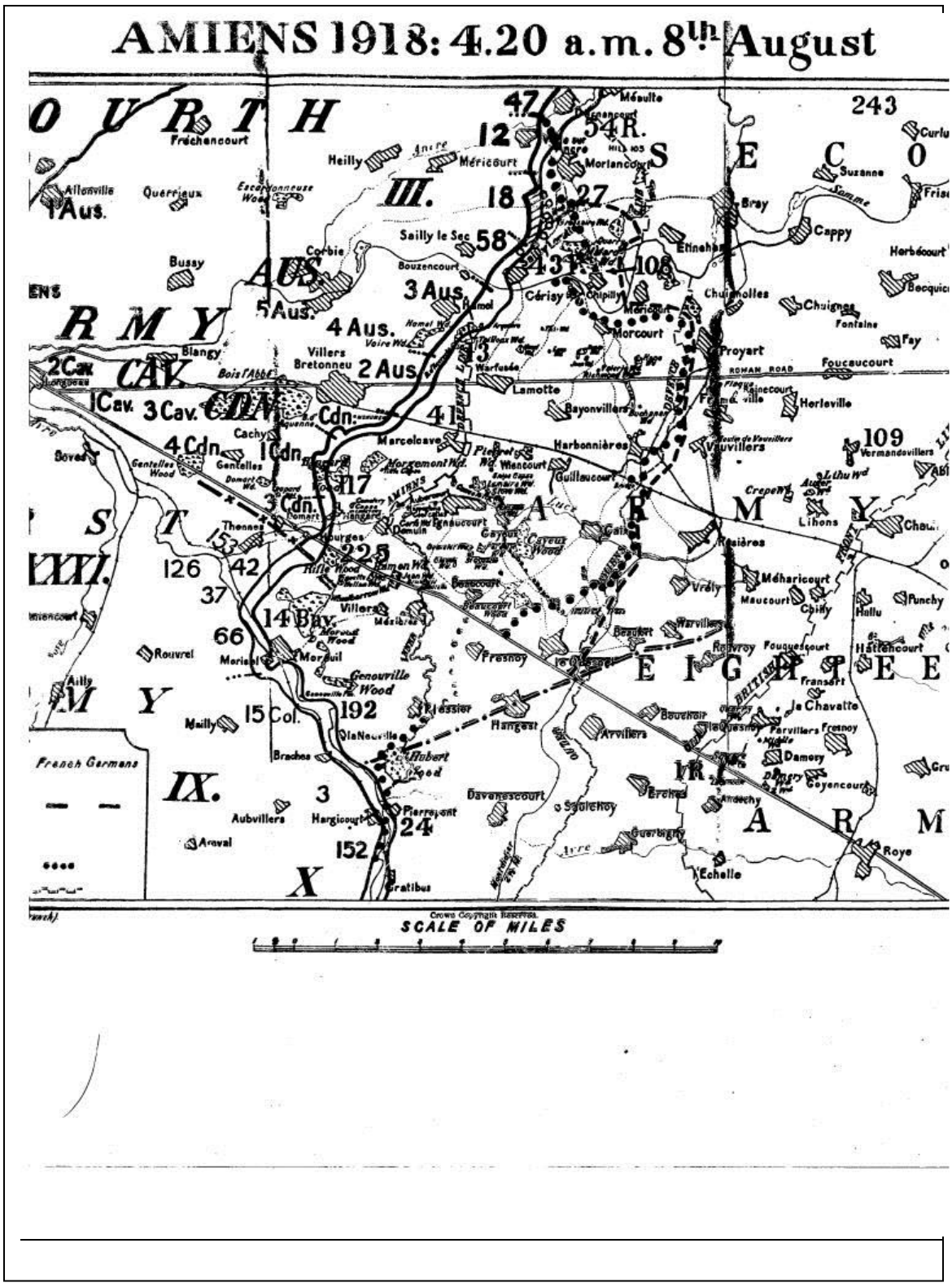
[161] Australian Corps War Diary, 11 August 1918, WO 95/986, PRO
[162] Canadian Corps War Diary, Daily General Staff Report, 11 August 1918, WO 95 / 1053, PRO
[163] Williams-Ellis, pp 210-211
[164] Liddell Hart, *History of the First World War*, p. 431



From J.E. Edmonds, *Military Operations: France and Belgium 1918.* Volume III – May-July: The German Diversion Offensives and the First Allied Counter-Offensives, (London: His Majesty's Stationery Office, 1939), Map Case

The Victory Analyzed – and its Confirmation in the Hundred Days

Undoubtedly, the Battle of Amiens represented the high water mark of the Tank Corps in the Great War. This was particularly the case given that a similar concentration of vehicles was never again achieved before the Armistice. An analysis of the victory, as well as some of the subsequent triumphs during the 'Pursuit to Mons', should serve to give a true indication of the tanks' role in the Allied victory. Of particular interest is whether the tanks represented a war-winning weapon on the Western Front and, on a related subject, if they had achieved their full potential.

Once the traditional, and simplistic, arguments as to the cause of the victory in 1918 are dealt with, the issue remains as to how and why the victory, which seemed so far away as late the spring of 1918, was achieved within a six-month period. Looking at operations on the Western Front during that period, the one difference from earlier operations that is apparent is the employment of tanks on an unprecedented scale by, most notably, the British, but also by the French and Americans. The other is the much greater fluidity of the lines than had occurred at any time since the Germans retired to the Aisne in September 1914. This was no doubt an effect brought about (to a degree) by the tanks.

Another important consideration in this regard, though, is the cumulative effects of nearly four years of grueling attritional warfare on the combatants. Although theoretically there existed more divisions on the Western Front in 1918 than at any time previous, this fact should not be confused with the availability of more front-line calibre combat troops. As previously stated, heavy casualties, coupled with a reduction in the numbers of replacements had caused the British to reduce the size of their divisions form

twelve to nine infantry battalions prior to the campaigns of 1918. The Germans and French had been forced to adopt similar measures. Further, as the year progressed, there became an increasing discrepancy in all armies (with the exception of the Canadian, New Zealand and American forces) between the numbers of recruits and vacant billets at the front – meaning that remaining units, even after amalgamations, became progressively more understrength as compared to their already reduced establishments. On a related point, the various armies came to possess widely variable morale and proficiency levels amongst their component divisions.

