Stretcher Bearers and Surgeons:

Canadian Front-Line Medicine during the First World War, 1914-1918.

(Stretcher Bearers and Surgeons)
(Monograph)

By

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Abstract

This thesis explores the medical treatment of Canadian battle casualties in the front lines during the First World War, from the work of the stretcher bearers who retrieved them from the battlefield to the more advanced surgical procedures undertaken at the casualty clearing stations. The work examines the problems that arose during battle conditions and the solutions that were implemented; it describes how the medical system was intended to function, how it functioned in practice, and the experiences of the men who provided the medical treatment. The evidence demonstrates that the Canadian Army Medical Corps was keen to learn and implement new ideas in both medicine and tactics throughout the war in an effort to save more soldiers' lives, and that these changes were made to improve the treatment of the soldiers, not as a result of pressure or decisions from the military hierarchy. The relevance of this project to the history of medicine is its contribution to our knowledge of the working conditions of medical practitioners and the state of emergency medicine during the First World War. In addition, this project is important to the understanding of advances in medicine during the Great War, through the processes by which progress in treatment was fostered through a combination of innovation, trial and error, and learning from experience.

Keywords: military medicine, First World War, Canadian Army Medical Corps, field ambulances, stretcher bearers, surgery, Canadian Expeditionary Force.

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Abbreviations

ADS	Advanced Dressing Station
ADMS	Assistant Director Medical Services
CAMC	Canadian Army Medical Corps
CCS	Casualty Clearing Station
CEF	Canadian Expeditionary Force
FLD AMB	Field Ambulance
MDS	Main Dressing Station
MO	Medical Officer
PAMC	Permanent Army Medical Corps
RAP	Regimental Aid Post

Introduction

"From the time that men began going to war they have had some concern for their wounded, if not from motives of humanity at least from prudence, so that being restored to health they could fight again." Sir Andrew Macphail[1]

Throughout the First World War, the Canadian Army Medical Corps (CAMC) was committed to learning new systems and new medical practices, and implementing new technologies to become more effective and efficient in its efforts to treat and save those wounded in battle. This mirrored the experience of other armies. But how did those armies learn and integrate new ideas and technologies into the front lines? The popular wisdom, rooted in the anti-war novels of the late 1920s and early 1930s and reiterated in the best-selling books from the 1950s and 1960s such as Alan Clark's *The Donkeys*, Leon Wolff's *In Flanders Fields*, and Alistair Horne's *The Price of Glory*, is that they did not learn very well.

More recently, historians have vigorously debated the will and ability of armies to learn from experience and alter their methods accordingly. A spate of books and articles has focused on what has become known as the learning curve, or the ability of military organizations (in this case, the armies of the First World War) to create and utilize institutional structures of learning in combination with the hard experience of the battlefield to overcome tactical problems and achieve success. Of particular interest to these historians is what happens when institutional structures and battlefield experience yield different solutions to a given problem.

The debate over the effect of the learning curve on the battlefield can be highlighted through an examination of two articles, written by Christopher Pugsley and

[1] Andrew Macphail, *Official History of the Canadian Forces in the Great War, 1914-19: The Medical Service* (Ottawa: F.A. Acland, 1925), 64.

Mark Humphries that are diametrically opposed in their views on this subject.[2] Pugsley argues that there was a learning curve in the tactics of the Canadian forces that occurred between the Battles of the Somme and the battles of 1918 that allowed for an Allied victory. The Battles of the Somme introduced some of the tactics, such as section and platoon rushes, that would be used in 1918, but it took time to learn and implement these new tactics to their full advantage. This explains why the Allies were not successful during the Somme battles, but were very effective in 1918.[3] In contrast, Mark Humphries argues that a refinement of tactics was all that occurred, and ultimately the same tactics were used from the outbreak of war to its end; the language changed, not the way the war was fought.[4] He finds evidence of small group tactics and movement under cover of fire in the manuals from 1914, 1916, and 1918, arguing that the 1918 training syllabus uses "almost identical" points as those highlighted in the pre-war manuals and exercises. In his view, the Allies were successful in 1918 and not in 1916 simply because the German army was stretched thin and could not offer the same level of resistance that it had throughout the war.[5]

Going beyond the battlefield, other historians have examined the same process of institutional and experiential learning in other contexts. Jonathan Vance has shown that, beginning in the First World War, the Canadian armed forces, slowly and by trial and

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[2] For other works on the debate, see Robin Prior and Trevor Wilson, *Command on the Western Front: The Military Career of Sir Henry Rawlinson, 1914-1918* (Oxford: Basil Blackwell, 1991); Shane Schreiber, *Shock Army of the British Empire* (London: Praeger, 1997); James McWilliams and R. James Steel, *Amiens: Dawn of Victory* (Toronto: Dundurn Press, 2001); Paddy Griffith, *Battle Tactics of the Western Front: The British Army's Art of Attack, 1916-18* (New Haven: Yale University Press, 1994); Bill Rawling, *Surviving Trench Warfare: Technology and the Canadian Corps, 1914-1918* (Toronto: University of Toronto Press, 1992).

[3] Christopher Pugsley, "Learning from the Canadian Corps on the Western Front," *Canadian Military History,* Volume 15, Number 1, (Winter 2006) 11.

[4] Mark Humphries, "The Myth of the Learning Curve in the 12th Canadian Infantry Brigade 1916-1918," *Canadian Military History,* Volume 14, Number 4, (Autumn, 2005) 15.

[5] Ibid, 29.

error, learned how to balance military priorities and powerful civilian lobby groups to achieve an optimum level of support for Canadians in enemy's hands.[6] In terms of military discipline, Pugsley demonstrated that the numbers of soldiers facing court-martial in the initial years of the First World War was high due to poor administration and a lack of leadership. However, as the administration gained experience and the Canadian Expeditionary Force (CEF) improved its manpower management practices, the number of soldiers facing court-martial declined.[7] Finally, a similar argument about advances in the medical corps is found in Tim Cook's work on gas warfare. Cook argues that "the medical corps was not entirely successful, but through perseverance and applied learning they were able to reduce the atrophying effects of gas on the Canadian Corps."[8] Vance, Pugsley, and Cook's arguments support the assertion of a learning curve in a variety of military areas. But can the same argument, that there was a process at work involving both institutional and experiential learning, be applied to front-line medicine as practiced by the CAMC?

Scholars have certainly shown significant interest in military medicine of late. There is a large body of literature on medicine in the American Civil War, the Vietnam War, and a growing number of articles and monographs on medicine in the Second World War.[9] But literature on medicine in the First World War has largely ignored the

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[6] Jonathan F. Vance, *Objects of Concern: Canadian Prisoners of War Through the Twentieth Century,* (Vancouver: UBC Press, 1994).
[7] Pugsley, 8.
[8] Tim Cook, *No Place to Run: The Canadian Corps and Gas Warfare in the First World War* (Vancouver: UBC Press, 1999), 157.
[9] See Albert Cowdrey, *Fighting for Life: American Military Medicine in World War II* (New York: Maxwell Macmillan International, 1994); Jan K. Herman, *Battle Station Sick Bay: Navy Medicine in World War II* (Annapolis, Maryland: Naval Institute Press, 1997); Michael A. Flannery, *Civil War Pharmacy: A History of Drugs, Drug Supply and Provision, and Therapeutics for the Union and Confederacy* (New York:

situation in the front lines. Dr. Andrew Bamji compiled an extensive bibliography on medicine in the First World War while researching articles and a book on facial injuries, and found that few historians have written accounts of front-line medicine during the First World War and that there is no single work focusing on this subject. [10] Several works do discuss aspects of front-line medicine as part of a broader narrative. Desmond Morton's *When Your Number's Up: The Canadian Soldier in the First World War* contained the most information on this topic of all the secondary works that have been published about the war. However, any discussion of the medical service is included to explain the experience of the infantry soldier at the front; the medical units are not examined on their own merit. Morton did write an article, "Military Medicine and State Medicine," that delves into the administration of war medicine and its impact on civilian medicine in Canada; however, the article did not focus on front-line medicine and provides few examples or details about the experiences of war. [11]

There are two histories of the Canadian Army Medical Corps, *Death Their Enemy* by Bill Rawling and *Seventy Years of Service* by Gerald Nicholson, both of which tell the history of the medical corps through peace and war.[12] They are historical narratives that cover a long period, and do not attempt to provide in-depth information on

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Pharmaceutical Products Press, 2004); Jack D. Welsh, *Medical Histories of Confederate Generals* (Kent, Ohio: Kent State University Press, 1995); Harry Holloway, "Epidemiology of Heroin Dependency Among Soldiers in Vietnam," *Military Medicine* (February, 1974) 139, 108-113; J.D. Bremner et al., "Chronic PTSD in Vietnam Combat Veterans: Course of Illness and Substance Abuse," *American Journal of Psychiatry* 153 (March 1996): 139-75.

[10] Andrew Bamji, "Facial Surgery: The Patient's Experience," in Hugh Cecil and Peter Liddle (eds.), *Facing Armageddon: The First World War Experienced* (London: Cooper, 1996). Bamji has not yet published his book on facial surgery.

[11] Desmond Morton, *When Your Number's Up: The Canadian Soldier in the First World War* (Toronto: Random House, 1993); Desmond Morton, "Military Medicine and State Medicine: Historical Notes on the Canadian Army Medical Corps in the First World War, 1914-1919," in David Naylor (ed.), *Canadian Health Care* (Montreal: McGill-Queen's University Press, 1992).

[12] Bill Rawling, *Death Their Enemy: Canadian Medical Practitioners and War* (Québec: AGMV Marquis, 2001); Gerald Nicholson, *Seventy Years of Service: A History of the Royal Canadian Army Medical Corps* (Ottawa: Borealis Press, 1977).

front-line medicine or the First World War. Most of the studies of military medicine are similar to Morton's, Nicholson's, and Rawling's monographs: while they are useful in providing structural information and snapshots of the experiences of the medical corps, none of them focus on front-line medicine. Other similar examples are Kim Pelis' article on blood transfusions during the First World War that looks at Canadian participation in developing this procedure and discusses the political fallout that took credit away from the Canadians; Marjorie Norris' work *Sister Heroines,* which explores the role of the nurse in the First World War; Tim Cook's monograph *No Place to Run,* which focuses on gas warfare but includes a few pages on the medical service and gas; and Duff Crerar's *Padres in No Man's Land,* which mentions chaplains' work in medical units. Two other works provide important contextual information but are not actually about front-line medicine, focusing instead on the rear-area hospitals: A.M.J. Hyatt and Nancy Geddes Poole's *Battle for Life,* which explores the work at No. 10 Canadian Stationary (later General) Hospital through both world wars; and Michel Litalien's *Dans le Tourmente*, an account of two French-Canadian rear-area hospitals.[13]

The final secondary work to consider is Andrew Macphail's *The Medical Services*, commissioned as the official history of the Canadian Army Medical Corps in the First World War.[14] The book attempts to recount the experiences of the entire medical system during the war, so a large portion of the information falls outside the

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[13] Kim Pelis, "Taking Credit: The Canadian Army Medical Corps and the British Conversion to Blood Transfusion in World War 1," *Journal of History of Medicine and Allied Sciences,* 56/3 (2001), 238-277; Marjorie Norris, *Sister Heroines: The Roseate Glow of Wartime Nursing, 1914-1918* (Calgary: Bunker to Bunker, 2002); Cook, *No Place to Run;* Duff Crerar, *Padres in No Man's Land: Canadian Chaplains in the Great War* (Montreal: McGill-Queen's University Press, 1994); A.M.J. Hyatt and Nancy Geddes Poole, *Battle for Life: The History of No. 10 Canadian Stationary Hospital and No.10 Canadian General Hospital in Two World Wars* (Waterloo: Laurier Centre for Military Strategic and Disarmament Studies, 2004); Michel Litalien, *Dans le Tourmente: Deux Hôpitaux Militaires Canadiens-Français dans la France en Guerre (1914-1919)* (Outremont: Athéna Editions, 2003).

[14] Macphail, *Official History of the Canadian Forces in the Great War, 1914-19.*

scope of this thesis. It contains no citations, so it is not clear how much of it was written from Macphail's memory, diaries, and correspondence. Tim Cook is also highly critical of Macphail's book:

> It was uneven in coverage and polemical in tone. Alternating between a narrative of military operations and thematic medical sections, and indiscriminately sliding from a service history to the national war effort, the book made for a poor and confusing read. Macphail even provided his own observations, which he cloaked in ambiguous references to unnamed Canadian officers.[15]

Furthermore, Macphail's book is entirely uncritical in its discussion of front-line medicine, which may indicate a bias on his part since he was writing about the corps he had volunteered to serve. Finally, the work is quite dated, since it was published in 1925.

While there are no secondary accounts of front-line medicine during the First World War, there are several primary accounts written by nurses, doctors, and other ranks in the medical service about their experiences. The most recent work to appear was Frederick Noyes' *Stretcher Bearers ... at the Double!,* published in 1937. Noyes was originally from Kingston, Ontario, but moved to Hamilton where he found work as a compositor, or typesetter. He enlisted in 1916 at twenty-six years of age as a stretcher bearer in No. 5 Canadian Field Ambulance. His book is written from the perspective of several stretcher bearers with whom he served; it is based entirely on their memories, and is full of innuendo and inside jokes. The work is light-hearted and not meant to be scholarly. Another primary account of a field ambulance, much more serious in tone, is *Historical Records of No. 8 Canadian Field Ambulance*, written by John Gunn in 1920 and based on the unit's war diary and personal recollections. The monograph was the

[15] Tim Cook, *Clio's Warriors: Canadian Historians and the Writing of the World Wars* (Vancouver: UBC Press, 2006), 55.

official history of the unit and provided valuable insight into its work. A third important source comes from Robert Manion, a thirty-six-year-old doctor from Ottawa who would go on to become a member of parliament and leader of the Conservative Party of Canada. He wrote two memoirs, one of which, *A Surgeon in Arms,* focused on his experiences in the First World War.[16]

While the memoirs and unit histories provide details and useful anecdotal evidence, they are generally narrow in scope and unable to speak to the broader conditions of the war. Another gap in the primary sources is an absence of patients' accounts of their experiences in front-line medical units. This is due to the fact that many of the men were in shock, unconscious, or had suffered some form of trauma that affected their ability to recall the details of what happened to them before they reached the base hospitals. As a result, most patient accounts discuss rehabilitation or treatment in the rear-area or base hospitals. The inability of primary sources to speak to the total conditions of war raises important questions. Were Dr. Manion's experiences unique to him or common to all? Can Noyes' work be considered representative when No. 5 Canadian Field Ambulance was still being raised in Canada during the Second Battle of Ypres? It is only by bringing all of these sources together with the archival evidence that a complete picture of front-line medicine can be formed and the notion of the learning curve in the CAMC fully explored.

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[16] Frederick Noyes, *Stretcher Bearers ... at the Double! History of the Fifth Canadian Field Ambulance Which Served Overseas during the Great War of 1914-1918* (Toronto: Hunter-Rose Co.,1937); John Gunn, *Historical Records of No. 8 Canadian Field Ambulance: Canada, England, France, Belgium, 1915-1919* (Toronto: Ryerson Press, 1920); R.J. Manion, *A Surgeon in Arms* (New York, London: D. Appleton and Company, 1918).

In general, historians of military medicine who have considered the process of medical learning and problem-solving have been less interested in the process itself than in war's impact on civilian medicine, and the degree to which advances in the treatment of battle wounds could be carried back to civilian practice. The easiest and most obvious way to measure the impact of war on medicine is to look at the advances made in both technology and medical procedures; the majority of authors use these to gauge the benefits of war for medicine. Sometimes progress is framed in a back-handed way, as in Fred Laffin's argument that "Nobody won the last war but the medical services. The increase in knowledge was the sole determinable gain for mankind in a devastating capacity."[17]

In 1919, one Canadian doctor had arrived at the same conclusion. George Armstrong served as a Medical Officer with the Canadian Army Medical Corps in the First World War and wrote several articles on his experiences. A sixty-two-year-old surgeon from Montreal when he enlisted in 1916, Armstrong believed that war made a positive contribution to medicine, arguing that the number and variety of wounds presented doctors with a great opportunity to study their pathology and methods of repair. As a result, "World War One eliminated many false ideas, improved and perfected sound principles and methods, and developed several fields of surgical activity."[18]

Richard Gabriel and Karen Metz take a similar view of medical advancement in the First World War and its furthering of medical science. Their two-volume history of military medicine from the time of Babylon to modern wars in Korea and Vietnam argues that military medicine brings improvement to medicine in general. They point to small

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[17] Fred Laffin, *Surgeons in the Field* (London: J.M. Dent, 1970), 237.
[18] George Armstrong, "The Influence of War on Surgery, Civil or Military," *Canadian Medical Association Journal* 9 (1919): 397.

but important changes in practice, such as the use of intravenous saline transfusions, clinical thermometers, haemostatic forceps, hypodermic syringes, improved retractors, and improved lighting in surgical wards, to support their assertion that the First World War was good for civilian medicine.[19] By the same token, Steve Sturdy's study of oxygen therapy in the First World War demonstrated that the first mask through which oxygen could be delivered, developed in response to the gas attacks of 1915, would come to have profound implications for treating injured workers, administering anaesthetic, and providing pilots with oxygen at high altitudes.[20]

In addition, Canadian doctors Bernard Wyatt and C. Lightfoot Roman wrote several articles on industrial medicine for the *Canadian Medical Association Journal* that demonstrated how to apply wartime medical and surgical techniques to treat industrial accidents and illnesses, and to deal with hygiene.[21] A specific example of using what was learned in war to treat civilians is the career of Captain Bruce Robertson, a surgeon born and raised in Toronto who enlisted in February 1915 at twenty-nine years of age. Robertson specialized in the treatment of burns during the First World War, and when he returned to Canada he found employment at the Toronto Children's Hospital where he applied his wartime knowledge to treating child burn victims. He was able to save severely burned infants and children who would have had little chance of survival before the war due to the state of medical knowledge in that area.[22]

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[19] Richard Gabriel and Karen Metz, *A History of Military Medicine,* Vol. 2*: From the Renaissance through Modern Times* (New York: Greenwood Press, 1992), 240-241.
[20] Ibid, 108-112.
[21] See Bernard Wyatt, "Industrial Medicine" and "Industrial Medicine: Its Motives and Merits" and C. Lightfoot Roman, "Severe Industrial Injuries to the Fingers and their Treatment," all published in *Canadian Medical Association Journal,* 13 (1923).
[22] Morton, When *Your Number's Up,* 205.

Part of the reason behind such advances is that the conditions of war fuel medical research in a way that simply cannot exist in peacetime. Armstrong argued that the factors contributing to medical success in the First World War were opportunity, a concentration of energy, and the desire of the doctors. The opportunity for research was based on the fact that in wartime there were a large number of similar injuries, allowing for research, classification, and treatment. Whether it was a study of wounds of the chest, abdomen, or femur, the unfortunate reality of war was that there were thousands of each type of wound that could be included in studies for treatments. By "concentration of energy" Armstrong refers to the common desire and political climate to support research and advancement. Associations of scientists, surgeons, and nations came together in a common cause and made medical progress a reality. Doctors were encouraged to visit each others' clinics or hospitals to learn the latest techniques and treatments. This in turn fostered education and stimulated ideas. The system of casualty evacuation also contributed to the concentration of energy by moving all the divisional casualties through the casualty clearing station.[23] The numbers of casualties that moved through the casualty clearing station meant that the value of any suggested therapeutic measure could be very quickly and accurately determined; treatments that did not work well were discarded, and other treatments could be sought. Another aspect of the large numbers of casualties was that a doctor learned his limitations immediately. Armstrong stated that "No conditions or surrounding have come under my notice that have more quickly and correctly established a man's value as a surgeon, than the work of a casualty clearing

[23] The casualty clearing station was a surgical centre and lynchpin of the evacuation system. It will be discussed in detail in the following chapters.

station."[24] Beyond all of the systemic aspects of care, a motivator in advancement was the doctor himself. According to Armstrong, "The incentive to work, to devise better ways, to discover more potent methods is the greatest possible. The burning desire to do one's best for those wounded on the field of battle comes to one and all with an intensity never before experienced." [25]

Armstrong's comments turn the debate away from the relationship between civilian and military medicine, and back to the central issue of the learning curve. Throughout the First World War there was a steep and inspired learning curve in the Canadian Army Medical Corps that saw a great deal of improvement in the way in which casualty evacuation and front line treatments were performed, ultimately creating better survival and recovery odds for the wounded men. The success occurred in a rapid fashion since medicine is somewhat unique; the consequences of systemic or medical changes are known immediately allowing for an idea to be disregarded or included quickly. The need for change was based on several factors such as the need for timely medical intervention, the need for new medical techniques, and the need to stop disease from spreading, among others. The following work will demonstrate that there were five important areas in which the learning curve in the medical system excelled: systemic changes, the growth of medical knowledge, the education system employed, improvements to sanitation and preventative medicine, and the adjustment to military life that doctors had to accept.

Systemic changes had to occur throughout the war to ensure timely medical intervention. Receiving medical treatment soon after being wounded provided better

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[24] Armstrong, "The Influence of War on Surgery, Civil or Military," 399.
[25] Ibid, 398-399.

odds of surviving the injury and of complete return to normal function. Military conditions often interfered with the ability of the medical staff to get the wounded men, however, there were factors within the control of the medical service that could determine the speed with which evacuation and medical intervention occurred. The number of men required to make the evacuation system and units within it function was constantly revised throughout the war. Re-evaluating the purpose and ability of front line medical units allowed a number of units to provide life-saving treatments in the forward areas that were not imagined in 1914. In addition, new units and transportation systems would be integrated into the casualty evacuation system to improve the speed with which the wounded were removed from the front and sent through the medical service. All this meant that, when military conditions allowed, the time that that the wounded waited for medical help was reduced by 1918.

The growth of medical knowledge throughout the war was astounding. This was necessary since many known treatments integrated into military medical knowledge failed under the conditions of the First World War and because a number of new medical problems needed treatments. An example of a need for new medical knowledge is found in the gas attacks first employed at Ypres. Since international treaties against the use of gas had been signed by all participants of the First World War there were no known treatments when the first group of gassed soldiers arrived in the Canadian medical wards. Research immediately began to find ways to ease the pain and suffering of gassed soldiers and return the men to health. Without advancement in medical knowledge many soldiers would have died without treatment in the moribund wards.

The growth of medical knowledge and change in status of the effectiveness of treatments presented another problem; the medical corps required an education system to keep all of the doctors apprised of new knowledge. This, like all other aspects of medicine was not unique to the CAMC. While many medical innovations and systemic ideas came from Canadians they were not the only service working to improve. This is due to the nature of medicine. Regardless of nationality a doctor is a doctor, there is no nationalist undercurrent spurring on the growth of knowledge, no need to create an individualistic way of attending patients, and no need to Canadianize treatments. Medicine is a profession that has no national boundaries. To this end the education system had to include the entire Allied medical system so that all of its medical personnel were aware and up-to-date of all treatments and systems that improved on medical ability. This was achieved in a variety of ways from circular memorandums to meetings of representatives of all the Allied medical services ultimately allowing for the best possible care of the wounded men.

Another area that was of utmost importance to medicine was the improvements made in sanitation and preventative medicine. These practices were crucial since the primary cause of death in all previous wars was disease. Many of the principles of sanitation were developed between the Boer and First World War. It was the application of these principles along with new technologies and systemic changes that allowed this area of medicine to improve throughout the war. This allowed the medical units to focus on the treatment of wounds since the wards were not overrun by men suffering from disease.

The final area where the learning curve was important was discipline. All medical doctors were officers in the military, which meant that they had to provide military discipline to those who worked in the wards and the fighting men. This issue was of key importance since doctors had to ensure that soldiers were not able to use the medical system to avoid their military duties. Some doctors felt that military discipline negatively impacted the relationship between doctor and patient and, at times, challenged medical ethics. Other doctors took on the responsibility of discipline without question. Despite the conflict that arose for some doctors between military needs and medical ethics the medical service was able to assimilate into military culture. Doctors learned to accept that there was a hierarchy beyond medicine that subordinated their professional beliefs.

The following work will demonstrate the successful learning curve in the Allied medical systems through the lens of the CAMC by examining select battles that provide insight into the need for changes in the medical system and medical knowledge. Through an examination of the systemic changes, medical advancements, education system, use of sanitation and preventative medicine, and acceptance of discipline it will be shown that there was a constant desire to improve the medical system. That desire became reality as new ideas, treatments, and systems were put in place allowing for timely medical intervention and cutting edge medical treatments that in turn saved lives and allowed for fuller recoveries for those wounded in battle.

Chapter One

The Canadian Army Medical Corps: History and Formation

The Canadian Army Medical Corps was not created in 1914 as a response to war. The beginning of the service can be found well before the First World War, when a system of casualty evacuation was established and several front-line units, the regimental aid post, the field ambulance, and the casualty clearing station, were created. This chapter will explore the history of the military medical service in Canada and the front-line units that were part of the casualty evacuation system, to demonstrate how the system was developed and how it was intended to work on the eve of war in 1914. That will, in turn, provide a basis for assessing the changes that occurred throughout the war and highlight the attention given to other priorities, such as sanitation and preventative medicine, that were not directly related to war wounds.

The Canadian military did not always have a formal medical system or units devoted to providing medical care. Early militia units were charged with finding, hiring, and providing for a medical doctor to look after their troops. The medical doctor was not a soldier and not subject to military discipline, nor did he wear his unit's uniform. This did not change until the North-West Rebellion of 1885, when the military approached Dr. Darby Bergin about creating and overseeing a military medical service. Dr. Bergin studied the question of how best to integrate medicine into a formal military system and recommended the formation of a Medical Staff Corps. The new corps was to have its own hierarchy of reporting and decision-making, and therefore its own administrative and

executive personnel. In addition, it would have a field hospital corps to treat and care for the wounded and ill, an ambulance corps for the transport and evacuation of the sick and wounded, and a military cadet corps. Dr. Bergin also recommended a separate institution to train the medical corps' troops and doctors in military medicine.[1] As a result of these recommendations, progress was made towards the first formal Canadian medical system when Canada sent soldiers to fight in the Boer War. Military doctors wore the same uniform as their regiments and were required to undergo military training. A system of advancement within the military hierarchy was created, although doctors could not obtain staff positions.[2] But the experience of the Boer War showed a lack of sufficient training and organization; this, in turn, provided the impetus to reorganize and create a much more effective and efficient medical service.

The Boer War (1899-1902) exposed problems in the military medical system,[3] many of which can be traced back to a lack of motivation in the government and the military to make the medical service a priority. Many patients, and some doctors, described it as inadequate: there were simply not enough doctors to care for the large numbers of patients suffering from tropical diseases, let alone to handle the wounded. The government refused to use Nursing Sisters to care for the wounded; instead they had to work as advisors to orderlies, which drew many complaints of lazy orderlies who were unwilling or unable to handle the necessary nursing work that the patients required. There was also a dearth of supplies. In addition, the stationary and general hospitals did

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[1] Andrew Macphail, *Official History of the Canadian Forces in the Great War, 1914-19: The Medical Services* (Ottawa: F.A. Acland, 1925), 9-10.
[2] John Adami, *War Story of the Canadian Army Medical Corps* (Toronto: Musson Company, 1918), 23.
[3] For more information on the Boer War, see Carmen Miller, *Painting the Map Red: Canada and the South African War, 1899-1902* (Montreal: Canadian War Museum and McGill-Queen's University Press, 1993); Denis Judd and Keith Surridge, *The Boer War* (London: John Murray, 2002); and John Gooch (ed.), *The Boer War: Direction, Experience, and Image* (London: Frank Cass, 2000).

not begin to arrive and set up their facilities until weeks after the campaign had begun. All the while, there were epidemics of typhoid fever that were barely contained; such outbreaks would be an ongoing challenge throughout the war.[4]

Many of the men, both in the infantry and medical service, felt there was "a lack of efficient organization, and apparent indifference to sanitation and the requisites of contemporary medical practice turned a difficult situation into a tragic one." The British government attempted to show an interest in the well-being of the troops and a desire to improve the medical system by convening a Royal Commission. However, the Commission did not have the desired effect, for it dismissed the medical problems as "one of the cruel penalties of war." As a result, the medical system continued to operate in a haphazard way that allowed sickness to increase, the troops' physical condition to deteriorate, and morale to suffer.[5]

The experience of the Boer War demonstrated to the medical and military authorities that improvements had to be made to create a more effective and efficient medical service for the military. Systemic changes were the focus after the Boer War. During the war the field hospital and stretcher bearer functioned under independent commands that made communications and medical efficiency difficult. This problem was addressed by combining the units into the field ambulance. The purpose of combining the units was to provide increased mobility at the front and to "combine under one command the two intimately related functions of collecting the wounded and affording immediate but temporary care of the same."[6]

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[4] Miller, *Painting the Map Red*, 121.
[5] Do.
[6] Adami, *War Story of the Canadian Army Medical Corps*, 23.

The reorganization of the main medical unit was followed by the creation of the Permanent Army Medical Corps (PAMC) in 1904 and a thorough overhaul of military medical procedures.[7] The line of command was one of the major issues that had to be dealt with to ensure a coherent command structure. An example of a problem created by command structure was that the Medical Officer of a battalion was responsible for sanitation and medical care, but he did not have any authority to enforce his recommendations or ideas. It was thought that giving the Medical Officer more authority could create conflict with the Commanding Officer of the unit, and military authorities did not want a split command. In order to work around this issue and keep a clear chain of command, the Commanding Officer rather than the Medical Officer was made responsible for all sanitation, despite the fact he was not a medical doctor or a sanitation specialist. If the men under the Commanding Officer repeatedly reported illnesses that could have been prevented by sanitary procedures, the officer would be reprimanded. The possibility of punishment for unsanitary conditions ensured that the Commanding Officer would listen to and implement the Medical Officer's recommendations without altering the command structure.[8] This arrangement was written into the military manuals that would be used in 1914 and throughout the First World War.[9]

With the new front-line systems in place, education and training were the next elements of the PAMC to be formalized. Education would be provided by the Medical Officers through courses and lectures on military medicine and sanitation at each permanent station during the winter months. Questions about how education in the

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[7] Macphail, *Official History of the Canadian Forces in the Great War, 1914-19,* 226.
[8] Adami, *War Story of the Canadian Army Medical Corps,* 24.
[9] Canada, *Regulations for the Canadian Medical Service, 1914* (Ottawa: Government Printing Bureau, 1915), 23.

permanent force could help militia officers led to another change, meant to increase integration between the Permanent Force Medical Officers and the Militia Medical Officers.[10] The Association of Medical Officers of the Militia was created in 1909 to help create corps spirit by bringing officers of various units together to gain familiarity with each other and share ideas and techniques. In addition, the association organized the first full Army Medical Corps Camp in London, Ontario, in 1911. Normally the medical units would have attended camps in their own districts, but this meeting allowed all the medical units from different districts to be brought together

> for sixteen days' training. Beginning with a scheme of attack and defence, which called into play purely the work of the regimental officer with a battalion, next schemes calling into play the work of the field ambulance with the brigade, and, finally, the divisional co-operation of field ambulance and casualty clearing unit were worked out, and an insight given into the functions and inter-relationships of the different branches of the service that no local annual camp with the infantry and other arms could have supplied.[11]

The camp at London allowed the medical force to test its units, strategies, and equipment, and attempt to work out problems in advance of any war.

Furthermore, each year prior to 1914, the PAMC administrative heads attended courses on sanitation, bacteriology, laboratory training, and the medical history of various campaigns. They would in turn provide courses to Militia Medical Officers in their districts, creating a trickle-down effect for the education that gave all Medical Officers in the militia access to the same information as those in the permanent force. Because of these seminars and the mass training exercises in London that constituted a system of

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[10] The Permanent Force Medical Officers were professional soldier-doctors who had military careers and no private practice. Militia doctors were citizen-soldier-doctors who retained employment in hospitals or had private practices and served in the Canadian militia on a part-time basis.

[11] Adami, *War Story of the Canadian Army Medical Corps,* 30.

institutional learning, the Canadian Army Medical Corps[12] believed it would be able to field a group of highly trained officers familiar with the difficulties of service and administrative procedures, as well as units that were well versed in medical stores, equipment, and movements. This expertise would be extremely important as the CAMC grew from a small pre-war permanent contingent of thirteen officers and five nursing sisters reliant on the militia for Medical Officers and other ranks, to a force of 1,525 Medical Officers, 1,901 nursing sisters, and 15,624 other ranks that relied on the Medical Officers for training and ensuring that the procedures continued to be effective.[13]

Implicit in the pre-war training regime was the notion that the Canadian Army Medical Corps had a dual role to perform. There was a professional side and a military side to its work. The professional side encompassed scientific medical work similar to what occurred in civil life, while the military structure enabled that work to be carried out by providing places of treatment that were located strategically to allow for convenient and efficient reception and evacuation. This included providing transport for the wounded, an apparatus for distributing the patients according to the nature of their disability[14], and feeding, housing, and clothing patients. Experience throughout the First World War would demonstrate that, "in those instances in which the Army Medical Services have failed, the faults within the service have been faults of the military side" due to a breakdown in the supply system or the inability to provide transport, usually because of battle conditions. Thus, particular attention was paid to improving the

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[12] The Permanent Army Medical Corps was re-named the Canadian Army Medical Corps at the outbreak of war.

[13] Desmond Morton, *When Your Number's Up: The Canadian Soldier in the First World War* (Toronto: Random House of Canada, 1993), 182.

[14] See Appendix A for the list of classification of wounded soldiers.

military structures through institutional learning and applying lessons drawn from battle experience. This was especially important since only three of the original fifty-nine doctors of the First Division overseas were of the Permanent Army Medical Corps and just three had previous experience in battle, all in the South African War.[15] It was not the highly trained force that the CAMC had hoped to field.

Several problems did occur on the professional side of medicine. One such issue was "distributing officers according to their individual qualifications." This refers to such things as ensuring that the top surgeons worked in units that performed the majority of surgery or that older physicians were not sent to the front where they would have difficulty with some of the physical aspects of the work or with trench living. Another problem on the professional side was "providing for keeping [doctors] in touch with advances in science."[16] This was due to the number of months that a front-line doctor could spend at the front with no access to medical literature. Many methods were introduced throughout the war to help keep the level of education high. The problems on the professional side of war medicine were not as severe as those on the military side and were generally able to take care of themselves since they were within the experience of the civilian doctors who joined the medical corps.

The work on systems and education that occurred prior to the First World War demonstrated the willingness of the CAMC to evaluate and change a variety of aspects of the service. The changes kept the medical needs of the soldiers at the forefront, being designed to improve the speed of casualty evacuation and medical intervention as well as creating greater efficiency in the education systems so that all military doctors had access

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[15] Adami, *War Story of the Canadian Army Medical Corps,* 88.
[16] John Fotheringham Papers MG30 E53, volume 5, file 22, letter from Surgeon-General G.L. Foster to John Fotheringham Re: 1917 improvements, n.d. Library and Archives of Canada [LAC].

to the same information. This work demonstrated an animated spirit and willingness to change, grow, and improve the military medical establishment, foreshadowing the work that constantly defined the CAMC throughout the First World War.

Another issue that would have to be addressed due to the experience of the Boer War was illness in war. In previous wars, the sick wastage[17] had been many times greater than the wastage from battle; as a result, the CAMC focused a great deal of its preparations for war on sanitation and preventative medicine. According to the command structure that was in place in 1914, doctors were responsible for testing the sufficiency, quality, and wholesomeness of food as well as checking on military cooks to ensure that food was properly stored and prepared. Sanitation units in the medical corps were responsible for ensuring the potability and purification of water. They also looked after the location, adequacy, and proper construction of the latrines, urinals, grease traps, and garbage pits (see figure 1), and ensured the proper disposal of all refuse. Medical Officers had to ensure the personal cleanliness of troops, the adequacy of bath houses, and the troops' access to clean clothes and blankets. All of the soldiers were inoculated for various diseases; when they fell ill with a communicable disease, it was the responsibility of the doctor to isolate the soldier to ensure his illness did not spread.[18]

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[17] Sick wastage refers to patients who were unable to fight on due to illness, while war wastage or wastage of battle refers to those who were wounded or injured during training or battle.

[18] War Office, General Staff, *Field Service Pocket Book, 1914* (London: Printed under the authority of His Majesty's Stationary Office, 1914), 51-52 and A. Snell, *The C.A.M.C.: With the Canadian Corps during the Last Hundred Days of the Great War* (Ottawa: F.A. Acland, 1924), 4-5. For information on sanitary services, see Major Forrest, "Sanitation of Camps," *British Medical Journal,* March 1915; J.W.S. McCullough, "Sanitation in War," *Canadian Medical Association Journal* 9 (1919): 783-793; and Anonymous, "Military Hygiene and the Efficiency of the Soldier," *British Medical Journal,* March 1915.