Due to differences in the selection and recruiting of remaining manpower, proficiency of respective Division and Corps staffs, training, combat experience and the impact of any previous mauling(s) received, the armies came to possess a minority of elite divisions. The combatants maintained many that could still be considered as front-line, but also contained a good many divisions that could be relied upon only to man defensive positions, at best. Perhaps no better illustration of this process can be found than in the components of the German Second Army, upon whom the blow at Amiens fell. On the morning of 8 August, this Army contained some 14 divisions – of which the 117 Division was fresh and the 27 (Wurttemberg) Division first-rate, 8 were suitable for use only in quiet sectors and 3 needed to be replaced.[165] Liddell Hart puts the rifle strength of many of its divisions at little over 3000 – perhaps 40% of their establishment strength and reflecting the effects of a million casualties in the first half of the year.[166]

In the case of the B.E.F. and French Army, this process of separation between the combat abilities of various divisions came about largely through the natural course of

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[165] Brook-Shepherd, p. 49

[166] Liddell Hart, *History of the First World War*, p. 428 and Travers, *How the War Was Won*, Chapter 6

events, and certainly was not strived for by G.H.Q., which feared the effect on the morale of the less-favoured divisions. In the German Army, though, there was a conscious effort to create *stosstruppen* ('Mobilization') divisions of selected personnel to lead the coming offensives in 1918, with the remaining two-thirds of the Army forming 'Trench' divisions.[167]

Whatever the cause, the fact was that in 1918, for the first time, there were insufficient front-line calibre troops to man the entire front and fewer local reserves to quickly smother any break-ins – the replacement issues facing both the British and German armies in Flanders having been discussed. Security and surprise regarding the employment of divisions therefore became tantamount in 1918. If elite divisions could be fed into the line without the enemy's knowledge, their qualitative superiority, coupled with the new offensive tactics (and in the Allied case, particularly, technology), could now carry the day. This was especially so given the fact that the continuous shifting of the front, and decline in morale, with the resultant slackening of emphasis on thorough trench digging, meant that the defensive systems were often much more frail than they had been for years.[168] If, however, the enemy noted the employment of one's elite divisions in time to augment the defenses, there was a good chance that those formations could be permanently crippled. From the German perspective, there was the added fear that their 'Trench' divisions' morale would crack if faced, unsupported, with tank terror.

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[167] Travers designates the former as 'Mobilization' Divisions. By most accounts, including Travers, *How the War Was Won*, Chapters 5 and 6, there were 99 German divisions positioned in the British sector of the front, of which at least 33 were the 'Mobilization' divisions.

[168] Terraine, p. 60 – In the British Fifth Army sector in March 1918, "the defences were very thin on the ground, continuous trenches virtually non-existent". There were also inadequacies in the (French) defensive positions along the River Aisne (pp. 70-71).

It is this potential of the tank, as a terror weapon, that is perhaps one of the cornerstones of the contention made by many (such as Fuller and Williams-Ellis) that the tanks represented a war-winning weapon. The accounts given of the tanks driving through German defenses at Amiens are replete with references to German infantry bolting, or surrendering, before the tanks. For example, the commander of Mark V Tank 9003 'Barrhead' reported that his and several other tanks steered a "zig-zag course" through the village of Bayonvillers with the "effect of bringing out any of the enemy who were hiding in the house and they immediately surrendered."[169]

To many others, though, it was the ability of the tanks to function as a 'mechanical barrage' that was the war-winning factor. This harkens back to the earliest days of trench warfare, when the primary concern of the infantry in crossing no man's land was the 'blue forests' of enemy wire. One of the main aims of the preparatory barrage, which, of course, threw any prospect surprise out of the window, was to destroy the enemy wire so that the infantry could cross over to the enemy trenches as quickly as possible.[170] Of course, artillery was at first not entirely suited to this task because of the propensity of high explosive to lift the wire and then set it down again, without cutting it. Shrapnel seemed to have more utility in this regard, but required much greater technical capacity (properly timing the fuses) to employ effectively. If the artillery was unsuccessful in this task, the infantry would be hung up on the wire in no man's land and at the mercy of the enemy's artillery and machine guns in terrain in which any possible

[169] Report on the Action of Tank No. 9003 'Barrhead' During the Operations of 8th and 9th August, 1918, 10 August 1918, TC 2 Bn, Bovington

[170] Fuller, *Tanks in the Great War 1914-1918*, p. 301. In espousing the abilities of the tanks to supplant the artillery in this role, he alludes to the lengthy barrage that preceded the Battle of the Somme, which permitted the Germans sufficient time to rail men from Eastern Poland to the threatened sector in France.

area of natural cover had long since been stripped by the previous shelling. One need only look to the first day of the Somme to see the result.[171]

The tanks abrogated the requirement for the preparatory barrage and thus enhanced the potential for surprise. They needed only to arrive at Zero-Hour to launch forward and clear gaps through the wire with a degree of certainty that the artillery could not match. Certainly, there were few, if any reports, of the infantry being held up on the wire at Amiens. It must be remembered, too, that in Fuller's theories, the 'mechanical barrage' extended beyond breaching the Germans' forward obstacles. In fact, the infantry's was a support role to the tanks that pushed through to neutralize the enemy's strong points and communications. The reduced infantry presence was to act simply as it had done at the Battle of Hamel, advancing to hold the ground already won. To Fuller, the ability of the tanks to function as a 'mechanical barrage' also served to lessen the import of the artillery. At Passchendaele, he had posted a sign at Tank Corps HQ calling on the troops to keep their morale up as that was destined to be "the last great artillery battle."[172]

On a related subject, much has been made of the German High Command's refusal to actively carry out a tank development program. This, in itself, should not have been that surprising given the generally inauspicious efforts of the tanks they faced at the Somme and Passchendaele. To Ludendorff's mind, "a tank was merely a moving target for a gun" and as, an extension of his conservative personality, he determined to win the war with the new *stosstruppen* tactics, rather than new technology, and the reports from

[171] After the second day, the Amiens offensive carried the attackers into the old Somme battlefield, still covered, in many places, with forests of wire and given by most observers (Liddell Hart, p. 429, etc.) as one of the reasons that the attack petered out – especially as the resources of the Tank Brigades had been used up and the artillery had to be re-sited forward.

[172]

Amiens, and later, indicated that the artillery is what was holding the German front together.[173]

As previously noted, Fuller (and Liddell Hart) saw things differently; their views on the merits of the tanks in the First World War were substantiated by operations in the Second, where the armoured forces played the key role. During the Interwar era, these theorists saw the impact of the tanks in the First World War and the even greater potential that they possessed if properly employed en masse and with continued technical development. The logical extension of this argument was that the tanks were not properly employed in order to achieve their full war-winning potential during the Great War.

In this respect, the failure to mass all of the tanks for a single surprise blow that would completely shatter the German line was the (or their) main indictment against the senior commanders within the B.E.F. – most notably Field Marshal Haig. Later there was the wrangling with the War Office in order to secure the necessary resources for continued production that caused that production to lag behind schedule both in terms of the quantity of machines and their continued development through more advanced models. This directly led to the piecemeal deployments of 1917 and the lack of reserves for the massed attacks at Cambrai and Amiens (or, especially, subsequent engagements).

Further at issue was the employment of the tanks after 15 August 1918. Specifically, GHQ sought to allot a Tank Brigade to each Army, so as to ensure that all of the major formations would have at least some tank support for the (effective) 'tout le monde à bataille' operations that followed, as the endurance of tanks on approach marches was limited and the need to entrain/detrain could add 1-2 days, precluding quick

[173] Brook-Shepherd, p. 51

operational re-deployments of the tank units.[174] Again, this represented, at an operational-strategic level, the subordination of the tanks to the more traditional combat arms within the combined arms battle. And, although the tanks were at the fore of all the major offensives to follow, the massive rupture of the German lines that the tanks proved capable of effecting at Amiens could not be facilitated by the dispersion of the tank battalions.[175] This was most frustrating in the view of the tank advocates given that 1993 tanks were in France by the autumn of 1918, and even taking into account that 881 of those were with the salvage crews, and would seem to have provided considerably improved potential to truly deliver the B.E.F. to the 'green fields beyond' in a single knock-out blow against the failing German Army.[176]

Even within the successful operation at Amiens, it would seem that only those senior commanders who knew the proper principles of tank employment, such as Lt.-Gen. Monash, reaped the maximum benefits from the tanks. In this case, the comparison between the Australian and Canadian operations on either side of the Amiens – Railway is of interest. The willingness with which the 5th Tank Brigade embarked upon the Amiens operation with the Australian Corps has already been touched upon. This was not only because of the qualities of the Australian troops, themselves, but also the result of the perception that they were the most proficient formations when it came to cooperating with the tanks.

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[174] To refer to the experiences the tanks east of Amiens, the approach from the railhead to the assembly areas for the offensive of 8 August took 2-3 days (*War History of the 10th Battalion, Tank Corps, 2 July 1917 – 5 January 1919,* p. 14, RH 86 / TC 10 Bn 7101, Bovington). Later, the IV (4th) Tank Brigade in its approach to the Hindenburg Line, took 5 days (nights, actually) to make its approach march of 16,000 yards – accounting for the fact that tactical conditions necessitated a stealthy approach (*IV Tank Brigade, Tank Corps History*, p. A-3, 1919, RH 5 / TC IV Bde, 953-964, Bovington

[175] Travers, *How the War Was Won,* Chapter 6

[176] *Ibid*.

At a glance, this would seem to have been borne out by the Amiens attack. Although the objective lines ran roughly parallel between the Australian and Canadian sectors, the Australians were the first to reach both the Green and Red Lines. The Canadians were up to the Blue Line at roughly the same time, however. Except for the enfilading fire from the Chipilly Spur that held up the left-hand 3rd Australian Division in the vicinity of Mericourt, the Australians had experienced no significant checks in their successful advance. Of course, the Australians were more experienced in operating with the tanks and placed a greater emphasis on reserves – apparently making tanks more available throughout the course of the advance. They were also more familiar with the ground, having been in the Amiens sector since the end of March.[177] Even more impressive was the face that they had taken, on a roughly equal frontage to the Canadians, 55% more prisoners and 7% more guns, for the loss of about 15 percent fewer casualties.[178] First day losses among the Mark V battalions were slightly higher in the Australian sector – 64% as compared to 60% in the Canadian sector. This strongly suggests that the Australians allowed the tanks to lead during the advance, given the ratio of tank to infantry losses between the respective sectors. This was in line with the then current doctrine on tank-infantry cooperation and displays, at the same time, the ability to conserve manpower on the part of the tanks. In simple mathematical terms, for the loss of one more tank among the leading battalions, 500 fewer casualties were sustained by the infantry.[179]

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[177] C.E.W. Bean, *ANZAC to Amiens*, (Canberra: The Australian War Memorial, 1983), pp. 420-421 and p. 459. The first Australian brigades had arrived to help stabilize the retreating Fifth Army's front, and maintain links with the French Army to the south, at Villers-Bretonneux. The Battle of Hamel (4 July) was fought in the same sector.

[178] Comparison of figures given by Terraine, p. 111

[179] *Ibid*.