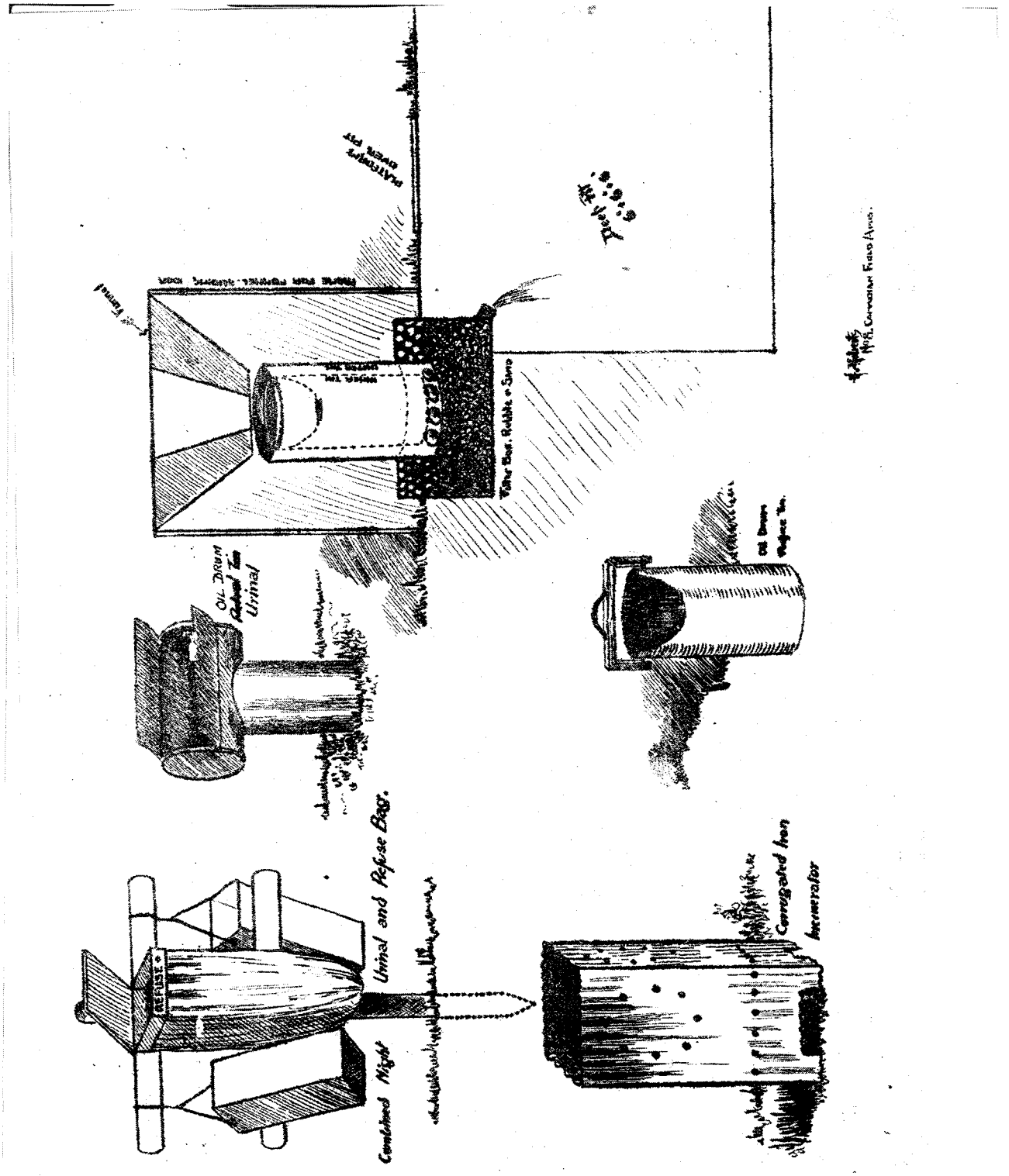

Figure 1– Hand Drawings of sanitary appliances. Library and Archives of Canada [LAC]: Department of Militia and Defence [DMD] Records: War Diary, No. 8 CND FLD AMB, May 1917 Appendix 1.

The unfortunate truth was that many of these duties would not be fulfilled to the wishes of the Medical Officers; the flow of battle and movements of units were not within the medical establishment's control, making it difficult to ensure that clean clothing, for instance, was available in the trenches. Nevertheless, sanitation and preventative medicine would prove to be of the utmost importance and would change the nature of treatment to a focus on wound treatment rather than treatment of illness.

Both the professional and the military aspects of the CAMC's work in the front lines were situated within a chain of command that remained essentially the same throughout the war. Each battalion was served by a regimental aid post (RAP) commanded by a Medical Officer (MO), who sent reports and received instructions through the field ambulances (FLD AMB), three of which were attached to each division. The Commanding Officers of the field ambulances, also medical doctors, sent reports and received instructions through the casualty clearing stations (CCS), of which there was one per division. Each division had one Assistant Director Medical Services (ADMS) housed at the casualty clearing station who received reports, held command meetings, sent out instructions, and helped to plan evacuation and ensure that the system was functioning well and the wounded were receiving the best possible care. All Assistant Medical Directors reported to the Deputy Director Medical Services (DDMS) France, who was the head of the front-line medical system and oversaw all Canadian medical units on the Western Front. He received military orders, such as movements around the front, through the Canadian military chain of command that ultimately answered to the commander in chief of the British Expeditionary Force. The DDMS reported and discussed medical issues with the Canadian Director of Medical Services, London, who

sat on a medical board consisting of the directors of the Empire's medical services that was overseen by the British Surgeon General.[19]

In addition to the military medical hierarchy, international agreements governed the rights and conduct of the medical personnel. The Geneva Convention of 1906 for the Amelioration of the Condition of the Wounded in Armies in the Field stipulated in Article 9, and Articles 18-23 who within the medical system was a non-combatant and under the protection of the Convention and who was not. The Geneva cross or red cross was reserved for persons engaged in the collection, transport, and treatment of the sick and wounded, and for those who administered the medical services. They wore a white armlet with a red cross on their left arm. Each person who wore this armlet was registered as a non-combatant, so long as the armlet was stamped with the official stamp of the medical services. In addition, the wearer carried an identification certificate with the same information as the armlet. If captured by the enemy, persons with the proper non-combatant identification were supposed to be returned to their service, although they could be held if they were needed to care for their own personnel in captivity.

There were, however, many times during the First World War when more men were required to perform the work of the medical service than were registered non-combatants. This was true of the regimental stretcher bearers and the men who were assigned to help the medical service in the front lines or at a unit. These men also wore a white armlet on their left arm, but instead of a red cross it had the letters "SB" (stretcher bearer) printed on it. These men were not protected under the Geneva Conventions and if

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[19] Snell, *The C.A.M.C.*, 5-6.

captured would become prisoners of war.[20] The status of the members of the medical service is important since the majority of stretcher bearers wore the "SB" and were not considered non-combatants.

The basic system of casualty evacuation[21] and treatment employed by the CAMC was based on the British model so that Canadian and British units could be interchangeable on the battlefield, and because the Royal Army Medical Corps had a much longer tradition and wealth of experience to draw on compared to the relatively new Canadian corps. Any soldier wounded on the Empire's front would have a similar experience that would take them through three front-line units, the regimental aid post, the field ambulance, and the casualty clearing station, before they reached the base hospitals in the rear. It is important to examine each front-line medical unit as it was envisioned before battle, in order to establish benchmarks for comparison that will make it possible to assess improvement in the casualty evacuation system on the part of the CAMC throughout the war. In the following description of the system of casualty evacuation, the ideal characteristics of the units, as envisioned in pre-war military manuals, are used even though it was not always possible to achieve the ideal for each unit under the variety of conditions faced on the Western Front.

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[20] Major G.R.N. Collins, *Military Organization and Administration* (London: Hugh Rees, 1918) http://www.vlib.us/medical/evacn/evacn.htm

[21] For more information on the casualty evacuation system, see M.C. Bricknell, "The Evolution of Casualty Evacuation in the British Army 20th Century, Part One: Boer War to 1918," *Journal of the Royal Army Medical Corps* 148/2 (June 2002): 200-7; Cuthbert Wallace and John Fraser, *Surgery at a Casualty Clearing Station* (London: A. and C. Black, 1918); and Adami, *War Story of the Canadian Army Medical Corps*.

The Regimental Aid Post

Each regimental aid post was attached to a battalion and had one Medical Officer in command. The MO had an orderly assigned to him, either a sergeant or corporal who had taken the regular CAMC course of training to ensure proficiency in wound dressing and the disinfection of instruments, among other tasks. One private was assigned to the MO as a batman; he was also responsible for driving the medical cart to get supplies and water when needed. Finally, each aid post had five men assigned for water detail. These men were trained in the sterilization and handling of water and supplied all of the water for the battalion.[22] In addition, the RAP establishment table that was in use in 1914 stipulated that the Medical Officer should have sixteen regimental stretcher bearers assigned to his post to tend the wounded and dress the men in the field. The regimental bearers were regular infantry soldiers selected by the Commanding Officer to act as stretcher bearers in battle. The Regimental Medical Officer trained these men in first aid, dressings, stopping haemorrhages, dealing with shock, handling unconscious patients, treating burns, setting fractures, and a variety of other duties when the unit was at rest.[23] They wore a white band with "SB" in bold black letters to mark them as distinct from the fighting men. The water detail, along with the battalion bearers when they were in the post, assisted the MO during battle by helping to apply dressings, moving stretcher cases around the unit, and providing hot drinks and comforts to the wounded.

A regimental aid post was intended to be situated close to the battlefield, in a dugout or preferably the cellar of a building when one was available. This ideal placement gave the best possible cover while still allowing the unit to be found easily; it

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[22] War Office, *Field Service Pocket Book,* 52-54 and Snell, *The C.A.M.C.,* 6.
[23] War Office, *Field Service Pocket Book,* 199-205 describes in detail the various ailments that the regimental bearers as well as all the others of the medical service had to deal with.

also would have been in reasonable proximity to the battalion headquarters for ease of communication. An RAP would not be on a line of communication, along a route used to bring ammunition forward, or near an engineering dump or artillery position; it could not be in the way of military movements or near a potential target. Access areas around the RAPs had to be wide enough so that a stretcher could be carried through without difficulty when turning corners. The unit had two doorways, one for incoming and one for outgoing patients, each at least six feet wide to allow for easy manoeuvring of stretchers and so that stretcher cases waiting to be dressed could be placed along the sides. A staircase that went down into the dugout or cellar had to be on a gentle slope with landings so that the bearers could rest when needed and walk at an even pace. The regimental aid post was divided into two rooms, the dressing room and the collecting room. The dressing room, the first stop for the wounded, was ten feet by eighteen feet and had dressings, bandages, splints, instruments, recording books, and cards placed on shelves around the room.[24] The collecting room was slightly larger when possible. It held the wounded who had received treatment and were waiting for an ambulance or stretcher-bearer squad to take them to the next station. In addition, an aid post had stretchers, first field dressings, water-testing apparatus, pills, ointments, scissors, thermometers, disinfectants, a surgical haversack, blankets, and a means for heating water.[25] Most of these items were housed in the dressing room, where most of the treatment was given.

The regimental aid post had many duties to perform when its unit was not in action. The MO was the "responsible advisor to the Commanding Officer in all matters appertaining to the health of the troops and to the sanitary state of the area they may be

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[24] Snell, *The C.A.M.C.*, 4.
[25] LAC: DMD Records, RG 9 III B2, volume 3751, file 2-1-1-2, "Duties of Officer in Charge of a Unit." n.d.

occupying."[26] The advisory role of the MO sometimes brought about conflict when he wanted to implement something that the Commanding Officer did not, but "If he frame[d] his advice on sound practice lines and [did] not put forth proposals that [had] no good reason he [would] gain the confidence of the Commanding Officer."[27] Notwithstanding, there were times when the Commanding Officer could not implement medical advice, or even explain why he could not, for tactical reasons. As a result, it was important to have a good working relationship with the Commanding Officer so that the Medical Officer could trust his judgement, and vice versa.

One of the most contentious issues between the Commanding and Medical Officer that also affected the men was the sick parade held each day by the MO. All the men from his battalion who were sick or injured went to see the doctor at the RAP for evaluation. There was immense pressure on the Medical Officer, as he had to balance the expectations of the patients with those of the Assistant Director Medical Services (ADMS) and the Commanding Officer. The ADMS expected a low sick rate among those who attended the sick parade, and battalion and company commanders wanted every available man to remain on duty, while only those who were genuinely sick received the medical attention they needed. This created pressure on the MO to keep the men in the front lines. Many of the patients did not want to remain at the front and tried to use sick parade as a way out of front-line duty. At times it was hard for the MO to tell if a man was truly ill or simply looking for a rest, but pressure from superior officers made it difficult for him to send a man back as a precaution.[28] This morning ritual would

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[26] Do. Author's emphasis.
[27] Anonymous, "Military Hygiene and the Efficiency of the Soldier," *British Medical Journal,* March 1915, Report on Major Lelean's lecture series, 507.
[28] R.J. Manion, *A Surgeon in Arms* (New York: D. Appleton and Company, 1918), 106-108.

be one of the many places where the MO would have to learn and practice military discipline. Sick parade was not held in times of battle; instead, soldiers who fell ill and could not continue to fight walked back to the regimental aid post to be evacuated with the wounded. In addition to sick parade, the MO also had to conduct a daily inspection of all billets, cooking places, and latrines.

During battle, events determined the speed with which a wounded soldier was evacuated to the RAP. If the advance was successful, it usually meant that the soldier would be evacuated quickly since there was little to interfere with the operation. However, the stalemate conditions of trench warfare as they developed in 1915 or an unsuccessful attack could force the wounded to lie on the battlefield until dark.[29] During that time, they were not always left unattended; battalion stretcher bearers did what they could to tend their wounds. Two bearers carried a stretcher between them; both men were the same height to make transportation by stretcher easier and to conserve energy. All bearers carried a haversack with large and small surgical dressings, bandages, splints, and a small bottle of iodine. The battalion stretcher bearers went into action behind the infantry, each of whom carried a first field dressing pack containing two cover dressings, two-and-one-half yards of bandages, gauze, safety pins, and an ampoule of iodine. It was encased in a khaki covering and carried in the right pocket of the skirt of the soldier's jacket. The bearer used the soldier's field dressings to stop bleeding by putting pressure on the wound, to clean the area of the wound, and to provide some relief from pressure to broken limbs, and used his own splints to set fractures temporarily.[30] After placing a rag on a stick or bayonet as a marker, the bearers moved the wounded soldier to a sheltered

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[29] Frederick Noyes, *Stretcher Bearers... at the Double! History of the Fifth Canadian Field Ambulance Which Served Overseas during the Great War of 1914-1918,* (Toronto: Hunter-Rose Co., 1937), 63.
[30] General Staff, *Field Service Pocket Book, 1914,* (1914) 199.

spot, and went on to the next case.[31] Later, often under cover of darkness, field clearing parties would come forward with the battalion stretcher bearers to collect the wounded. Stretcher bearers were held in high regard by the fighting men, who saw that they sacrificed themselves to save their fellow soldiers, treating the wounded despite the dangers of bullets flying past them and shells exploding around them.

The regimental aid post was not a surgical unit. Once the wounded men arrived there, the Medical Officer would check and adjust their field dressings, changing them when necessary. Splints were applied, but only when urgently needed. The primary function of treatment at the RAP was to stop or control any bleeding, provide first aid and give pain relief with morphine injections, and move the wounded to suitable cover and safety. The patients were also made as comfortable as possible with blankets, hot drinks, and cigarettes while they awaited transportation to a field ambulance.[32]

Figure 2– Placing stretchers on a horse-drawn ambulance, 1916. The picture demonstrates that it took four men to raise the stretcher into the ambulance. LAC PA000160

[31] LAC: DMD Records, RG 9 III B2 Volume 3753 File 6-3-7, "RAPS," n.d.
[32] *Field Service Regulations Part II: Organization and Administration, 1909 (Reprinted with Amendments to October, 1914)* (London: His Majesty's Stationary Office, 1914), 119.

The Field Ambulance

In 1914, each field ambulance was staffed by nine Medical Officers and 238 other ranks, including a lieutenant-colonel, two majors, six captains, one quartermaster, one dental officer, and one chaplain. A field ambulance had sixteen horse-drawn vehicles that worked as ambulances (see figure 2) and water carts, as well as seven motor ambulances. This unit was designed to be highly mobile so that it could move around the immediate rear of the front line. To this end, a FLD AMB was equipped to work under tents and had enough transportation to move all of its supplies. FLD AMBs were broken into three sections: two advanced dressing stations (ADS) and one main dressing station (MDS). Each division had three FLD AMBs assigned to it, meaning it had access to six ADSs and three MDSs.[33]

Each of the advanced dressing stations had a Medical Officer, a male nursing staff, and stretcher bearers who looked after the wounded. These stations were one or more miles behind the RAP, ideally in large cellars, dugouts, or other suitable places in villages that ambulances could reach at night in relative safety.[34] As a result, there was no uniform method of constructing the station. Notwithstanding, there were desirable characteristics that each field ambulance sought when considering where to place its ADSs. The ideal station had a large dressing room, approximately forty feet long by ten feet wide, where all walking wounded were taken care of and where the men rested until evacuation to the rear (see figure 3). It had two dressing tables in the centre of the room, two tables that held dressings, drugs, and instruments, one table that held anti-tetanus and other sera, one table for record keeping, and one large cabinet to hold extra supplies. Hot

[33] Macphail, *Official History of the Canadian Forces in the Great War, 1914-19,* 67-68.
[34] Noyes, *Stretcher Bearers... at the Double!,* 63.

drinks were distributed to the men here as well. The advanced dressing station also had two stretcher wards that measured twenty-four feet by ten feet, where all the lying cases were brought, treated, and awaited evacuation. All doors and hallways had to be wide to allow the stretchers through and, as with the regimental aid post, any staircase had to have a slight slope and landings.

Figure 3– The wounded wait for evacuation in an advanced dressing station of a field ambulance in 1916. This dressing room was for the walking wounded since it has no stretchers or visible trestles to hold them. LAC PA000029

Each station could handle fifty casualties, although there were many times during the war when this number was exceeded and patients had to receive treatment outside. Very little surgical work was performed in these units unless extreme conditions demanded intervention. The focus was similar to the RAP in that the MOs worked on controlling haemorrhage, redressing wounds, and applying suitable splints. Every patient was given anti-tetanus serum and labelled with "ATS" written on the wrist. The medical staff also performed the sorting and classification of the wounded for further disposition,

instituted any necessary supporting treatment, and used any other means to make the patient ready for transport and keep him comfortable.[35] The equipment that the station carried was similar to the RAPs, though generally there was more of it since the unit was expected to treat more casualties and did not have to be as mobile.

The wounded who lay waiting in the regimental aid posts were brought first to the advanced dressing station. Whenever possible, horse-drawn ambulance wagons were brought right up to the RAP to evacuate the wounded to the FLD AMB; the wagons were faster than going on foot, they could be righted and stay in use when overturned, and could hold three lying cases or six sitting cases. Sometimes the terrain had no passable roads or open areas, had been torn up by shells, or was too muddy for the carts to get to the aid post. In such locations, which were many, the field ambulance bearers carried the wounded by stretcher.

The job of the stretcher bearers of a field ambulance was as dangerous as the battalion bearers, especially while they were at the regimental aid post and susceptible to snipers. As they moved away from the front, shells were the greater danger. Ambulance bearers were stationed at the RAPs closest to their units in times of intensified fighting. They directed the walking wounded back to the advanced dressing station of the field ambulance, and also carried stretcher cases there. In addition, during active times, the Regimental Medical Officer could rely on the stretcher bearers of the field ambulance to bring forward supplies to replenish what he used.

Stretcher bearers were supposed to carry "Orderlies' Pouches" that contained scissors, a clasp knife, a small pair of tweezers, pins, a tourniquet, a flask of aromatic

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[35] *Field Service Regulations Part II,* 118; A.M. Fauntleroy, *Report on the Medico-Military Aspects of the European War* (Washington D.C.: Government Printer's Office, 1915), 37-38.

spirits of ammonia, rolls of adhesive tape, compressed wool, bandages, wire splinting material, and several packs of foot powder, but usually these packs were discarded and the bearer would only bring shell dressings, scissors, and the tourniquet. This was because "all the time the roads were intermittently shelled and under such conditions, few injured men would desire more than the application of the "first field" or "shell dressing" and it [was] even unlikely that a man would have stopped to powder his feet were they never so sore."[36]

As soon as they could be moved, patients were evacuated from the advanced dressing station to the final unit of the field ambulance, the main dressing station (see figure 4), situated about a mile back from the advanced dressing station. It was usually in a small town or village and was constructed in a similar fashion to the ADS, but had an additional room for the dentist and a recovery ward for patients with very minor ailments who would be able to return to duty in two or three days' time. The majority of the wounded would leave this station within twelve hours of arriving. Patients were brought here by motor ambulances that could accommodate four stretcher cases or six sitting cases. The medical attention provided to the wounded here was similar to that provided at the ADS, but the doctors could take more time to inspect the wounds and perform minor surgery, if necessary, and the occasional surgery that was not so minor. Generally the only surgeries that would be performed at a main dressing station were compound, comminuted fractures of the cranial vault with depression (multiple skull fractures), shell wounds of the extremities that required immediate amputation, and compound, comminuted fractures by shrapnel or bullets with explosive effects that required more

[36] LAC: DMD Records, RG 9 III C10, volume 4551, file 5th, 8. "Private Diary - Historical (Moved to the Somme)," n.d.

efficient drainage.[37] In addition to being equipped to perform some surgical duties, the MDSs housed the bulk of the Medical Officers, male nursing staff, and supplies, as well as all horse and motor transport and the headquarters detail. The people who worked in the FLD AMB were often shifted around between the advanced and main dressing stations in an attempt to share the workload in more forward locations. In addition, if a Regimental Medical Officer was wounded or unable to perform his duties he would be replaced temporarily by an MO from the field ambulance.

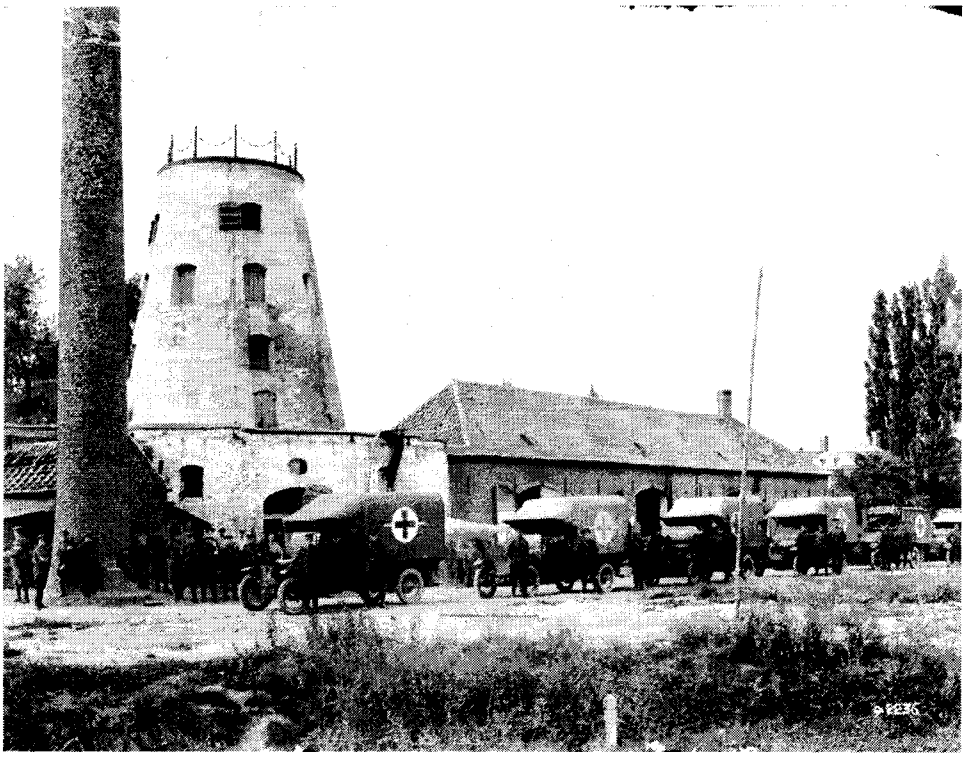

Figure 4– The Old Mill in Vlamertinghe was converted into a Main Dressing Station. This picture of ambulances waiting for patients to be unloaded or loaded was taken in November 1917. LAC PA002151

[37] LAC: DMD Records, RG 9 III B2, volume 3749, War Diary, No. 3 Canadian Field Ambulance, Letter from Capt. S. Alwyn Smith to OC No. 3 Canadian Field Ambulance, Appendix "B," 19 March 1915. Also see Fauntleroy, *Report on the Medico-Military Aspects of the European War,* 37; Noyes, *Stretcher Bearers... at the Double!,* 64.

In quiet times and at rest, the field ambulance was not broken up into its three components as it replenished its personnel and equipment and underwent instruction, training, and drill. The FLD AMB also served the division by running its rest stations, working either under tents or in schools or other large buildings. The Medical Officers and headquarters staff used this time to prepare their stations for the next battle by carefully going over the ground they expected to occupy and studying it for the best primary and alternate routes of evacuation. This was important since the "Field Ambulance was the essential battle unit of the medical services. Its organization had to be kept in the highest state of perfection to withstand the heavy strain of battle."[38] In addition, it still functioned as a hospital, tending to infantry units that were also in the rest area or to soldiers in the trenches who were accidentally wounded or became ill. The majority of treatment was for minor ailments that did not need attention while in the trenches, and dentistry.

The Casualty Clearing Station

The Canadian Army Medical Corps provided one casualty clearing station per division, which at full strength in 1914 was designed to treat as many as 200 wounded men; four Canadian CCSs were mobilized and sent to battle throughout the war. The CCS was a line-of-communication unit that was normally located at an advanced base near a railhead.[39] This meant that it was out of the range of bullets and light artillery, but still risked being hit by long-range guns. At the beginning of the war a casualty clearing station's staff consisted of one Commanding Officer, one Quartermaster, six Medical

[38] Snell, *The C.A.M.C.*, 7.
[39] *Field Service Regulations Part II,* 122-123.

Officers, seven nursing sisters, and seventy-seven other ranks.[40] The seven nursing sisters who served with each CCS are of note since this was the only forward unit that allowed female nurses. The following work will not examine the specific contribution of nursing sisters to the CCS. This is not to minimize the important services they provided. These women attended the training courses, endured the horrors, and assisted the medical officers and patients in any way they could just as the male nurses further forward did. There will be no independent discussion of the sisters due to the fact that of the 1,901 nursing sisters who would serve with the CAMC, merely twenty-eight to thirty-six of them served at the CCS at any given time. The experiences of these women are better explored in a work about nursing sisters in the war.[41]

The equipment available in the CCS was similar to that of a FLD AMB. Though the surgical equipment was restricted to one tent with one surgical table, since surgery was not generally to be performed in the CCS as the unit was intended for "the temporary reception and care of sick and wounded pending and during evacuation."[42] Casualty clearing stations used existing buildings that suited the purpose, such as schools or hotels. Once the wounded soldier arrived, he was brought to an inspection hut where his label was examined or, if he did not already have one, a label was made out giving his personal information, his unit, and the medical attention that he had already received. A Medical Officer decided who would be admitted and who was fit for immediate evacuation to a base hospital. Patients who were unfit to travel were brought into the station for treatment. These generally included men who had collapsed, were unconscious, or had

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[40] Snell, 209.

[41] For more information on nursing sisters, see Gerald Nicholson, *Canada's Nursing Sisters* (Toronto: Samuel Stevens, Hakkert, 1975); Marjorie Norris, *Sister Heroines: The Roseate Glow of Wartime Nursing 1914-1918* (Calgary: Bunker to Bunker, 2002).

[42] Ibid, 209 and *Field Service Regulations Part II,* 122.

severe pain, vomiting, or a high temperature, symptoms often associated with head, chest, and abdominal wounds. A CCS could generally retain thirty to fifty patients; as a result, over eighty per cent of the wounded were evacuated on the day of their arrival.[43]

The casualty clearing station was later "termed the 'pivot upon which the removal of sick and wounded turns.' Perhaps it more appropriately might be called the Keystone of the arch formed by the regimental medical service and the Field Ambulance"[44] by Lieutenant-Colonel Frederick Ford. This was due to the astounding growth and change in role of the casualty clearing station throughout the war that Ford was already witnessing by 1916. At the war's beginning, however, the CCS was a relatively mundane unit, whose main purpose was sorting and evacuating the wounded.

All the wounded evacuated from the casualty clearing stations to the various base hospitals were taken by Ambulance Trains (see figure 5). These units had staffs of doctors, nurses, and orderlies to look after the wounded, as well as emergency operating rooms and dispensaries. The number of patients on the train was to be cabled ahead so that there would be the correct number of motor ambulances waiting when the train arrived at its destination. The motor ambulances were designated to specific hospitals to which they took the wounded. As a result, no hospital was overwhelmed and there was no confusion as to where the men would go.[45] Once at a base hospital, the wounded received any medical treatment, surgical intervention, and rehabilitation that they required.

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[43] John Taylor Fotheringham Papers, Lieutenant-Colonel Ford, "The Casualty Clearing Station," 1 May 1916.
[44] Do.
[45] Adami, *War Story of the Canadian Army Medical Corps,* 92.

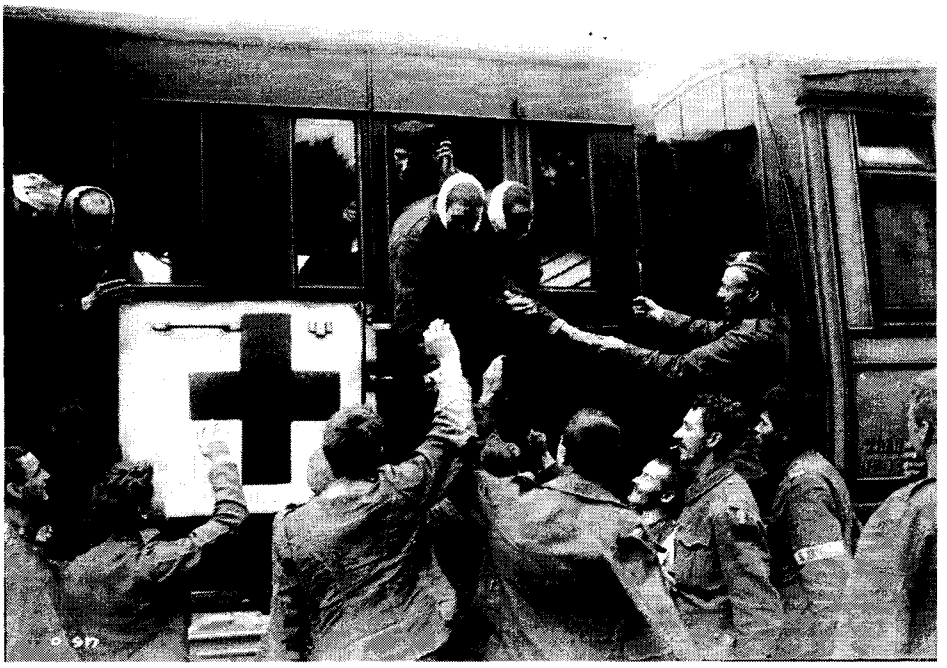

Figure 5– The wounded say good-bye to each other before a hospital train leaves for "Blighty," in October 1916. LAC PA000975.

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The Boer War had proven to be a learning experience, yielding many improvements and ideas that came together in the system of casualty evacuation that the Canadian Army Medical Corps created (based on the Royal Army Medical Corps plan) for use in the event of war. The changes made between 1902 and 1914 were written into military manuals and taught to members of the PAMC and militia. They demonstrate the importance placed on evaluating and changing systems to effect better care and transport of the wounded, creating sanitation and preventative medical practices to reduce the effect of disease on soldiers, and providing ongoing education. All of these elements would continue into the Great War. The evacuation system described throughout this chapter would be used throughout the war, at least in theory, with the men following the same basic route through these units. Nonetheless, there would be many substantial

changes to the personnel, establishment, and capabilities of these units as a result of developments in medical knowledge, military experience, and conditions such as the terrain and weather. But the immediate problem facing the Canadian Army Medical Corps in 1914 was recruitment and the training that the growth of the medical corps required. The PAMC had merely eighteen members, not nearly enough to serve the First Canadian Division, let alone all those units that might follow it across the Atlantic.

Chapter Two

Recruitment and Training

In order to serve the men of the First Canadian Division, the medical corps would have to undertake a massive enlistment drive, just like the rest of the army. The members of the medical corps were enlisted through a variety of methods and came from wide and varied backgrounds. As soon as they arrived at Valcartier Camp in Quebec, they would begin the first of three stages of medical training. A well formulated syllabus based on the training requirements laid out in military manuals allowed the members first to learn and then to implement the training in a real battle situation before the units would serve on their own at the front. Difficulties in training and discipline did arise along the way and a number of solutions were found and implemented to help the medical personnel perform their duties. Ultimately this chapter will examine the education system in place at the war's beginning and the way in which the medical service was made battle-ready. The willingness to change and adopt diverse ideas to improve the medical corps began in training and would continue throughout the war. [1]

The Canadian military had a plan, known as HQC 1209, that was created in 1912 in case of war to mobilize the already existing militia units, including the medical corps. When the First World War began, the Minister of Militia and Defence, Sam Hughes,[2] scrapped the plan for reasons that appear to have involved little more than vanity. As a

[1] According to National Library and Archives Archivist Andrew Horrall, recruitment and training records are difficult to find since the block of files dealing with them was destroyed by the Department of National Defence decades ago in an attempt to save space for records deemed historically important. In addition, units did not begin writing their war diaries until they reached England, nor did they provide much in the way of details until they reached France.

[2] For information on Sam Hughes, see Ronald Haycock, *Sam Hughes: The Career of a Controversial Canadian, 1885-1916* (Waterloo: Wilfrid Laurier University Press, 1986).

result, there was no uniform method of recruiting. Generally Hughes' office sent orders either to military district commanders or commanders of militia units to enlist men and proceed to Valcartier Camp.[3] It was then up to the commanders to raise the men they required. Enlistment in the CAMC was handled in the same ad hoc manner as the rest of the Canadian Expeditionary Force.

No. 1 Canadian CCS of the First Canadian Division was originally a militia unit, No. 2 Canadian Clearing Hospital, commanded by Major Frederick Ford, a forty-year-old militia doctor from Milton, Nova Scotia. Major Ford received the order to mobilize No. 1 Casualty Clearing Station on 10 August 1914 at Liverpool, Nova Scotia, and began holding recruitment parties for doctors and potential other ranks at his home and at local services clubs. Many of the men who volunteered came from Queen's and Annapolis counties, where the recruiting parties were held, but a number of recruits were also found throughout the three eastern provinces. No. 1 CCS trained on its own for a week at Sussex Camp in New Brunswick before leaving for Valcartier on 20 August. By that time, Major Ford had managed to raise enough men to bring the unit to its full peace-time complement of forty-seven men. Once it arrived at Valcartier, on 3 September, No. 2 Clearing was renamed "The Clearing Hospital, CEF" and brought up to wartime strength by taking on an additional forty-one men from No. 1 Clearing Hospital, Toronto. After three weeks' training in Quebec, the unit boarded the S.S. *Megantic* for England, where it would receive its final name, No. 1 Canadian Casualty Clearing Station.[4]

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[3] Andrew Macphail, *Official History of the Canadian Forces in the Great War, 1914-19: The Medical Services* (Ottawa: F.A. Acland, 1925), 17-18.

[4] Library and Archives of Canada [LAC]: Department of Militia and Defence [DMD] Records, RG 9 III B2 No. 5, Adami Papers, file No. 1 CND CCS, Historical Sketch of the First Canadian Casualty Clearing Station, British Expeditionary Force, n.d.

No. 2 Canadian Casualty Clearing Station of the Second Canadian Division took a different approach to recruiting when it was raised in late 1914 and early 1915. This unit was raised and trained in Toronto, drawing a number of men from south-western Ontario. The Commanding Officer, Lieutenant-Colonel George Rennie, a forty-eight-year-old surgeon from Hamilton, focused on recruiting doctors and other ranks from medical schools and militia units. Forty-two of the nursing staff would be recruited from medical schools, the focus being on recent graduates or students in fourth or fifth year. This ensured a certain degree of familiarity and experience in medical wards.[5] The rest of the nursing staff, thirty-five men, were to be recruited from militia field ambulance units and clearing hospitals.[6] This unit was also successfully filled before being sent to England in March 1915. Other units would rely on the militia for help, such as No. 5 Canadian Field Ambulance (Second Canadian Division) from Hamilton, Ontario, which gathered the majority of its men from militia Field Ambulances Nos. 10-13 and No. 1 Clearing Hospital. It was raised late in 1914 and trained at Toronto's Exhibition Park Camp, where volunteers were accepted to fill the spots the militia could not.[7] Some medical corps units did not rely on the militia to recruit members, preferring to secure volunteers by other means. No. 8 Canadian Field Ambulance (Third Canadian Division) from Calgary placed recruitment notices in Alberta newspapers in order to fill its ranks, and was just as successful in doing so as the units that relied on the militia.[8]

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[5] LAC: DMD Records, RG 9 III B2, volume 3751, Personal Diary of Major G.S. Strathy, November 1914.
[6] Ibid.
[7] LAC: DMD Records, RG 9 III B2, volume 3749, file Adami No. 5 FLD AMB, War Diary, No. 5 Canadian Field Ambulance, November 1914-June 1915.
[8] LAC: DMD Records, RG 9 III Volume 5030, microfilm T-10919. 2, War Diary, No. 8 Canadian Field Ambulance. December, 1915. "Historical Record of No. VIII Canadian Field Ambulance."

The largest number of recruits to the medical units served as nursing staff or stretcher bearers. These other ranks came from wide and varied backgrounds. A sample of 370 men[9] reveals that the average age of a volunteer in the medical services was 25.3 years and that eighty-one per cent were unmarried. The country of birth listed on attestation papers showed that the largest group of volunteers, forty-eight per cent, was born in Canada, thirty per cent were born in England, eight per cent in Scotland, four per cent in Ireland, two per cent in the United States, and the final eight per cent of recruits came from nine other countries. Despite the variety of birthplaces, the names on the nominal rolls, such as Ball, Baylins, Coatsworth, Cumberland, Fraser, Hodge, MacDonald, Morton, and Norwich, suggest that the volunteers were overwhelmingly of British descent. Just two medical units, No. 6 and No. 9 Canadian Field Ambulances, were raised in French Canada, both in Montreal. The nominal rolls demonstrate that the French-Canadian units were also filled with men of British descent; very few French names appear on the rolls.

What was interesting about the other ranks was their varied backgrounds. The majority of men who volunteered for medical units did not have any previous medical experience, either through their occupation or service in the militia. Only twenty-nine per cent had served in a militia medical unit or held a position such as a nurse, hospital attendant, x-ray operator, or undertaker that could have provided them with medical training, or at least some familiarity with medicine. The kinds of pre-war occupations

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[9] Statistics were compiled by using the nominal rolls from CCS No. 1-3 and FLD AMB No. 1 & 6. The names were entered and then information about the soldiers was obtained from their Attestation Papers. Where their Attestation Paper was missing the soldier was not included. The units surveyed represent Ontario, Nova Scotia, Alberta, and Quebec to compile a sample that is representative of all regions of Canada. They also represent the First and Second Canadian Divisions, which recruited a year apart, in order to determine differences in the recruiting periods; none were found.

listed on attestation papers include policemen, carpenters, iron workers, shoe makers, and a host of other trades and labour jobs. Fortunately, the medical service was able to recruit from militia units so its men had some military experience to draw on. Fifty-two per cent of those who volunteered claimed to have some previous military experience, either with the Canadian or British militias or in the British regular army. Why these men chose to join medical units despite a lack of medical training is not clear, but training would obviously be an important priority since over half of these men would have to learn the military side of the job and nearly seventy-five per cent of them would have to learn the medical side of the work they would have to perform.

It is not possible to compile similar statistics for the medical doctors who served except to say that the names on the nominal roles are also overwhelmingly of British descent.[10] The military experience of medical doctors cannot be gleaned from the attestation papers because all medical doctors were assigned to a militia unit before receiving an appointment in the army; this makes it appear that all of the doctors had military experience prior to the war according to attestation papers. However, this was most likely only true on paper and did not constitute comprehensive military training or experience. Since the attestation papers do not ask for a specific unit or length of service, it is not clear which doctors were long-standing members of the militia and which may have served for merely days or weeks.

Doctors could volunteer for specific medical units, to be a Medical Officer for a battalion, or for an administrative position, either in Canada or overseas. In their memoirs, front-line doctors rarely discuss their medical practice or position before the

[10] All doctors had to be recognized medical practitioners in good standing with their provincial medical association. However, the attestation papers did not ask for the length of time employed as a doctor, a speciality, or previous employer, so the amount of experience is not clear from military documents.

war, nor do they write extensively about their reasons for volunteering. Those who do talk about their motivation for signing up, such as Major George Strathy from Barrie, Ontario, who joined in 1915, state that they had a duty to their country and its ideals.[11] The only real mention of doctors' pre-war experience was in the history of No. 5 Canadian Field Ambulance. All but one of the doctors of this unit "gave up private practices at home to give their medical and surgical skill to the service of their country ... in each of these cases at considerable financial and personal sacrifice."[12] It is not clear if the experience of No. 5 was common to all front-line medical units.[13]

Despite the call of duty, it was difficult at first for Canada to recruit the number of doctors needed for its medical corps. This was not because doctors were not signing up for war; it was because they were joining the Royal Army Medical Corps (RAMC) instead. Canada was simply not offering a competitive compensation package. The British were offering a considerably higher rate of pay, a larger allowance for clothing and equipment, and a $300 bonus at war's end, while the Canadians were paying doctors significantly less.[14] The British were unapologetic and unwilling to change the rate of pay for a Canadian serving in the RAMC. Furthermore, they gave Canadian medical students who had graduated but had not practiced medicine commissions in the RAMC, for which they would not qualify in the CAMC. The British also accepted doctors who had volunteered for the Canadian Army Medical Corps but decided to switch for the

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[11] LAC: DMD Records, Personal Diary of Major G.S. Strathy, November 1914.
[12] Frederick Noyes, *Stretcher Bearers... at the Double! History of the Fifth Canadian Field Ambulance Which Served Overseas during the Great War of 1914-1918* (Toronto: Hunter-Rose Co., 1937), 2.
[13] Tracing medical professionals through provincial medical registers is problematic because of the incomplete information they contain. See, for example, http://www.library.dal.ca/kellogg/digitalcoll/MedicalRegisterNS/mrns.htm
[14] LAC: DMD Records, RG 9 III C10 volume 4557, folder CCS #2, Paymaster Files, 30 March 1915.

higher pay.[15] The Canadian military had no choice but to change its pay scales in order to attract and keep Canadian doctors and medical school graduates.

The Canadian Army Medical Corps faced problems beyond recruitment. Officer selection was a key area of dispute. While all doctors in the medical service were commissioned as officers, they received different ranks and all appointments were subject to approval by Ottawa. The unit Commanding Officers were generally the commanders of a militia unit in the military district or were appointed by the commander of the military district in consultation with the office of the Minister of Militia and Defence. The Commanding Officer was then free to choose the doctors he wanted to recruit into the unit, along with the other ranks, eventually submitting his list to the Minister in Ottawa for approval. In some cases the process was questioned as doctors with many more years of experience or better qualifications were taken on strength at a lesser rank than other men. When he received word that No. 2 Canadian Casualty Clearing Station was going to be formed and that he would be an officer, Major Strathy wrote:

> COCONER RENNIE [sic] has returned from Ottawa, and the composition of the 2nd C.C.S. has been changed, he says by the M. of M., ~~but I believe he himself has named his Officers.~~ [sic] … it looks like a political deal with Col. Rennie getting his way to some extent, as Watts is a friend of his and also Jackes and Col. Osborne. Col. Fotheringham has protested and wired Ottawa 'urgently requesting that Robertson be put on instead of Watts'[16]

The existence of political or patronage appointments was a common complaint at the time. Frederick Noyes, a stretcher bearer in No. 5 Canadian Field Ambulance, argued that "politics had a lot to do with appointments in the fifth" right from the beginning; essentially, he believed that the ability of the doctor or his general fitness for the job was

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[15] Do.
[16] LAC: DMD Records, Personal Diary of Major G.S. Strathy, November 1914.

not a primary consideration in choosing the officer.[17] Officer selection was not just a problem at the time of recruiting the first units for overseas service. Problems in this area would continue throughout the war and come under public scrutiny when the Bruce Report on the CAMC was released in 1916.[18]

The Canadian Army Medical Corps also faced problems retaining the other ranks of the medical units. The issue of medical students in this regard was unique to the medical corps. The problem grew out of the shortage of doctor volunteers and the number of doctors who became casualties overseas. In order to increase the number of doctors in the service, it was decided in November 1915 that all fourth- and fifth-year medical students would return to Canada to complete their medical training.[19] This was devastating to front-line units that had relied on medical schools to help them recruit students. Hardest hit was No. 2 Casualty Clearing Station, which had recruited more than half of its other ranks from medical schools. It took time to replace all of the medical students, some of whom had served for over a year; the reinforcements needed training and lacked the experience that the medical students had gained. So, the policy of recruiting medical students, while positive in theory, fell short in practice.

As with non-medical military units, a certain number of the recruits had to be discharged. Some of these men had discipline issues, such as drunkenness and rowdy behaviour, and others were discharged as "not likely to become efficient soldiers."[20] Nonetheless, the CAMC was able to fill its ranks throughout the war. However, the lack of medical experience among the other ranks, combined with the limited military

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[17] Noyes, *Stretcher Bearers... at the Double!, 2.*
[18] The Bruce Report will be discussed in more detail in Chapter 5.
[19] LAC: DMD Records, RG 9 III B2, volume 3749, file Adami No. 1 FLD AMB, War Diary No. 1 CND FLD AMB, 27 November 1915.
[20] LAC: DMD Records, War Diary, No. 5 CND FLD AMB, 2 December 1914.

experience of the entire corps, meant that a strong emphasis was placed on training not just in Canada, but in England and France as well. Training would generally proceed well, but inevitably presented a challenging set of issues.

All medical units recruited for the First Canadian Division trained at Valcartier Camp in Quebec, which was originally purchased in 1913 as a 4,391-acre training camp that could accommodate 5,000 troops. It was right on the Canadian Northern Railway, allowing for easy troop movement, and sixteen miles northwest of Quebec City. At the outbreak of war the plan was to train 25,000 troops at Valcartier. As a result, more land was purchased to train the First Canadian Division, creating a 12,468-acre training site. By all accounts, the land around the training grounds was beautiful. Rocky wooded hills rose a thousand feet above the plains on the north and eastern boundaries, while the Jacques Cartier River flowed along the western boundary. By 8 September 1914 the camp was training 32,665 men, including the medical staffs of the two stationary and general hospitals as well as the clearing hospital that all the medical units served.[21] The units that followed did not necessarily train at Valcartier, using facilities such as Exhibition Park and Upper Canada College, a prestigious boys' private school, in Toronto, among others.

The First Canadian Division received three weeks' training in Quebec before entraining for the ships to go to England, but subsequent units could have several months' training before they left for overseas. However, the First Canadian Division received more training in England than the other units, so in the end all units received approximately the same number of months training. The precise length of the training

[21] Colonel A. Fortescue Duguid, *Official History of the Canadian Forces in the Great War, 1914-1918: General Series Volume One, August 1914- September 1915* (Ottawa: King's Printer, 1938), 34-35, 48, and 69.

period varied, based on the progress of the unit and, at times, the need for units at the front.

Officers had special military courses to attend in order to maintain their rank. The average day was spent learning military and stretcher drills, attending lectures, and taking horseback-riding lessons. Officer courses were meant to train doctors in military discipline and enable them to run the drills for the other ranks. The other ranks' typical day was not radically different from an officer's while training. He endured physical drill, military drill, attended lectures, practiced first aid, and went on route marches. In addition, once a week the units went out to the country to practice collecting the "wounded" and other field ambulance work.[22]

Accounts of training throughout the war are remarkably similar. In 1915, No. 5 Canadian Field Ambulance at Exhibition Park in Toronto recorded training in infantry drill, stretcher drill, and first-aid treatment such as bandaging, putting on splints, and stopping haemorrhages. They learned how to roll their puttees and pack their kit, while the horse transport men took riding instruction and the motor transport men took mechanical classes.[23] No. 2 Canadian Casualty Clearing Station also trained in 1915, at Upper Canada College in Toronto, which was converted to a hospital unit. No. 2 recorded lectures and drills, route marches, tactical field exercises, fire drills, and kit inspections.[24] No. 11 Canadian Field Ambulance, constituted from the various western universities, trained at the Manitoba Agricultural College in Winnipeg in 1916 where the unit reported physical training, lectures on sanitation, anatomy, diseases, daily first-aid,

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[22] LAC: DMD Records, Personal Diary of Major G.S. Strathy, November 1914.
[23] Noyes, *Stretcher Bearers... at the Double!*, 6.
[24] LAC: DMD Records, RG 9 III B2, volume 3747, file No. 2 CCS, War Diary, No. 2 CND CCS, February and March, 1915.

and stretcher drill.[25] No. 8 Canadian Field Ambulance trained in Alberta in 1916. Stretcher drill was the focus of training among the men of this unit. It consisted of a number of men being labelled, on cards pinned to their tunics, with various wounds. Then, the bearers and officers practiced finding the wounded, bandaging them according to the wound on the card, and carrying them to the ambulance unit. They also practiced setting up advanced dressing stations and carrying the wounded to the main dressing station.[26] While the structure of training remained constant throughout the war, the topics covered and the actual content of the drills did not. The main difference in training came with knowledge. While stretcher drill was part of training every year, the actual drill evolved as knowledge gained overseas was assimilated; this was also true of the content of lectures.

One of the other differences in training through the war was in the equipment used; it was not so much that the kind of equipment changed, but rather the availability of the equipment changed. The First Canadian Division medical units were equipped with haversacks and field panniers, as well as all the necessary medical equipment, but they did not have any ordinance stores (such as eating utensils, bedding, and beds). In addition, they lacked first-line transport such as general service wagons, which were wooden horse-drawn carts, and ambulance wagons, which were actually motor trucks that carried some medical supplies and could accommodate four stretcher cases; First Canadian Division units would not receive these or the ordinance stores until they arrived

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[25] Canada, Militia, Canadian Expeditionary Force, 11th Canadian Field Ambulance, *Diary of the Eleventh: Being a Record of the XIth Canadian Field Ambulance (Western Universities) Feb. 1916 - May 1919* (Winnipeg, 1919), 10-11.

[26] LAC: DMD, War Diary, No. 8 Canadian Field Ambulance, December, 1915. See also entry for 3 May 1916.

in England.[27] In contrast, No. 5 Field Ambulance, while training in 1915, had a transport section that could train with fifty-five horses and seven horse-drawn ambulance wagons and general service wagons, and received three motor ambulances while training at the camp.[28] This does not mean that units training later in the war avoided some of the issues that plagued the units of the First Canadian Division. For example, the men of First Canadian Division were measured for uniforms that took on average ten days to arrive. Despite the measurements, many inappropriately sized uniforms appeared – either too small or large for the soldier for whom it was meant. Random uniform sizes arriving was something that occurred throughout the war, though the organization of this was worse for those in the First Canadian Division. To solve the issue the men swapped clothing items in a bid to assemble a sharp-looking uniform that fit well; however, it was often "solely through liberal expenditure of the men's own money that a credible appearance was obtained."[29]

When the soldiers who were to make up Canada's First Division were at Valcartier Camp, the medical corps had much work to do. All of the recruits had been medically inspected in their hometowns at the time of recruitment to ensure that they were physically and medically fit for duty, but many of the men sent to Valcartier should not have passed the medical exam. These men made it into the service due to a combination of over-zealous doctors trying to send as many men as they could, men themselves lobbying the doctors because they desperately wanted to do their bit, and a lack of time to perform proper medical exams on the stream of hopeful soldiers coming

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[27] Macphail, *Official History of the Canadian Forces in the Great War, 1914-19,* 22-23.
[28] Noyes, *Stretcher Bearers... at the Double!,* 4-5.
[29] Ibid, 5.

through the enlistment centres.[30] At Valcartier, the doctors inspected the men whom the Commanding Officers suspected were not medically fit to go overseas. In addition, the doctors had to inoculate all of the men against typhoid and smallpox. It was during the inoculation process at Valcartier that doctors began to gain a reputation among the troops as "croakers", a name given to a stern Medical Officer.

While giving inoculations, the Medical Officers had to be stern. It was important to practice preventative medicine along with any other measures possible to stop disease, which had historically resulted in more casualties than battle. A soldier in training at Valcartier described the experience of inoculations: "I must say the doctors had it down to a pretty fine point. We were led like sheep to the slaughter in droves. Special batches of ruthless medical men stood over us, and with arms bared and iodined [sic], the cold steel was shoved into us." He went on to describe the doctor as "standing by and gloating over our sufferings ... [an] unbribable [sic] policeman" who would ensure that no one escaped the inoculation needle. The strange nervous tension over receiving inoculations dominated the soldier's thoughts: "It was remarkable to notice how nervous everyone was; men who afterwards faced every form of death from rifle bullet or shell quailed before this simple inoculation."[31]

Beyond the inoculations and second physicals, the reality of military life was that training resulted in injuries and illness. The medical services set up their units as functioning hospitals in order to treat these cases and to train their own men in medical procedure and the work they would take on overseas. However, the men of the front-line medical units had to learn to march long distances and endure military life, so they

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[30] Macphail, *Official History of the Canadian Forces in the Great War, 1914-19,* 158.
[31] Herbert Rae, *Maple Leaves in Flanders Field,* second impression (Toronto: William Briggs, 1916), 23-24.

needed to receive military training as well. This created a conflict over whether military or medical training should come first, demonstrating that difficulties arose between the dual roles of the medical personnel even in training. At Valcartier, No. 2 Canadian Field Ambulance was advised by the Camp Commandant to have a separate unit run its hospital so that the unit could begin field training. The Commanding Officer of No. 2 disagreed, stating that it was essential for all ranks in the field ambulance to receive training in their hospital duties. The concept of having another unit run the hospital so his section could be relieved to attend field training caused the Commanding Officer to observe that "the excellent opportunity for training of all ranks in a most important direction is not appreciated as fully as it should be."[32] The Medical Officers of the First Canadian Division generally felt that medical training was more important than military training, as the Commanding Officer of No. 2 Field Ambulance observed at Valcartier:

> There seems to be a desire on the part of those at Camps to carry out Field Training without regard to Hospital Training.
>
> Having regard to the conditions overseas at the present time, it would appear that proper training in Hospital Management, nursing of the sick, First Aid, etc. are more important than Field Training, such as is given the personnel of Field Ambulances. No better opportunity for this training can be given than the actual carrying on of a Camp Hospital.[33]

A compromise was reached when the Commanding Officer requested that personnel for field ambulances be increased so that they could take shifts working in the hospital and have time for field training. This worked well in the Canadian training camps, but when the FLD AMB landed in England it became much busier and could barely keep up with the number of patients it had to see, let alone find time for military training. In this case, the Commanding Officer did not offer any apologies or request

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[32] LAC: DMD Records, RG 24 volume 1337, file HQ 593-3-21-6, Letter from "A" section No. 2 Field Ambulance Depot to Valcartier Camp Commandant, 26 July 1915.
[33] Do.

more men since there were none to request. Instead of filing an overseas training report, he wrote to the Secretary of the Militia Council, "I beg to point out that as "B" Section No. 2 Field Ambulance is carrying out the work of a general hospital it is impracticable for this unit to carry out Field Training. No report has therefore been rendered."[34] There was no further correspondence over field training from any of the First Canadian Division Medical Officers and no clear resolution of how to approach training a medical unit for both military and medical duties.

When the First Contingent went overseas, it took three field ambulances, one casualty clearing station, two general hospitals, two stationary hospitals, and a sanitary section. These medical units set up treatment areas to deal with injuries or illness aboard the ship, while the Medical Officers held a daily sick parade on board and also ran the dispensary. Each day the medical volunteers received two lectures on various aspects of first aid, as well as attending regular drills. The men would march or run around the ship's deck, do callisthenics, and practice loading and unloading ambulance wagons if they were available.[35]

At the end of the journey across the Atlantic, the men were greeted by enthusiastic crowds that raised their spirits. No. 1 Canadian Casualty Clearing Station had another surprise waiting. The Commanding Officer had written a personal letter to Henry Ford about obtaining a new motor ambulance for his unit.[36] Ford did not answer the letter, but instead sent a motor ambulance directly to England. No. 1 Casualty

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[34] Ibid, Letter from GOC Second Division to Secretary Militia Council, 31 January 1916.
[35] LAC: DMD Records, RG 9 III B2, volume 3751, Personal Diary Captain P.G. Bell, September-October 1914.
[36] For more information on ambulances, see H. Buist, "Motor Ambulances for War Service," *British Medical Journal,* January 1915, and Katherine Barkley, *The Ambulance: The Story of Emergency Transportation of Sick and Wounded Through the Centuries* (New York: Expedition Press, 1978).

Clearing Station eventually took the ambulance to France, where it became the first Ford ambulance used in the British Army. These vehicles were later employed extensively by field ambulances for front-line operations. The lightness and adaptability of the Ford ambulance made it particularly efficient when travelling over bad roads; the excellent service these vehicles provided earned them the nickname "Flying Bedsteads."[37]

Training in England continued along the same lines as in Canada, but became more refined. Manoeuvres were organized for regimental aid posts and field ambulances to stress the importance of getting in touch with each other immediately after they were set up. The necessity of maintaining constant communications to ensure that all the medical units knew about the movements of any other units so they could find the new positions was also stressed.[38] Exercises were developed to simulate combat conditions, such as a mock battle to recapture and defend a railway. The soldiers being trained were told that the enemy "Blue Force", with an estimated strength of three infantry battalions, two horse artillery battalions, and two cavalry squadrons, had seized Ashford. Blue Force was holding the Ashford and Ramsgate branch of the South Eastern & Chatham Railway from its junction with the main line of the railway to approximately five miles down the line. Intelligence had been informed of a convoy sighted off Folkestone and it was believed that the objective of Blue Force was to co-operate with a force that would be landed from the convoy. [39] The scheme then set the positions of the Canadians, and the mock battle to recapture and defend the railway before the new force landed began. While the infantry units performed their exercise, mock injuries occurred that the

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[37] LAC: DMD Records, RG 9 III B2 No. 5, file No. 1 CND CCS, Historical Sketch of the First Canadian Casualty Clearing Station, British Expeditionary Force, n.d.
[38] LAC: DMD Records, Personal Diary Captain P.G. Bell, 12 November 1914.
[39] LAC: John Fotheringham Papers, MG30 E53, Volume 6, O.C. CAMC, Second Division, Brigade Training: Scheme for a Field Ambulance, n.d.

stretcher bearers attended and sent through the front-line system of units. As the infantry was successful, the medical units were forced to move forward to new dugouts, a process that challenged them to find each other in new locations and called attention to the need for constant communication.[40]

Training for the First Canadian Division on Salisbury Plain was difficult due to the weather. It rained constantly, and most of the units did not have the proper equipment to care for the wounded and ill; the equipment that the units did have was not up to British standards. The wagons that went over with the units were "shoddy" and too wide to turn on European roads.[41] Nor were they sturdy enough to carry the equipment that they needed, so all the wagons and carts had to be replaced.[42] This was difficult since Canadian units were generally supplied from Canadian sources, which built the same wagons and produced the same equipment that was being rejected by the British. The British had to supply their own units and could not take care of the Canadians too. Fortunately the equipment was replaced through a combination of Canadian and British sources before the units were sent to France.[43]

Sitting in the mud, listening to the rain, and with little desire to endure more training, the infantrymen created some discipline problems for Medical Officers to attend to. The bulk of the problems occurred during the morning sick parade when large numbers of men appeared in an effort to get some rest in a dry, warm hospital ward, or any other kind of comfort they thought the Medical Officer could provide. The soldiers generally found that the "Doctor was frequently not at his best at these early-morning

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[40] Do.
[41] Macphail, *Official History of the Canadian Forces in the Great War, 1914-19,* 32.
[42] Ibid, 32-33.
[43] John Adami, *War Story of the Canadian Army Medical Corps,* Volume One. (Toronto: Musson, 1918), 81-82.

séances. In fact, many of his extensive clientele no doubt found him a trifle unapproachable and unsympathetic."[44] In fact, this was a façade that the Medical Officers came to rely on to keep the sick parade in check. Once in England, many doctors complained that their daily sick parade numbers were growing and becoming unmanageable. One doctor awoke at seven in the morning to find 480 men lined up for the sick parade. He worked until the evening and still had a long line, which prompted a call for medical assistance. Another Medical Officer came to assist, and the overworked doctor naively admitted to him, "I do not think all the men reporting sick are actually sick, just pretending." The advice received became a sort of mantra for the daily sick parade: "I never permit the parade to be bigger than thirty; if there are anymore, I go sick myself – that settles them."[45] Learning to enforce military discipline was important for the medical officers to ensure that long sick lines did not occur so they could perform their duties and that the medical service was not used as a method to gain a rest or escape duty.

The first severe medical problem facing the Canadian Army Medical Corps occurred on Salisbury Plain, with an outbreak of cerebral spinal meningitis. By February 1915, merely a month and a half after its arrival, the CEF had thirty-nine cases, twenty-eight of which proved fatal.[46] Isolation became a key tool in fighting the deadly strain of meningitis. If any soldier showed the slightest sign that he might be ill, he was isolated along with the men in his hut or tent until the doctors confirmed that it was meningitis. There were no orders covering how to treat the disease, and no cure was found. As the

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[44] Rae, *Maple Leaves in Flanders Field,* 37.
[45] Ibid, 42.
[46] Desmond Morton, *When Your Number's Up: The Canadian Soldier in the First World War* (Toronto: Random House, 1993), 28.

men went to France the medical corps was given instructions to "spray with a weak solution of formaldehyde (a few drops to each pint of water) on the throats, noses and ears, also the clothing of the men called out on active service" in order to prevent any further outbreaks.[47]

Another aspect of the training program was temporarily posting Medical Officers in British hospitals during their stay in England. To that end, Captain Percy Bell, a thirty-year-old physician from Winnipeg, Manitoba, and Captain John McQueen, a twenty-seven-year-old surgeon who was originally from Scotland but resided in Brandon, Manitoba, before the outbreak of war, were sent from No. 3 Canadian Field Ambulance to a British hospital. There they saw many British soldiers who had been wounded in the Battle of the Aisne; they were able to examine and treat wounds that were not necessarily found in civilian hospitals, and reported learning many new techniques and ideas about how to approach certain injuries.[48] Seconding for such purpose was common for all Medical Officers. This training did not replicate what the officers would experience in the front lines, but it was their first time dealing with the variety of war wounds. Doctors were also seconded so that they could read medical journals they had missed while in training; Captain Bell regularly went to the Royal College of Surgeons library to catch up on his reading. Training in England was also a time for Medical Officers, many of whom had never had a military command before, to think about what it meant to be a leader. Officers worked hard to define their role as a disciplinarian and determine the kind of officer they wanted to be. Captain Bell often thought about how to be a good officer. After a short time in England, he came to the conclusion that "The men only demand that

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[47] Canada, Militia and Defence, *General Orders, Militia Orders and Precis of HQ Letters Bearing Upon the Administration of the Canadian Army Medical Service, Aug 6 1914-Dec 31st 1916,* 46.
[48] LAC: DMD Records, Personal Diary Captain P.G. Bell, 16 and 26 February 1915.

their officers should take a genuine interest in their progress and welfare – this being assured they will trust him through thick and thin."[49]

Learning what it meant to be a leader and catching up on medical journals were not the only things that Medical Officers had to do to prepare for the battlefields of France. There were military-specific medical issues that had to be learned in order to ensure the health of the men; many of them would appear in medical journals, but not until months after they had been discovered. Some of these issues were taught during training, such as learning the role of the Medical Officer while the men were on the march, an uncommon issue for civilian practitioners. While a soldier was marching, his internal body temperature rose to 100.5 degrees Fahrenheit. However, if his body temperature reached 102 degrees Fahrenheit he had a pathological disorder. It was the job of the Medical Officer to watch for signs of trouble, such as the man starting to sway, muscles starting to tremble, a loss of coordination, and marching with a flushed face and open mouth, which meant that the body was not dispersing a sufficient amount of heat. Keeping the men's legs from tiring and aching too much was also the responsibility of the Medical Officer. At halts in the march, the men would be ordered to remove all of their equipment and lie down; on long marches the men would be ordered to massage each other's leg muscles. The Medical Officer had to ensure that the men buried their excreta for sanitary reasons while they rested, and also examined the soldiers' feet at intervals to look for blisters. When blisters were found, they were popped, drained, and painted with a tincture of iodine, then covered with a bandage that allowed for drainage. The body temperature of a man with a blister would rise an additional degree while he marched. This meant that the soldier would produce twenty per cent more heat and

[49] Ibid, 23 December 1914.

expend twenty per cent more energy. The only way to prevent blisters was with good boots and socks. At the end of each day the men were ordered to change their socks and wash the used ones so that they would be ready for the next day. Hard socks, socks that were badly darned, or socks with holes in them caused seventy per cent of all disabilities from sore feet, proving that this seemingly trivial responsibility was actually of the utmost importance. Fortunately, the training process presented many opportunities for the Medical Officers to practice watching the men on the march.[50]

While all aspects of training were important and served a purpose, the most effective training occurred in France. Before any Canadian unit saw action in France, various members would be sent to shadow British units at the front. No. 3 Canadian Field Ambulance sent members to the front to learn from the British units in March 1915, just a month before it would see its first action in the Second Battle of Ypres. Captain Alwyn Smith, a surgeon who was originally from England but had moved to Canada and joined the CAMC at Valcartier, was sent for training with Captain Percy Bell, three motor ambulances, three horse ambulances, three stretcher squads, and thirty men to No. 17 Field Ambulance. The stretcher squads were sent out with British chaperones to teach them how to react while under real fire for the first time. The same was true for the thirty men who served alongside the men of the British unit, performing the tasks they would soon have to accomplish alone in their Canadian unit. Captain Smith was assigned to the field ambulance's surgical specialist, Captain Turner. He wrote his Commanding Officer detailing three treatments he had learned during his training: that peroxide of hydrogen

[50] Anonymous, "Military Hygiene and the Efficiency of the Soldier," *British Medical Journal,* March 1915, 428.

was as efficient as iodine; that all cases of wounds due to shrapnel should be rubbed over with powdered potassium; and that all belly wounds should be treated conservatively.[51]

Captain Bell was assigned to the Commanding Officer for part of his training to learn about the disposition of the ambulance during war conditions; he also wrote to his Commanding Officer about his training experiences. The Commanding Officer of No. 17 only opened up two sections of his field ambulance, one for surgical cases and the other for medical cases. He held a section in reserve so they could help deal with the strain of emergency conditions. In addition, Captain Bell learned that the advanced dressing station was not always used as a necessary link in the evacuation chain; under heavy battle conditions, it was often used as a collecting post for the wounded. In the case of some injuries, such as abdominal and head wounds, the advanced dressing station was skipped entirely and the wounded man was taken straight to the main dressing station.[52] Essentially, Captain Bell was reporting that the arrangements of the field ambulance had to be flexible and capable of changing at a moment's notice, based on the military situation and the medical needs that the battle presented. There was no formula for the ambulances to follow; they would have to use the knowledge they acquired in the British units to make their decisions as to how their field ambulance, regimental aid post, or casualty clearing station would be used in any given battle.

As for the stretcher bearers, learning their trade in the field with live patients was an eye-opening experience that demonstrated the work was far more difficult than training had made it seem in Canada and England. Agar Adamson was a forty-eight-

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[51] LAC: DMD Records, RG 9 III B2, volume 3749, file Adami No. 3 FLD AMB, War Diary, No. 3 CND FLD AMB, Appendix "B" Letter from Capt. S. Alwyn Smith to O.C. No. 3 CAN FLD AMB, 19 March 1915.

[52] Ibid, Appendix "C," Letter to O.C. No. 3 CND FLD AMB from Capt. Bell regarding training with the 17th FLD AMB, March 1915.

year-old Montrealer who enlisted in the privately-funded Princess Patricia's Canadian Light Infantry in 1914 despite being blind in one eye. He was selected to work as a stretcher bearer and sent forward in March 1915 to train in collecting the wounded at the front lines. There he discovered that it was difficult to dress a wounded man in a bombarded trench since the soldier's clothes were almost always soaked from rain and clung tightly to his body. Adamson described attempting to dress a soldier with a bullet wound to his shoulder:

> You cannot take off his fur coat, his serge, his shirt and vest to get at him. It is too painful and really quite impossible, so you cut it off with a knife and this is most difficult and few men have really sharp razor blades or knives which are required. The only thing you do is to give him opium and then try to pour two iodine capsules over the place which is often impossible to see as you cannot use a light; the moon helps. You then use safety pins (which all men carry) to fashion together part of his cut clothing.[53]

Fortunately for Adamson, he had time to work out what to do since he had many experienced British stretcher bearers to assist him in collecting the wounded and could focus on the one man he was trying to save. But once the Canadians took up their positions in the Ypres Salient just a month later, there would be no time to consider how best to get through the clothing of the wounded.

Learning would not end once the Canadian Army Medical Corps took its place in the battlefield; it would be an ongoing process throughout the war. That there were always new procedures or treatments to be learned became abundantly clear to the Canadians when the medical staffs received Circular Memorandum No. 6 as they arrived in the trenches in April 1915, days away from their first battle. Circular Memorandums were a key way in which communication occurred throughout the war, usually originating from the DGMS and sent to all the medical units. Memorandum No. 6 was

[53] N.M. Christie (ed.), *Letters of Agar Adamson, 1914 to 1918* (Nepean: CEF Books, 1997), 34.

about treatment of the wounded before they were evacuated from the front. Doctors suddenly learned that, because of the French soil, all wounds were to be assumed septic or infected. As a result, sutures were not to be used or, if used, the doctor was to leave the wound partially open to allow for drainage using large rubber tubes, rather than gauze. The bearers had to make sure that the bandages were not applied too tightly, which had been part of their training: bandages that were too tight caused problems when limbs swelled up. It was also the doctor's responsibility to check dressings frequently to make sure the wound was not swelling beyond the bandage. [54]

The same memorandum stipulated that staff at the casualty clearing station now had to make arrangements to hold patients (and add nursing staff to care for them) since it was decided that no patient who underwent an operation would be moved for twenty-four hours. In addition, a new operation would be performed at casualty clearing stations on compound, comminuted fractures. The Medical Officer would clean the wound with the patient under anaesthetic, provide a splint, and allow for free drainage of the wound. Furthermore, all chest wounds would remain in the casualty clearing station for a week since recurrent bleeding was easily caused by movement. Abdominal wounds were to be cared for at these units, too, but surgery was not indicated since "it should be remembered that wounds of the intestines which can be sutured are rare… [and] many patients with wounds in the upper part of the abdomen and the flanks recover without

[54] LAC: DMD Records, RG 9 III volume 3752, file 3-3-3, Circular Memorandum No. 6, Treatment of wounded before evacuation from the front, from A.T. Sloggett Director General Medical Service British Forces in the Field to all Directors Medical Service, Deputy Directors Medical Services, Assistant Directors Medical Service and ALL Medical Units, April 1915.

operation."[55] The memo showed that experience in the field was proving that training was not sufficient and would have to be improved upon.

As the Canadians who served temporarily with the British discovered, the evacuation system had to be able to change as battle revealed the weaknesses in practices and procedures. While this kind of learning would continue through the war, the Canadian Army Medical Corps was considered ready to take its turn in the line in April 1915 when the First Canadian Division assumed its position in the Ypres Salient. The men had been through rigorous drills and countless lectures, lived in poor conditions, and had experienced a taste of battle conditions at the front. There was nothing left that the military or medical establishment could do to prepare them for what lay ahead. The question was how they, and the system, would respond when the casualties began to pour into their units and their training was tested against the experience of battle.

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Chapter Three

1915

The Canadian Army Medical Corps would fight several battles through 1915. The experience gained in these battles demonstrated a need for systemic changes as well as a great deal of research and innovation in medical treatment. The majority of these changes came as a result of the problems endured in the CAMC's first action during the Second Battle of Ypres.[1] Examining the experiences of each medical unit in the evacuation system at Ypres demonstrates what the medical service endured, several problems with the evacuation system that would have to be dealt with, and the need for new medical treatments and ideas.

The Canadian Army Medical Corps was settling into its new stations at Ypres when the Germans launched a surprise attack. There had not been enough time for the Canadians to learn the terrain, which would put severe pressure on the medical units as well as the infantry. Each unit in the medical service faced different problems throughout the battle. Ypres was the ground on which the CAMC would answer a number of questions: Would it stand the strain of a casualty-heavy battle? "Were the separate parts [aid posts, dressing stations, and staff from the bearers back to divisional staff] so coordinated that without preparation they would carry on like clock-work?" Would the men be able to manage the problems of the situation?[2] A unit-by-unit examination of the medical corps during the battle will demonstrate that the CAMC was indeed up to the

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[1] For more information on the Second Battle of Ypres see George Cassar, *Beyond Courage: The Canadians at the Second Battle of Ypres* (Ottawa: Oberon, 1985); Beatrix Brice, *The Battle Book of Ypres* (Stevenage: Spa Books in association with Tom Donovan Military Books, 1987).

[2] Library and Archives of Canada [LAC]: Thomas Brenton Smith Papers MG30 E31, Clearing: The Tale of the First Canadian Casualty Clearing Station, British Expeditionary Force, 1914-1919. Smith, Clearing, 114-115.

task. While the CAMC was not specifically prepared for what awaited it, the men of the medical corps adapted as the battle wore on and kept the system of casualty evacuation functioning, despite the difficulties that arose throughout the Second Battle of Ypres. The experience at Ypres not only demonstrated what the medical corps was capable of managing, but was reviewed and studied afterwards to improve the evacuation system and implement new medical treatments and ideas as the corps prepared for future campaigns.

The ancient cloth trading city of Ypres was dominated to the north by a ten-kilometre ridge, which the enemy held. The Germans thus had a distinct advantage in that they could observe much of the lower ground in the Ypres Salient. The Canadians moved into the line in the middle of April, immediately realized that the 'ideal' evacuation system that their training had envisioned would not work on this terrain, and made an effort to correct the medical plan that had been in use in the salient. The aid posts were two miles behind the trenches, too far for the stretcher bearers to carry the wounded, and there was no way to use ambulance wagons to assist them. The Regimental Medical Officers decided to move the aid posts forward and try to hide their whereabouts by moving them to the side of the slope where they felt the Germans' view would be obstructed.[3] A problem was that the Germans would be able to view the bearers carrying the wounded to the aid posts. As a result, all the wounded would have to be collected at night.[4] No. 2 and No. 3 Canadian Field Ambulances were sent to villages

[3] George Adami, *War Story of the Canadian Army Medical Corps* (Toronto: Musson, 1918), 100-101.
[4] LAC: Department of Militia and Defence [DMD] Records, RG 9 III, volume 3751, file Capt W.M. Hart, Personal diary of Captain W.M. Hart.

near the front to set up their stations. No. 2 Field Ambulance set up its advanced dressing station at a road junction in the village of Wieltje; its main dressing station was in the north-east corner of Ypres itself. No. 3 Field Ambulance set up its advanced dressing station about three-quarters of a mile to the north-west of Wieltje using buildings on a farm; its main dressing station used a girls' school at Vlamertinghe, two miles east of Ypres on the main Poperinghe-Ypres road.[5]

The descriptions that follow, both in this and later chapters, will examine the response of individual elements of the CAMC (stretcher bearers, RAP, FLD AMB, CCS) to battle. This will allow an exploration of the problems and solutions that each part of the medical system experienced. All units of the CAMC would eventually feel the strain of battle at Ypres but the pressure was first felt by the stretcher bearers. This was due to the high number of casualties, having to endure poison gas[6] with little in the way of protection, and the long return trips from the front to the regimental aid posts and from the RAPs to the field ambulances that caused severe exhaustion. In addition, there were no reinforcements to help the bearers, and the horse-drawn ambulances were not able to take on a greater workload. The limited number of stretcher bearers, combined with the exhaustion they experienced, would become the single most important aspect of the battle in terms of the lessons learned and the new ways in which the CAMC would approach future battles.

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[5] Adami, *War Story of the Canadian Army Medical Corps,* 100-101.

[6] For more information on gas warfare see Tim Cook, *No Place to Run: The Canadian Corps and Gas Warfare in the First World War* (Vancouver: UBC Press, 1999); N.M. Christie, *Gas Attack: The Canadians at Ypres, 1915* (Nepean, Ontario: CEF Books, 1998); L.F. Haber, *The Poisonous Cloud: Chemical Warfare in the First World War* (Oxford: Oxford University Press, 1986).

The beginnings of the Battle of Ypres were shocking as the Germans launched a surprise attack and broke the line between the Algerians and the Canadians. It was all the Canadian and French troops could do to fill the gap and press the Germans back. Making it even more difficult was the use of gas that was causing a severe number of casualties for the medical system to deal with. The system of casualty treatment and evacuation was set in motion as soon as a bullet, shell, or gas cloud wounded a Canadian soldier. The majority of the wounded were carried out by the stretcher bearers under cover of darkness. This was a result of the military conditions. The Germans broke through the Canadian/French lines and, while the Canadians were able to close the gap, they were unable to push the Germans back to regain the lost ground. This meant that many of the casualties lay in No Man's Land between the two armies. Because men who ventured into No Man's Land in daylight would be shot before they could fully emerge from the trenches, the wounded had to be evacuated at night.