There are, however, several mitigating circumstances that must be considered before completely accepting the above points and, thus, the contention that the tanks represented the war-winning weapon at Amiens, and in 1918 as a whole. The first comes out of the discussion concerning the differences in the employment of the tanks by the Canadian and Australians. Specifically, the favourable casualty ratios are not solely attributable to the fact that tanks were used to better effect by the Australians. The British *Official History* pins much of the blame for the higher casualties on the fact that the Canadian infantry still employed a variation of the more traditional, and seemingly less effective, linear tactics instead of the section files used by the Australians.[180] Certainly, the accounts of the actions at the Somme and Vimy Ridge show that the Canadian infantry was also quite prone to push forward on its own if the pace of the tanks' advance was at all lagging.[181] Further, the Canadians (despite, or perhaps, because of the Conscription Crisis) did not have the same degree of concern over replacements that the rest of the B.E.F., including the Australian Imperial Force, had and, perhaps, did not place such a premium on avoiding casualties when making an offensive push, as a result. This, however, would only be by a matter of a slight degree in that the Canadian Corps had always meticulously planned its operations to avoid unnecessary casualties – one of the key reasons that it had come to occupy the elite position that it did (if only because there were sufficient survivors from their earlier major engagements).

A much simpler explanation, and one that is often overlooked, is the difference in the quantity of opposition that the respective Corps might have faced, albeit difficult to precisely ascertain given the depleted state of the German formations at this time. The

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[180] Edmonds, p. 386
[181] K. Macksey, *Vimy Ridge 1914-1918*, (London: Ballantine, 1972)

intricacies of the standard dispositions of German divisions in the defence, which were, for the most part, followed by Gen. von de Marwitz's Second Army are beyond the scope of this discussion, but the resultant effects are not. The Australian attack brought them into contact with the German 13 Division, the bulk of the 41 Division, and part of 43 Reserve Division. In sum, the equivalent of two 'Trench' quality divisions at reduced strength.[182]

The Canadians, on the other hand, faced the 117 Division, the freshest formation on the Second Army front having just conducted a relief-in-place on the night of 7 August, as well as 225 Division, the reserve elements of the 14 (Bavarian) Division and elements of 41 Division – closer to three divisions.[183] The resistance may have been stiffer in this sector as there is evidence of close quarter combat along the forward trench lines, in this case, the bodies of Germans in their trenches that had been bayonetted and found by the advancing gunners.[184] Carrying this forward to its logical conclusion, POW returns were likely to be less if the enemy were more inclined to fight – and an accurate breakdown of German battle casualties is not available to allow for a true comparison of total German casualties in each sector.

Continuing the study of German dispositions, we find that some of the problems experienced by the British III Corps might have had something to do with the opposition as well as the terrain and the fact that it only had one battalion of heavy tanks. In this sector were 43 (Reserve) Division, the bulk of the first-rate 27 (Württemberg) Division,

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[182] See Map – from J.E. Edmonds, *Military Operations: France and Belgium 1918.* Volume III – May-July: The German Diversion Offensives and the First Allied Counter-Offensives, (London: His Majesty's Stationery Office, 1939), Map Case

[183] Brook-Shepherd, p. 49

[184] Jackson, p. 146

and 108 Division in immediate support.[185] Thus, the better part of three divisions were available to the Germans – representing, by far, the most favourable ratio of defenders to attackers on the Second Army front. By contrast, the six divisions of the French First Army faced a roughly equivalent force (i.e. close to three divisions).

Another factor concerning the discrepancies in the availability of tanks between the Australian and Canadian sectors has to do with the terrain and distances covered. The tanks in the Canadian sector had to contend with the Luce crossings. This, and the fact that the position of their start line meant that the tanks here had to advance 15% further than those with the Australians and, therefore had increased exposure to the risk of mechanical breakdown, ditching, and enemy fire – based on the fact that they were not alongside the Australians until close to mid-day, they would not have been as far through the German defenses when the mist had burned off.

In the later stages of the Amiens offensive, differing loss rates were suffered based on the duration of the fighting to date and the ground that was covered. As previously noted, the loss rate for 8 August ran at about 50%, while those of 9 August were about 30% of the tanks committed. This would seem to suggest that if GHQ was inclined and able to provide more reserves for the attack, as the Tank Corps had suggested, then the attack could have been sustained with a diminished loss rate on the subsequent days. Again, there are several mitigating circumstances that must be considered. The first is that the subsequent advance on 9 August, in the most successful (Canadian) sector, covered slightly less than half the distance achieved on 8 August, and thus exposure to battle and mechanical risks was likewise reduced. This is an extension of the argument concerning tank availability before the Blue Line in the Canadian and

[185] Brook-Shepherd, p. 49

Australian sectors on 8 August. But this is also borne out by the operations of the 10th Tank Battalion with III Corps, which took part in a less successful attack, though the Battalion gained less ground, a lower casualty rate was endured compared to the units to the south.[186]

The days following 9 August, however, show a much higher loss rate and encapsulate the limitations of the tanks in 1918. Operations on 10 August saw the number of available tanks drop from 85 to 38 machines, a reduction of over 55%. This was followed by a stunning 85% reduction to a mere six machines during the course of 11 August. Only part of these casualties can be given as battle losses, especially given that the tanks were being called upon to do less and less, with the infantry increasingly shouldering the sole burden of the attack in the days before the offensive was called off.[187] Rather, they confirm a realization, evident to the Tank Corps at the time, that the tanks possessed an endurance that was actually less than that of the accompanying infantry formations. Notes for the Tank Board meeting of 21 August 1918, which examined Fourth Army operations, stated, "the endurance of the Heavy Tanks may at present be pit [sic] down to three days, after which Light Tanks must carry on … or else a fresh force of Heavy Tanks."[188] This not only related to the endurance of the tank crews, which was badly sapped by the overwhelming heat and fumes of the tanks' interiors, but also to the tanks continued mechanical unreliability (even if this had been much

[186] Based on the returns in the various Tank Corps War Histories, there was a reduction of 10-15% in unit casualties than were experienced by the leading battalions in the centre.

[187] Except in the French sector, where the French First Army seems to have been reinforced with 80 tanks in the latter stages of the battle (Fuller, *Tanks in the Great War, 1914-1918*, p. 196).