By the second night of the battle, the Canadian/French lines had been pushed back but were stabilized by reinforcements fighting as hard as they could to regain the lost ground and ensure there were no gaps in the line. The experiences of the stretcher bearers were intense and it was impossible to keep up with the number of wounded. The experiences of Captain Ernest Rudolf Brown, who joined the CAMC at the outbreak of the war at forty-seven years of age to become Medical Officer of the 13th Battalion, were similar to those of the stretcher bearers and provide a window to their experiences. Brown went out looking for wounded soldiers with his medical sergeant to assist the bearers who were too few in number and becoming exhausted from the workload. The darkness and the shell-pocked ground made walking difficult. The German shelling had

destroyed all communications between his unit and any others, so Brown and his sergeant walked on opposite sides of the road and shouted out "any wounded here?!" They eventually reached the artillery batteries, which were then in the process of pulling back, when they learned of a wounded officer hidden in a dugout down the road. They searched for some time and finally found the officer in a tiny dugout. He had suffered a fractured knee that had been splinted with a bayonet. The two medical men had a difficult time manoeuvring the officer out of the dugout, but eventually managed to get him free and evacuate him.[7]

Owing to the dearth of stretcher bearers, and Medical Officers who were able to assist them, the wounded were often helped by other infantrymen with no medical training. The infantrymen could not evacuate the wounded to the rear since they had to continue to fight, so they moved them to areas that seemed out of harm's way and under cover, where they could wait in relative safety for the bearers to find them. This was the case when Captain Brown came upon a farm house that accommodated some twenty wounded men. There was no Medical Officer in the area and he could not treat all of the men with the limited supplies he carried; he needed to move them to a medical unit, but the shelling was so heavy that the ambulances could not get to the farm house. Like many of the stretcher bearers during this battle, Brown would have to be creative in order to evacuate the wounded. He searched the farm, found the farmer, and the two men hitched up the farm horses to a large farm cart and piled the wounded into it. Captain Brown then made his way to Ypres, carefully avoiding the roads by going across the fields. He had two vivid memories of the ride to Ypres. The first was passing infantry

[7] LAC: DMD Records, RG 9 III B2, volume 3751, file Lt- Col Adami's War Diary, Conversation with Lt-Col. Brown, MO 13th Canadian Battalion 3.10.17.

reinforcements on their way to the front, and being impressed by their positive attitude as they walked into danger. What impressed him even more was that each time his cart was stuck in a rut or shell-hole Canadian soldiers emerged from their trenches to help him along. He left the cart at a field ambulance where the wounded were immediately attended. There, he ran into another MO who was wounded and who pointed out wounds that Captain Brown had suffered. The two went back to Vlamertinghe as walking wounded, leaning on each other the whole way.[8] Brown's actions typify the ingenuity and quick thinking on the part of individuals in the medical service that saved many lives and kept the system running throughout the battle, despite the loss of communications. Notwithstanding, the need to evacuate at night and the loss of communications created long wait times for the wounded in No Man's Land.

The agony of the wounded did not end when the stretcher bearer arrived, since during the carry to the rear the man on the stretcher would inevitably be jostled, causing more pain. Still, wounded men were expected to control themselves and patiently wait for help in silence. Those who yelped, screamed, and groaned loudly in agony were looked down upon. This was also true of the men whom the stretcher bearers carried. While there was some allowance for a grunt of pain when the stretcher was moved, there was little sympathy given to a man who cried during the carry. Louis Keene, an Englishman who joined the CEF in Montreal in 1914, was working as a stretcher bearer in the front lines during the Second Battle of Ypres. While performing his duties, he saw a "pathetic sight … A stretcher came by with a man painfully wounded; he was inclined

[8] Ibid.

to whimper; one of the stretcher bearers said quietly to him 'Be British.' He immediately straightened himself out and asked for a 'fag.' He died that night."[9]

While it was difficult for the stretcher bearers to get the wounded to the rear for treatment, the journey, at times, could be harder on the man than the bearer. The experience of Harold Baldwin, a thirty-eight-year-old Englishman from British Columbia who was wounded in the fighting at Ypres, provides the perspective of the wounded man being helped by the bearers. His ordeal demonstrates the long wait for medical help that many endured at Ypres and the difficulty of transporting the wounded men. While Baldwin was engaged in the fighting, he suddenly felt as though he had been kicked on his ankle. He turned to "curse the man" he thought had kicked him when he fell over and screamed with pain; his left foot had been smashed by a bullet. While he laid awaiting help, the Canadian and German forces collided in hand-to-hand combat. One of the Germans lunged towards Baldwin with his bayonet. Unable to react, Baldwin closed his eyes but was not hit. He opened his eyes in time to see the German fall with a bayonet through his neck and his sergeant-major briefly standing over him before carrying on. The German fell just opposite Baldwin with a "hellish grin on his face," a grin Baldwin would have to look at for hours while he awaited medical help. As time passed the pain in his leg became excruciating "and forgetting the etiquette of the Western Front that a man must not squeal too much when he is hit, [he] groaned aloud." For this Baldwin was terribly embarrassed; as he later wrote, "I shall be ashamed to meet many of my comrades in later days, for they remember my whimpering." [10]

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[9] Louis Keene, *"Crumps": The Plain Story of a Canadian Who Went* (Boston: Houghton Mifflin Company, 1917), 84-85.

[10] Harold Baldwin, *Holding the Line* (Chicago: A.C. McClurg and Co., 1918), 265-266.

Baldwin described the waiting as lying "shivering in a hole full of icy liquid mud, with every nerve in your body quivering with pain, with the harrowing moans of the wounded all around."[11] After a few hours of waiting the sergeant-major returned, but merely to give the wounded some rum to help them compose themselves; Baldwin would not be moved until the following morning when some of his comrades decided to help him, despite having no medical training. Unfortunately there was also a stretcher shortage during the battle, so the men who tried to help Baldwin had to take turns carrying him on their backs. Baldwin tried to convince them that they were taking too much risk and to leave him behind in a shell hole to be evacuated at night; this was also because the pain he was experiencing from being moved was overwhelming and he did not feel he could bear it. The men cursed him for being a fool and refused to leave him; rather, they tried not to jostle him around.[12] Once the men reached the relative safety of the trenches, they tied Baldwin's injured leg to his good leg to prevent the bones from rubbing together and found a stretcher on which they could take him to the regimental aid post. There he was put on the last horse-drawn ambulance to leave for a field ambulance until that night.

Baldwin lost consciousness in the ambulance. When he awoke he was lying on a stretcher in the middle of a road with a doctor standing over him. He was informed that his foot would have to be amputated as it was hanging on to his leg by a piece of flesh. He described what happened next:

> Smiling down at me, to reassure me, [the doctor] reached in his pocket, produced two cigars, placed one in his mouth, lit it, then placed it in mine. The other he placed in the pocket of my shirt. I lay back, averting my eyes,

[11] Ibid, 267.
[12] Ibid, 270.

> expecting every minute to feel a horrible cutting sensation. Then I heard the doctor sigh. I looked up and to my astonishment my foot was gone. Such was the amazing gentleness and skill of the wonderful doctor.[13]

After Baldwin's foot was removed, he slipped in and out of consciousness until he was back in England, where several more surgeries were needed to heal his leg. Despite losing his foot he held no ill will towards the doctor who could not save it, instead writing of the doctor "God bless him wherever he is" for performing the procedure without causing him additional pain.[14]

The situation Baldwin found himself in was not unique. While in this instance it was friends with no medical training that assisted him, the situation was only slightly better for those treated by the Regimental bearers who had received limited training from their Medical Officer. Indeed, there was only a very slight chance that a wounded soldier would receive his first treatment from anyone with substantial medical training. In a letter home, Private Victor Swanson, a farmer from Ottawa, wrote about his friend H.P. being wounded. A shell came through the roof of the shelter that they occupied, killing "two of the men at our feet and tore all the flesh from the inside of the other man's leg, and also took a small chunk out of [Swanson's] hand."[15] A medic looked at H.P.'s wound and declared that he would not last the night. H.P. was left in Swanson's care with a handful of morphine tablets and instructions to "give him a few of these every time he yells."

This forced reliance on untrained personnel to administer care brought the medical corps to the realization that casualties had to be evacuated more quickly, not just to reduce the suffering that the men endured while waiting but to help the wounded

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[13] Ibid, 272-273.
[14] Do.
[15] Nathan Greenfield, *Baptism of Fire: The Second Battle of Ypres and the Forging of Canada, April 1915,* (Harper Collins Canada, 2007).

receive medical care in a more timely fashion to improve their chances of survival. This would result in systemic change after the battle that would re-organize the stretcher bearer units and increase their numbers to meet the goals of the medical service. However, the slow pace of the evacuation was not just a result of the number of stretcher bearers; it also occurred due to problems in the RAPs.

The regimental aid posts were extremely busy throughout the entire Second Battle of Ypres, their difficulties compounded by enemy shelling, supply shortages, and communications problems. On the night of 23 April the Germans began to shell the Canadian part of the line heavily with shrapnel and high explosives; the shelling would continue until 27 April. At one point in the battle, it became so intense that the Medical Officer of the 15th Battalion was shelled out of his regimental aid post. He was able to move his post back and re-establish it; however, this second post was completely demolished by shell fire and the Medical Officer was separated from his unit and left with no supplies. The shelling was so intense that he could not proceed forward to his unit, so he went back to help out in the field ambulances. It would be two full days before he could re-join the 15th Battalion.[16] This meant that there was no RAP working in the battalion's area. Without communications, the stretcher bearers did not know that the RAP was no longer in existence, although the shelling would have prevented them from reaching it in any case. Indeed, the shelling forced several medical units to move during the battle, causing some confusion in the evacuation system. This is one of the reasons

[16] LAC: DMD Records, Lt- Col Adami's War Diary, Conversation with Lt.-Col. A.J. Mackenzie, MO 15th Canadian Battalion, 26.11.17.

why the stretcher bearers and infantrymen placed the wounded in farm houses or evacuated them straight to the field ambulances.

The medical situation was just as difficult as the military one since the wounds that were appearing were much more complex to treat than originally envisioned. Captain William Malloch Hart, Medical Officer of the 5th Battalion and a thirty-three-year-old doctor from Winnipeg, Manitoba, later wrote that on the night of the 23rd he saw some of the worst cases of shell wounds he ever had to deal with. One patient was hit in eleven places, and Hart removed a large piece of high explosive shell casing from that soldier's foot that had penetrated through both sides; "this was perhaps the least grave of all his wounds," Hart observed.[17] Furthermore, he had to improvise as supplies began to dwindle, for the field ambulances were unable to send supplies forward since they were just as busy and just as vulnerable to shelling, and could only move under cover of night. A stretcher shortage started to become a problem for Hart so he took the only remaining door from the cellar that his aid post occupied and used it, supported on four boxes, as a dressing table.[18]

Captain Hart's unit was not the only one experiencing a shortage of stretchers on the 23rd of April. The problem was that the Canadian medical units were evacuating a large number of French troops to their own hospitals and the French hospital system used a different procedure with respect to its front-line units. All British and imperial units exchanged equipment, such as stretchers, to re-equip the bearers and ambulance wagons so they would not run out. However, the French did not replace the stretchers that the Canadians brought in with the wounded men. All the units of the field ambulances sent

[17] LAC: DMD Records, Personal diary of Captain W.M. Hart, 4-5.
[18] Ibid.

back requests for stretchers, but there were no Canadian reserve units in the area so there was no way of securing supplies from Canadian sources. Fortunately, a British hospital in Poperinghe was able to answer the request and quickly sent hundreds of stretchers forward to the Canadians.[19] At the same time, the stretcher bearers brought as many supplies as they could carry forward at night; in the meantime, the doctors at the RAPs would have to make do and improvise treatments with whatever they had at hand.

Communications problems compounded the supply crisis as the battle raged on. On 24 April the Medical Officer of the 14th Battalion was informed that the Commanding Officer had lost contact with three companies. The medical staff was worried that these men were wounded and without help, but had no idea where to begin looking for them. To make matters worse, the Battalion's stretcher bearers were past being tired and had reached the point of complete exhaustion; now every carry was difficult and took longer. There was nothing that the medical men could do but wait for the lost units to report to headquarters.[20]

But the situation would worsen before it improved, for the gas attacks continued to plague the Canadians on 24 April. Captain Hart went to Battalion Headquarters to report his casualties that day, just as Headquarters received a telephone call from the Commanding Officer of the 8th Battalion to report that the Germans were using gas against his part of the line and that it had reached his Battalion Headquarters; he was coughing and struggling for breath while he spoke. Captain Hart and the others ran to

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[19] LAC: DMD Records, RG9 III B2, volume 3752, file 4-1, War Diary, ADMS 1st Division War Diary, 23 April 1915; LAC: DMD Records, RG 9 III B-1, volume 960, ADMS Report of Operations 22 April- 4 May at Ypres.

[20] LAC: DMD Records, RG 9 III B2 Volume 3751, Captain F.A.C. Scrimger Personal Diary, 24 April 1915.

their door where they could see "a dense yellowish-green smoke-like cloud rolling over the trenches of the 8th and the country behind them. It seemed most dense at the ground, thinning out to a light yellow I should judge about 50 or more feet from the surface."[21] As Hart watched the gas cloud, he received a call from his RAP that gassed and wounded men were coming in and that he was needed; he would work for the next sixty hours straight.[22]

Following Captain Hart's actions during the Ypres battle provides a window on the variety of challenges such as working under intense shelling, dealing with supply and communication problems, coping with the severe problems that the volume of casualties created, and the problems that military campaigns could add to an already difficult situation. His actions show that the Medical Officers of the regimental aid posts tried to adjust to the problems of the battle. Hart took any chance he could to look out of his regimental aid post over the battlefield. Each time he looked out, "a perfect storm of high explosive shells could be seen and heard bursting with ear-splitting detonations over the trenches ... a shell would burst over [the soldiers and] they could be seen bowled over like ninepins in all directions." While looking over the field he noticed "a little heap of red rags." He was unsure what it was, but then a hand and a red cap shot up waved. He was starting out to help when he saw two of his bearers emerge from the nearby woods and head towards the red cap to offer assistance. When the bearers arrived with a stretcher, Captain Hart realized that the blood-stained figure was his close friend Major David Sandeman, a farmer from Prime Lake, Alberta. Fortunately the Major was

[21] LAC: DMD Records, Personal diary of Captain W.M. Hart, 5.
[22] The following account is drawn from LAC: DMD Records, Personal diary of Captain W.M. Hart.

conscious and able to speak since his wounds were not severe; he could even joke with the doctor.

Another captain arrived at Hart's RAP later in the day. He was brought in on a stretcher, but was embarrassed by it and apologetic about all the attention. The captain stated that while he was not wounded he had suddenly become unable to use his right leg. Hart was suspicious of his condition, so he had the bearers put the stretcher on a trestle to examine him. Upon opening his clothes, Hart discovered a bullet-hole over the patient's appendix; he quickly dressed him in preparation for evacuation. Many of the wounded did not know that they were wounded by bullets or shrapnel when they arrived; this was likely a result of shock.

The heavy shelling continued to cause movement and communications problems. A stretcher bearer came to the RAP to get the MO to help with some wounded men, so Hart, like many of the Regimental Medical Officers, had to leave his post to assist some twenty-two wounded men who had been left at a bombarded crossroads. All the wounded had received first aid from stretcher bearers, but the shelling was too heavy to move them to the RAP. Many of them had been gassed and were blue with cyanosis on their lips, faces, and fingernails. A number of the men died as a result of gas inhalation. Hart did what he could to provide treatment and comfort to these men, but there was no known treatment for gas wounds. He then directed the stretcher bearers to take them to the field ambulance while he undertook the difficult journey back to his RAP.

Hart then lost track of time through the 24th and 25th as "night and day brought no change in or respite from the stream of wounded limping, crawling or being carried to the Aid Post." He was ordered to evacuate all of his patients since his battalion was

likely to be retired; he did everything he could to comply, but for each wounded soldier who started out along the road to Ypres, another came in needing treatment. In his personal diary, Hart described an experience during the Ypres battle with a patient he referred to as "the Adjutant" who walked into the dressing room and told Hart he had been hit in the side. A bullet wound had pierced his left side near the heart, leaving a hole that Hart attempted to dress. He had difficulty doing so because the Adjutant refused to allow Hart to destroy his shirt by cutting it; Captain Hart had to give him his own extra shirt in exchange for permission to cut the one he was wearing, even though the bullet hole had already ruined it. The Adjutant then insisted on walking back, but the medical staff would not permit it. Adding to the stress of the constant flow of wounded men, there were always difficult patients with irrational complaints (again likely caused by shock) with whom doctors had to cope.

Two military officers then arrived at the aid post to inform Hart that the Battalion was slowly retiring to the bombarded crossroads, which would leave the RAP between the German and Canadian lines. The officers left behind all the men they could spare to help move the wounded back and evacuated all but eighteen men. Captain Hart decided to stay behind with the wounded, at which point his own staff begged to be permitted to stay with him; he refused and ordered them to assist the wounded who could be moved. However, Hart's friend in civilian life and driver during the war, A.J. Hosie, refused to leave. Hosie was originally from London, Ontario, but relocated to Manitoba where he was an insurance manager. Captain Hart allowed Hosie to stay then gave his horse to a wounded officer to take to the rear with the help of the last remaining orderly. Hart later wrote:

> By the time Hosie and I had finished dressing what wounded had come in during the departure of the others, there was nothing further to be done and I managed to get a few minutes' sleep curled up in the bottom of an empty wardrobe, as the floor was covered with blood and discarded dressings and as my blankets, sleeping bag, & c., had necessarily been employed to wrap the wounded, who complained greatly of the night cold.

Despite his exhaustion, that was all the rest that Captain Hart would get as the battle raged on. Within half an hour he would be awakened by Hosie to deal with the patients still awaiting evacuation.

Hart and Hosie began formulating a plan for evacuating the remaining wounded while they continued to care for them and waited for aid. By 03:30[23] they had reached a point that there was nothing they could do to offer further comfort to the wounded. There seemed to be a respite in the shelling and, since they could not hear or see any Germans in the immediate vicinity or in the direction of the Battalion's new line, they decided to go to headquarters for some assistance. As they were leaving, Private Hennessey, who had been shot through the abdomen, begged to come along. Hart reluctantly acquiesced, so the three set out. There were two other patients who could not bear to be left behind. Both had been wounded in the legs and there was no way to carry them. Barely discouraged by their ailments, these soldiers dragged themselves along on the ground behind the Medical Officer. Since Hart and Hosie were not able to help the crawling men, the party was travelling very slowly and daylight was chasing them. They were able to reach the buildings at the bombarded crossroads before losing cover of darkness. It was in a cellar here that the Medical Officer and his driver left the wounded and continued on.

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[23] For the sake of clarity and ease, this work will use the twenty-four-hour clock even though the army of the First World War did not.

Hart and Hosie came across small groups of men hiding as well as they could in ditches who warned them that parts of the road were exposed to machine-gun fire; "Mute evidence was also offered by the dead bodies lying singly and in little heaps on and beside the road," Hart wrote. As they continued on their journey, they noticed that buildings that had been used as a Report Centre, Battalion Headquarters, and billets when they had first arrived in this sector mere days ago had been burned to the ground. When they arrived at Wieltje there was nothing left – the village was completely in ruins. Bodies of men and horses lined the road the entire way. Captain Hart did not find anyone who could help him until he reached the village of St. Jean. There he found the Medical Officer of the 10th Battalion who had managed to get a good sleep the night before and insisted on taking Hart's message to Headquarters, which was close by, so that Hart and Hosie could get some much needed food and rest; Hart wanted to deliver the message himself, but realized that the ambulances would not be able to come forward until nightfall to help the men in his RAP and that he needed some relief. He tried to eat some breakfast but fell off his chair three times as he drifted off to sleep between bites.

During breakfast the Germans began to shell St. Jean heavily. The men made their way to a strongly built cellar that was full of wounded and found a mattress for Captain Hart so he could get some rest. Hart remembered "throwing myself down on the mattress without even removing my eye-glasses or spurs, I slept heavily till the late afternoon, only occasionally becoming semi-conscious when a high explosive would burst specially near the window at my head." Awake and rested, Hart continued on to Battalion Headquarters. His message had been delivered and a convoy of ambulances was to arrive that night to collect the wounded at his regimental aid post. On his way

back to his RAP, Hart found Captain Percy Bell with four motor ambulances on their way to help the wounded.

When they reached the old Report Centre, the motor ambulances could not continue on; a large elm tree had been shelled and fallen across the road. The men could not move it and there was no way for the ambulances to pass. Dawn was approaching quickly so the ambulances reluctantly turned around, promising to meet Hart at the exact spot the next night. In the meantime, Hart was to arrange to have the tree removed. He had promised the wounded he would return to them and was growing anxious over their condition, so he decided to make his way back to the RAP even though it was daylight. Hart did his best to get back to the wounded, but on the way was captured by a group of German soldiers. He would not be returned to the Canadian forces until the International Committee of the Red Cross arranged for a prisoner exchange later in the war. As the days and nights passed, it was becoming clear that the medical service's ranks were being depleted by battle and exhaustion. Captain Hart had been taken prisoner, Captain Brown had been evacuated with wounds, and the 15th Battalion had lost its regimental aid post to shelling, a scenario that was becoming all too common across the front.

One of the remaining Medical Officers at the regimental aid posts, Captain Francis Alexander Scrimger, a surgeon from Montreal, sat in a dugout on the 25th of April writing in his diary while waiting for orders. He was quite pleased that he had managed an hour's sleep that afternoon for the first time in three days and three nights. The personal strain that the Medical Officers had endured, with much more ahead, came through in Scrimger's diary entry for the day: "About this time, lack of sleep and food, anxiety and the excitement of a vigorous cannonade, had worked me up to such an extent

that I did not care what happened. I caught myself once out in the open cursing the Germans and all their works. I first now felt a personal hatred towards them. I was afraid too, to speak for fear of breaking down."[24] The Medical Officers were not alone in feeling this way; the medical staff and stretcher bearers were also breaking down under the strain of sustained battlefield conditions. Captain Scrimger noticed it, but felt powerless to change the situation or help his men, writing "again the question of transport from unit to ambulance presses me for some solution as my bearers are exhausted."[25] It was becoming common for medical staff, officers, and bearers to fall asleep the minute they sat down.

The grim scenes at the regimental aid posts also affected the Medical Officers and their staff. Herbert Rae described the RAP he was stationed at during the Second Battle of Ypres: "The room was filled with dying and badly wounded men; trampled straw and dirty dressings lay about in pools of blood. The air, rank with the fumes of gas, was thick with the dust of flying plaster and broken brick." Rae marvelled that in spite of "the stench of that foul atmosphere … the wounded lying with the dead, made no complaint."[26] The composure of the wounded, the number of dead, and the gruesome working conditions made it difficult for the medical personnel to cope. Rae recalled a wounded soldier who had been lying in No Man's Land for two nights with a bullet hole in his lower back being brought into the RAP. The wounded soldier woke up when the Medical Officer began to investigate the wound. Despite his wounds, the soldier said hello to the doctor and told him that he feared he was badly hit; he could not move his

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[24] LAC: DMD Records, Captain F.A.C. Scrimger Personal Diary, 25 April 1915.
[25] Do.
[26] Herbert Rae, *Maple Leaves in Flanders Fields,* second impression (Toronto: William Briggs, 1916), 164.

legs and wanted to know why and what was to come of him. Rae recalled, "As he had done frequently before, the Doctor lied, lied with a cheerful smile, to hide the sorrow in his heart" and told the wounded soldier that the problem with his legs was "Shock – only shock; you'll be right as rain in a day or two," although it did not seem likely that was the case at all.[27]

The strength and endurance of individuals did not go unnoticed. For his actions on 25 April, the day that he wrote of the difficulties of exhaustion in his diary, Captain Scrimger was awarded the British Empire's highest battle honour, the Victoria Cross. He was serving at an advanced dressing station after being shelled out of his RAP and the dressing station itself was under intense shellfire while Scrimger directed the evacuation of the wounded. He managed to get all of the wounded out of the station before it was shelled, leaving himself and another Medical Officer, Captain Harold MacDonald, who was badly wounded in the head and shoulder. Scrimger carried MacDonald as far as he could, occasionally taking cover from shells at the side of the roads or in ditches. Each time they took cover, Scrimger used his body to shield MacDonald from any further harm. When Scrimger was unable to carry MacDonald any further, he found cover and waited for help while caring for the wounded Medical Officer.[28]

As the battle raged on, the Medical Officers in the regimental aid posts continued the struggle to keep the evacuation system flowing with their depleted numbers. Fortunately by 27 April the battle was beginning to wind down. Though casualties still came into the units, the numbers were much more manageable and even allowed time for

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[27] Ibid, 184.
[28] Arthur Bishop, *Our Bravest and Our Best: The Stories of Canada's Victoria Cross Winners* (Toronto: McGraw-Hill Ryerson, 1995), 30.

some rest and nutrition. The staff of the RAPs had kept the system running in spite of the difficulties encountered. Fortunately, the same could be said of the men who worked at the field ambulances throughout the Second Battle of Ypres.

The field ambulances were the first medical units forced to deal with gas. On the first day of the battle, the field ambulances on the extreme left of the salient were suddenly overrun with Turcos, the name given to the French "Zouaves" of the 45th Division on the Canadians' left flank. They showed a number of symptoms, such as conjunctivitis, an irritating cough, vomiting, a staggering gait, general weakness, a general stupor, tachycardia, an earthen or ashen colour to their skin, and a very strong odour on their clothes. As the doctors and medical orderlies tried to help the soldiers, they began to experience similar symptoms. No one knew what was happening. The Turcos thought that food poisoning caused their condition, but the doctors disagreed since the symptoms did not correlate.[29] To make matters worse, the field ambulances were informed that the Germans had broken through the Algerian lines, leaving the left Canadian flank exposed. All medical units were to prepare to move quickly, but the chaos in the units was such that it was difficult to spare any staff to prepare for the move. Throughout the entire night and the next day, eight or nine wounded soldiers were being dressed simultaneously in every unit. Still there was no medical diagnosis as to what was affecting the Algerians and no word from the military about the gas attack. In the middle of the night, an officer was evacuated through No. 3 Canadian Field Ambulance who could finally shed some light on the problem. He explained that the Germans were

[29] LAC: DMD Records, RG 9 III B2, volume 3749, file Adami No. 3 FLD AMB, War Diary, No. 3 Canadian Field Ambulance, 22 April 1915.

pumping gas through pipes and the breeze was blowing it over the trenches.[30] The field laboratory tested the clothing of the wounded and discovered the Germans were using chlorine and bromine gas, despite the conventions that they and many other nations involved in the war had signed in peace against the use of gas.[31] It was thought that a pad soaked in hyposulphite of soda would help to protect the men if they breathed through it, so the pads were quickly distributed. Furthermore, the lab assumed that the Germans already had an antidote and prophylactic to the gas so the stretcher bearers were told to search the field for German equipment that might help protect them against gas while collecting the wounded.[32] At the same time, further treatments had to be improvised to ease the pain of the wounded, for no one knew exactly how to provide comfort to gas cases.

To make matters worse, the advanced dressing station of No. 3 Field Ambulance was too close to the shell fire. The first message that the Medical Officer, Major Charles Perry Templeton of Brandon, Manitoba, sent back indicated the strain the unit was encountering: "Simply unable to collect wounded until dark as it is hell here." Several hours later, he sent a message back that they had "been shelled out of our Advanced Dressing Station. Will establish one further back this evening; require stretchers and bearers."[33] Having to fall back due to shelling would be a common experience of the advanced dressing stations of the First World War. The ADS of No. 2 Canadian Field Ambulance, run by Captain John McQueen, would also move during the first day of

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[30] Ibid.
[31] Article 23(a) of the rules attached to the Hague Convention Respecting the Laws and Customs of War and Land of 1907 forbids the use of poisoned projectiles.
http://wwi.lib.byu.edu/index.php/Hague_Convention
[32] Adami, *War Story of the Canadian Army Medical Corps,* 107-108.
[33] LAC: DMD Records,War Diary, No. 3 Canadian Field Ambulance, 22 April 1915.

fighting. The unit was not in an effective location since it was not along the lines of communication and the Algerians and other wounded could not find it. In an effort to take some pressure off No. 3, Captain McQueen moved his unit into the village of Wieltje. He arrived soon after the other advanced dressing station was shelled and took over the receipt of patients until Major Templeton could relocate his unit.[34] This helped to keep the evacuation system functioning.

By the 23rd it had become apparent from the number of wounded and the time it was taking to move them through the medical system that the field ambulances needed to be better positioned. This was in part due to the loss of regimental aid posts to shelling and wounded doctors. As a result, the field ambulances were moved closer to the front and the advanced dressing stations were moved out of the villages. This was dangerous and created difficult working conditions for the staff, but it was important to permit timely treatment of the wounded, to give them a better chance of surviving, and to keep the evacuation system running. In order to help with the strain, a skeleton crew was left at the divisional rest station so that its men could be moved forward and used to reinforce the ambulances.[35] It was thought that the additional men would help ease the exhaustion of the medical staff, but the reinforcements had just as much work to do and no time for rest either.

As the stream of wounded continued to pour through the medical units, No. 3 Canadian Field Ambulance received another message from Major Templeton asking for help: "Very heavy casualties – large number of extra dressings and stretcher-bearers required." The number of wounded had not let up in two days; the ADS had been

[34] Adami, *War Story of the Canadian Army Medical Corps,* 117.
[35] LAC: DMD Records, War Diary, ADMS 1st Division, 23 April 1915.

completely overwhelmed by the number of patients coming in and had to use the medical staff's personal billets for them. Soon after, space again became an issue so a local house was taken over to hold the wounded. The main dressing station sent up all of its motor ambulances to assist the forward unit while the administration managed to secure two Medical Officers and twenty-four more bearers for No. 3 to get it through the battle. [36]

Like the Medical Officers in the regimental aid post, the men at the field ambulances experienced enormous strain due to the unending stream of wounded coming through their units. As the days passed, the wounded continued to pour into the dressing stations and the staff had to work without relief, but the medical units seemed to be keeping pace and working well together. Lieutenant-Colonel Richard Raikes was a fifty-five-year-old physician from Barrie, Ontario, who worked in a FLD AMB at the time of the Ypres battle. He described the night of 22 April to the Assistant Director Medical Services, London, John Adami, a physician originally from England who had relocated to Canada and resided with his wife in Montreal:

> By now, although every body was dead tired, things were going smoothly, they had got into the way of working with the fullest economy of effort. To share the labour of stooping he had a high trestle, one bearer would cut off the bandages, he himself gave the morphine, other bearers gave beef tea, etc ... By now his bearers were so dead tired that if they sat down they went to sleep straight off. The striking part was that all the wounded once being given their beef tea and morphine slept like children; not a sound was to be heard but quiet breathing.[37]

The exhaustion of the staff of the medical units and bearers was difficult to overcome since there was a dearth of reinforcements. Every available man had been sent forward, so they would have to soldier on for a week with almost no reprieve.

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[36] LAC: DMD Records, War Diary, No. 3 Canadian Field Ambulance, 24 April 1917.
[37] Adami Personal Diary, Conversation with Lt-Col. Raikes, 9.10.17.

Help would start to arrive on the 25th in the form of British and Indian Field Ambulances, whose members initially worked in the Canadian FLD AMBs to reinforce the staff and help evacuate the wounded. Later, once the situation in the Canadian units had stabilized, they were able to establish their own FLD AMBs and begin receiving Canadian wounded. It is important to note that all of the Allied medical units treated any and all soldiers, including the enemy, who came to their units with the same care as they would their own. As a result, the Canadian Army Medical Corps continued to work in the area even after Canadian Expeditionary Force men were relieved in the trenches.[38]

In the midst of help arriving for the medical corps, on the 25th of April No. 3 Canadian Field Ambulance lost another advanced dressing station to shelling. This time, it was unable to save any supplies and barely had time to move the wounded out of the unit before it burned to the ground. Even though the shelling was heavy, the unit continued to work until it could not contain the fire that the shelling had caused. It was re-supplied and ordered to re-open further back in Wieltje.[39] This was not the only unit that was destroyed on the 25th. An ambulance of No. 1 Canadian Field Ambulance was also shelled and then suffered a direct hit while transporting wounded men. Two officers were badly injured and three privates who were working as stretcher bearers were killed.[40] Such incidents reminded the staff of the personal danger that they faced and created stress for those who had to treat their own.

By 26 April, some of the Medical Officers had become accustomed to the excitement of their first action. As Captain Scrimger wrote in his diary that day, "Not

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[38] Adami, *War Story of the Canadian Army Medical Corps,* 139, 150-151.
[39] LAC: DMD Records, War Diary, No. 3 Canadian Field Ambulance, 25 April 1915.
[40] LAC: DMD Records, RG 9 III B2 Volume 3749, File Adami No. 1 FLD AMB, War Diary, No. 1 Canadian Field Ambulance, 25 April 1915.

much of interest except we have lost all our stretchers, three bearers hit and two sent to hospital from exhaustion."[41] He wrote this in spite of the many wounded he was still treating and the large number of shells that were still falling. Other MOs began to take stock of the situation. Captain Bell went outside of his field ambulance for the first time in days and commented in his diary,

> The scene along the road was a terribly desolate one - buildings smashed, shell holes in roads, dead horses lying near wrecked limbers, trees down and a dead man here and there in the ditch - the only living thing being occasional transport wagons and ammunition limbers going along at the gallop and several little groups of 4 men carrying a wounded man on a stretcher.[42]

The battle was apparently winding down, despite the fact that the numbers of casualties would not let up until the 28th. On that day the FLD AMBs were able to evacuate all of their patients in the morning for the first time since the battle began. The wounded continued to come in, but the numbers were more manageable than in the previous days. Captain Bell and another MO were injured on the 28th, but were able to keep working. The battle was shifting to other points along the line and most members of the CAMC would finally be able to gain much needed sleep and food.[43]

The field ambulances had also stood the test that Ypres provided and managed to keep the evacuation system running despite the loss of bearers, injured Medical Officers, and working conditions that no one had imagined, let alone experienced. The ability to endure the horrific sights of their first battle experience required a great deal of inner strength from all those who served in the medical wards and on the battlefield. This was demonstrated in the aftermath of Ypres when doctors from other countries and areas of

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[41] LAC: DMD Records, Captain F.A.C. Scrimger Personal Diary, 26 April 1915.
[42] LAC: DMD Records, RG 9 III B2 Volume 3751, File Captain P.G. Bell, Captain Percy Bell Personal Diary, 26 April 1915.
[43] LAC: DMD Records, War Diary, No. 3 Canadian Field Ambulance, 27-28 April 1915.

the front lines or rear areas came to Ypres to visit the wounded who remained in the Canadian field ambulances. Harvey Cushing was an American doctor serving in a privately-funded volunteer American medical unit when he went to visit Ypres. At the first field ambulance he visited, Cushing was shown "men too sick to be evacuated, men in sheds about to die and join the others buried in Flanders Fields." He recalled "it was enough to shake even very strong men," so much so that Cushing and the doctors with him did "not care to examine [the wounded] in any detail" since dealing with the scene about them and the wounded men was "too harrowing."[44]

The Canadian Army Medical Corps' first action during the Second Battle of Ypres had revealed problems but was considered a success. When issues developed during the battle, the units adjusted and most continued receiving patients. The system slowed, forcing casualties to wait long periods for help, but it never broke down nor did the units run out of equipment, with the exception of stretchers. During the intense fighting in the Canadian sector from 22 April to 4 May, No. 3 Canadian Field Ambulance alone treated 304 officers and 9,739 other ranks. Of these, 79 officers and 1,985 other ranks were Canadian.[45] The total number of Canadian casualties for the battle, including those suffered by the medical corps, was 5,506.[46] Once the fighting ended, the medical units remained in the area until they were relieved. Fortunately, the number of casualties per month levelled off at approximately 800 to 1000; of course, this number would increase as soon as fighting started again.[47]

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[44] Michael Bliss, *Harvey Cushing: A Life in Surgery* (Toronto: University of Toronto Press, 2005), 293.
[45] LAC: DMD Records, War Diary, ADMS 1st Division, May 1915.
[46] Colonel A. Fortescue Duguid, *Official History of the Canadian Forces in the Great War, 1914-1919: General Series Volume 1, Aug 1914-Sept 1915* (Ottawa: King's Printer, 1938), 421.
[47] LAC: DMD Records, War Diary, No. 3 Canadian Field Ambulance, 28 April 1915

The Canadian Army Medical Corps would examine the Second Battle of Ypres, as it would all battles, through a series of reports from the various units. The after action reports after the Second Battle of Ypres focused a great deal on systemic changes. From dealing with stretcher bearer exhaustion, to creating a tag system, to changing the way the FLD AMBs and CCSs would function, to the creation of a new unit, no stone was left unturned in trying to create an efficient medical force.

One of the major problems that the medical corps endured through the Second Battle of Ypres was the exhaustion of stretcher bearers, which was important to correct so that the medical service could provide timely treatment and so that the wounded would not lay in the mud for hours or days waiting for help and subject to being captured. Captain Scrimger wrote after Ypres, "The question of bearers going forward to help collect wounded in zones of severe fighting needs attention. We had with us only 22 men for all work and could not spare men to send out as bearer squads."[48] Many diaries repeat the same observation. The number of regimental stretcher bearers was increased after Ypres, but weariness was still a problem during the fighting at Festubert later in 1915. As a result, the number of bearers was doubled, between 1915 and 1916, from thirty to sixty men in time for the fighting on the Somme in 1916.[49] The equipment also changed for regimental stretcher bearers; now every bearer would carry a haversack with a tourniquet, scissors, and first field dressings. Previously, only the bearers of field ambulances carried these supplies since the regimental bearers were to use the dressings

[48] LAC: DMD Records, Captain F.A.C. Scrimger Personal Diary, 3 May 1915.
[49] LAC: John Taylor Fotheringham Papers, MG30 E53, volume 5, file 22, letter to 2nd Division HQ, 31 May 1916.

and supplies that the infantry soldiers were supposed to carry with them, but did not always have.[50]

With the increase in bearer strength came a new system for collecting the wounded to ensure that proper triage decisions were being made. One of the problems revealed in battle was that the regimental stretcher bearers were often killed or wounded early in the action. These men had valuable first-aid training that could not be replaced when they fell; they were needed throughout the whole battle. The injuries to the bearers combined with their low numbers forced those with no medical training to collect and help the wounded. As a result, it was decided that the bearers with training in first aid would no longer act as bearers *per se*, but would still go into No Man's Land to collect the wounded. Each battalion commanding officer would detail fifty to sixty men with little medical training as bearers to work in groups under the direction of those trained in first aid. This would spread out the trained bearers to minimize the number who might be killed or injured. All the bearers would act under the orders of the Medical Officer and would wear white armlets with SB in bold letters while they performed bearer duties. This plan provided a greater number of bearers to help reduce exhaustion; it was thought that this would hasten the pace of removal of the wounded to the regimental aid posts. But it was also a gamble with the lives of the soldiers, since untrained bearers would be making triage decisions, often without the consultation of the trained stretcher bearers. Time would tell if this arrangement was effective.