[188] Unsigned/Unidentified Lt.-Col. (believed to be Fuller), 11 August 1918, Notes From Fourth Army Operations (11 Aug 1918) For Tank Board Meeting – 21 Aug 1918, WO 158 / 867, PRO – This document is type-written, so cannot be compared to Fuller's handwriting in the TC 1362 files. In 1920, Fuller commented on the significant limitations on tank crew endurance (see also footnote 212).

improved from September 1916).[189] On a related subject, the tracks on the tanks had a useful operational endurance of 20 miles before requiring overhaul.[190] If one includes, the approach march from the railhead, this was reached by 10-11 August in most sectors. This, in turn, does some damage to the theory that the tank was misused and could have been a war winner if employed properly with sufficient reserves, and Fuller's enthusiastic assertion that the "Tanks easily travers the earth in all directions."[191] It follows that any depth / reserve formation(s) would have to advance across the devastated battlefield the same distance as the assault tanks had, and would, likewise, near the distance requiring track maintenance after an advance of perhaps 15,000 yards and, thus, hardly be in position to effect a rapid penetration into the enemy's rear areas. The crews would also have their endurance period reduced by such an arduous approach march as was the case with the 4th Battalion, Tank Corps, prior to Amiens.

There is great validity to the observation, particularly as it relates to the break-in battle, that the 'mechanical barrage' (facilitating surprise by allowing the attacker to dispense with a lengthy artillery barrage), emasculated the opponent's opportunity to employ his reserves prior to the breach being made.[192] However, the delay in deep penetration (envisioned in Fuller's Plan 1919 to effect the paralysis of the enemy command structure) caused by either having to lay new rail lines through the breach to extend the cross-country range of the tanks, or frequent and extended rest periods, would

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[189] For the medical issues, refer to footnote 45.

[190] This figure is given by multiple authors. The Mediums possessed superior endurance, as did the newest Heavy Tanks, which Brig.-Gen. Hankey reported, which could optimistically last for 150 miles before needing complete replacement. Hankey went on to indicate that the track links would have given out completely before 100 miles had been travelled.

[191] Fuller, *Tanks in the Great War, 1914-1918*, p. 313

[192] The delays of days, for crew rest and vehicle rehabilitation, would permit the Germans to send their available reserves – even if their numbers were dwindling. It took four days for the Germans to have more divisions in the line of battle than the British at Amiens (Bishop and Drury, p. 49).

have allowed the German reserves to react to much the same extent as the lengthy barrages of 1916-1917 had. In fairness, Fuller had never seen a sustained multi-day combined arms advance when he dreamed of Plan 1919 in May, 1918, erroneously formulating that "the depth of penetration is limited by the infantryman's endurance to 8,000 yards – 10,000 yards at the maximum."[193] What is certain is that the infantry were outrunning their tank support in the latter stages of several of the 1918 offensives.[194] Later (at the Hindenburg Line), the 301st Battalion, Tank Corps, American Expeditionary Force (supporting the B.E.F. as part of IV Tank Brigade), sent 39 machines into action, assisting the infantry break-in.[195] However, 12 machines failed to reach the Starting Point (7 breakdowns, 3 "direct hits" and 2 vehicles "mined") and only 7 were able to make it past the intermediate line.[196] Notably, 9 vehicles were "ditched in trenches" or "roads" and only one vehicle (Lt. Dunning's Tank No. 9265) was able to exploit towards the Final Objective line before attempting to retire – it was taken out by a "direct hit."[197]

Other facets of tank operations, at Amiens, were also found to have been less effective than had been hoped. The entire concept of 'continuous mobility', sustained by the 'mechanical barrage' that Fuller touted, received some modification during the battle. Specifically, 4th (IV) Tank Brigade Instruction No. 1 ordered that "Tanks are not to be employed as a mechanical barrage in advance of the Infantry" and that "Tanks must follow in the rear of the Infantry until the latter are held up either by M.G.s, which they cannot overcome with their own resources (i.e. smoke bombs, rifle fire and manoeuvre)

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[193] Lt-Col Fuller, Tank Operations For 1918 – Tank Offence, TC 1362, Bovington. The Canadian advance was close to 15,000 yards on 8 August and another 5000 yards the following day.

[194] Travers, *How the War Was Won,* Chapter 6

[195] Maj. R.I. Sasse, *War History of the 301st Battalion, Tank Corps, A.E.F.*, "Sector Le Catelet" Battle Graph, RH.(73)86, TC, 301 Bn, 966, TC Archives, Bovington

[196] *Ibid.*

[197] *Ibid*.

or by wire."[198] This was the only way to restrict losses to an acceptable level, unless heavy covering fire and smoke concentrations were available – difficult to coordinate the further one advanced from the supporting gun lines.

In addition, the Mark V Stars proved less effective in practice than in theory. Being longer than the usual Mark V (both in order to accommodate the Lewis Gun section and to increase trench crossing ability) they were, consequently, difficult to steer and possessed less battlefield mobility. Further the infantry therein, exposed to the unaccustomed foul conditions of the tank interiors, were not in much condition to consolidate upon their dismount from the vehicles. 4th Canadian Division's War Diary, in discussing the operation of the 1st Tank Battalion, asserts simply "the infantry detachments in these tanks suffered severely."[199] More specifically, Lt. MacDonald of the 46th Battalion C.E.F. (South Saskatchewan Regiment) reiterated the experience of his friend, Lt Hugh Rising, who commanded one of these detachments, who said of his day, "one the tank got lost [in the mist]; two, the tank broke down; three, that his men got pitched about and got sick with motion and fumes. He had quite a dreadful time."[200]

While the tanks performed better at Amiens than in any previous engagement, this did not necessarily presume their success in subsequent engagements. The next operation in which the tanks took part was at the Battle of Albert (21-29 August 1918). While the offensive was a success with the New Zealand Division entering Bapaume on 29 August, the tanks, themselves, experienced difficulties. The difficulty arose not from a lack of positive effect on the Battle, but, rather, from the casualty levels sustained in the initial

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[198] Brigade Major IV Tank Brigade, Instruction No. 1, 14 August 1918, RH 5 / TC IV Bde, Bovington

[199] 4th Canadian Division War Diary, 8 August 1918, WO 95 / 3882, PRO

[200] J.L. Williams and R.J. Steel, *The Suicide Battalion*, (Edmonton: Hurtig Publishers, 1978), p. 152

stages. A total of 190 Mark Vs and Whippets took part in the attack, which again benefitted from a ground mist in its earliest stages.[201] The mist cleared at about 1100 hours on the morning of 21 August and found the 37 tanks that reached the objective (a railway line), suddenly exposed to the fire of several of the German's Flying Squads of field artillery – which proceeded to immolate most of the tanks.[202] Losses eclipsed the usual 50% and, in fact, were close on 70%.[203]

The fact also remained that if surprise (and the resultant qualitative and quantitative superiority in infantry and artillery) was not achieved, tanks could not carry the day on their own. Evidence for this comes from the attack of the French Tenth Army near the Oise on 2 September. The French divisions, participating in Tenth Army's attack, were preceded by the (FT-17) tank swarm, which the French were fond of – basically a heavily emphasized version of the British Advance Guard. However, the French had the misfortune of encountering the German 1st Guard Infantry Division and the (dismounted) Guard Cavalry Division. These elite troops were "undaunted by tanks" (which we can presume to mean 'as continuing to protect and man their machine gun and artillery positions') and proceeded to stop the attack dead in its tracks.[204]

In the British sector, "tanks in varying states of decrepitude" were deployed for all of the diverse, limited offensives in the autumn that forced the German Army to begin the withdrawal from France.[205] Again, the available tanks were deployed piecemeal (with one Brigade allocated to each Army) in order to enhance the offensive potential of these

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[201] A.J. Smithers, *A New Excalibur: The Development of the Tank 1909-1939*, (London: Leo Cooper, 1986), p. 175
[202] *Ibid*.
[203] *Ibid*.
[204] E. von Ludendorff, *Ludendorff's Own Story*, (Freeport: Nobel Press, 1919), p. 346
[205] G. Blaxland, *Amiens: 1918*, (London: Frederick Muller, 1968), p. 248

Armies. This ran contrary to the principles of concentration of force and could be the source of further criticism of GHQ, because theoretically, there were more tanks available than ever before. However, the facts are somewhat misleading. While more machines were available, the lack of trained crews meant that only the 16th Tank Battalion, as well as the British-equipped U.S. 301st Tank Battalion, arrived by September to augment the depleted battalions then in France and Belgium.

It has been discussed how deep breaches of the enemy line were difficult to effect and almost impossible to sustain and to exploit. Thus, what proved more effective was rapidly shifting local offensives designed to "loosen and unravel" the German front and soak up their reserves by forcing them to hastily counter-attack assault troops that had already consolidated their gains, further depleting their manpower and keeping them off balance.[206] In fact, this method provided the model for Soviet operations in their successful offensives of 1943-44, which probably bore the greatest resemblance to the Allied offensives of 1918.[207] Between the Dniepr and the western frontiers of the Soviet Union, the Russians attacked at non-reinforced, "weak points and broke off whenever they encountered strong resistance, only to renew their advance elsewhere", never breaching the German front, but pushing them back as occurred in 1918.[208] Marshal Foch would have used the boxing analogy that, "instead of winding up the giant 'haymaker' for the knock-out punch, the Allies would force the Germans to throw in the towel with a series of jabs to the body."[209]

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[206] Tim Travers, *The Killing Ground*, (London: Allen and Unwin, 1987), p. 257
[207] Taylor, p. 180
[208] *Ibid*.
[209] Boff, p. 24

Related to this was the realization of the major benefit that the tank offered to the infantry – significantly reduced casualties. As a result, the infantry commanders were often reluctant to carry out potentially costly assaults without tank support. Perhaps the best example of this comes from Third Army operations in early October 1918 when 1st (I) Tank Brigade was pulled out of the line in order to rest and refit. This, in turn, provoked something of tempestuous reaction from Lt.-Gen. Currie who had a division slated to make an attack, now without tank support. The Canadian divisional commander flatly refused to attack without the use of tanks, demanding to know, "Why should I lose three thousand men when, with tanks, I should lose only three hundred?"[210] In the end, 12 tanks were scraped together, after Currie assailed General Byng on the matter, and assisted the Canadian Division in the attack, which took all of its objectives with ease, suffering minimal casualties.[211] Episodes like this one, which became fairly common, serve to illustrate why it was difficult to mass tanks for the decisive blow.

This does not seem to align with the increased losses, which Travers reports were suffered by the Canadian Corps in 1918, as opposed to 1917 (when the tanks were available in very limited numbers). Travers reasoned that the increased casualties were the result of fewer Amiens-type offensives and the more ad hoc, piecemeal employment of the tanks in the offensives of the Hundred Days.[212] Certainly this was a contributing factor and one could see Australian infantry platoons reduced to only 16 soldiers and Australian battalions (nominally close to 1000-strong) reduced to 300 in the closing stages of the Hundred Days.[213] However, it must also be remembered that these units

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[210] Smithers, *A New Excalibur*, p. 198
[211] *Ibid*.
[212] Travers, *How the War Was Won*, Chapter 6
[213] Terraine, p.176-p.177 (Caption to 13th Photo Plate)

were seeing much more frequent offensive action than in 1917, gaining much more ground and occasionally out-running their supporting tanks (endurance) and artillery (range) by the third and fourth days of their attacks, as Bidwell and Graham (and Travers) all have noted. However, based on the Amiens example, it is problematic as to how many tanks would have actually been with the infantry, anyway, on the second and (especially) the third days of the subsequent offensive, even if full tank brigades had been committed. Further, and more critically, these forces (particularly the most heavily used Dominion divisions) were able to conduct offensives in relatively rapid succession, because they were not sustaining crippling casualties in any single engagement, which would have rendered them *hors de combat*.