Suggestions for and research into new kinds of stretchers to help the medical service curb exhaustion came from all over the medical service and from Canadians at

[50] LAC: DMD Records, ADMS Report of Operations, 22 April - 4 May at Ypres.

home. Scrimger thought the French had an answer that would help – wheeled stretchers. Each had two large wheels and could be pushed by one man. Scrimger argued that there should be a collecting unit with 150 of these stretchers, with 200 to 300 men to transport the wounded to the field ambulances.[51] The CAMC would indeed receive wheeled stretchers, though not nearly the number Captain Scrimger thought necessary because the fighting in August 1915 demonstrated that the wheeled stretcher did not work during wet weather.[52] Another suggestion was the toboggan stretcher, made of light galvanized iron and with low sides reinforced by wooden battens. The wounded soldier was placed on a ground sheet on the stretcher and the sheet was wrapped around the soldier and fastened to the toboggan with four cords. Then one man could pull the toboggan over the ground. This was considered an efficient device because it only needed one man to pull it, it was cost effective (thirty per cent cheaper than the stretchers in use), it was comfortable, and it was simple in design and use. However, it was rejected and never used during the war. This was in part because of a design flaw: the patient's neck would rest on a sharp metal edge. The edge could be inverted to fix this flaw, but the toboggan stretcher had other problems. It was prone to flipping over when turning corners, and was only effective in dry conditions and snow; it would not work on wet ground with more than an inch of mud.[53] The toboggan stretcher was one of many new stretcher designs submitted for consideration throughout the war. While this particular design was not accepted, it, along

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[52] LAC: DMD Records, War Diary, No. 3 Canadian Field Ambulance, Summary of Work, Appendix, August 1915.
[53] LAC: DMD Records, RG 9 III B2, volume 3508, file 17-8-0, Canadian Memo Toboggan Stretcher, November 1915.

with all suggestions for equipment that could help speed up the evacuation process, was given serious consideration and time was taken to test the ideas.

Changes in systems for the field ambulances were minor but important in creating a more efficient medical system. One of the first changes made was the creation of a tag system for the wounded. The keeping of admission and discharge books caused a degree of chaos due to the number of wounded moving through the units. It was decided that each wounded soldier would have a tag, attached to a button of his uniform, giving his name, unit, and ailment, in addition to the linen tag that all cases wore throughout the medical system. Each tag had a serial number on it that would be used to identify the individual in the admission and discharge book. As the soldier was evacuated, the tag was collected to provide a record of who was still in the unit and who had moved on.[54] This measure was introduced as a result of the problems that No. 1 Canadian Casualty Clearing Station encountered at the Battle of Neuve Chapelle earlier in 1915, and became the status quo for all CAMC units by the end of 1915.

Other organizational changes were instituted as well. During the Second Battle of Ypres, No. 3 Canadian Field Ambulance was shelled out of its advanced dressing station twice. As a result, it was decided that when an ADS was in a heavily shelled area, the staff would be housed further back, instead of in the station, during the daylight hours. Fifteen men would have easy access to the unit so they could return to it quickly if they were needed and the rest of the staff would be returned to the unit as soon as possible. It was also decided that one section of the FLD AMB would be kept in reserve to reinforce the unit in times of heavy strain. The men would rotate through the rest

[54] Smith , Clearing.

station, main dressing station, and advanced dressing station every ten days so that all of the sections were capable of running all the units. The Commanding Officer was to remain at the main dressing station.[55] This systemic change would reduce the number of wounds sustained by the medical staff and help prevent exhaustion.

Another change involved the way the units of different field ambulances would work together. Rather than setting up three separate advanced dressing stations in a variety of areas that were subject to three different sets of orders for the various brigades, the wounded would now all travel to one area. The ADSs of the different units would work together as a single unit; they would be set up side by side and each unit would work as before, but they would share supplies and personnel as needed.[56]

The reason that the field ambulances had been dispersed during the early years of the war was that they had to be placed in proximity to the casualty clearing stations and the roads leading to them. This was because there were a limited number of motor ambulances to transport patients between the main dressing station and the clearing station. The initial plan had called for the use of supply trucks that had delivered their supplies and were returning back, but this was found to be impractical and difficult to arrange.

The centralization of the advanced dressing stations could not have occurred if not for the creation of a new unit. The Canadian Motor Ambulance Convoy was created after the battle at Ypres. These unit consisted of about fifty motor ambulance cars and drivers and orderlies to staff the ambulances. The unit was used in two ways. The first

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[55] LAC: DMD Records, War Diary, No. 3 Canadian Field Ambulance, Summary of Work, Appendix, August 1915.
[56] Adami, *War Story of the Canadian Army Medical Corps,* 184-186.

was to move patients between the casualty clearing station and the hospital trains that would evacuate them to the base hospitals; this freed up the motor ambulances of the field ambulance so they could focus on transportation between the main dressing stations and casualty clearing stations. Secondly, the motor ambulance convoys were used to reinforce the field ambulances. When the fighting became intense, the medical system tended to slow down since there were so many men needing transport. This meant that at times wounded soldiers had to be left out in the open, within range of the artillery, while they waited for transport. The motor ambulance convoys would move to the main dressing stations when they were under strain to help evacuate the wounded to keep the system moving.[57]

While no Canadian casualty clearing station participated in the Second Battle of Ypres, changes were still made to them based on the experience at Neuve Chapelle and the experiences of the British clearing stations at Ypres. While the unit began as a station for sorting and evacuating the wounded, it was found that more medical work could take place in the CCSs. As a result, their capacity was raised from twenty-five to seventy-five beds to care for severe cases. All casualty clearing stations would have a full operating theatre, as a great deal of major surgery was now expected of them.

The problems of the British casualty clearing stations at Ypres mirrored those of the more forward medical units: exhaustion from working day and night without rest and with little food. Active operations saw more than 5,000 cases a week, and as many as 1,600 patients a day. If surgery was to become a major component of the casualty clearing stations' work, the doctors could not work for seventy hours straight; surgery

[57] Smith, Clearing.

was too exacting in the skill and concentration that it required. A new system, similar to what had been instituted at the field ambulance, was developed that saw three CCSs built in close proximity to each other. The placement of the units was set so that serious cases would have a shorter distance to travel for treatment, while sitting or walking cases were seen further back.

A three-day cycle of work was instituted. On the first day, one casualty clearing station would receive and treat patients for twenty-four hours. On the second day, the unit would stop receiving and focus on evacuating its wounded and completing treatment of the serious cases. On the third day, the unit would clean and restock. The work on the first two days meant thirty-hour shifts for the medical staff and doctors. That justified the need for the light day, which was a day off for most of the unit. It was nearly impossible to run this system during a battle exactly as intended since the number of casualties could not accurately be predicted, but it represented a concerted effort to improve practices based on the experience of battle.[58]

All the systemic changes, from the addition of stretcher bearers to the changes in the CCS, were designed to reduce wait times for the wounded so that timely medical care could be provided and to provide more effective medical care that was only available in the rear-areas. While these were significant changes, the battle descriptions note issues beyond transportation and exhaustion that the after-action reports and medical service do not address, such as the bombing out of the RAPs and FLDAMB units. The loss of these units throughout the battle created confusion and caused many wounded to be hidden in buildings and treated by non-medical personnel. There was no back-up system to help

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when communication systems failed, making it difficult to locate units. This oversight would continue to be a problem that would not be addressed until late 1916.

Innovations in medical treatment also came out of the empire's medical services' first months at war. While some of the new treatments, such as the treatment of gassed men, were directly related to the Battle of Ypres, others, such as abdominal wound treatment and Paraffin No. 7, were initiated in 1915 or early 1916 as a result of ongoing studies that were not directly related to events during the Ypres battle. Treatment for wounds caused by gas became a major concern after the Second Battle of Ypres, and not just for those who were evacuated. The delay in gas effects meant that those who were slightly gassed were allowed to stay at the front. When these men exerted themselves in the course of action, they would collapse and die suddenly. No one could have predicted the condition and no one knew how to treat it. Gas had not been medically studied since it was not supposed to have been a weapon of war. After Ypres it was decided that after a gas attack, the men would be spared all exertion until the battalion was relieved from the line. The men were not to be sent back as walking wounded since the exertion could literally kill them.[59]

Research into gas began immediately on the battlefield in the mobile laboratory. It was testing by this unit that determined the type of gas and gave a recommendation to help the soldiers through the battle. Having on-the-spot research facilities served the men well, but further research was required. Once the members of the medical service found methods for treating and dealing with gas, there would need to be an education program

[59] LAC: DMD Records, RG 9 III B2, volume 3752, file 3-3-2-1, Medical Report on Gas Attack, 19 December 1915.

to ensure that all the doctors understood what to do in the event of a gas attack. The medical services developed gas schools to study gas and create effective treatments for the wounded, and to teach Medical Officers and Non-Commissioned Officers how to deal with gas. Every officer had to attend a three-day gas school in February 1916. The first day included lectures on gas and gas attacks, and demonstrations and practice at inspecting helmets and helmet drills. The second day focused on the use and care of sprayers and the principles of building gas-proof dug-outs, while the final day taught the officers how to clear shell holes of lingering gas and how to investigate gas attacks.[60] The result of the lectures was that the dug-outs of the trenches became safe havens for gas victims since they were gas-proof, and the medical service became more confident in dealing with gas wounds.

The treatment of abdominal wounds saw one major change.[61] A British casualty clearing station focused its work on new techniques for medical and surgical care that went against the status quo and one of its Medical Officers, A.H. Tubby, wrote an article for the *British Medical Journal* in January 1915 about the clearing station's ideas.[62] The positive results that the doctor presented, along with the experience of Ypres, would change the status quo on treating abdominal wounds. The experience of the South African War had had a tremendous impact on military medicine procedures and treatments. During that war, it was learned that "in most abdominal wounds the intestines [were] relatively unharmed suffering only minute punctures ... if the intestine

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[61] For more information on surgery in the war, see Sir W.G. Macpherson et al, *History of the Great War Based on Official Documents: Medical Services: Surgery of the War* (London: HMSO, 1922); John Laffin, *Surgeons in the Field* (J.M. Dent: London, 1970); Frederick Cartwright, *The Development of Modern Surgery from 1830* (New York: Thomas Y. Crowell, 1967).

[62] The unit and doctors other than the author are not identified in the article.

was not full the punctures were rapidly covered by Lymph and sealed off."[63] The dryness of South Africa meant that it was better to treat such wounds in a patient conservatively – the soldier was left to heal alone with morphine and starvation. The problem was that this war was not being fought in South Africa; the conditions were very different, and patients were dying as a result of conservative treatment.

The conditions of the First World War were so different that Tubby was "convinced that in every case where a wound of the intestines [was] suspected an immediate laparotomy [was] imperative."[64] The bullets used on the Western Front were different from those used in South Africa. This was due to the German pointed bullet. Forensics at the time was a limited science, but the ideas generated through forensic studies became part of the basis for the treatments of abdominal wounds that would be used throughout the war. These studies demonstrated that the German bullet's centre of mass was far back in the bullet, which caused it to turn over when it struck tissue and pass through the soldier backwards. This explained why the entrance wounds were small, the exit wounds were large, and why a large amount of tissue destruction occurred not just in abdominal wounds, but with all bullet wounds. Rather than producing small punctures in the intestines, they sliced through the intestines, leaving large jagged holes.[65] This meant that there was little chance that the wound would heal on its own. The base hospitals were too far back to perform the required treatment in a timely fashion. For any chance of survival, the wounded soldier had to have surgical intervention within six hours; otherwise, "it would be much better to leave them in the trenches and to use

[63] A.H. Tubby, "Cases of Concussion due to Bullet and Shell Wounds," *British Medical Journal,* January 1915, 65.
[64] Do.
[65] Ibid, 64-65.

available transport for more practical purposes."[66] As a result of these findings, it was decided after Ypres to establish special CCSs closer to the front lines to treat abdominal wounds.

The recommended treatment for abdominal wounds stressed that shock, cold, and blood loss had to be treated first, with warm saline injections, coffee, brandy, and morphine. It usually took a half-hour to treat the shock and prepare the patient for surgery. The soldier was often given ether along with an anaesthesia to help alleviate his nervousness and to stimulate the effect of the ether. The soldier was awake when the abdomen was opened. The injured portion of the intestines was clamped and one to three pints of blood and fecal matter were cleaned out of the cavity. A portion of the intestine was usually excised,[67] while smaller perforations were sutured. Finally, the abdomen was filled with saline and closed without drainage.[68] The results were positive, but based on the time of intervention. When it took twelve hours or more for the patient to receive treatment, very few recovered but when treatment was rendered within six hours, there was reasonable hope for recovery.[69] This study demonstrates the importance of early medical intervention.

The timing of intervention was not the only issue that doctors had to consider when treating patients. In his writings about his work in the casualty clearing stations, Tubby noted that "The men all have in common exposure to trench living which

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[66] Ibid, 65.
[67] "The two ends of the mesentery were carefully brought together and end to end anastomosis was used (except in cases involving resection of both the large and small intestines) … We are, in fact, dealing with a case of peritoneal contamination and not of peritonitis in the ordinary sense of the term. In the ordinary case of infective peritonitis we should regard the treatment we have described as the most fatal which could be adopted." Ibid, 65- 66.
[68] Ibid, 65.
[69] Ibid, 66.

produced sodden, mud-caked clothing, insecure sleep, and in most cases they had to lie for some hours in mud or dirt waiting for assistance."[70] When combined with loss of blood and the development of shock, "it becomes clear that the surgeon must treat the condition of the man before he can address the injury."[71] The number of wounded who arrived at the medical units in a state of shock was astounding. Due to the prevalence of shock in the war, research into its causes and treatment became a focus of Tubby's group. The group stressed warming the patient with hot water bottles, warm saline injections, and coffee or brandy enemas. The patient would receive morphine for the pain and efforts were made to restore circulation. Bleeding out was not an issue since it was controlled in the field; a wounded soldier would not make it to a casualty clearing station or base hospital if the bleeding had not been controlled.[72]

A significant difference between the Boer War and the First World War was the soil upon which the battles were fought. The fields of battle were also the fields of the French farmers, and had been for generations. The use of manure to fertilize the land created a problem for the medical staff as all of the wounds of the First World War were infected and would develop gas gangrene if left untreated. It was not the bullet or shell fragment that specifically caused the infection to occur. Every time a soldier was hit, the projectile tore pieces of clothing from his uniform and pulled them deep inside his wound. Since the uniforms were covered in dirt or mud from living in the trenches, the clothing fragments carried infection deep inside the soldier's wound. Topical anti-septic ointments, like iodine, could not fight the deep-wound infection, so a new form of

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[70] Tubby, "Cases of Concussion due to Bullet and Shell Wounds," 64.
[71] Do.
[72] Do.

treatment had to be pursued. Thomas Archibald Malloch, from Hamilton, Ontario, joined the CAMC at twenty-eight years of age. He was one of the first doctors to offer advice on how to proceed with such wounds in an article for the *Canadian Medical Association Journal* in May 1915. Treatment to date had consisted of cleaning the wound as much as possible, painting the skin with iodine, and suturing the wound closed. Malloch built on that approach to offer a new protocol for treating gas gangrene. The Medical Officer had to remove the gauze and iodine field dressing, shave the area of the wound, and clean it with soap and water. The area was then cleaned with ether or benzene and painted with iodine. A ring of skin was cut away from the entrance and exit wounds and all foreign objects, such as bone, clothing, or metal, were removed. An x-ray could be taken to ensure that the wound was clear if it was thought necessary. The wound was then irrigated with hydrogen peroxide. Rather than suture the wound closed, Malloch recommended leaving the wound open, inserting a fenestrated drainage tube, and packing it with cyanide gauze. The wound was then irrigated twice a day with hydrogen peroxide when the gauze was changed. This procedure was to be performed at the casualty clearing stations since they had access to x-ray units and were not generally under fire. The patient could then be evacuated to the base hospital for further care.[73] Malloch's treatment would not become standard, but is important to note since his ideas would become the basis for the most popular method of treating wounds that was developed by a French doctor later in the war.

Another major problem during the First World War's early battles was burn wounds, but researchers in the medical services found a way to treat burns that would be

[73] T.A. Malloch, "Correspondence from the Seat of War," *Canadian Medical Association Journal,* May 1915, 734-735.

readily available by 1916. The French used Ambrine to treat burns but the treatment was protected by proprietary rights and the Ambrine Company of Paris would not share the formula. The cost of the treatment was very high and it was not as effective as the American and British Medical Associations would have liked. Ambrine was able to heal burns and reduce pain quickly by preventing air from touching the wound, and also allowed the wound to heal with almost no scarring. This allowed doctors to avoid having to graft large burns and prevented sepsis. It worked by protecting the wound from the air and immobilizing the skin near the wound, and the warmth of the treatment stimulated blood flow to the burned area. Ambrine was different from regular paraffin in that it had a lower melting point, did not crack, and adhered to the skin better than paraffin.[74] The British were able to develop a new treatment, Paraffin No. 7, which worked like Ambrine but was more effective and would be available by early 1916.

Treatment with Paraffin No. 7 began at the first dressing in the regimental aid post. The burn was washed with sterile water, then carefully dried and painted with Paraffin No. 7 with a broad camel hair brush. A thin layer of cotton wool cut the same size as the wound was placed over the Paraffin No. 7 and painted with a second layer of the paraffin. More wool was applied to the paraffin and then the wound was dressed. The process was repeated each day at the various medical units until the very last stages of healing, and then it was repeated every forty-eight hours. After the second dressing, the dead skin was cut away. The principle behind the treatment was that antiseptics retarded the growth of new tissue. With Paraffin No. 7, the wax peeled off without sticking to the skin or causing the patient any pain while dressing the burn. Paraffin No.

[74] LAC: DMD Records, RG 9 III B2, volume 3587, file 22-7-4, Treatment of Burns by Paraffin.

7 also allowed the dressing and wound to be touched with a great deal less pain than a regular dressing or Ambrine, making transport much more comfortable for the patient. The final benefit of Paraffin No. 7 was that it allowed a surgeon to perform an amputation when necessary without hesitation. Before the paraffin treatment, the doctor required a skin flap or graft of skin to cover the stump, but Paraffin No. 7 allowed the skin to grow over the stump while protecting the wound from infections.[75] The development of Paraffin No. 7 is an excellent example of how rear-area research helped create treatments that had important applications for front-line units. For this particular treatment, all of the medical units would have to play a part since the patient would need the dressing changed each day even while making his way back to the base hospitals. While the sharing of resources of the medical service in such a way had obvious benefits, this was also a case in which the front-line doctor had to obey the rear-area researcher since those at the front would not see the results of this treatment.

The new treatments, from abdominal surgery to gas treatments to Paraffin No. 7, had to be integrated into the medical structure through education. Each winter, when fighting was at a lull, Medical Officers were sent to schools, to visit other medical units performing new procedures, to read medical journals, and to attend a number of lectures on a variety of topics. The MO would then return to his unit and teach its members what he had learned so that all the doctors were able to use cutting edge medicine as soon as it was proven and available.

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During the Second Battle of Ypres, the CAMC discovered problems with the medical system and procedures that had been laid out in their training manuals. Nevertheless, the flow of patients through the system worked fairly well, the flexibility or adaptability of the system was well managed as dressing stations were forced to move to cope with the battle conditions, and the men of the medical corps did all they could to help the wounded. The limited success was achieved despite the surprise attack, which meant that the medical units had received no operational orders. In the aftermath of Ypres, the Canadian Army Medical Corps spent a great deal of time studying the lessons that had been learned and arriving at ways to implement new advances in medicine that came in 1915. The use of less-trained stretcher bearers to assist those with proper first aid training was designed to provide fast medical intervention, prevent exhaustion, and to spread out the trained bearers to keep them from being wounded together. New procedures such as the Canadian protocol for wound treatment and the British introduction of Paraffin No. 7, meant that there would be changes in the treatment available to wounded soldiers in the front lines to improve their odds of full recovery. All of this necessitated that the lull between battles and the winter months be spent not just tending to the injured and ill, but also learning new ideas and systems to implement before the next battle. The new practices for front-line units, the willingness to accept and develop new medical treatments, and new medical units such as the Canadian Motor Ambulance Convoy showed that, from its first experience in battle, the medical corps was committed to learning to become more efficient and provide better care to wounded soldiers.

Chapter Four

External Investigations and Internal Scrutiny

Before launching into an examination of the CAMC during the Battles of the Somme, the next major episode in the evolution of the medical system, it is important to explore the actions of the medical corps between battles. As previously discussed, formal investigations were conducted by the CAMC through its after-action reports to investigate and implement new systems and medical procedures and technologies. In addition, international committees of the Allied medical forces met each year. Beyond this internal scrutiny, there was also a formal investigation into the Canadian Army Medical Corps and its practices in late 1916. The investigation was conducted in an attempt to make the force more effective and efficient, and to ensure that it was indeed doing the work it was created to do. This demonstrated the total commitment that the CAMC had to improving the odds of survival for the wounded by ensuring that doctors were performing duties and receiving promotion based on qualifications and experience, among many other issues. The resulting report drew a strong reaction from the men at the front; they had struggled to do their best and persevered through so much, so criticism was hard to accept. The institutional scrutiny was not the only appraisal in the medical units. Individual doctors engaged in a process of self-examination. The majority of doctors' personal reflections were concerned the military system of discipline and treatment and their place as doctors within it. An examination of doctors' personal thoughts in diaries and memoirs will demonstrate the prevalence of debates and questions concerning the impact of military structures on the ability to perform medicine as it was taught, and affirmed that the members of the medical service had to accept their role as disciplinarians in order to function within the greater system.

The after-action reports, written by officers of the CAMC, that were discussed in relation to the Second Battle of Ypres were created after every action in which the CAMC served; these constituted the first level of scrutiny to which the CAMC was subjected in an effort to learn how to do its work better. There was no specific time-frame in which the reports had to be submitted. This was due to the number of patients who continued to seek treatment at the medical units, the importance of moving the units close to the front as soon as possible, and as a result of skirmishes that continued after the main thrust of the battle had ended. The reports were to be written and delivered as soon as possible after the fighting ceased and the casualties in the unit were manageable. It is a sign of determination of the CAMC to improve that some of the recommendations were forwarded up the military hierarchy while the battle was still in progress. An example of this occurred on 10 April 1917, during the fighting in the La Folie sector of Vimy Ridge. That day, three of the Regimental Medical Officers, James Marshall from Forrest, Ontario, Henry Davis of Coquitlam, British Columbia, and Richard Ireland from Trenton, Ontario, sent back reports to Major John Gunn, Acting Commanding Officer of No. 8 Canadian Field Ambulance, with information that they believed should be acted on immediately: a change in the location of the RAPs, the arrival and location of extra stretchers and bearers, and a water report with a sample for testing. Major Gunn responded promptly to reports that required quick action, but the impact of reports such as the ones written by Marshall, Davis, and Ireland did not stop there. All of the communications exchanged during a battle were condensed into a single after-action report to be submitted by the FLD AMB. In this case, the after-action report of No. 8 Canadian FLD AMB was compiled and forwarded on 30 April 1917, and eventually ended up in DMS London Adami's files.[1]

[1] War Diary [WD], No. 8 Canadian Field Ambulance. April 1917, Appendix 1, sheets 18 and 21. Library and Archives of Canada [LAC], Record Group [RG] 9 III-D-3, Volume 5030, T-10919.

The after-action reports allowed the medical services to examine the problems that arose during a battle at every stage of casualty evacuation and make improvements to the system and medical procedures. The after-action post morta might also be discussed by the formal groups that constantly worked on issues of medicine in war, such as the Empire's Medical Research Council and the Chemical Warfare Committee. These organizations gave medical doctors and scientists a degree of authority to determine the direction of research activities and the ability to coordinate them with other departments, allowing for "a singular convergence of ideas among medical scientists and military thinkers; both groups were coming to share a view of the war itself as an experimental enterprise, in which new techniques of warfare were continually being developed and tested, and in which the line of demarcation between the laboratory and the battlefield was increasingly blurred."[2] This had not occurred before the First World War and was significant because it represented a shift in thinking from the pre-war notion that war research and development should be confined to the periods between wars. This revolution in thinking was brought about by wartime necessity that forced the Allies to rely on innovation, not just for weapons to fight the war but also for medical advances.

Outside of the after-action reports, requests or suggestions could be given formally in writing or informally verbally. Indeed, this procedure was written into the military regulations: "The officers of the Medical Service are charged with the...duty of recommending to officers commanding, verbally or in writing, any precautionary or remedial measures... [conducive] to the preservation of the health or comfort of the troops."[3] One such communication was sent to Second Division Headquarters by then Major John Fotheringham on 31 May 1916 to suggest a

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[2] Steve Sturdy, "War as Experiment: Physiology, Innovation and Administration in Britain, 1914-1918: The Case of Chemical Warfare," in Roger Cooter et al (ed.), *War, Medicine and Modernity* (Gloucestershire: Sutton Publishing, 1998), 74.

[3] Author Unknown. *Regulations for the Canadian Medical Service, 1914.* (Ottawa: Government Printing Bureau, 1915) 7.

new plan for evacuation involving stretcher bearers.[4] Other informal exchanges of information occurred when medical officers visited other units to learn about new treatments or simply to discuss procedures. In some cases informal medical societies such as the 2nd Army Medical Society were created to help keep everyone informed on new medicine. The 2nd AMS held regular meetings in the winter and whenever possible during the fighting seasons. One meeting occurred at No. 1 Canadian Casualty Clearing Station at Bailleul on 5 January 1917 when 130 medical officers attended a lecture on "Some early points of treatment of wounds and the wounded."[5]

Recommendations and orders came back to the MOs at the front in much the same way that the information flowed to the rear: through direct correspondence in routine orders or circular memorandums. An example of this kind of communication was Circular Memorandum No. 6, written on 27 March 1915 at General Headquarters by A.T. Sloggett, the Director General Medical Service, British Forces in the Field and addressed to all DsMS, DDsMS, ADsMS, and all medical units. The memo included twelve points for better wound treatment. Some of the points the memo made were that all wounds were to be regarded as infected or septic, that special care had to be taken when bandaging wounds since swelling would occur and prevent blood circulation if the bandages were too tight, and information on treatment of skull fractures, bladder wounds, and compound fractures, among others.[6]

Another forum for education and communication was the medical journal. Not only did the medical officers contribute articles to the journals, but they used them to keep up with changes in medicine, just as they would in civil practice. When Captain Percy Bell was training in England, for example, he was seconded from his unit to read the journals, a practice that was

[4] John Taylor Fotheringham. Letter to 2nd Division HQ, 31 May 1916. MG 30 E53, Volume 5, File 22. [LAC]
[5] WD No. 1 Casualty Clearing Station. 5 January 1917. LAC: RG 9 III B2 Adami Papers, Volume 5, 8-28.
[6] A.T. Sloggett, Circular Memorandum No. 6, 27 March 1915. LAC: DMD, RG 9 III vol. 3752, File 3-3-3.

encouraged throughout the war. Medical information was not the only reason that the doctors read the journals; they also contained a great deal of war news. The *Canadian Medical Association Journal* had a section for war news in most issues and also printed articles by MOs about their experiences and descriptions of war. For example, in 1915 there was a three-part series titled "Correspondence from the Seat of War" written by a Canadian Medical Officer to describe his experiences in the medical wards and in battle.[7]

Despite the medical services' work towards achieving better systems and practices, there was still a large number of casualties dying in the medical wards and being held in convalescent hospitals in England. Sam Hughes, the Canadian Minister of Militia and Defence, began to think that there might be serious problems in the CAMC because of the large number of casualties convalescing in England instead of being returned to the front. He approached Dr. Herbert Alexander Bruce to inspect the medical corps. Dr. Bruce was chosen for three reasons: he was considered a first-rate surgeon; just a year earlier he had volunteered to serve overseas and paid his own way to France; and, finally, he was a prominent member of the Conservative Party.[8] Appointed Special Inspector-General of the CAMC, Colonel Bruce was to inspect the Canadian hospitals and medical institutions overseas to which the government had contributed. He formed a committee to assist him in his duties, and over a six-week period they conducted a thorough investigation that culminated in an unflattering report on the work of the CAMC. The bulk of the report focused on issues that affected rear-area and base hospitals.

One complaint concerned Canadian soldiers convalescing in British rather than Canadian hospitals. Bruce argued that Canadians should be kept in Canadian hospitals whenever possible and, if it was not possible, then Canadians should be allowed to inspect the British hospitals and

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[7] T.A. Malloch. "Correspondence from the Seat of War," *Canadian Medical Association Journal,* 5 (1915) 728-740.
[8] Charles Godfrey, *Bruce: Surgeon, Soldier, Statesman, Sonofa* (Madoc Ontario: Codam Publishers, 2001), 43.

ensure that the Canadian soldiers were receiving proper care. He argued that the British hospitals did not send healed soldiers back to the front lines in a timely fashion due to a lack of supervision by surgeons, nor were they sent home to Canada to convalesce if they would not be able to return to battle. Bruce thus recommended that there be better coordination between the Allied hospital systems, that the personnel of the hospitals have a permanent character to improve treatments, and that a consulting surgeon should be available to oversee all cases.[9]

The report raised other criticisms of problems in the rear-areas of the medical service. Bruce, who wanted all Canadian wounded to be served by the CAMC, was furious that there were three Canadian Stationary Hospitals serving in the Mediterranean when there were no Canadian units in the theatre. In addition, the Canadian Casualty Clearing Stations had also not treated Canadians by 1916. Casualty clearing stations, while they were considered front-line units, were well behind the trenches and served large geographical areas, and all the troops in them. Since they were not attached to divisions, as field ambulances were, they were sent to areas that required their services, regardless of the nationality of the troops in the area. No. 1 Canadian Casualty Clearing Station entered the battlefields of France in late February 1915, serving the British at Neuve Chapelle, and by the end of 1915 had not treated a single Canadian soldier. No. 2 Canadian Casualty Clearing Station was in a similar situation as it was also serving a British sector. The Canadian medical staff treated the wounded as carefully as they would a Canadian soldier, and the British clearing stations that served the Canadians did the same. Nonetheless, the Canadian units were raised in Canada, paid for by Canadians, and wanted to serve Canadian soldiers; it was what the medical staff volunteered to do in France, and the Canadian public shared their desires.

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[9] Herbert Bruce, *Politics and the Canadian Army Medical Corps* (Toronto: William Briggs, 1919), 49-50.

Evidence of the Canadian public's desire to see Canadians in Canadian hospitals is found in the newspapers of the time. One such article appeared on 2 October 1916. It recounted the speech that Professor Jack Mackenzie, a professor of biology and pathology at the University of Toronto, presented to the Canadian Club about why Canadian hospitals should help in Salonika where there were no Canadian troops engaged. His speech was in response to criticism about the hospitals being sent there, and was one of many public speeches and debates on the topic of the hospitals in Salonika.[10] However, the debate about the treatment of Canadian soldiers also extended to the wounded being placed in British hospitals. Once the Bruce report was made public but before it was debated in Parliament, Sam Hughes publicly stated that "he had never been able to understand why it had been necessary to send Canadians soldiers to the north of England when there were well-equipped Canadian hospitals at hand." His comments were in response to the outcry against Canadians being treated in British hospitals where volunteers instead of trained Canadian nurses would care for the soldiers.[11] As a result of these debates and the Bruce Report, the Surgeon-General, Guy Carlton Jones, wrote a letter to the Director General of the medical service requesting that the Canadian casualty clearing stations be moved "into close touch with the Canadians" since it was "very much desired by Canadians, and the people in Canada, that these hospitals should be serving the Canadian Corps."[12] While some of the Canadian CCSs would see Canadian wounded in 1916, all the medical units would not be brought together to serve in a Canadian area until the Battle of Vimy Ridge in 1917, which was

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[10] *Globe* (Toronto), 3 October 1916, 7. For Professor Mackenzie's observations in Salonika see, J.J. Mackenzie, *Number 4 Canadian Hospital: The Letters of Professor J.J. Mackenzie from the Salonika Front.*(Toronto: Macmillan Company, 1933)

[11] *Globe* (Toronto), 7 February 1917, 1 and 5.

[12] Library and Archives Canada [LAC]: Department of Militia and Defence [DMD] Records, RG 9 III, volume 3686, file 30-1-1, Surgeon-General Jones, Letter to Director-General Medical Services, BEF, France from Surgeon-General Jones, 30 December 1915.

also the first time that the four divisions of the Canadian Corps would fight together at the same time.

There were few criticisms specific to front-line units in the Bruce report, although some of the complaints made against the rear-area hospitals were generally applicable. One issue that affected the entire medical system was the use of its personnel. Bruce argued that the members of the medical corps were not being used to the best advantage. One example he cited was sending an experienced surgeon to a regimental aid post where surgery was not performed, leaving less capable men to perform the operations at the rear. Ultimately, Bruce was arguing that staff was not being given duties based on their qualifications, training, and previous experience, a practice that should change.[13]

Discontent concerning promotion and appointments was the other issue raised by the Bruce Report that affected the Canadian Army Medical Corps' front-line units. The Bruce Inquiry discovered that promotion was not necessarily based on the skill of the doctor or the level of experience he had gained while serving at the front. New medical units that were being raised in Canada were selecting officers from among the men who remained in Canada; men were going overseas holding higher rank than men with much more battle experience and training as physicians in wartime conditions. Instead, Colonel Bruce recommended that promotion be based on merit, length of service, professional ability, and organizing capacity. In addition, he recommended that all rapid promotion in Canada be discontinued and that all newly formed medical units be placed under the command of Medical Officers already overseas.[14]

Appointment, promotion, and rank issues were felt right down to the front lines, not merely in the bureaucracy. Complaints about officers who were promoted and sent to front-line

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[13] Herbert Bruce, *Politics and the Canadian Army Medical Corps,* 78-80.
[14] Ibid, 81.

units appear in many doctors' diaries. There was a feeling of worthlessness in the work as a result of how promotion was handled. As Sir Andrew Macphail, a fifty-year-old physician originally from Prince Edward Island who would go on to write the official history of the CAMC in the First World War, wrote in his personal diary,

> The medical service is slackening off. I have observed keenly for 18 months. Nothing happens to a man who neglects his work. No reward comes to a man who does his work faithfully. Appointments and promotions are made from London without any regard to service or seniority in the field. Men arrive from Canada as Majors and Colonels who had not even joined when we left. Men come from the Base, who have been in comfortable empty hospitals all winter, and being of a higher rank take precedence. Major Phillip, who never saw a Field Ambulance has been posted to No. 5 over all the Captains who have served in it for 15 months ... Col. Young is attached to No. 4 for training during a few weeks preparatory to taking command of an Ambulance in the new Division ... Our own Colonel whose work has been faultless is passed over just because he does his work so well.[15]

When new officers without experience turned up at front-line units, they were often greeted coldly and, in several cases, incumbents promptly applied to be moved to other units. No. 2 Canadian Casualty Clearing Station received a new appointment as surgical specialist in November 1916. As a result of the appointment, Major Harvey Lee Jackes, the unit's ear and eye specialist, left, since he perceived a slight when he did not receive the appointment despite his wealth of experience serving the unit.[16] In most cases, officers were not able to leave their units when a new doctor was taken on strength, so they carried on and tried to keep the unit functioning while the newcomer learned how to command it. The system led to cynicism among officers and other ranks. Macphail commented that "these things are well understood in the service, and a man who is anything higher than a Captain becomes suspect. He begins to explain,

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[15] LAC: Andrew Macphail Papers, MG 30 D150, volume 4, Personal Diary of Andrew Macphail, volume 2, 12 May 1916.

[16] LAC: DMD Records, RG9 III B2, volume 3751, Personal Diary of Major G. S. Strathy, March 1916.

sometimes to apologize."[17] This issue was not easily resolved and would continue to be a problem for the duration of the war.

Other accusations, some without merit, were made in the Bruce report that angered the entire medical establishment. Bruce made "sweeping condemnations" that operations were "poorly performed" or performed as a "private hobby." In addition, Bruce wrote in his report that "many of the officers who have been given commissions are drug fiends or addicted to alcoholism."[18] Sir George Perley, Canada's High Commissioner to Britain, and many others were outraged by the report in general and such accusations in particular. In fact there was a "growing conflict between Colonel Bruce and his report" that went right through the ranks of the Canadian Army Medical Corps and was demonstrated in letters written to Perley.[19]

While the intention of the Bruce Inquiry had been to help improve the medical system, the results of the report were not well accepted. The formal response to the Bruce report was an inquiry into its accusations to be conducted by three highly respected Canadian doctors then serving in France, Colonel John Taylor Fotheringham, Colonel Arthur Edward Ross, and Colonel John Munro Elder, and a doctor friend of Sam Hughes, Colonel E.C. Aston (added to the group with a mind to keeping the process fair). This inquiry was led by British Medical Officer Sir William Babtie, the former medical director of the medical services in India and the Mediterranean. The board was to investigate the criticisms made in the Bruce Report, to evaluate their legitimacy, and to make recommendations as to which ideas should be supported and which discarded.[20] The Babtie Report was published within three weeks. It generally discredited the Bruce report, though it accepted some of Bruce's ideas, such as those regarding promotion.

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[17] LAC: Macphail Papers, Diary of Sir Andrew Macphail, volume 2, 12 May 1916.
[18] Desmond Morton, *A Peculiar Kind of Politics: Canada's Overseas Ministry in the First World War* (Toronto: University of Toronto Press, 1982), 94-95.
[19] Do. Morton makes mention of the letters written, but does not provide any examples of what was specifically said.
[20] Sir Andrew Macphail, *Official History of the Canadian Forces in the Great War, 1914-19: The Medical Services,* (Ottawa: F.A. Acland, 1925) 174.