The casualty returns of a single Canadian infantry unit, the 10th (Canadians) Battalion, is illustrative. In the successful fighting at the D-Q Switch Line (2 September, 1918), aided by 4 tanks (which were out of action quickly, after drawing heavy fire) and the artillery, the Battalion suffered between 233-256 casualties, while capturing 22 guns, 150 machine guns and 700 prisoners (more than the strength of the Battalion's four rifle companies).[214] At the successful Canal du Nord offensive three weeks later, without the assistance of the tanks, 302 casualties were taken – in both instances the parent (2nd) Brigade's advance had been three miles (an increase in casualties of approximately 20-30% without the presence of the tanks).[215] This still might be favourably compared to the shorter set-piece advance, without tank support, at Hill 70 (15-16 August, 1917), resulting in the Battalion losing 270 personnel on the first day alone, before being sent to take over the assault on the final objective – ultimately taking 225 prisoners and 26

[214] D.G. Dancocks, *Gallant Canadians*, p. 186. The unit CO stated 233, the War Diary – 256.
[215] *Ibid*., p. 191 and pp. 168-169

machine guns (and the unit not being committed to major offensive operations, again, until November).[216]

This is not to say, though, that the tanks were the final arbiters of victory during the autumn battles. In face with so few available for each attack, and all badly in need of overhaul, their effect was felt only in the initial stages of each action. Pressing the advance, and defeating the German counter-attacks, as at the D-Q Switch Line, was left to the infantry. In these operations, the Germans were not (solely) mesmerized, by the tanks, into slackening their resistance. The German 39 Division, defending before the D-Q Switch, had singled out the reason that little encouragement was given to opposition in that "the commitment of the Canadians, the best British troops, had been recognized."[217] Less mention was made of the tanks moving up to take part in the battle.

Overall, the tanks played an important role in the combined arms operation at Amiens. However, in the later stages of the battle, the advance and the subsequent defeat of most of the German counter-attacks, was accomplished by the infantry, supported by the artillery – once it had been able to re-deploy forward in the wake of the advance. The fact that the infantry, while making unaccustomed advances (at least compared to what was customary in 1915-1917), was also drawing away from the support of the other components of the combined arms team led to the slowing of progress (and more casualties).

The issue of whether the tanks achieved their full potential thus would have to be answered in the negative, although, given the mitigating circumstances present in 1918, they were still used very effectively. Part of the problem obviously lies in their troubled

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[216] *Ibid*., pp. 131-136
[217] Macksey, *Vimy Ridge 1914-1918*, p. 150

development, which truly manifested itself in 1917-1918 on the battlefield in the relatively few machines and trained crews available – necessitating their use almost exclusively with the forward infantry formations, in order to provide effective support over a sufficiently wide frontage. Of course, these problems did not go so far as to inhibit the tanks, as a brief study of Fuller's theories and later writings would have one believe – once it is realized that some of these theories were proved less than completely successful on the battlefield. Indeed, the 4th Tank Brigade came to realize, at Amiens, that some of Fuller's concepts were unsustainable with the armoured force available, but still provided crucial support to the Canadian Corps in the opening days of the battle. Fuller acknowledged some of these issues immediately after the War, stating that,

> on the evening of 8th August, the tanks rallied. The crews, however, were so exhausted by the great distances covered, and by the heat of the day, that it was necessary to resort to the formation of composite companies for the next day's operations…the 9th Tank Battalion (a strategic reserve), moving east from Cavillon was not in a position to take the field for, at least, forty-eight hours.[218]

Further, 688 tanks saw action between 8 and 11 August, "with 480 sent to salvage, very few of the remaining machines were fit for a lengthy action."[219] Also, Fuller's purpose in being able to manoeuvre tanks into the German rear areas was to impart a decisive effect in degrading the German command structure, but (even if the endurance issues could be overcome) the British forces would still have to be directed against the German command structures. Issues with friendly communications in the age before reliable wireless (British aircraft communications with the ground, provided the atmospheric conditions permitted visibility, being largely for the purpose of assisting the artillery) especially once forward of one's own positions, were endemic during the First

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[218] Fuller, *Tanks in the Great War, 1914-1918*, p. 224
[219] *Ibid.*, p. 227

World War.[220] The mist that helped the British tanks and infantry breach the German lines at Amiens, also served to inhibit British situational awareness, as the III Corps War Diary attests. A later writer would observe, more bluntly, "the tank of 1916-1918 was considerably less potent in practice than its propagandists would have us believe."[221]

There was also the fact that there were insufficient infantry reserves available by 1918 – so any reserve tank battalions, which might have been able to navigate the battlefield in a timely manner to exploit, would have found few infantry divisions to work with (there were exactly two reserve divisions at Amiens, the most significant attack launched by the B.E.F. in 1918). In fact, the attack frontage at Amiens (25,000 yards), would have required the commitment of over one-third of the B.E.F. to amass the 20 divisions actually committed, even with the inadequate level of reserves, had the support of 6 French divisions on the right flank (covering almost one-third of the total frontage) had not been forthcoming. Such a concentration would have implied a defensive risk (by over-stretched lines) elsewhere.

In addition, the promise of the new tanks, the Medium Ds that would have sustained a Plan 1919, was potentially illusory. The Medium C (an improvement on the Whippet) was being developed as a stopgap as it was highly unlikely that the advanced Medium D would have been ready in time for the campaigns in 1919.[222] Nor was it assured that these tanks would fully realize their potential and be a signal improvement over their predecessors – the somewhat retrograde combat capabilities of the heavy Mark II (inauspiciously employed at Second Arras), as compared even to the Mark I, being a

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[220] Bidwell and Graham, pp. 141-143

[221] P. Griffith, *Battle Tactics of the Western Front*, (London: Yale University Press, 1994), p. 163

[222] C. Chant, *World Encyclopedia of the Tank. An International History of the Armoured Fighting Machine*, (Stroud: Sutton Publishing, 2002), pp. 32-33

case in point. It is true that the British were gaining more experience in tank development by 1918, but the hazards of trying to rush tanks off the drawing board and into production was an issue not just confined to 1916-1918 – many hundreds of British tanks developed in the Second World War, under similar conditions, proved unbattle-worthy, once delivered.[223]

Also, growing pains, and problems in development, were not limited to the Tank Corps. It took several years for the British artillery to obtain sufficient ordnance, munitions and technique to become a key component in the technological, combined arms battle.[224] With this in mind, with the Germans already being forced back towards the Belgian frontier by break-ins in different sectors, and with the infantry divisions facing manpower shortages (leading to reductions in their establishments), the assertion that 'the longer development period was less risky, and more sound, than for GHQ to hedge all of its bets on them' has some merit.[225] Operationally, with the enemy off balance and something of a pursuit underway in the last days before the Armistice, it was doctrinally correct to maintain the pressure on the enemy, as Napoleon had expounded a hundred years earlier – a position that Terraine, Griffith and others support in their studies.[226] While it seems apparent that another Amiens-offensive, as opposed to smaller,

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[223] B.T. White, *Tanks and Other Armoured Fighting Vehicles of World War II*, (London: Peerage Books, 1975). p. 268 – The Cavalier was one such, with several hundred models produced, but whose failure led to the requirement to modify existing designs (such as the Crusader II to the Crusader III).

[224] Bidwell and Graham, pp. 143-145

[225] Griffith, p. 169

[226] D.G. Chandler, *The Campaigns of Napoleon*, (New York: Scribner, 1966), pp. 180-191. As Chandler points out Napoleon (who was studied by all of the military commanders of that era) placed great emphasis on the moral defeat of the opposing commander by never allowing him to recover from a defeat – the relentless pursuit of the defeated Prussian Army in October-November 1806 being an outstanding example. Further, Liddell Hart talks of the lesson of 1918 being that war is made "on the mind of the enemy command and Government" and, paraphrasing Napoleon, "it is the man, not the men, who counts" (Liddell Hart, *History of the First World War*, p. 463). Of course he was referring to the surprise attack at Amiens, but his point has equal applicability to the Hundred Days which followed, when they could not stop the series of smaller break-in battle that forced them back from France. Boff (p.242) would assert that

ad hoc operations would have been the most economical in terms of manpower, the delays inherent in gathering the critical mass of tank battalions, may have permitted the German Army a recovery period to establish themselves on their own frontiers – perhaps making future tank attacks less effective than at Amiens (which benefitted from flat, dry ground perfect for the tanks). The more technologically advanced mechanized forces of the U.S. First and Ninth Armies did not find the advance through the Ardennes and Hurtgen forests in winter conditions particularly easy 26 years later. Further, the individual British Armies, conducting their smaller scale attacks were still gaining ground, inflicting the significant punishment on the German Army, on which all sources agree, and were bloodied, but (crucially) did not cripple themselves in the process.

Allied tempo, permitting multiple complimentary attacks along the front, overcame the rigidity of the German operational defence methods.

Conclusion

In his definition of the role, and importance of the tanks in the First World War, (then) Colonel Fuller said, "that the War might have been won without tanks is quite possible, but that 59 British divisions would have beaten 99 German divisions in three months is unlikely."[227] Certainly, the B.E.F., which had taken the leading role in the Allied offensives during the Hundred Days, had an edge, the combined arms efforts of its technological assets in support of the infantry. As has been seen, based on the relative progress (and casualties sustained) by the infantry, depending on when and if they were present, the tanks played a very important role in these combined arms break-in battles. Most significantly, they served to shield those infantry formations leading most of the later offensives, from excessive casualties – allowing them to return to the attack quickly and thereby "loosen and unravel" the German front – leading to the Armistice.[228]

That the tanks could have been *the* war-winning weapon is a more problematic assertion – or one that would require a very optimistic view that the development challenges encountered earlier would have entirely fallen away during the continued development of the medium tanks. The simple limitations on the endurance of the machines and perhaps, more so, the crews, in the debilitating interior operating conditions of the vehicles limited their ability to take the war deep into the German rear area, something Fuller and the tank proponents felt necessary to bring the War to a successful conclusion. As such, Plan 1919 was still a "dream" at the Armistice and quite some ways from becoming a reality. Much vitriol was later expended on the high command (by the tank theorists, buttressed by the substantiation of their theories in the

[227] Fuller, *Tanks in the Great War, 1914-1918,* p. 305
[228] Travers, *How the War Was Won,* Chapter 6

Second World War) for friction in the development of the tank force, which might have been partially substantiated by events (i.e. their positive impact in the first few days at Amiens), with the supposition that the War could have been ended earlier (and with much fewer casualties) if more emphasis had been placed on the Tank Corps. While this has some merit, it goes a bit too far in overlooking the technical (endurance) limitations and susceptibility to casualties of the tanks in 1918.

While most modern scholars, such as Travers, raise very valid points regarding the utility of the tanks and that more could have been accomplished with them, it seems most accurate to echo Childs in his observation that the tanks infantry-support role (as part of a combined arms team) was based on "limited capabilities, not deliberate design."[229] More might have been done to centrally control them, but their limitations in tactical mobility, inhibited their effect at the operational level – meaning that even masses of tanks would still tend to wither away after the first 48 hours of an engagement. Further, some, such as Dr. Boff, would assert that the decentralized conduct of the Hundred Days permitted limited offensives that could best exploit local conditions and opportunities.[230] Employed within their limitations by GHQ, they materially facilitated a successful offensive strategy that served as a blueprint for operations, with more effective machines, 25 years later in Russia. Indeed, the concept of improved combined arms operations, facilitated by technology, in order to minimize an attacker's casualties persists to the present day. As such, it can be seen that the British employment of tanks was not the singularly decisive element in the victory of 1918, but was very significant.

[229] Childs, p. 150
[230] See footnote 49.

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