Ultimately the Bruce Report was dismissed since it often overlooked the military reality behind situations and made few suggestions as to how to implement its recommendations. As for Bruce's claims that the Medical Officers were dope fiends and alcoholics, the official history made clear that this was not the case: "In the whole Canadian army during the period of the war there were amongst all officers in all arms only 29 cases of alcoholism, one of addictions to other intoxicants," and no deaths as a result of these instances. It went on to state that just twelve Canadian Medical Officers were struck off strength by action of court-martial.[21]

Ultimately, the Babtie report created a better representation of the CAMC's needs by considering all of the factors involved in decision-making. The creation of this panel demonstrated that the CAMC was committed to improving its care. The medical service could have dismissed the Bruce report out of hand for its unsubstantiated comments and problems of analysis, displaying distaste for the criticism contained within it. Rather, the medical service decided to review the work and integrate changes that addressed the important and applicable criticisms.

As Andrew Macphail's musings on the unfairness of the promotion system suggest, members of front-line medical units often engaged in self-scrutiny. Although there is no direct evidence that the Bruce and Babtie reports encouraged greater introspection among the men of the CAMC, it is reasonable to deduce that, with their work coming under careful examination by externally-appointed committees, medical personnel were moved to take stock of their situation. With a wealth of experience to ponder, they gave specific attention to a number of issues related to their dual roles as doctors and soldiers. The most significant of them, dealing with self-inflicted wounds, executions, and shell shock, concerned the operation of military discipline.

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[21] Ibid, 173.

The participation of doctors in and adherence to the military system was of the utmost importance since the medical service did not want to become a place for soldiers to avoid their military duties.

The role of the doctor in the system of military discipline prompted much reflection from doctors. Some felt that military discipline was not harsh enough, or at least was not applied as universally as it should be. In essence, each doctor had to come to his own conclusions about military discipline. The opposing views can be seen in the writings of Andrew Macphail and John McCrae, two of Canada's best known military doctors. Macphail was at odds with military discipline. As he wrote, "I have not observed that power sits well on these militia doctors ... Too many doctors forget the instincts of their profession in the attempt to copy the manner of the officer."[22] He was referring to several doctors who had boasted to him that they never had many men at sick parade since they had dealt with the issue; these Medical Officers took pride in giving to men who claimed to be ill medications that had harsh side-effects, or in arresting soldiers whom the officer felt were not sick enough to warrant their evacuation.[23] This disappointed Macphail, who did not engage in such activities himself. The case highlights the conflict between military needs and the medical profession. The Medical Officers were trying to conserve manpower by forcing men to stay at the front, but in order to do so they were testing the boundaries and going against the spirit of their profession. When it came to arresting soldiers and exposing their antics at sick parade, there was nothing a MO could do to spare them the ordeal of the military trial since it was their duty to report malingerers.

In contrast to Macphail, Major John McCrae, better known as the author of "In Flanders Fields," supported and encouraged strong military discipline in his writings. Many incidents of

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[22] Ibid, 9 October 1916.
[23] Do.

crime occurred in the front lines that had to be dealt with by courts-martial, and when civilians were injured by soldiers through malicious attacks or pranks gone wrong, the Medical Officers at the front had to take care of the wounds. McCrae wrote of an incident that occurred in April 1915 while he was serving in a field ambulance that involved two Canadian soldiers and a French woman who had been beaten in a village near Ypres. She had two black eyes and a broken rib that McCrae treated at his medical station. The soldiers who committed the attack were quite drunk and asking for coffee. The woman did all she could to turn them away, but they became angry and beat her. Surely no Medical Officer would have condoned the brutal actions of these soldiers, but this incident caused McCrae to reflect that

> The men sadly need some severe lessons. The authorities have only recently wakened up to giving even decently heavy sentences. Why they persist in failing to punish our men as they would their own is a mystery ... At this moment a French Canadian case is before G.O.C. for desertion. I will bet any money his death sentence will be commuted because he is French Canadian. Yet an order of 2 days ago contained news of 4 men being shot in different regiments in two days. However, we struggle on, and strive to make the hand heavy when we can.[24]

McCrae was lamenting differences in how British and Canadian soldiers were punished, arguing that the punishments meted out by the British were a better way of running a war. McCrae wanted harsh punishments to make an example of soldiers and create a more disciplined army. Considering that he bemoaned the possibility that the French Canadian might escape being shot for desertion, then one must wonder what fate he thought should befall the soldiers who beat the French civilian.

Malingering, skrimshanking,[25] venereal disease, and self-inflicted wounds were important manpower and morale issues that also affected soldiers' pensions. It was considered the responsibility of the Medical Officer to prevent malingering, but to suspect a soldier of

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[24] LAC: John McCrae Papers, MG 30 D209, microfilm reel A-1977, Personal Diary of John McCrae, 16 April 1915.
[25] Malingering and skrimshanking were slang words used by the men during the war. They both refer to soldiers who actively tried to escape front-line duty by inventing illnesses or ailments.

malingering was "to enter into an adversarial relationship that was not based on the basis of a doctor seeking a patient's trust, but on the grounds of mutual suspicion and distrust. It did not aim to promote health through the exposure of illness, but to elicit punishment through the exposure of deceit."[26] A man accused of such a crime faced military discipline that could range from Field Punishment #1 to imprisonment. Roger Cooter argued that doctors had different views as to how to deal with malingering. Some doctors, though primarily in the rear-area hospitals, tried to "medicalize or psychologize" malingering, while others, primarily in the front lines, tended to view malingering as "a character flaw, a failure of manhood, of patriotism, or as personal cowardice."[27] The divide was not necessarily between front- and rear-area doctors, but the former did tend to be the first line of defence against malingering. Front-line doctors had a wide range of responses to this aspect of military discipline. In addition to reporting malingering and venereal disease, doctors also had to provide evidence against their patients at court-martial proceedings. This violated the rules of confidentiality in private practice, yet doctors had only limited means to resist and stay true to their medical training.

The diagnosis of venereal disease was not a matter to be kept between doctor and patient, or even simply noted on the medical chart. A Medical Officer had to file a report to the soldier's Commanding Officer when he was found to have one of these conditions, because venereal disease was considered an offence under military law and brought a pay stoppage of fifty cents a day for the duration of the man's treatment or stay in hospital.[28] Many officers could afford this penalty as a result of their higher pay, but enlisted men were less able to afford this deduction from their pay, so their dependants at home had their allowance docked to make up the

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[26] Roger Cooter, "Malingering in Modernity: Psychological Scripts and Adversarial Encounters During the First World War," in Roger Cooter et al (ed.), *War, Medicine and Modernity* (Gloucestershire: Sutton Publishing, 1998), 130.
[27] Ibid, 137.
[28] Library and Archives of Canada [LAC], Record Group [RG] 150, accession 1992-93/166, box 8549, file 28. Service record of #928728 Harvey Austin Rusk, pay statement.

fine. Family members in Canada would complain about the deductions and the military authorities did not hide the reason for the pay stoppage. As a result, a doctor filing a report of a soldier contracting venereal disease knew there were very real consequences for the patient, beyond his medical care, that could cause him grief.[29] Notwithstanding, the soldiers were aware of the consequences of their actions and still chose to engage in indiscriminate sexual activity. In this example it is easy to excuse the doctor and contest the assertion that military needs went against medical morality; the soldier made a choice knowing the consequences and that the doctor would have to report it. This is not so easy in other contexts.

Self-inflicted wounds were at the heart of the debate about the role of the front-line Medical Officer, a debate that has spanned many wars and decades. A doctor in the Napoleonic Wars wrote that "the surgeon could not decide the question [whether a wound was self-inflicted], as there was no positive sign that could enable one to distinguish a wound inflicted by the man himself and one received in the ordinary way."[30] However, a French doctor in the First World War thought that self-inflicted wounds could be medically determined. Point-blank gunshot wounds had different burn patterns than wounds received in battle; patterns that focused directly on the point of entry were present in self-inflicted wounds, whereas in accidental injuries there tended to be blackening in other areas. The way the wound had caused the skin to move was another factor.[31] While this may have been the case with bullet wounds, the doctor had no way to distinguish self-inflicted wounds using other weapons, or feigned illness.

When a soldier was suspected of having a self-inflicted wound, he was sent to a field ambulance with a "Charge Sheet" and a brief statement of evidence while the Deputy Adjutant General was informed. The wounded soldier was also marked with an "SI" in red marker on his

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[29] Rawling, *Death Their Enemy,* 75.
[30] Anonymous, "Self Mutilation by Soldiers," *British Medical Journal,* May 1915, 899.
[31] Ibid, 900.

arm or forehead before he was evacuated. In the case of an injury that was not severe, the soldier was tried within forty-eight hours at the FLD AMB. If the injury required surgery or other medical intervention that was not available at the front or if the court could not convene at the ambulance, the soldier was evacuated back through the medical system until he reached a special hospital that dealt only with self-inflicted wounds. Sometimes the wounded man was not suspected of having a self-inflicted wound until he reached the FLD AMB or another medical unit down the line. In such a case, it was the duty of the Medical Officer to place the man under arrest immediately and follow the steps to convene a court martial. The court martial usually commuted the sentence of imprisonment to Field Punishment #1 and returned the man to his unit as soon as possible.[32] Field Punishment #1 meant that the soldier was attached to a fixed object in a public area by straps, irons, or rope for no more than two hours a day. The man could only be attached for three of four days and for a term of no longer than twenty-one days.[33]

There were many ways soldiers could try to injure themselves to evade front-line duty. Private Masterson shot a finger on his left hand. Private Young shot the upper part of his right arm. Lance-Corporal Edwards shot his left foot.[34] Some soldiers attempted to find a less obvious way of securing medical evacuation without being caught. One method was for a soldier to break open a rifle cartridge and chew a thread of cordite, the explosive substance in the cartridge, which produced a rapid pulse, a flushed face, and sometimes a fever. These symptoms would last for several hours. It was impossible for a Medical Officer to distinguish between these symptoms and those that any severe cold or infection created, so the man was usually able to gain a few days' rest at a field ambulance or casualty clearing station before he "recovered" and was

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[32] LAC: DMD Records, RG 9 III-C-10 volume 4542, folder 5, file 1, Report on Self Inflicted Wounds, n.d.
[33] War Office, General Staff, *Field Service Pocket Book, 1914* (London: Printed under the authority of His Majesty's Stationary Office, 1914), 223.
[34] LAC: DMD Records, RG 9 III-C-10 volume 4542, folder 5, file 1, Report on Self Inflicted Wounds, n.d

returned to his unit.[35] Another, more subtle way of causing a self-inflicted wound was for soldiers to wear a wet towel around their necks while they slept. This could cause severe catarrh and would ensure a visit to hospital.[36]

Medical Officers had different reactions to soldiers who tried to avoid duty by injuring themselves. Major Strathy saw seven cases of self-inflicted wounds in his battalion, almost all of whom had come to several days' sick parade with trivial excuses why they could not continue instead of plainly stating that they had lost their nerve. While Strathy made it clear that the man who had lost his nerve could not be removed from the line since the effect on the other men would be disastrous, he did devise an alternate solution that bent the rules while respecting the integrity of the military system. Strathy would talk to the soldier's company commander and get the man put on light work, such as being a gas guard in a dugout, while the unit was in the front lines. Once the unit left the line, Strathy would get the soldier transferred to an area "well behind the fire zone."[37]

Strathy was able to balance his sympathy for the soldier's predicament with the needs of the military, demonstrating a certain amount of compassion for the man in the process. This was based on his experience. When Strathy worked in casualty clearing stations or base hospitals, he had little experience with self-inflicted wounds. Some of the accidentally wounded soldiers would at times try to prolong their stay in hospital before returning to their units, but he found that the majority of the men actually wanted to go back to the front and were quick to convince a doctor they were ready to return or to agree with a doctor who thought they might be ready, even if they were not fully healed. Strathy's experience in the battalion taught him that soldiers

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[35] Robert Manion, *Life is an Adventure* (Toronto: Ryerson Press, 1916), 183.
[36] William Mathieson (ed.), *My Grandfather's War: Canadians Remember the First World War, 1914-1918* (Toronto: Macmillan, 1981), 128.
[37] LAC: DMD Records, Personal Diary of Major G. S. Strathy, Malingering or Scrimshanking, and Self-Inflicted Wounds, n.d.

considered it a disgrace to be evacuated due to illness. As a result, the majority of the men who reported to sick parade had sufficient cause to be there. He found that every battalion had three other types of soldiers liable to evade duty. The first was the nervous man who reported sick over the slightest ailment "for fear it might be serious." Strathy described this kind of soldier as a hypochondriac, "the same as those seen in civil practice." The second kind of soldier was merely lazy and trying to escape work, while Major Strathy described the third kind as the "cowards and the nervous." These men generally reported sick the day the battalion was going into the line or on the day of a planned attack. If they were not excused through sick parade, they were the most likely soldiers to desert or shoot themselves. Major Strathy argued that "these men [were] to be pitied, but most [were] not to be shown sympathy."[38]

Medical Officer Robert Manion generally held the same ambivalent view towards self-inflicted wounds. Manion thought the chief duty of the Regimental Medical Officer was to keep the men in the trenches; this meant always being on guard for soldiers "swinging the lead" or malingering. Malingering had an impact on relations with patients by creating "suspicion in most examinations at the front."[39] Rather than being a doctor trying to find a solution to an illness, the Medical Officer became an inquisitor trying to judge if there actually was a problem. Once Manion had seen a soldier appear at several sick parades with no obvious problem, he would threaten to place him under arrest. Most of the men, knowing they had been caught, would stop pretending at sick parade, and Manion never had to follow through on a single threat. He demonstrated the same compassion that Strathy did to his men. Rather than arrest them immediately, he gave the soldier a chance to gather his nerves and continue on in the front lines. Again, this meant bending the rules while adhering to military needs.

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[38] Do.
[39] Manion, *Life is an Adventure,* 181.

Manion felt that fear and shell shock were different matters, but both had to be handled with compassion. His experience with soldiers in the front lines taught him that most of the men gritted their teeth and faced their fears with tremendous courage. Nevertheless, he argued that under the conditions of warfare it was unavoidable that one man in a thousand would have his courage fail. In order to avoid being accused of desertion and branded as cowards, soldiers would drop behind their units to hide in shell holes or dugouts until the danger passed. They would later rejoin their unit and claim that they had been stunned by a shell or become lost. Those who were branded cowards could "retrieve themselves later" and work their way back into the fraternity of the unit. Manion felt that these men were "more to be pitied than blamed" for their actions. When an officer or ranker who had previously been an excellent soldier had a moment of nerves, it was to be understood, not punished, and Manion considered it a sign of shell-shock more than a sign of cowardice.[40]

The most extreme case of a doctor having to reconcile his medical and military personas was also the most extreme disciplinary issue: capital punishment.[41] Regardless, overseeing an execution was part and parcel of learning to become military doctors. Both Andrew Macphail and Robert Manion had to attend executions during their time in the front lines. The soldier whom Macphail presided over was Private Elsworth Young of the 25th Battalion, 5th Brigade, 2nd Canadian Division. Young had been ordered to report to Sausage Valley during an intense period of fighting in one of the battles of the Somme, but he never reported. The military police caught Young impersonating an artillery corporal in a nearby village; he was arrested, tried, and sentenced to death for his actions. It was not the soldier's first offence, but the other offences

[40] Robert Manion, *A Surgeon in Arms* (New York, London: D. Appleton and Company, 1918), 161-163.
[41] For more information on capital punishment in the war, see Julian Putkowski and Julian Sykes, *Shot at Dawn: Executions in World War One by Authority of the British Army Act* (London: Cooper, 1992); Cathryn Corns and John Hughes-Wilson, *Blindfold and Alone: British Military Executions in the Great War* (London: Cassell, 2001); Andrew B. Godefroy, *For Freedom and Honour?: The Story of the 25 Canadian Volunteers Executed in the First World War* (Nepean, Ontario: CEF Books, 1998).

were considered minor infractions.[42] The sergeant-major presiding over the execution had Macphail indicate where he should place the target, "a piece of paper about four inches square," on the soldier's chest. The "boy" was bound to a chair that had already been secured to a tree. A gas helmet was placed over the soldier's head so he could not see the proceedings. "No one spoke, not even the Chaplain – it was not allowed."[43] After the "boy" was shot, Macphail "went to the body, and placed [his] finger over the artery in the neck. There was no sign [of life]. [He] opened the boy's tunic. The breast was pierced and bleeding from five holes." He pronounced the soldier dead and signed the death certificate. Macphail felt the actual act was "without dignity – a hangman's spectacle, but most efficiently performed."[44] He was uncomfortable with this aspect of being a Medical Officer – "I felt that I had now done my full duty to the Service" – but he would have to serve for another three years. There was no pride of accomplishment in his words or tone. For the first time he did not refer to the man in his care as a soldier, but as a boy. For Macphail this kind of punishment went too far, but he justified it as part of war and followed orders.[45]

Robert Manion's experience at an execution resembled Macphail's, though he provides no details about when, where, or why the soldier was executed. He was equally uncomfortable with the event and his role in it. Manion understood the motivation behind the execution, stating that the reason men were shot for some military crimes, such as desertion,

> is that wartime necessities are indeed harsh if human beings are to be forced to take part in such fearful methods of settling international disputes, for if men were permitted to desert without sometimes being severely punished, there would be a great danger of the army gradually being reduced to such dimensions that it no longer would be able to serve its purpose. [46]

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[42] Godefroy, *For Freedom and Honour?,* 90.
[43] LAC: Macphail Papers. Diary of Sir Andrew Macphail, volume 2, 29 October 1916.
[44] Do.
[45] Do.
[46] LAC: Robert Manion Papers, MG 27 III B7, volume 122, *Life is an Adventure* (Draft Copy). In both the published version of this book and the draft copy, chapter 5 is about Manion's experience during the Great War. However, in

Manion was deeply affected by pronouncing over the soldier's death. Being able to explain why something happens and agreeing that it should were very different things. Manion was not sure that a Medical Officer should be part of an execution. Doctors in war faced death on a daily basis but it was at the hands of the enemy, not their own army. The doctor was supposed to fight death, not stand by to pronounce an executed man dead. In his memoirs, Manion expressed regret at his decision to volunteer for the war. He was embarrassed by some of the comments he had written in his diary in the first few months in France, when he had been enthusiastic about getting to the front, proving his mettle, and doing his bit. He expressed bitter disappointment when other units and Medical Officers went forward before his own unit. After the execution and the Second Battle of Ypres, however, he felt that no one who had already served would ever volunteer or show enthusiasm for war or the front lines. He regretted "waxing poetic about the war."[47] Despite his personal thoughts and dislike of military discipline he complied with the military hierarchy and followed orders.

Revulsion at capital punishment was not hidden in Frederick Noyes' memoir about the experiences of No. 5 Canadian Field Ambulance. One of the field ambulance orderlies or stretcher bearers was always present when a soldier was shot to carry away the body. On one such occasion, a twenty-year-old soldier was being shot for desertion. The orderly was unable to cope with the scene and vomited while waiting for the sentence to be carried out; he then tried to avoid watching the punishment to keep his composure. The officer in charge of the execution found the orderly's action distasteful, and forced him to watch the proceedings by threatening him with severe punishment. He watched it, but had problems coping with what he saw. He was

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the published version of his book Manion did not discuss capital punishment. There was no explanation as to why he deleted the quotation used here or the brief section on capital punishment from his manuscript.

[47] Do.

not alone, as the "padre who was with the infantryman during his final few hours was hysterical for many hours afterwards."[48] The padre's reaction shows that it was not just members of the medical service who had difficulty taking part in executions. Reflecting upon capital punishment and the unit's views of it, Noyes wrote:

> All too often were Medical Officers called upon to officiate at the post-mortem of some young lad who had been shot for 'desertion' – some mother's son who had enlisted with the ideal to uphold all that was good and noble and righteous, and had carried on until his brain and body had reached the breaking point. Surely there must have been some other way out, than by having him shot down in cold blood by his own comrades. 'Shot for desertion' was the way the court records closed such a case, but we wonder if the correct entry should not have read *'Murdered by the Prussianism in our own army!'*[49]

Noyes concluded his appraisal of capital punishment by hoping that "similar injustices" would not occur in any future war, and that a better solution would be found.

Another example of doctors having to learn to balance their military and medical roles was the first time a doctor had to treat an enemy combatant. All wounded, whether they were Allied, adversaries, or civilians, were treated at medical units according to the Geneva Convention of 1906; enemy soldiers received the same treatment that the Canadians and their Allies did in the medical units. They were free to walk around the medical station and talk and mingle with the Allied soldiers, which was very common and generally everyone was cheery or cordial. As Major Harold McGill wrote in a letter home, "Our boys are splendid. Before they go 'Over the wall' they all swear by all that's high & holy that they will kill every sausage eater they come across. Yet a few hours afterwards you may see them handing out their rations and cigarettes to prisoners" and those in the medical wards.[50] Major McGill shared the soldiers'

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[48] Frederick Noyes, *Stretcher Bearers... at the Double! History of the Fifth Canadian Field Ambulance Which Served Overseas during the Great War of 1914-1918* (Toronto: Hunter-Rose Co., 1937), 113.
[49] Do.
[50] Major McGill, *Dear Miss Griffis,* http://missgriffis.wordpress.com/tag/capture, 19 August 1917.

attitudes shown in a letter in which he wrote, "One cannot help having compassion on wounded enemies but the sight of a dead Boche does not excite any sympathy in me."[51]

However, some doctors were not happy to minister to the Germans. As Macphail wrote of his first time treating the enemy, "when I regard them I have a feeling of horror as I reflect that these are the hands which fired the guns which have destroyed so many of my friends."[52] Like Captain Scrimger when he lost control and cursed the Germans in the open at Ypres, Andrew Macphail and many other Medical Officers could not help feeling revulsion for the German enemy after watching what the war had done to countless Canadian soldiers and after losing so many of their own staff members to German fire. Nonetheless, the doctors put their own thoughts aside and medically treated the enemy with the same treatments a Canadian would receive.

Nineteen-sixteen was a year of formal investigations into and internal scrutiny of the challenges facing the medical service. The institutional investigations were in addition to the after-action reports and self-scrutiny that the CAMC undertook following each battle but had the same goal – to find a way to do things better. The Bruce and Babtie reports showed that there were problems in the medical service that would take time to address; it would also take time to calm the offended Medical Officers. After all, the medical men had done all they could through a year and a half of war to evacuate and save each wounded or ill soldier, so it is hardly surprising that they took offence at charges levelled against them. The self-scrutiny over the military system and the place of a doctor within it is also an important process to highlight. Military life was very different for a doctor than civil practice, even creating conflict between military needs

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[51] Ibid, 28 May 1917.
[52] LAC: Macphail Papers, Diary of Sir Andrew Macphail, volume 2, 24 October 1916.

and medical ethics. Doctors had to put their opposition to some military practices aside and learn to accept that there was a military hierarchy beyond the medical service that they would have to uphold to help keep the war effort running.

The external investigations and acceptance of military discipline were all part of the learning process in which the CAMC was constantly involved. Whether it was a government-appointed commission examining the process of promotion or a battalion medical officer wrestling with the moral issues of a soldier with a self-inflicted wound, it all contributed to the corps' desire to improve its practices and procedures. And those procedures would be put to the test throughout the Battles of the Somme.

Chapter 5

1916

The battles of 1915 had brought about a call for changes in how several units were used, such as the re-organization of the stretcher bearers and the addition of surgical responsibilities to the casualty clearing stations. New medical and surgical procedures had been introduced and studied over the winter months to ensure that all the units were able to offer the same level of care. The only way to discover if the new ideas would improve the medical service and save more lives was to put them into practice on the battlefields of 1916. A unit-by-unit investigation into the work of the CAMC during the Battle of the Somme will demonstrate the positives and negatives of the new systems and treatments. The after-action reports highlighted the problems and made further suggestions for systemic improvement. In addition, research and development of medical science continued throughout 1916, adding some new treatments and refining others. All of this would benefit the medical service by providing improvements in patient care.

Canadian troops fought in the Somme[1] region in a series of battles between 15 September and 18 November 1916. The broad objective of this campaign was the reduction of the strong defences that the Germans had been constructing in this area since the start of 1916. Yet despite the change of location, the issues that the medical corps faced were similar to those experienced during the Second Battle of Ypres. The Germans

[1] For more information on the Battle of the Somme, see N.M. Christie, *Futility and Sacrifice: The Canadians on the Somme* (Nepean, Ontario: CEF Books, 1998); Martin Gilbert, *The Battle of the Somme: The Heroism and Horror of War* (Toronto: McClelland & Stewart, 2006); Martin Marix Evans, *The Battles of the Somme* (London: Weidenfeld & Nicolson, 1996).

held the high ground and could see all of the Canadian evacuation routes. This meant that the medical units had to be placed further behind the trenches than was desired, necessitating a long carry of one to three miles for the bearers of the field ambulances to reach an advanced dressing station. As at Ypres, most of the wounded would have to be evacuated under cover of darkness since there was little movement during the fighting and many of the wounded were caught in No Man's Land. Once again, the military situation would highlight problems of exhaustion of stretcher bearers, of the wounded being left out in the open and unable to receive timely treatment, and in the organization of the regimental aid posts, all of which would have to be addressed before the next action.

The Battle of the Somme did not begin with the Canadian assault in the fall, but in July with a series of attacks by the British Army on its front. Canadian doctor Major George Strathy participated in the initial stages of the battle as part of a two-week training stint to learn the work of a casualty clearing station; now that the clearing stations had a more significant medical and surgical role to play due to the introduction of new procedures, such as Tubby's proposed treatment of abdominal wounds, there was much to learn. One of the best sources of education was sending the MOs to other stations that were using new techniques so they could learn the new procedures and then teach them to the men in their own unit. While this form of training was not unique to the medical service, it did offer unusual opportunities for innovation. In any other aspect of an operation, such as the work of the artillery or infantry, success demanded that everyone work together on schedule according to a pre-determined plan. If one unit were to conceive of a different approach, even if it offered a potentially greater chance of

success, unilateral innovation was not possible because deviating from the plan could ruin an entire operation and cause more extensive casualties. However, a doctor could formulate a new and innovative treatment, and experiment with it on a handful of casualties. If the new technique proved successful, it could be integrated into the work of the medical corps' and doctors from other units would visit to learn the new treatment. They would then return to their own units to teach and train their members so everyone was up to date on the most successful treatments.

At No. 22 British Casualty Clearing Station at Béthune, Strathy was put into a very busy environment that saw five to ten deaths a day. Despite the rotation system created after the Second Battle of Ypres, he observed that the men worked too many hours without rest and food. The number of wounded was simply overwhelming the system, though it managed to continue to treat and evacuate the wounded. Strathy felt that more staff was needed since the Medical Officers were too tired, but the situation would soon deteriorate even further. No. 29 British Casualty Clearing Station had been hit by an overwhelming number of casualties in the previous twenty-four hours and needed help. Three Medical Officers, including Strathy, were ordered to leave for that CCS within fifteen minutes. Immediately upon arriving at No. 29 Casualty Clearing Station, Strathy was dressing wounds in the orderly chaos of battle at a medical station. No. 29 would clear 3,000 men in the first twenty-four hours that Strathy served there, and nearly 9,000 casualties in the three days and two nights he remained with the unit. He later described his first work in the Battle of the Somme:

> The cases were of all varieties. Those nearly dead were put to bed and given morphine if necessary, and left to die. A few of these recovered. Everybody, except those dying, were evacuated, chests, abdomens and heads. There were

> a considerable number of cases of gas bacillus infection, especially in the limbs and in cases who had not been dressed for 48 hours. Many of the men had been lying in 'No Man's Land' for 12 hours or more. Most of them had had little or nothing to eat for 48 hours. I never heard a complaint. They were all dressed as quickly as possible and sent on to the base by the next train ... The only cases operated on were those requiring immediate amputation, those infected with gas bacillus and those who were bleeding. There was no time for operations on abdominal cases. One sees cases for such a short time, it is not possible to judge results. [2]

Major Strathy's experience at the Somme demonstrated that the units were working on the ideas generated as a result of the Ypres battles, but that many points, such as abdominal wound treatment at the casualty clearing stations, would still have to be worked out during battles as casualties poured into the medical units in overwhelming numbers. The experience of the British CCSs foreshadowed what the Canadian clearing stations participating at the Somme would endure.

The Canadian participation on the Somme consisted of several battles and lasted several months from 15 September to 18 November. The fighting was particularly difficult due to the Germans' superior artillery, barbed wire protection, and machine guns. The German artillery was raining shells down on the Canadian trenches, killing or wounding soldiers before they had a chance to fight. The artillery support the Canadians received was unable to silence the German guns or to break the barbed wire to allow the Canadians to pass. When a break through the wire was finally achieved the Canadians had to face the German machine guns. The Germans simply hid in well constructed dugouts while the artillery fired. Then they ran to their machine guns before the infantry reached their trenches, allowing them to inflict a great number of casualties. In fact, the Canadians had 5,969 casualties over seven days of fighting at Flers-Courcelette alone.

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[2] Library and Archives of Canada [LAC]: Department of Militia and Defence [DMD] Records, RG9 III B2, volume 3751, Personal Diary of Major G. S. Strathy, 16 June 1916.

Ultimately the battle would prove long and costly to the Empire's forces with little change in the Canadian or German positions.[3]

When the Canadians began to fight on the Somme the CAMC found that it was facing familiar problems as it had in 1915. Once again, the strain fell first on the stretcher bearers. The Somme had very few roads that could be used to move casualties, and most of them had been destroyed by German shells. In addition, the terrain was difficult to traverse and the carry-back to the medical stations was long, so the bearers faced mounting exhaustion as the battles wore on. All this meant that more stretcher bearers were needed. However, the increase in the number of regimental bearers (see figure 6) recommended after Ypres and again after the fighting at Festubert had already taken sixty men from each battalion. The infantrymen coming forward as reinforcements were supposed to take the place of the fighting men, not the bearers, so they had no first-aid training.[4] Furthermore, the demands of battle focused attention on the conflict between military and medical needs: if a Commanding Officer of an under-strength battalion received fifty reinforcements, was it wiser to put them into a military role (as infantrymen) or a medical role (as stretcher bearers)?

The field ambulance bearers were in worse shape since they were fewer in number (fifty) than the regimental bearers and had to clear all the regimental aid posts. On the night of 26 September the bearers of No. 1 Canadian Field Ambulance helped move 1,200 casualties the two miles to their advanced dressing station over an eight-hour

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[3] Bill Rawling. *Surviving Trench Warfare: Technology and the Canadian Corps, 1914-1918.* (Toronto: University of Toronto Press, 1992), 71.

[4] Library and Archives of Canada [LAC]: Department of Militia and Defence [DMD] Records, RG 9 III B2, volume 3749, file Adami No. 1 FLD AMB, War Diary, No. 1 Canadian Field Ambulance, discussed in entries from 19 to 27 September 1916.

period. By midnight their Commanding Medical Officer had enough of watching the tortured bearers try to endure one more carry, then one more after that, and ordered all his bearers to sleep. He sent for men from other sections to take their place. Two Medical Officers and 120 stretcher bearers arrived at 04:00. The two Medical Officers led the stretcher bearers to the front where they managed to clear the three aid posts in No. 1 Field Ambulance's sector.[5] By bringing more men forward from other sections that were not under heavy fire or running rest stations, some of the issues of stretcher bearer exhaustion were addressed. However, the weather and military situation were not cooperating with the medical corps' plans.

Figure 6– Regimental stretcher bearers dress the wounded in a trench during the Battle of Courcelette, 15 September 1916. PA000909

[5] Do.

The weather of the Somme had devastating effects on the efficiency of every part of the medical service, especially the bearers. It had rained through much of the battle, creating thick mud for the bearers to wade through. This slowed them down, especially the regimental bearers who had to work in No Man's Land and the trenches. At times, as many as eight bearers had to help lift a stretcher through the mud to the regimental aid posts. A British stretcher bearer recalled one of the carries he made during the battle in November 1916: "I shall never forget this carry – it was slow work, and the mud in the wood was knee deep, we were slipping all over the place with the stretcher, and I felt sorry for poor old Chambers [the wounded soldier], who gave an extra loud moan every time the stretcher bumped."[6]

Once the wounded were at the advanced dressing stations it was easier to evacuate them using the motor ambulances, but these were often late in arriving due to the heavy shell fire, and several of the ambulances were blown up.[7] Beyond the delay caused by the weather, the Canadian attacks were not generally successful in gaining ground. This meant that "many of the wounded were forward of the area that the 1st Canadian Division would finally occupy" between the Canadian and German lines,[8] forcing the wounded soldiers to lie in No Man's Land for hours instead of getting the medical care they needed quickly. Undoubtedly, a number of men died who might have survived had they received more timely treatment. Instead, the wounded had to find ways to help themselves.

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[6] R.H Haigh and P.W. Turner (eds.), *The Long Carry: The Journal of Stretcher Bearer Frank Dunham, 1916-18* (Toronto: Pergamon Press, 1970), 13.

[7] Library and Archives of Canada. [LAC]: John Taylor Fotheringham Papers, MG 30 E53, volume 5, file 22, Report of the Medical Arrangements during the fighting in the Ypres Salient on the Canadian Corps front from 13 June to 15 July.

[8] Library and Archives of Canada [LAC]: Department of Militia and Defence [DMD] Records, RG 9 III B1, volume 960, War Diary, ADMS 1st Division War Diary, October 1916.

William Mathieson recorded the experiences of Oliver Bright, a policeman in civil life, who was wounded at Thiepval Ridge on the Somme when he was twenty-four years old. On 26 September 1916 he was hit, but was not sure what had hit him; he thought it was shrapnel. Bright rolled into a shell hole for cover where he fought to remain conscious. He discovered several wounds to his leg and realized that he was losing a lot of blood, so he struggled to get a tourniquet on his leg and paint a small wound with iodine. Bright then noticed that he had been hit in the groin and was unable to apply his tourniquet to stop the bleeding. He mustered the strength to pour iodine into the groin wound and to pack and dress the wound as well as he could with his first field dressing. He saw several Canadians walk past him throughout the day but, because they could not see him and he was too weak to call out for help, he was left in the shell hole overnight. The next day Bright managed to call out to two stretcher bearers who promptly took him to the regimental aid post. The Medical Officer re-dressed the soldier's wounds and noted that the leg had swollen up. The doctor then gave him rum and encouraged him to sleep saying, "Well, I can't do anything more for you here." As consciousness came and went, a horse-drawn ambulance evacuated him back to a "Field Hospital," most likely a casualty clearing station, where he received surgical intervention to remove the shell fragments from his leg before being evacuated to England.[9]

Oliver Bright was fortunate that he had brought his first field dressings and tourniquet with him. Another problem that came up throughout the Battles of the Somme was that some of the infantrymen had decided not to carry their first field dressings. This meant that the stretcher bearers had to haul a heavier load to ensure that they had

[9] William Mathieson (ed), *My Grandfather's War: Canadians Remember the First World War, 1914-1918* (Toronto: Macmillan, 1981), 130.

sufficient materials to dress the wounded. Often their best efforts were not enough. Frederick Noyes, after his first action, described carrying a wounded man on the Somme and the negative effects that the work of a stretcher bearer could have on the psyche. He asked, "What man who carried the wounded under these terrible circumstances [the mud and holes throughout the ground on the Somme] could ever forget the terrible groaning, cursing and pleading of the poor fellow, half-rolling off a shoulder-high stretcher?" There were many loud complaints from the wounded while they were carried; the ground was slippery with mud and it was hard to carry the stretcher without jostling it around and causing the wounded man more pain. Noyes went on to ask, "Who could ever forget the dark brown and purplish stain that seeped through the stretcher canvas, and all-too-often dripped down onto our backs and arms?" Noyes lamented the number of times that the bearers on the Somme went through all this exertion "only to find, on reaching the aid-post, that the wounded man had died on the way, and that all our efforts to save him were futile." He questioned the point of the work when the wounded were dying in spite of their exertions. Nevertheless, he argued that the stretcher bearers had to "carry on as long as [they] had sufficient strength and fortitude to do so."[10]

The shelling on the Somme was relentless, endangering the bearers and the wounded men they carried. One night while a group of Canadian stretcher bearers was carrying a casualty shoulder-high back to the advanced dressing station, a shell exploded very close to the party. The bearers could not flop to the ground or run for cover; they had to continue on with a steady hand since they were holding a man in their arms, something that required a great deal of nerve. After the close call, the bearers made sure

[10] Frederick Noyes, *Stretcher Bearers... at the Double! History of the Fifth Canadian Field Ambulance Which Served Overseas during the Great War of 1914-1918* (Toronto: Hunter-Rose Co., 1937), 124.

they were not hit and then continued on. When they got to the advanced dressing station they "noted that the stretcher frame had been hit and [their] casualty was dead. [They] never knew whether he was killed by that shell or whether he was on his way out anyway."[11] The stretcher bearers felt a great deal of frustration over not being able to get the wounded medical help in time.

The stalemate conditions of the Somme forced the armies to arrange informal truces to carry the wounded out of No Man's Land. A Canadian stretcher bearer wrote that he was back at work after an all-night carry and two hours' sleep, but in the most "unusual" way: "so many wounded from both sides lie out in No Man's Land that a truce was arranged, stretcher-bearers each carrying a white flag cleared their own wounded in broad daylight."[12] Another such cease-fire was reported on 10 October 1916. The fighting had been heavy for two days, forcing the wounded to lay in No Man's Land waiting for help. An officer of No. 3 Canadian Field Ambulance wrote in a surprised tone that both combatants were collecting their wounded in daylight. He went on to write, "It was reported that an Officer of the 13th Battalion lying out in No Man's Land was picked up by a German stretcher squad and brought to our trenches. This apparently was not an isolated incident of this nature."[13]

A most vivid description of a truce was written by Lieutenant Clifford Almon Wells, a twenty-three-year-old student from Toronto. In a letter, he recounted meeting a German soldier in No Man's Land in the midst of an informal truce one morning during

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[11] Library and Archives of Canada [LAC]: Hubert Morris Papers, MG 30 E 379, Personal War Diary, 16 September 1916.
[12] Do.
[13] Library and Archives of Canada [LAC]: Department of Militia and Defence [DMD] Records, RG 9 III B2, volume 3749, file Adami No. 3 FLD AMB, War Diary, No. 3 Canadian Field Ambulance, 10 October 1916.

the Battles of the Somme while he was helping supervise the work of the stretcher bearers. The German was a stretcher bearer wearing the standard arm band with a red cross and he offered to take Wells to a number of "verwundete Englander" lying in various shell holes. The Canadian went to retrieve a team of six bearers and, with the help of the German and five other German stretcher bearers, they brought in twenty wounded Canadian soldiers. Wells wrote: "The Germans brought the wounded to a point about midway between the lines, and my men carried them the rest of the way. Sometimes I had a German and a Canadian carrying a stretcher between them."[14] At one point, the Germans lent Wells a stretcher with which to carry in a wounded Canadian. Once the wounded man was back in the Canadian trenches, they returned the stretcher to the Germans. Wells observed of the Germans, "The skill of the Germans in binding up the wounded, their strength and endurance in the exhausting work of carrying stretchers over ground which was a mass of shell holes, and their quiet disregard of stray shells and the possibility of being sniped from our lines, commanded my highest admiration."[15] The wounded Germans and Canadians that the enemies had helped evacuate had been lying in the open for three days; once they had been taken care of, the Germans and Canadians returned to their respective trenches. Still, despite the informal truces that helped evacuate the wounded, the work of the bearers at the Somme demonstrated that the changes proposed after the Second Battle of Ypres were not enough; exhaustion and timely medical intervention were still problems that would need to be examined.

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[14] O.C.S. Wallace (ed.), *From Montreal to Vimy Ridge and Beyond: The Correspondence of Lieut. Clifford Almon Wells, B.A. of the 8th Battalion, Canadians, B.E.F. November, 1915- April 1917* (Toronto: McClelland, Goodchild and Stewart, 1917), 271.
[15] Ibid, 273.

Throughout the various battles of the Somme, the regimental aid posts endured the same kinds of conditions they endured at the Second Battle of Ypres. The stream of casualties seemed never-ending, the bearers were slow in getting the wounded to the RAPs, and the long hours of work were taxing. Another familiar problem for the RAPs was that they were not sufficiently protected from shelling. In some cases the RAPs had merely been constructed with one doorway, rather than the preferred two. This caused some chaos when shells caved in the only entrance/exit of the unit. Captain Harold McGill endured this experience when a shell blew up and completely blocked the doorway to his RAP, filling the unit with acrid fumes from the explosive. In order to get in and out the men had to climb a ladder to go through a hole in the roof. This meant that no stretcher cases could be removed and only some walking wounded, when injuries permitted, could leave the dugout. The men in the unit dug through the debris to clear the entrance/exit, allowing stretcher cases to be gathered a few hours later.[16]

Several RAPs were bombed out and forced to relocate during the battles, causing communications issues when the Canadian lines advanced or changed positions. Not only did the infantry not know where the new RAPs were located (and so they did not know where to go for assistance), but several RAPs were unable to help with casualties because they did not know where the Canadian wounded were. The new regimental aid post positions added to the difficulties of the bearers, who could not manage a long carry-back to the aid posts in their new positions further behind the lines.[17]

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[16] Marjorie Norris (ed.) *Medicine and Duty: The World War I Memoir of Captain Harold W. McGill, Medical Officer, 31st Battalion C.E.F.* (Calgary: University of Calgary Press, 2007) 211-212.

[17] Library and Archives of Canada [LAC]: Department of Militia and Defence [DMD] Records, RG 9 III-C-10, volume 4546, folder 6, file 2, Report on the medical service in the Somme fighting.

Figure 7– A padre (in white) oversees the grave diggers in their work at a Canadian burial ground on the Somme. PA002145

The field ambulance experience was also much like that endured during the Second Battle of Ypres. A large number of casualties poured into Canadian field ambulances when the Canadians reached the sector in September 1916. Sir Andrew Macphail's diary reported that 3,250 casualties went through his field ambulance in thirty-three hours on 16 September. In total the Canadian Corps would suffer 23,734 casualties during the Battle of the Somme, of whom 3906 died (see figure 7).[18] These were costly battles for all the armies involved, causing 660,000 German and 623,907 Allied casualties.[19]

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[18] Andrew Macphail, *Official History of the Canadian Forces in the Great War, 1914-19: The Medical Services* (Ottawa : F.A. Acland, 1925), 85.

[19] G.W.L. Nicholson, *Canadian Expeditionary Force, 1914-1919* (Ottawa: Queen's Printer and Controller of Stationary, 1962), 199.

As was the case at Ypres, each unit described the problems that it encountered during the battles and compiled its suggestions for improvement into a report. These reports were gathered by the Assistant Directors of the CAMC to create a comprehensive after-action report that addressed the issues faced on the Somme and detailed the new systems that might be implemented to solve the problems.

The after-action reports regarding the Somme stressed that the bearers needed better trained CAMC personnel to accompany and supervise them. This demonstrated that the plan to use battalion men with little medical training was not successful; the infantrymen pressed into the job of stretcher bearer were not able to dress wounds properly since they had minimal training and no experience. For future battles, there would be more training and the squads would be led by men not only with first aid training, but with more experience using it in the wards of the FLD AMBs and in the carries between the RAPs and ADSs. The introduction of the FLD AMB bearers to the battalion squads was devised to create better care since the trained and experienced bearer could supervise and assist the others, leading to better triage decision-making, as well as being able to help the regimental Medical Officer to train the battalion bearers.[20]

The after-action reports also stressed that despite the CAMC's best planning and more than doubling the number of battalion bearers, there still were not enough men to shoulder the burden of excessive casualties. In addition, to reduce the fatigue of the bearers, the reports demanded that the company officers perform better inspections before an attack to ensure the soldiers carried their first field dressings and small medical kit.

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[20] Library and Archives of Canada [LAC]: Department of Militia and Defence [DMD] Records, RG 9 III-C-10, volume 4546, folder 6, file 2, Report on the medical service in the Somme fighting.

This would reduce the weight of the bearers' packs by allowing them to carry fewer medical supplies.[21]

Another recommendation of the reports concerned the need to find a way to ensure constant communication between the regimental aid posts and battalion headquarters. While this had been a problem during the Ypres battle no solutions were offered. After the recurrence of communication problems on the Somme, it was decided that two runners from each battalion would be detailed for communications, to maintain contact between the units so that the system would function even if the RAPs were forced to move during battle. The reports also suggested that the RAPs should be built strong enough to withstand shelling, since they could be used during a successful advance as collecting posts and small dressing stations if the success allowed the regimental aid post personnel to move forward with an advance.[22]

The after-action reports for the Battles of the Somme focused entirely on the stretcher bearers and regimental aid posts. The majority of the issues faced during this battle were caused by the weather or the military situation, and so were deemed beyond the control of the medical service. In a situation where the attackers were pushed back to their start lines, clearing the wounded was an impossible task. This was demonstrated to the medical authorities during the Battle of the Somme when many of the wounded were only able to receive medical help through the highly unusual informal truces that the men themselves arranged from the trenches. The medical staff in the front-line units were again pushed to work long, hard hours because their units were overwhelmed with casualties at various points in the battle. However, according to the plan made after

[21] Do.
[22] Do.

Ypres there was now a system of rotation that had reinforcements standing by and rested units close to the action to take the place of the exhausted units. While long shifts of over thirty-hours were still common, it was much less common to work for seventy hours without rest, as had occurred at Ypres.[23] Most of the systemic changes that were introduced after Ypres had not been immediately or entirely successful; the problems that remained during the Somme offensive were how to cope with large numbers of wounded streaming through the units, the continuing exhaustion and training needs of the regimental stretcher bearers, and how to reach the wounded in No Man's Land if the army was not moving forward. These problems would be studied and answers found before the next spring offensive.

While the Battles of the Somme did not lead to specific medical advances or significant changes to the evacuation system in the front lines, 1916 did see a great deal of considered thought as to how to improve military medicine. In fact, medicine in 1916 took on a somewhat experimental tone at times as doctors continued to press for better solutions to help wounded soldiers. The trial-and-error approach to medicine meant that for every advance that was embraced, a different idea was discarded. This occurred at a rapid rate since the value of medical treatment could be quickly evaluated and results quickly obtained. The new medicine, which was mostly researched in the rear-area hospitals, again had an impact on the front-line units that would implement the new techniques. The ideas came from all the Allied forces and, like the winter of 1915-16, the

[23] DMD Records, War Diary, ADMS 1st Division War Diary, October 1916.

winter of 1916-17 would be spent learning the new medical techniques and systemic changes.

The spirit of invention to alleviate the exhaustion of the stretcher bearer was at the forefront in 1916. Several ideas for stretchers were submitted to the medical authorities from a variety of sources, including other Allied medical corps and Canadian civilians who had read about the difficulties of the bearers and wanted to help.[24] A medical unit from New Zealand created an Ambulance Barrow to help with the strain of evacuating the wounded. It was made of light, strong timber formed into a box in which the wounded man was placed; the rest of the design was essentially a wheelbarrow, with two handles running under the wooden box to one wheel in front. This design was considered helpful since it only required one man to push, but could have a bearer on each handle if the load was heavier than normal or the terrain difficult to traverse. However, it was rejected for front-line use in the field ambulances or regimental aid posts. The single-wheel design made the stretcher too unstable while crossing uneven terrain, and it was nearly impossible to push through mud. However, the casualty clearing stations and rear-area hospitals decided to use the Ambulance Barrow to make moving the patients around the wards easier and less labour-intensive.[25]

Another idea that reached Adami's desk in 1916 (like many such suggestions, his files give no hint of how, or from whom it reached him, except that it was from a Canadian civilian) was called the Stretcher Carrier, designed to go on a large animal such as a horse. An apparatus capable of holding two stretchers, one on each side of the

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[24] Library and Archives of Canada [LAC]: Department of Militia and Defence [DMD] Records, RG 9 III B2, volume 3508, file 17-8-0, Memos on ideas for new stretcher designs.
[25] Ibid, "Ambulance Barrow," October 1916.

animal, was constructed from wood and leather and strapped to the horse's back. A stretcher with a wounded man could then be placed on each side of the horse and secured in the special harness; the design was akin to carrying two buckets of water with a yoke across one's shoulders. The positive attributes were that the stretcher did not tilt, it attached to the harness quickly, and it did not constrain the animal's movement in any way. However, the Stretcher Carrier was not approved for military use because there were not enough horses available to be used as part of a bearer squad. There were also fears about how the horses would react when working under fire or what would happen when a horse was hit with shrapnel and ran off with the wounded soldiers still strapped to its side. In the end, there were simply too many risks involved in using the Stretcher Carrier.[26]

While new inventions for stretchers were being submitted, some of the equipment created the previous year was under review. After the gas attacks at Ypres, new helmets were designed to prevent gas inhalation but there were problems with the helmets that would have to be addressed if they were going to be helpful to the soldiers and forward area medical staff. The first was the way the helmet fastened to the soldiers' uniforms. The helmet used tape and buttons, which often failed to keep it attached during use; a new fastener would have to be developed. Another problem with the helmet was that the skirts that hung down around the neck and shoulders of the soldier were too loose and allowed gas to seep under the mask. To correct this, the helmet needed elastic or tape to hold the skirts firmly in place. The final issue with the helmets was of the utmost importance. A piece of paper covering the mouthpiece of the helmet held a pad soaked in

[26] Ibid, "Stretcher Carrier," October 1916.

chemicals that neutralized the gas. The soldier had to remove the paper and then put on his helmet, which caused delays; in some cases, the mouthpiece came out of the helmet while the soldier pulled off the piece of paper, making the helmet useless. Some soldiers did not know that they were supposed to take the piece of paper off, as they thought it was part of the mask. This meant that they could not breathe through the mouthpiece. It would take time to fix the flaws in the first gas helmets used on the Somme, but research began right away.[27]

Another issue surrounding gas was making the dugouts gas-proof. It was imperative that headquarters, signal, and regimental aid post dugouts continue to operate through a gas attack to ensure that orders continued to be given, and so that those wounded who could not be moved would be safe in the aid post. Otherwise these posts would have to be evacuated as soon as a gas attack occurred, or the men would be trapped in a dugout full of gas. Rather than clear the dugouts during a gas attack it was decided that the doorways would be covered with heavy wet blankets and chemically treated curtains. These would prevent the gas from entering the dugouts while still allowing for easy exit and entrance from the units.[28]

Medical treatments for gas were also changing throughout 1916. Research had been underway since the first attack at Ypres in 1915, after which the Germans had used gas regularly. This meant that there were many gassed soldiers to treat. While the doctors did not use the men as human test subjects, the large pool of cases meant that a treatment could be evaluated quickly and discarded in favour of another if rapid

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[27] Library and Archives of Canada [LAC]: Department of Militia and Defence [DMD] Records, RG 9 III B2, volume 3752, file 3-3-2-1, 2nd Army Report on Gas for 1916.
[28] Do.

improvement did not occur. All treatments were based on the fundamentals of medicine and the ideas of educated experts. Articles published in early 1916 on venesection,[29] or bleeding gassed soldiers, made it appear that this treatment was the most effective way to save the majority of the gassed cases. There were two kinds of patients who had to be treated for gas: those who had cardiac failure, and those who were cyanotic. The cardiac cases were pallid, collapsed, and did not require bleeding. Cardiac failure was a result of overstrain caused by "increased resistance through the pulmonary system." In such a case, the patient was treated with cardiac stimulants; bleeding the patient was not indicated and had no marked results.[30]

The majority of gassed patients were of the cyanotic type. The patient was grey or ashen in colour with blue lips, fingernails, and sometimes skin, a discolouration caused by a lack of oxygen. These patients were also very dyspnoeic, meaning they could barely breathe, and had great pain when they tried; this was caused by inflammation of the alveoli.[31] Bleeding the patient was thought to be the best treatment for cyanosed patients since it would improve the ability of the heart and lungs to function; this would relieve the cyanosis and lung congestion to allow for easier breathing, and would also relieve the post-gas acute headache that almost every patient developed within twenty-four hours of exposure. In addition, the blood loss promoted sleep, allowing the patient to wake up refreshed and with less discomfort.[32] But the patient had to be bled early. Of the ten men

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[29] "Venesection is performed by direct incision into the median cephalic or median basilica vein. The amount of blood extracted depends on the patient, 20-25 oz from over abundant men and 15-20 oz from less robust men or elderly men. It takes 10-15 minutes to bleed. Patients collapsed if the blood was collected faster." Stuart Heblethwaite, "Treatment of Chlorine Gas Poisoning by Venesection," *British Medical Journal*, July 1916, 108.
[30] Ibid, 107-108.
[31] Ibid, 108.
[32] Do.

upon whom the article was based on, five were bled as soon as possible and did well with no further treatment. Of the remaining five, two died within twelve hours and the condition of the others deteriorated quickly. They were then bled, but also required cardiac stimulants to aid their recovery.[33] A study of ten men when there were thousands of gassed patients should not have been conclusive, but bleeding became the standard treatment for gassed patients through 1916.

Gas was deployed over the Canadian lines from 9 to 12 August 1916. During those days, No. 3 Canadian Casualty Clearing Station saw 178 gassed patients, fifty-four of whom died. The gas being used was a mixture of chlorine and phosgene gasses, and the addition of phosgene to the German arsenal necessitated finding new ways to treat gassed cases. At No. 3 Casualty Clearing Station, gas treatment changed from bleeding to oxygen therapy, which brought much better results. Oxygen was to be freely given as soon as possible to alleviate the cyanosis. Other inhalants, such as strychnine or alcohol, were added to the oxygen to help reduce inflammation in the lungs and keep the patient conscious. In severe cases, morphine was also given to stop restlessness. Oxygen therapy could be used as far forward as the regimental aid posts, but was usually given at the field ambulances first.[34] Despite its good results, oxygen therapy would not become commonplace in the medical units until late in 1917. This demonstrates that individual units did not always have the same medical practices, especially while they were working out new treatments.

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[34] Library and Archives of Canada [LAC]: Department of Militia and Defence [DMD] Records, RG 9 III B2, volume 3747, file No. 3 CAN CCS, War Diary, No. 3 Canadian Casualty Clearing Station, 16 August 1916.

Improvements in sanitation, such as dealing with insects, were continually studied throughout the war. Sanitation treatments for scabies and trench fever discovered in late 1916 and early 1917 highlight the achievements of two Canadian doctors in the fight against disease. These diseases were discovered to be caused by lice, creating a need to find a way to sterilize the soldiers' uniforms to prevent these pests from living in the men's clothes. Part of the solution came from Colonel John Amyot, who was born and raised in Toronto where he became a doctor at the University of Toronto. He enlisted in 1915, at forty-seven years of age, and went overseas where he developed a steam-based sterilization machine called the Amyot Disinfector. A large room was built to hold hundreds of uniforms on racks. A coke oven outside of the room was used to heat a massive tub of water to boiling, and the steam from the boiling water was then forced through pipes at ceiling level in the room where the clothing was kept. The pipes had small holes that created sufficient pressure to spray the steam onto the men's uniforms, thereby killing the lice.

The problem with the Amyot Disinfector was that it only killed the adult pests, allowing larvae and eggs to remain in the clothing to grow and cause the same problems to recur. Major Harold Orr, who worked with Amyot, was also from Toronto and enlisted in 1915 when he was twenty-five years old. Orr discovered that dry heat at fifty-one degrees Celsius or higher killed eggs and larvae, so he adjusted the disinfection room to make Orr's Huts. They were smaller than Amyot's in order to maintain heat better, but they functioned on a similar principle in that a coke oven produced the heat. The difference was that there was no steam; instead, a fan circulated hot air around the

uniforms.[35] These disinfecting units became commonly used in all the Empire's medical services. When the infantry were rotated out of the trenches they went to bath houses. While the men cleaned up their uniforms were run through the machines to ensure that they would be free of lice, thereby reducing the incidence of scabies and trench fever. The quick spread of these disinfectors show the importance of sanitation and preventative medicine to the CAMC, as well as the corps' willingness to adopt new procedures.

A great number of surgical treatments were introduced or refined in 1916. The blood transfusion[36] was one such procedure that became more and more common by 1916, when doctors started performing them in casualty clearing stations. Several Canadian surgeons took the lead in advancing the use of blood transfusions, such as Colonel Alexander Primrose, from Pictou, Nova Scotia, and Major Edward Ryerson from Toronto. Blood transfusions were done directly from person to person since no one had developed a way to store blood. It was an ancient procedure that had "never in its history been employed as extensively as it [was in the First World War]."[37] Blood transfusions were used to treat shock, haemorrhage, and severe gas poisoning, as well as other forms of toxaemias; they increased the blood's ability to coagulate and improved resistance to secondary infections. To perform the transfusion two soldiers lay head to toe on separate beds or stretchers. A glass canula was inserted into the median basilica vein and attached

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[35] Morton, *When Your Number's Up,* 199. The description of the machine comes from Nicholson, *Seventy Years of Service,* 90.

[36] For more information on blood transfusions, see Kim Pelis, "Taking Credit: The Canadian Army Medical Corps and the British Conversion to Blood Transfusion in World War 1," *Journal of History of Medicine and Allied Sciences,* 56/3 (2001), 238-277; J. Julliard, "Blood Transfusion during the war of 1914-1918," *Revue des Corps de Santé des Armées: Terre, Mer, Air, et du Corps Vétérinaire* 7, (November 1966), 821-38; W.H. Schnieder, "Blood Transfusion between the Wars," *Journal of the History of Medicine and Allied Sciences,* 58/2, April 2003,187-224.

[37] Colonel Primrose and Major Ryerson, "Direct Transfusion of Blood: Its Value in Haemorrhage and Shock in the Treatment of the Wounded in War," *Canadian Medical Association Journal,* April 1916, 384.

to a 20 CC glass syringe by an intervening piece of rubber tubing. One glass cannula was placed in the proximal end of the vein of the recipient and another in the distal end of the vein of the donor. Saline was used to keep the fluids flowing between the men. It could take up to ten separate syringes to complete the transfusion since the blood began to clot in the used syringe after 500 CC of blood had run through it. The apparatus made the procedure simple to use, so it was thought that blood transfusions should be used in front-line units. In fact, a Medical Officer with No. 2 Canadian Casualty Clearing Station experimented with transfusions in his unit and argued it was possible to perform the procedure as close to the front as a field ambulance, though this would not become common.[38]

Another important development in surgery was the introduction of the Carrel-Dakin method of treating wounds in 1916. Treatment of wounds was tremendously important to the survival of the soldier. In the First World War, nearly all wounds from shells, bombs, and bullets were septic and the initial methods of treatment were unable to "check the progress of the infection."[39] The infections created large scars that remained after the wound had healed, preventing the normal functioning of limbs or the affected areas. The soldier was then unable to return to duty, or even to work of any kind. The French doctor Alexis Carrel turned to Listerian principles of surgery, such as the debridement of wounds, to aid in treating soldiers' wounds. Dr. Lister's techniques had been cast aside by surgeons, but were revisited during the war since the methods employed were not working.

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[38] Ibid, 386.
[39] Alexis Carrel, *The Treatment of Infected Wounds* (Toronto: Macmillan, 1917), 1.

Carrel was trying to determine how he could destroy local infections caused by fragments of shells and clothing without harming the surrounding tissue. War wounds were not treatable by vaccine or serums since several strains of bacteria entered the wound; numerous serums would have to be given to the wounded man to cover all the possible types of bacteria that could be in the wound.[40] Carrel studied over 200 substances, but it was Dr. Henry Dakin who created a hypochlorite solution that worked well in sterilizing wounds without hurting the tissue. Once the two doctors put their ideas together, they were able to create an effective procedure that called for the debridement of the necrotic tissue surrounding the wound, the insertion of fenestrated tubes into the wound, and flushing the wound at regular intervals with Dakin's solution. The results of this work were first published in 1915, but the technique was not immediately employed with any regularity in any of the Allied medical services.[41] It would be studied in 1916 by all the Allied medical forces.

One of the studies of the treatment of wounds in war was conducted by Major Edward Archibald, a surgeon from Montreal who was forty-two years old when he joined the Canadian Army Medical Corps. There were three competing anti-septic solutions being used in the front lines: Dakin's hypochlorite solution, Wright's hypertonic salt solution, and Lorraine Smith's Eusol. Archibald found that the solutions were complementary as they were suited to treat different areas. The salt solution helped build resistance to infections on the surface of the wound, while Eusol made the skin's surface aseptic. However, the Dakin solution could be used in all areas of the wound with success, which led Archibald to conclude that "It is obvious that the Carrel-Dakin

[40] Ibid, 3-6.
[41] Ibid, 10.

[method] works the best."[42] In fact, the Carrel-Dakin method of wound treatment was talked about so much that Canadian Medical Officers started to visit other units that were using the method so they could learn how to perform it themselves and see its results.[43] By 1917, the treatment would become commonplace in all medical units in the Allied armed forces.

The treatment of abdominal wounds changed after the Second Battle of Ypres when it was decided that early intervention rather than conservative treatment was crucial to the recovery and survival of these patients. The casualty clearing station was now the surgical centre responsible for the majority of abdominal surgery. Major Archibald was training at a clearing station in 1916 and wrote about the success rate of the new system for abdominal patients when the numbers of casualties allowed for treatment. He noted that the unit had seen its first fifty abdominal wounds and had good results, with a survival rate of forty per cent.[44] Civil practitioners could expect a sixty per cent survival rate, but the military survival rate was lower due to the severity of the wounds that the military treated; the kinds of wounds were not comparable to civil society except in cases of industrial accidents. In addition, shock was a more significant issue in the military medical wards than in civilian hospitals due to the conditions in the trenches and the longer time between being wounded and receiving treatment that soldiers could expect. Patients with abdominal wounds usually died as a result of shock, haemorrhage, intestinal obstructions, gas gangrene of the wound, or pneumonia.[45] Major Archibald's work

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[42] Major Archibald, "A Brief Survey of some Experiences of Surgery of the Present War," *Canadian Medical Association Journal*, July 1916, 775.
[43] DMD Records, War Diary, No. 3 Canadian Casualty Clearing Station, 16 August 1916.
[44] Archibald, "A Brief Survey of Some Experiences in Surgery of the Present War," 780.
[45] Ibid, 782.

demonstrated that when early intervention on abdominal wounds was possible, there was a greater chance of survival for the wounded soldier. It would now be up to the medical corps to find a way to ensure that early intervention occurred even with the high numbers of casualties experienced in heavy fighting.

When to operate on an abdominal case and when to leave the soldier to die was a difficult question to answer. The lessons of Ypres had taught that the first issue was to treat shock and stop the bleeding. Often these conditions occurred at the same time, complicating the treatment. The patient was surrounded with hot water bottles and given a warm saline enema to combat shock. After an hour if the patient had a heart beat he was operated on to ensure that no haemorrhage had been missed. Unfortunately, cases of severe shock died in large numbers; however, the small number saved gave encouragement to the medical staff so they continued to intervene surgically and hoped for better results.

A soldier who survived abdominal surgery was not out of danger yet. The second most frequent cause of death in abdominal wounds was a paralytic obstruction. This post-operative condition showed symptoms within twenty-four to forty-eight hours after surgery, including a drop in body temperature, an increase in pulse, quick and shallow breathing, and a drop in blood pressure. The most obvious outward symptom appeared when the soldier vomited blood that looked like coffee grounds. There were different approaches to treating an obstruction. In many cases nothing was done as the patient was considered a hopeless case. Some medical units washed out the stomach, others inserted

a catheter, and some units injected a drug to force the bowels to move in hopes that the soldier could pass the obstruction. None of these methods had positive results.[46]

Pneumonia was the other common complication of abdominal surgery. A number of soldiers had already developed chronic bronchitis from trench life, and were therefore more susceptible to post-operative pneumonia, but soldiers did not have to have bronchial conditions to develop pneumonia. The distension of the stomach and bowel was found to interfere with the diaphragm, making it difficult to breathe. Post-operative infections tended to affect the lungs, which caused the fluid build-up. To treat pneumonia, a "shipway apparatus" was used to deliver warm ether vapour combined with oxygen into a mask. This relaxed the patient and made it easier to breathe.[47]

At 40%, the survival rate was not very high for the majority of abdominal wounds, and soldiers with complications had even lower odds of surviving their wounds. However, the Medical Officers agreed to keep treating abdominal wounds aggressively and to operate on any soldier with a pulse. Major Archibald summed up the reasoning behind this: "Operation is not killing the one who would get better by abstention. Abstention is killing many who would get better by operation."[48]

The treatment for chest wounds also evolved and saw better success in 1916. It was decided after Ypres to stitch up chests to help prevent infection before sending the patients through the evacuation system; operating on chest wounds was rarely indicated medically and was formally discouraged by the authorities.[49] Chest wounds were

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[46] Ibid, 783-784.
[47] Ibid, 784.
[48] Ibid, 789.
[49] Archibald mentions in his article that some doctors were beginning to experiment on chest cases by aspirating the blood with "good effect at times." Do.

primarily treated at casualty clearing stations once they had more surgical and medical abilities. When the patients arrived they could barely breathe, had a rapid but weak pulse, were deeply cyanotic, were spitting blood, had blood pouring out of their wound, air whistling in and out of the wound, and had a "look of anxiety."[50] Rather than stitch up the wound, in 1916 it was thought that the wound should be tightly packed. The patients were freely given morphine to deal with the pain and left alone. Most of the patients improved after twelve to forty-eight hours and were able to move to the base hospitals within five to seven days after treatment. Military orders stated that chest cases would remain at the CCSs for five days before evacuation. Once the patients were at the base hospitals, they received further care.[51]

The other change that was being made to the casualty clearing stations came about as a result of the standard chest treatments. The responsibility and size of the CCSs had grown after 1915, but little thought had been given to their organization. Before the summer of 1916, the patients were placed wherever there was room for them; this scattered wounds of a similar nature, such as chest wounds, throughout the hospital. Medical Officers, including Canadian doctors Lieutenant-Colonel Norman Gwyn from Dundas, Ontario, and Major Hugh MacDermot, a twenty-six-year-old Jamaican-born physician who had relocated to Montreal, realized that similar cases had to be kept together to make medical practice easier. As a result, all chest wounds were placed in

[50] Do.
[51] Do.

one ward to convalesce.[52] This idea would lead to the reorganization of the casualty clearing station in 1917.

Many of the problems that occurred during the Battles of the Somme were beyond the control of the doctors, but more experience allowed the Canadian medical service to generate ideas to improve its effectiveness. As a result, new ideas, systems, and medical treatments learned by the various Allied medical services and implemented throughout the CAMC in 1916 marked the main progress of the medical service for that year. The growth of the casualty clearing station into a surgical centre was almost complete. The new system of evacuating abdominal wounds directly to this medical unit was increasing the survival rate of the soldiers affected, although the doctors would need to continue working on this issue. The treatment of wounds was improving, giving the soldiers a better chance of making a full recovery and being able to work after the war. Preventative methods against gas poisoning were enhanced as the military discovered how to make gas-proof dugouts and effective masks, while oxygen therapy was improving the treatment for gassed patients and sanitation was helping curb the spread of disease. The winter of 1916-1917 would see the new medical and organizational ideas implemented in the field and more education and training for Medical Officers and the medical staff, but this winter was also a season of preparation for the great spring offensive at Vimy Ridge.

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[52] Lieutenant-Colonel Gwyn and Major MacDermot, "Wounds of the Chest," *Canadian Medical Association Journal,* 1920, 50.

Chapter 6

The Canadian Army Medical Corps at the Battle of Vimy Ridge, 9-12 April 1917

The Battles of the Somme in 1916 had shown the medical service that many of its ideas to improve the speed of evacuation and make proper triage decisions at the front had failed. This failure was helped by the battle conditions that left a great number of wounded trapped in No Man's Land between the German and Canadian lines. In contrast, the medical advances that were incorporated into the service by 1916 demonstrated great success in saving soldiers lives. In order to address the failures on the Somme, the CAMC would introduce new ideas before the spring offensive at Vimy Ridge that were meant to curb stretcher bearer exhaustion, improve triage decisions, and reinforce the regimental aid posts. These ideas would find success on the Vimy battlefield.

The Battle of Vimy Ridge[1] was the first battle of the First World War in which the units of the Canadian Army Medical Corps worked together in the same forward area. The Canadian Corps had the task of taking control of the ridge and Vimy Village. The situation was familiar to the Canadians who had served at Ypres and on the Somme since the Germans held the high ground, allowing them to see the medical corps' movements. This forced the Medical Officers to place their units further behind the trenches than they would have liked and meant that once again the majority of casualties would have to be evacuated at night. Despite long and careful planning for Vimy, difficulties would arise

[1] For more information on Vimy Ridge, see Geoff Hayes et al (eds.), *Vimy Ridge: A Canadian Reassessment* (Waterloo, Ontario: Wilfrid Laurier University Press, 2007); Brereton Greenhous and Stephen J. Harris, *Canada and the Battle of Vimy Ridge, 9-12 April 1917* (Ottawa: Department of National Defence and Directorate of History and Heritage, 1992).

throughout the battle. The sheer volume of casualties was trying enough, but the difficulties the medical service faced were compounded as regimental aid posts were lost on the battlefield, stretcher bearers became disoriented, evacuation routes became clogged, and field ambulances and casualty clearing stations, set up well back of the lines but often still under German observation, undertook the grim task of sorting the dead from the dying and the wounded. When the battle was over, the medical service considered its effort at Vimy a tremendous success even though the work was not perfect.

The fighting at Ypres and on the Somme spawned many ideas to improve the evacuation system. The crucial problem was still the stretcher bearer, who was often driven to exhaustion by trudging through dirt and mud with little time to sleep or eat. Originally, there were sixteen bearers allotted to a regimental aid post; in late 1915 that number was doubled to thirty-two, then in 1916 to sixty. For the Battle of Vimy Ridge each regimental aid post was allotted twenty-five stretcher squads of four men each, or 100 men in total. In addition, stretcher squads were held in reserve to strengthen over-worked areas throughout the battle and to provide time for the bearers to rest. To increase the knowledge of the regimental bearers and ensure that the best possible triage decisions were made, an orderly from the field ambulances supervised each squad. This orderly also helped the Medical Officer to train the other bearers so that they would have better education on wound treatment.[2] The squads of bearers were arranged by height to make it easier to carry the wounded, but friendship was another consideration in

[2] Library and Archives of Canada [LAC]: Department of Militia and Defence [DMD] Records, RG 9, volume 5030, microfilm reel T-10919, War Diary, No. 8 Canadian Field Ambulance, April 1917, Appendix 1, sheet 3.

assigning bearer squads at Vimy. Friends were placed into squads together "with the idea of gaining the best results from the services at our disposal."[3]

As well as the addition of more stretcher bearers to prevent exhaustion, a key development in speeding up the casualty evacuation system occurred when the Canadian Railway Corps constructed narrow-gauge railways that ran between the RAPs and the dressing stations from a collecting post named "Ambulance Corner." A hand truck (see figure 8) was used on the narrow-gauge railway that could hold four stretcher or ten sitting cases; it needed as few as two bearers to push it, weather permitting, thereby allowing two men to do the work of ten. [4] It was hoped that these improvements would alleviate the exhaustion of the bearers and allow for more timely treatment of the wounded.

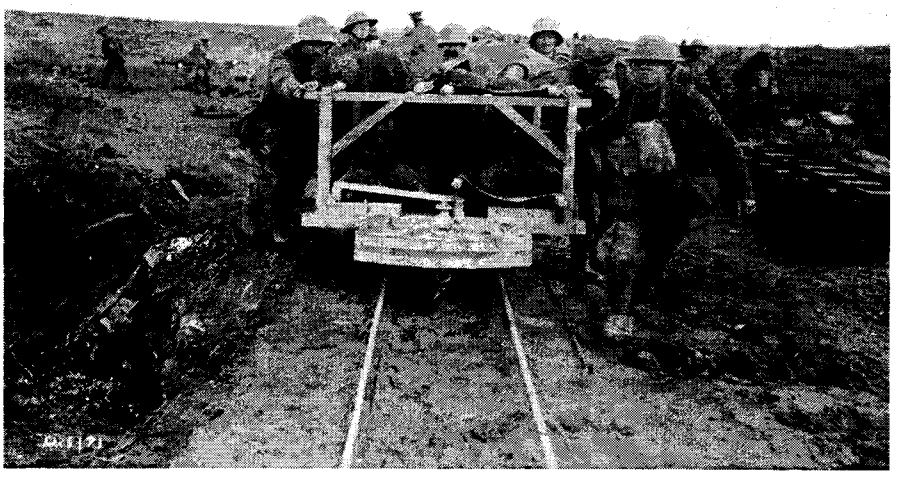

Figure 8– Canadian stretcher bearers, with the assistance of German POWs, bring wounded Canadians to a dressing station during the Battle of Vimy Ridge. More than two men were required to push this hand truck due to the mud, which made it difficult to walk. PA001024

[3] Ibid, April 1917, Appendix 1, sheet 7.
[4] Ibid, April 1917, Appendix 1, sheet 7 and 5.

The casualty clearing stations also underwent changes to allow for effective surgical treatment and to help accommodate the large numbers of casualties so that the medical staff would not have to work around the clock. Each division at Vimy had one casualty clearing station attached to it that now included twenty-two Medical Officers, eight of whom were surgeons, and twenty-nine nursing sisters to care for the wounded. From the original fifty beds, the unit now had the capacity to treat 900 patients. For the Battle of Vimy Ridge it was decided that surgical teams from the base hospitals would sent forward to reinforce casualty clearing stations to improve efficiency, allow for rest, and to increase the ability of the unit to treat serious cases. To that end, eight to ten surgical teams joined each casualty clearing station from the rear-area hospitals in the days before the Vimy offensive.[5]

These innovations were just a few of the extensive preparations made before the attack on Vimy. On 11 March 1917 the first advance parties from the medical services arrived in the area, under the supervision of Major Ernest Raymond Selby, a doctor from Bradford, Ontario, to begin enlarging and improving existing dugouts for use as RAPs and dressing stations. The methods of clearing the casualties and the evacuation routes also had to be thoroughly arranged and understood to prevent congestion or delays.[6] The supplies that would be needed were delivered by 6 April so that all the units were prepared when the attack began. Saturday 7 April was spent organizing the supplies and getting the units ready for the battle. Massive amounts of dressing materials, blankets, rations, and other medical supplies were sorted and divided. In the final days before the attack, all of the wounded and ill patients in the field ambulances and casualty clearing

[5] LAC: Thomas Brenton Smith Papers, MG 30 E31, Clearing: The Tale of the First Canadian Casualty Clearing Station, British Expeditionary Force, 1914-1919.
[6] LAC: DMD Records, War Diary, No. 8 Canadian Field Ambulance, April 1917, Appendix 1, sheet 2.

stations were evacuated to make room for the wounded who would soon be streaming through the units.[7]

By 8 April the preparatory work was complete and the medical service was ready to take part in "the great attack which had been anticipated so long."[8] The battle opened at 05:30 hours. The Medical Officers listened to the bombardment and waited for the impending rush of wounded. As one Medical Officer wrote of the shell barrage, "It is impossible to describe the intensity of this, as all efforts would fail to convey to the imagination what it resembled, and one can only be satisfied with the general description that it surpassed anything previously seen or heard."[9] One of the first casualties treated by No. 8 Canadian Field Ambulance was one of their own. At 06:00 a sergeant walking from his sleeping quarters to the dressing room was hit in the neck by a stray bullet. He died later at the base hospital.[10]

The forward movement that followed the success at Vimy Ridge forced the regimental aid posts to move behind the advancing battalions, which meant that much of the careful planning was for naught. In order to address the communications problems experienced in the previous two years of war runners were added to the RAPs to help maintain contact between the RAPs and the battalion headquarters, but as the day progressed the RAPs became more difficult to locate. On the night of 9 April, No. 8 Field Ambulance sent a bearer party forward to find the new regimental aid posts; they

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[7] Ibid, April 1917, Appendix 1, sheet 4.
[8] Ibid, April 1917, Appendix 1, sheet 7.
[9] Ibid, April 1917, Appendix 1, sheet 8.
[10] Do.

returned to the dressing station hours later with no idea of the posts' locations.[11] Meanwhile, a runner from another RAP reported to No. 8 Field Ambulance that some forty to fifty wounded men were lying in shell holes in front of another aid post. With the help of the runner, stretcher bearers were able to find and clear the area, though there were not as many wounded as reported. Not until the 10th of April did the stretcher bearers of No. 8 Field Ambulance again go forward in daylight to find the missing regimental aid posts.[12]

The new regimental aid posts were difficult to find because they were not necessarily located in proper dugouts. Captain Arthur Chester Armstrong, a twenty-nine-year-old doctor from Drayton, Ontario, had a new RAP that was little more than a hole in the ground and very difficult to enter. He had managed to fit seven stretcher cases in the hole, but there was scarcely room for any other wounded.[13] Captain James Frederick Stewart Marshall, a thirty-year-old Canadian doctor who practiced medicine in Montana, moved to a post that was "a very small place, with practically no accommodation as a Dressing Station, and only just sufficient cover for himself."[14] The entrance was so obscured that the bearers who found the hole in the ground had to crawl into it to see if anyone was inside. The terrain contributed to the difficulty in finding the RAPs since "the land they traversed was simply one mass of shell-holes and ruined barbed wire, and it was a matter of impossibility to follow any given direction."[15] The new RAPs were unsuitable and created problems for the stretcher bearers, who could not evacuate the

[11] Ibid, April 1917, Appendix 1, sheet 12.
[12] Do.
[13] Ibid, April 1917, Appendix 1, sheet 1 and 14.
[14] Do.
[15] Do.

wounded to RAPs they could not find. In addition, there was no room for supplies or treatment of the wounded in these makeshift facilities.

On 10 April, it became apparent that even the increased number of stretcher bearers allotted to the task was insufficient, for the distance between the regimental aid posts and the field ambulances had become too great for tired bearers to cover. The only solution was to increase further the number of bearers, or find a way to shorten the carries. To try and solve the problem, Medical Officers who had previously been held in reserve went forward to reopen the former RAPs as collecting posts and relay stations. This shortened the carry for the bearers and ensured that the soldiers received the medical care they needed while they waited to be evacuated.[16]

Still, the stretcher bearers struggled over terrain that was now unfamiliar since it was marked by large shell holes that destroyed landmarks and made the carries very long and difficult (see figure 10). At night the bearers could hardly see anything as they searched for casualties. The threat of gas forced them to wear their gas masks while they worked, which further obscured their vision. It was difficult to navigate by landmarks since every tree around the advanced dressing station at La Folie Wood, for example, was destroyed, leaving in its place a wild jumble of tree trunks, branches, and barbed wire that had to be traversed. The stretcher bearers nicknamed the evacuation route through La Folie Wood "Death Valley." At some point, the collecting post that the field ambulance bearers established near the station had to be abandoned and re-established further back due to intense shelling.[17] To make matters worse, one of the tram lines that was to speed evacuations was blown up. Road and field conditions made it impossible to use wheeled

[16] Ibid, April 1917, Appendix 1, sheet 16.
[17] LAC: DMD Records, RG 9 III B2, volume 3752, file 4-3, The Period of Preparation for the Vimy Offensive.

stretchers, so the area continued to be cleared by hand.[18] Despite these difficulties, the stretcher bearers were able to maintain their morale. In addition to their increased numbers, the field ambulances held bearers in reserve until 10 April when the rested bearers moved forward to help with the evacuation. Most of the bearers worked a full forty-eight hours, but they were able to rest and eat to keep up their strength. While their heavy work over torn up roads and through new districts was hard and the opportunity existed to stop and get some sleep, the bearers "were ever anxious to continue so long as there were any wounded remaining to be brought in."[19]

Figure 9– A wounded Canadian receives first aid in a crater created by a shell during the Battle of Vimy Ridge. PA001064

Difficult triage decisions continued to fall on the shoulders of the stretcher bearers. Fortunately they now had better training and a CAMC orderly with them to assist in decision-making. No soldier with any chance of survival was left behind;

[18] LAC: DMD Records, War Diary, No. 8 Canadian Field Ambulance, April 1917, Appendix 1, sheet 1 and 9.

[19] Ibid, April 1917, Appendix 1, sheet 13.

however, some of the wounded were clearly not going to make it to the treatment centres before they died. In the forward areas, the stretcher bearers decided who to carry back first based on the extent of the injuries. Occasionally the infantrymen could not accept or understand the decisions being made and would try to convince the bearer squads to help a man for whom nothing could be done. At Vimy a private came across a group of wounded men lying in a crater, one of whom, "a Scotsman, had shrapnel in him on the left side from head to foot." The stretcher bearers were collecting the wounded, but none of them moved to assist the Scotsman. The private pulled a bearer aside and asked him why they were leaving without the wounded Scotsman. The reply is an example of the harsh reality of war; the bearer whispered that he "was fatally wounded and would peg out at any moment."[20] The private was upset by the reply, but did not interfere with the work of the stretcher bearers.

Figure 10– A wounded soldier being carried to the rear by German POWs during the Battle of Vimy Ridge. PA001025

[20] Reginald Roy, ed. *The Journal of Private Fraser, 1914-1918, Canadian Expeditionary Force* (Victoria: Sono Nis Press, 1985), 268.

Figure 11– German prisoners evacuate a wounded man to the Canadian lines under the direction of the Canadian stretcher bearers behind them. PA001031

German prisoners of war also became stretcher bearers (see figure 11). They were quite adept at the work and were actually happy to help clear the wounded. The war for these Germans was over, which may well account for their cheery, helpful disposition. While prisoners had been used as bearers throughout the war, it had never before occurred in such numbers. Hundreds of Germans loaded stretchers onto Canadian ambulances and carried the wounded miles from the front lines to the dressing stations. The only problem that developed was that the Germans did not know whether they were to keep or exchange the stretchers where they dropped off the wounded, so a shortage of stretchers resulted. To ease the ensuing crisis, the German prisoners, with the help of Canadian bearers, improvised stretchers by using sheets of corrugated iron that were padded with blankets. They also scoured the ground for German stretchers that had been left behind, and built new stretchers out of wood and canvas. Armed soldiers ensured that the Germans did not try to escape or harm any of the wounded.[21]

[21] Ibid, April 1917, Appendix 1, sheet 10-11.

The Canadian soldiers and medical staff were receptive to the assistance of the German bearers, although the fact that these were the same men who had been shooting at them earlier was not lost on the Canadians. One Canadian soldier commented that he "was impressed by the thought that here were men striving to save the lives of men they had tried to destroy a few hours before." He went on to say that "The Germans worked hand in hand with us [see figure 11 and 12], dressing wounds, carrying stretchers over muddy, soaked ground ... there was not a trace of hate in the heart of any [German] I worked with that day."[22]

Figure 12–Canadian stretcher bearers work with German POWs to bring back the wounded. The ground conditions are noticeable in the background, where the ground is pock-marked by shell explosions and appears hilly. In addition, the uniforms of the men are covered in mud from their boots to their helmets. PA001021

[22] William Mathieson (ed.), *My Grandfather's War: Canadians Remember the First World War, 1914-1918* (Toronto: Macmillan Canada, 1981), 119.

Military instructions noted that wounded prisoners of war would "be treated in every way similarly to our own wounded."[23] To that end, when two German Medical Officers were captured on 10 April they were attached to No. 1 Canadian Field Ambulance where they worked with two German interpreters. The Canadians set aside a separate ward for the German wounded where the German Medical Officers worked until the last patients were evacuated.[24] This was very helpful since the captured doctors spoke German and could better understand the patients' complaints allowing for better treatment.

The field ambulances, like the RAPs, also dealt with the experience of forward movement. Throughout the battle at Vimy, "[t]he work at the Advanced Dressing Station proceeded satisfactorily. As the cases arrived by trucks, on narrow-gauge railway, across country, or down the main road," they were greeted by a non-commissioned officer and his staff who arranged all the casualties according to urgency of treatment.[25] The War Diary of No. 8 Field Ambulance boasted that patients were well cared for; when necessary, their dressings and bandages were reinforced and their muddy, soaked clothing changed. Splints were applied to fractures and everything possible was done to keep the wounded comfortable.[26] The success of the operation was shown in the particularly cheery disposition of the Canadian wounded who seemed optimistic about the war, and proud and happy as a result of the successful efforts of the day. One

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[23] LAC: DMD Records, RG 9 III-D-3, volume 4893, microfilm reel T-10688-10689, War Diary, 7 Canadian Infantry Brigade, Appendix "A", Prisoners of War, Arms, Documents, Etc,"April 1917.
[24] LAC: DMD Records, RG 9 III, volume 5027, microfilm reel T-10913, War Diary, No. 1 Canadian Field Ambulance, 9 April 1917,
[25] Ibid, April 1917, Appendix 1, sheet 10.
[26] Do.

wounded soldier "laughingly remarked 'I wouldn't have missed this morning for anything!'"[27]

During the Battle of Vimy Ridge, the ambulances had difficulty moving the wounded back against the flow of traffic moving forward, despite a great deal of effort to create evacuation routes for the wounded. Regulations made it clear that ammunition columns and other supplies going to the front were given priority in all travel, followed by the medical service.[28] This problem was anticipated when the dedicated railway lines were built that ran straight to the Main Dressing Station from a collecting post at the front so that serious cases could be evacuated quickly. This railway did not run hospital trains, but rather platforms that could hold many wounded men. This service was different from the hand trucks because it was propelled by an engine, not the stretcher bearers. The railway was expected to provide a train every twenty minutes to collect the wounded, but traffic congestion slowed the train to every two hours since supply trucks had to cross the tracks on their way to the front.[29] In order to accommodate the trains, and because the Germans held the high ground and enjoyed a clear view of the Canadian lines, the main dressing stations were farther back than normal. While this was a good idea in theory, since the trains could move more men it created a new problem; the walking wounded could not manage the six- to ten-kilometre walk to reach the main dressing stations.

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[27] Ibid, April 1917, Appendix 1, sheet 13.
[28] LAC: DMD Records, The Period of Preparation for the Vimy Offensive.
[29] Do.

Figure 13–Stretcher cases wait to be loaded onto the light railway during the Battle of Vimy Ridge. PA001034

With space at a premium and the traffic flow moving slowly, the field ambulances were quickly overflowing with wounded men. The war diary from No. 4 Canadian Field Ambulance reported, "As we had only space for about 100 men under cover a number varying from 100-200 men were lying out on a field near the road most of the afternoon and evening."[30] Medical Officers had to leave wounded men out in the snow on stretchers, causing some chaplains to complain of inhumane treatment. But the Medical Officers did what they could. Each patient had his wounds dressed and was covered with blankets. While waiting, the men were given hot drinks and food, at least those whose conditions allowed them the welcome warmth.[31] While some units used the outdoors as a dressing room (see figure 14) and tried to keep the men warm, others used the outdoors as a moribund ward. Hubert Morris, a twenty-one-year-old school teacher from Lambton, Ontario, was a stretcher bearer at an advanced dressing station throughout

[30] LAC: DMD Records, RG 9 III-D-3, volume 5027, microfilm reel T-10914, War diary, No.4 Canadian Field Ambulance, 9 April 1917.
[31] LAC: DMD Records, The Period of Preparation for the Vimy Offensive.

the Vimy battle. His dressing station became overcrowded and, like the others, had rows of stretchers lying in the snow. Morris's Medical Officer, Major Herbert Wadge, a forty-year-old doctor from Winnipeg, had the bearers follow him around the dressing room while he examined each case. He would stand in front of a wounded man whom he did not think would survive and give the bearers a slight nod. They then moved the soldier outside and placed him in the row of stretchers. Whether conscious or not, the wounded men did not complain about being laid in the snow. The bearers covered them with several blankets and did what they could to make them comfortable. The Medical Officer checked on the wounded outside the station often and gave whatever medical aid he could.[32]

Figure 14– Canadians have their wounds treated outside an ADS in June 1917. PA001406

[32] LAC: Hubert Morris Papers, MG 30 E379, The Story of My 3 ½ Years in World War 1, November 1978.

Further back from the front lines at Vimy, the casualty clearing stations generally performed their tasks with few difficulties. The system of grouping three stations together to take turns with intake worked much better at Vimy than it had at the Somme. This was most likely due to the length of time it took to evacuate the wounded from the main dressing stations. A hospital train could transport 300 patients, which was the same number of beds that the CCSs had available for the seriously wounded; however, the CCSs could treat an additional 600 walking wounded patients. This allowed each CCS to take its turn treating the patients who arrived by train. The Motor Ambulance Convoy did its best to evacuate the wounded (see figure 15), weaving through the vehicles that were bringing supplies to the front. Their progress was so slow that the CCSs were not as overwhelmed as they had been at the Somme, although they were still very busy treating hundreds to thousands of casualties a day.[33]

Figure 15– Canadians being placed in an ambulance of the Motor Convoy at an ADS June 1917. PA001404

[33] LAC: Smith Papers, Clearing.

No. 1 Canadian Casualty Clearing Station had an odd start to the battle at Vimy Ridge that would come to represent the flexibility of the medical services and the ongoing cooperation between the Empire's services. The first train of casualties did not arrive until 11:45, six hours after the first artillery barrage was launched. This meant that the clearing station was practically idle in the first hours of the battle. By noon it was clear to those in the station that the other CCSs attached to the First Army could handle the area since Canadian casualties were fewer than expected; however, the British 17th Corps to the south of No. 1 Casualty Clearing Station was taking very heavy casualties and the medical units in that section required assistance with the strain. It took the medical authorities time to realize this, but at 18:00 on the 9th of April No. 1 Casualty Clearing Station was placed at the disposal of the Third Army to help it clear its hospitals that were overwhelmed and desperate for help. No. 1 Canadian was to take all the admissions until it was full in order to help the other units catch up with their wounded.[34] The strain caused by the volume of wounded made it impossible to continue with the system of rotating receptions, so the CCSs attached to Third Army had to work straight through the Battle of Vimy Ridge. This situation demonstrates the military reality that Colonel Bruce often overlooked in his report. The original intent was to use the CCS to treat Canadian patients, but due to the circumstances of the battle it was assigned to assist the British, no longer taking in Canadian casualties. There was no time to discuss nationality of troops, for a decision had to be made on the spot about using the available resources in the most effective way; that meant a Canadian unit serving a British section.

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[34] Do.

The dressing room at No. 1 Canadian Casualty Clearing Station was completely full within a couple of hours. There was a line of Motor Ambulance Convoy vehicles outside the station waiting to be unloaded, the drivers growing impatient since they had to get back to the main dressing stations to pick up more wounded. As a result of the station's inability to receive any more patients and with no other unit in better shape in the area, the wounded were unloaded from the ambulances and left by the roadside until they could be brought inside the station. The weather was bitterly cold so a Medical Officer had to go outside to check on the wounded while his orderly brought out extra blankets for all the men and hot drinks for those whose wounds permitted them a drink. By 02:30 on the morning of 10 April the last of the wounded were brought into the station.[35]

On the 10th of April No. 1 Canadian Casualty Clearing Station saw 1,234 casualties, including 165 wounded Germans. They managed to evacuate 523 men, but still had 711 cases in the station at midnight. Twenty-six soldiers died at the station that day, and others had died on the journey there. As a result, the mortuary was filled beyond capacity and rows of bodies lay on the ground outside. The other CCSs had finally caught up and were able to take some of the pressure off No. 1 so it could stop receiving for twenty-four hours. The unit managed to clear all but 203 wounded men before it had to begin receiving again.[36]

The field ambulances estimated that their personnel saw 1,000 to 2,000 casualties a day during the Vimy battle.[37] However, it is important to note that the

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[35] Do.
[36] Do.
[37] LAC: DMD Records, RG 9 Series III-D-3, volume 5027, microfilm reel T-10914, War Diary, No. 3 Canadian Field Ambulance, April 1917, Appendix 'A', sheet 1.

medical units in the sector continued to treat the wounded long after the battle had been won, because other skirmishes continued in the area. In the records covering the period between 9 April and 9 May, No. 1 Canadian Casualty Clearing Station treated 7,773 cases, the majority of whom were stretcher cases. In that period, 1,315 major operations were performed at No. 1 Clearing Station on 1,119 patients, along with the 723 minor operations done in the dressing room.[38]

In all, there would be 3,598 Canadian dead and 7,004 wounded at Vimy Ridge.[39] The medical units would see many more casualties than these, however, since the number of German prisoners of war was higher than in any other battle, and many Imperial soldiers used their services as well. Overall, on 9 and 10 April, the days of the heaviest fighting, Canadian medical units admitted 5,962 Canadian, 7,350 British, and 706 German wounded a total of 14,018 patients in two days. Despite the volume of casualties, "there was no careless rushing in order to keep free, the care of the patient was the greatest consideration" for the Medical Officers.[40]

The Canadian Army Medical Corps had good reason to celebrate its actions in the Battle of Vimy Ridge since a number of its new systems were successful. Unlike during the Battle of the Somme, the regimental aid posts had been strongly fortified and built in deep dugouts. While this innovation made them impervious to shell fire, which solved the problem of losing the posts that occurred at the Somme the solution also caused a problem. While the strongly constructed posts were very useful under stalemate

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[38] LAC: Smith Papers, Clearing.
[39] Major-General Sir W.G. Macphearson, *History of the Great War Based on Official Documents: Medical Services, General History,* volume 2 (London: His Majesty's Stationary Office, 1921), 110.
[40] LAC: DMD Records, War Diary, No. 8 Canadian Field Ambulance, April 1917, Appendix 1, sheet 10.

conditions, they were frequently wasted in a successful engagement. The advance was so rapid that the Medical Officers were forced to move their RAPs forward to dugouts in the former German lines on the first day. In many cases there was no time to build a post, so the Medical Officers and their staff carried as many supplies as they could manage and dressed the men out in the open or in trenches before flagging down bearer squads to evacuate the wounded to the field ambulances. This meant that the original RAP dugouts were barely used. The aid posts were eventually employed as relay and collecting posts for the stretcher bearers after they had been vacated, but the number of bearers supplemented by the German prisoners meant that there was a steady stream of men to carry the wounded back. As a result, it was rare for the wounded to spend any time in the former regimental aid posts.[41]

The medical service could be commended for the speed with which the wounded were cleared back to the field ambulances. This was in part due to the battle conditions, and in part due to the new stretcher bearer squads and their numbers. A significant innovation, the trains that were able to collect patients as far forward as the main dressing station as well as the tram lines laid between the regimental aid posts and the advanced dressing stations (see figure 17) were first used at Vimy Ridge and assisted in preventing exhaustion and allowing for faster medical intervention for serious cases.[42] In addition to the tram lines, there were more bearer squads available to the ambulances for the Vimy battle that were better trained than regimental bearers who served in previous battles, and had an orderly of the CAMC to work with them to ensure proper triage decisions were being made in the front lines. The use of German prisoners and the number of prisoners

[41] LAC: DMD Records, RG 9 III-D-3, volume 5025, microfilm reel T-10910-10911, War Diary, Assistant Director Medical Service 2nd Division, Report to ADMS 2nd Division, May 1917.
[42] Do.

also contributed to the unprecedented speed of evacuation from the front. All of the ideas that contributed to the rapid clearing of the front also enabled the stretcher bearers to work throughout the battle without the complete exhaustion that they had experienced in previous battles.[43]

The main problem that occurred in the front area was the shortage of stretchers. As we have seen, this occurred in part as a result of employing German prisoners as bearers. The Germans often made just one trip between the regimental aid post and the field ambulance; since they did not return to the RAP with a stretcher, shortages began to occur there. Some of the prisoners did make several trips carrying the wounded, but did not know they were supposed to bring a replacement stretcher to the RAP when they returned. The German prisoners were not the only reason for the dearth of stretchers. Before the Battle of Vimy Ridge the ratio of stretcher cases to walking wounded was 1:3. For reasons the medical corps did not understand, at Vimy the kind of wounds that the Canadians received were generally more severe than in previous battles. As a result, the ratio of stretcher cases to walking wounded during the Vimy battle was 1:1. This meant that more stretchers were being used than in any previous campaign. To combat the problem, regimental aid posts increased the number of stretchers they carried as part of their equipment. In addition, a massive number of stretchers were to be supplied to the RAPs in preparation for future battles to ensure that the medical service would not run out of stretchers in the front lines. The change in stretcher ratio created a dilemma. More stretchers meant that more bearers and more motor ambulances were needed. At Vimy, it

[43] LAC: John Fotheringham Papers, MG 30 E 53, volume 5, file 22, Report on Collection and Evacuation during Vimy.

meant more trips back and forth between the units and necessitated "new preparations to accommodate large numbers of stretchers" at the various units.[44]

Figure 16– Collecting the wounded at the tram lines during the Battle of Vimy Ridge. PA001036

The number of stretcher cases was not the main reason for the slow evacuation between the dressing stations and the casualty clearing stations. Traffic congestion was a serious problem during the Vimy battle, for it blocked the tram lines and trains and made it impossible to evacuate patients in a timely fashion. The guns and ammunition columns going forward limited the speed of the motor and horse ambulances to a walking pace and at one point blocked a train for two hours. To help the medical services evacuate patients, the 8th and 13th Motor Ambulance Convoy Units each sent eight to ten of their trucks. While this was a promising idea in theory, the new trucks added to the congestion on the roads and did not speed up the evacuation process. The Canadian Army Medical Corps had no solutions to offer regarding traffic congestion; the Inspector-General of

[44] Do.

Communications controlled the traffic, not the medical corps, so there was little that the Medical Directors could do beyond informing the inspector of the problem.[45]

The terrain at Vimy also contributed to the slow pace of evacuation. The roads were in poor repair and became worse from shell fire as the battle wore on, making them difficult to drive on. In previous battles when the roads became impassable, the motor and horse ambulances had simply used the open fields to evacuate the wounded, but the shelling at Vimy was so intense that the fields were even more cratered than the roads; whether they went by road or overland, the wounded would be jostled about in the back of the ambulances, causing intense pain and possibly further injury. In fact, the destruction was so extensive that the war diarist of No. 11 Canadian Field Ambulance took the time to describe the terrain that its members saw as they walked to their new positions immediately after the battle:

> A more desolate scene than this battle-field could scarcely be imagined. Every foot of earth had been up heaved time and time again during the furious bombardments from both sides, until the very bowels of the Ridge had been hurled on high and spread abroad, and clay, chalk and gravel had been so mingled together and compounded with the moisture as to resemble the contents of a giant haggis. The plateau was so flooded that it presented the appearance of a series of lagoons and in some places the only possible footing across the Ridge was afforded by narrow, slippery reefs of mud thrown up around the shell holes and dividing one lake from another. Amid this flood ... lay the half-submerged bodies of the dead, whose blood had coloured to rusty red the stagnant water lapping around them.[46]

In addition to the problems presented by the destruction of the terrain, the Canadians once again fought over a ridge that was held by the Germans. The high ground of the ridge provided a view of the Canadian lines, so the medical units had to be

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[45] Do. See also: LAC: DMD Records, War Diary, ADMS 2nd Division, Report to ADMS 2nd Division, May 1917.

[46] Canada, Militia, Canadian Expeditionary Force, 11th Canadian Field Ambulance, *Diary of the Eleventh: Being a Record of the XIth Canadian Field Ambulance (Western Universities) Feb. 1916 - May 1919* (Winnipeg, 1919), 62.

placed further back than in past battles. This meant that the distance to travel between the units was too far. No. 4 Canadian Field Ambulance had a four- to five-hour round trip between its advanced dressing station in Aux Rietz and its main dressing station in Les Quatre Vents as a result of traffic congestion. Given a four-hour return trip, the motor ambulances could not keep up with the number of wounded.[47]

Even with these various issues, overall the performance of the Canadian Army Medical Corps during the Battle of Vimy Ridge must be considered an important milestone on the learning curve. The corps had finally implemented an evacuation process in which the stretcher bearers were not overtaken by exhaustion. There was a stronger commitment to training the regimental stretcher bearers, who were accompanied by experienced orderlies from the CAMC to ensure proper treatment was rendered to the right soldiers, thereby improving the standard of front-line care. The majority of the problems that did occur were deemed to be beyond the control of the medical establishment, so the after-action reports from the medical service contained few ideas or solutions directed at making it more efficient or effective. Since Vimy was such a success for the CAMC, it would provide the basis for the efforts of the medical service in the future.

[47] LAC: DMD Records, Report on Collection and Evacuation during Vimy. See also: LAC: DMD Records, War Diary, ADMS 2nd Division, Report to ADMS 2nd Division, May 1917.

Chapter 7

The Battle for Passchendaele Ridge and the Medical Advances of 1917

The Canadian Army Medical Corps fought several significant battles throughout 1917. The ideas and systems that found success at Vimy continued to be employed throughout the year, allowing for quicker medical intervention and better medical care. However, the system was still subject to factors beyond the medical service's control, such as weather and the varied military situations that each battle brought. An examination of the CAMC during the Battle for Passchendaele Ridge will provide a contrast to the success at Vimy due to the difficulties that were faced. While the system was still successful, it was challenged on the Passchedaele battlefield. The Battle for Passchendaele was the most difficult battle that the medical service would have to endure. The weather would once again become a major factor hindering the work of the stretcher bearers, despite the new systems that had been implemented to ameliorate the problem of bearer exhaustion. At the same time, the massive weight of shells claimed the lives of many medical men while they tried to treat the wounded, putting strain on the Corps' resources of trained personnel. Beyond the battlefield, new medical advances, surgical techniques, and equipment discovered or built on in 1917 were vast in scope and nature. Integration of new ideas for medicine and systems based on the work of 1917 allowed for better survival rates and even more forward treatments.

The Canadians took over the line in the Ypres sector on 18 October 1917, less than a week before their attack on the ridge at Passchendaele[1] was to begin. The British medical units they replaced, which had been in the area since the offensive opened in July 1917, had worked hard at preparing the medical stations, so little else needed to be done other than readying the supplies and determining the evacuation routes that would be used.[2] The Battle of Passchendaele, also known as the Third Battle of Ypres, occurred on "virtually the same ground as that which [the Canadians] held in April 1915 before the gas attack."[3] The members of First Canadian Division who had fought in the previous battle at Ypres were unable to recognize the ground since the woods and many of the farm houses had been destroyed, as had the towns of St. Jean, Wieltje, and Fortain. There was nothing left but ruins, the shelling having reduced "the countryside to an unrecognizable waste of ridge and hollow."[4] The battle, as far as the Canadian Corps was concerned, was to consist of four attacks on German positions between 26 October and 10 November to ward off "any German attempt at a decisive counter-offensive by launching a series of attacks with limited objectives."[5] If the Canadians could take and hold the high ground for the winter, the superior drainage would provide them with better

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[1] For more information on the battles of Passchedaele Ridge, see Peter Liddle (ed.), *Passchendaele in Perspective: The Third Battle of Ypres* (London: Leo Cooper, 1997); Daniel Dancocks, *Legacy of Valour: The Canadians at Passchendaele* (Edmonton: Hurtig, 1986); Robin Prior and Trevor Wilson, *Passchendaele: The Untold Story* (New Haven, Connecticut: Yale University Press, 1996).
[2] Library and Archives of Canada [LAC]: Department of Militia and Defence [DMD] Records, RG 9 III-D-3, volume 5030, microfilm reel T-10918-10919 file 831, War diary, No. 8 Canadian Field Ambulance, November 1917, Appendix 1, sheet one.
[3] Colonel G.W.L. Nicholson, *Canadian Expeditionary Force, 1914-1919* (Ottawa: Queen's Printer and Controller of Stationary, 1962), 312.
[4] Ibid, 312-313.
[5] Ibid, 299.

living conditions. The Canadians were able to capture the ridge, but at a tremendous cost of 15,634 casualties.[6]

The system of evacuation at Passchendaele was similar to that employed throughout the war. The regimental stretcher bearers would clear the wounded from the front lines to the regimental aid posts, where the bearers of the field ambulances would pick them up and carry them to the dressing stations. However, in order to bring even more efficiency the bearers were no longer attached to specific units while they cleared the wounded. All the bearers of the FLD AMBs in the division worked the front lines day and night, regardless of which ambulances were actually forward. Tram lines were again built for the medical services so that the wounded could be pushed on hand trucks between the RAPs and the advanced dressing stations to save the strength of the bearers. While the majority of the carries would have to be done in the open, there was a tunnel running between the RAPs in the Third Canadian Division's area and the ADS at Wieltje that provided some cover for the bearers. Since the battle was again for a ridge held by the Germans, the medical service had to find a way to reduce the distance of the carries for the stretcher bearers. As a result, relay posts were constructed between the RAPs and the ADSs. This allowed the stretcher bearers to walk shorter distances to the posts, where the wounded were picked up by relay stretcher squads who then carried them to the entraining point so the hand trucks could take them to the dressing station.[7]

The Canadians' battle began on the morning of 26 October and would continue with varying degrees of intensity through 10 November 1917. The stretcher bearers were

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[6] Desmond Morton, *When You're Number's Up: The Canadian Soldier in the First World War* (Toronto: Random House, 1993), 171.

[7] LAC: DMD Records, War diary, No. 8 Canadian Field Ambulance, November 1917, Appendix 1, sheet 2-3.

up to the task and worked hard throughout the whole first day until noon of the 27th, when it was reported that all of the casualties had been collected, for a time at least; the bearers could clean up and have a quick rest before they would again be called upon to go out and help the wounded. The conditions under which the stretcher bearers struggled to carry the wounded defy imagination. Other than the tunnel in the Third Canadian Division sector, there was no cover for the bearers to use because the trenches were clogged with water and mud, and virtually impassable to men carrying a stretcher. The enemy continued to shell the area relentlessly throughout the whole battle, forcing the stretcher bearers to carry their loads two and a half miles under intense shelling. The terrain was a "quagmire" and a "featureless desert of yellow mud, pocked by flooded shell holes and bottomless morass."[8] The heavy rainfall created pools of water up to four feet deep, in which wounded men and horses drowned. The war diary of No. 11 Canadian Field Ambulance described the work of the bearers: "Squelching and sliding down shell holes at almost every step, burdened with the stretcher, and soaked with a fine rain, the visual sense sickened with the desolation and slime, with corpses of man and beast, the squads were glad to change their relays for a change of scene."[9] The problem was that the environment was beginning to hurt morale. The stretcher bearers were beginning to think that "when all is told there is little glory in the work of the Ambulance men; it is sheer mulish endurance that achieves the end."[10]

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[8] Morton, *When You're Number's Up*, 171.
[9] Canada. Militia. Canadian Expeditionary Force. 11th Canadian Field Ambulance. *Diary of the Eleventh: Being a Record of the XIth Canadian Field Ambulance (Western Universities) Feb. 1916 - May 1919* (Winnipeg, 1919), 83.
[10] Do.

To help the stretcher bearers traverse the difficult, muddy ground, trench mats or duckboards were laid along the evacuation route. They improved traction while walking, but were very narrow and could not accommodate four men carrying a stretcher. In order to walk on the mats, the bearers broke up their squads so that two men rather than four carried a stretcher shoulder high. With only two men to a stretcher, the work was much more difficult. To make matters worse, the constant shelling continually destroyed the mats and forced the bearers to walk though the mud (see figure 17).

Figure 17– Canadian stretcher bearers carry a wounded soldier through the mud of Passchendaele, November 1917. PA002107

To maintain a sense of direction and stay on the mats as much as possible, the bearers tried grouping themselves into squads of six men. One bearer did not carry; instead, he walked ahead of the squad to find the safest route, to avoid the possibility that a stretcher bearer might slip into the mud and be lost or add to the injuries of the

wounded man being carried.[11] Compounding the difficulties of the bearers was the enemy's use of gas shells, which forced the bearers to wear their box respirator gas masks, constraining even further their ability to see.[12] Deward Barnes, a twenty-nine-year-old apprentice machinist from Toronto, worked as a stretcher bearer at Passchendaele. He described the difficulty of traversing the mud on duckboards and the implications for the wounded soldier on the stretcher:

> We had a long way to carry each one under shellfire, four to a stretcher and each one kept an end on a shoulder. We could not keep to [the trench] mats, but had to go [another] way, sometimes a quarter mile out of our way. One fellow could slip in a little hole or sink in mud and let that end down. Some of the wounded were great, others moaned or yelled at each jar; it could not be helped. Often the four of us went through a big shell hole, water near the thighs.[13]

As they had done at Vimy, the field ambulances kept stretcher bearers in reserve so they could be rotated every forty-eight hours, to keep them from tiring. However, exhaustion was nearly impossible to prevent due to the mud that made every carry that much more draining. The ground was so bad that it often required ten men lifting a stretcher just to struggle through the mud and water to the regimental aid post. In addition to the shell fire, destroyed roads, and horrible weather, the scenery was horrific. As the bearers walked, they passed hundreds of dead bodies lying in the mud and floating in the pools of water, while dead horses and burning motor trucks littered the fields of mud. The wounded themselves added to the horror because of the kinds of wounds that were common in this battle. Deward Barnes later described the wounded and scenery:

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[11] LAC: DMD Records, War diary, No. 8 Canadian Field Ambulance, November 1917, Appendix 1 sheet 3.
[12] Ibid, sheet 4.
[13] Bruce Cane (ed.), *It Made You Think of Home: The Haunting Journal of Deward Barnes, Canadian Expeditionary Force: 1916-1919* (Toronto: The Dundurn Group, 2004), 129-130.

"Carrying the wounded out, most all we carried had parts of their faces shot away, some nearly all their face, as well as dozens of dead laying all around … Hundreds could get wounded and die in the mud, stuck with slight wounds. It is always a sickening sight to see them half-buried."[14] In No. 3 Canadian Field Ambulance, every single motor ambulance was hit by shell fire, sometimes blowing up the ambulance and other times causing only minor damage. The scene caused the diarist of No. 3 to write that the Battle of Passchendaele "constituted a combination of conditions without parallel in my experience of warfare."[15]

Unfortunately the extreme circumstances of this battle meant a higher percentage of wounded and dead in the medical service relative to the other battles they had endured.[16] Private David Stewart of No. 8 Canadian Field Ambulance was killed on the morning of 26 October while he was working at the regimental aid post at Kronprinz Farm. He was leading a squad of German prisoners who were working as stretcher bearers in the Canadian lines, taking a wounded man to the advanced dressing station under intense shell fire. The German prisoners could not find the strength to carry on under such intense shelling. Near the ADS the prisoners dropped their stretcher with the wounded man on it into the mud and prepared to run for cover. Private Stewart stopped them and compelled the prisoners to pick up the soldier and move forward. As the prisoners picked up the wounded soldier, a shell landed in the middle of the party, killing all of the prisoners, the wounded man, and Private Stewart instantly.[17]

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[14] Ibid, 131-132.
[15] LAC: DMD Records, RG 9 III B2, volume 3749, file "Adami No. 3 FLD AMB," War Diary, No. 3 Canadian Field Ambulance, November 1917.
[16] LAC: DMD Records, War diary, 8th Canadian Field Ambulance, November 1917, Appendix 1, sheet 4.
[17] Ibid, sheets 4-5.

The casualties of the CAMC were not confined to the stretcher bearers. Sergeant Steel of No. 8 Canadian Field Ambulance was killed on the night of 27 October outside the pill box that was in use as a regimental aid post at Waterloo. Steel was assisting Captain William Abbott, a Medical Officer from Stockton, Manitoba, by dressing soldiers outside the post in the open, because the RAP was full. An enemy shell dropped at Steel's feet and killed him instantly. Captain Abbott later wrote to No. 8 Field Ambulance to inform them of Steel's death. He stated that "owing to [sic] large number of wounded, I was unable to secure a party to carry out his body. At my request Rev. Capt. Pringle of the 43rd Canadian Battalion buried his body at the foot of a large tree about 100 feet South-South-West of Waterloo Dressing Station. His work and example to his men in caring for wounded was beyond praise."[18]

While the system of evacuation did not collapse at Passchendaele, the regimental aid posts were stretched almost to the breaking point at various times during the battle due to the number of casualties coming through. To assist the RAPs, which had experienced a similar problem at Vimy, several Medical Officers were kept in reserve and sent out to help in the areas that were hardest hit by casualties. Major Strathy was one of the roving MOs during the Battle of Passchendaele. MOs at the RAPs would send a message out when they were over-worked and the reserve MOs would go to their RAPs and help them until the numbers were under control; then they would move on to the next over-burdened post. At 21:00 Strathy was sent to the 47th Battalion to assist at its regimental aid post with another MO and a signaller. It was difficult to locate the RAPs in the darkness under heavy shell fire, but the party did find the Battalion Headquarters.

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[18] LAC: DMD Records, War diary, 8th Canadian Field Ambulance, November 1917, Appendix 1, sheet 5.

Strathy described the headquarters as pure chaos. The men were scattered, there was seemingly no control, and morale appeared to be wavering as "everyone was depressed, and the men were unquestionably very nervous."[19] The Medical Officers split up to help the two RAPs in the area. Strathy made his way through mud that was up to four feet deep to the RAP; outside, he found nine or ten severely wounded men on stretchers suffering from chest, abdominal, and spinal injuries, along with a soldier who had suffered a compound fracture of his femur that had not been splinted. The men were at risk of being hit by shellfire, freezing under the elements, and had no greatcoats or blankets to help them stay warm.[20]

Moving inside the regimental aid post, Major Strathy found twenty-five stretcher cases huddled together on the floor, rather than on stretchers. Strathy found Captain Holmes and asked what was happening. Holmes explained that no stretcher bearers had arrived for some time and that nothing could be done to help the men in the RAP. Then Major Strathy found the Medical Officer in charge, Captain James Gordon McKay, huddled under the dressing table with a ground sheet covering his head. He was in a very nervous state, exclaiming that nothing could be done to help anyone. Strathy was "disgusted" with the attitude of hopelessness and started yelling orders at Holmes to try to get the station up and running again. McKay grabbed some of his things and ran out of the post (Major Strathy would later learn that McKay was suffering from a severe case of nephritis that made him unable to treat the men in the post or cope with the situation).[21] Strathy was left to run the RAP.

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[19] LAC: DMD Records, RG 9 III B2, volume 3751, Personal Diary of Major Strathy, 1 November 1917.
[20] Do.
[21] Do.

The illness of Captain McKay created a difficult problem: Major Strathy had never worked at a regimental aid post at any point during the war and he was suddenly bewildered to find himself in charge. Strathy realized that he did not know the evacuation route, his patients had not been attended to, and all of them were hungry and cold because they had not eaten since before the attack that morning. He immediately pulled himself together and set to work the station the best he could. Strathy had Captain Holmes organize the inside of the station by getting the wounded on stretchers, stoking the fire, and making hot drinks for the men. They managed to feed and warm the patients with the help of a wounded man's "Tommy Cooker" on which they made hot toddies (rum, water, and sugar). Only half of the men felt they could eat anything, but every wounded soldier accepted a cigarette. In the meantime, Strathy attended the wounded outside the RAP. Some of the men had died, which angered Strathy since he could not determine whether they died from shell fire causing new wounds, or as a result of being left in the mud to suffer with barely any treatment. He dressed all of the wounds of those still living, which required the help of Captain Holmes since none of the men could sit up or walk. Nearly all of the wounded outside were in great pain so each man was given morphine as required. Captain Holmes brought out ground sheets on which to place the wounded and blankets to help warm them up. The two medical men were having a great deal of difficulty splinting the fractured femur, but fortunately they were able to stop a passing infantry officer for assistance.[22]

By 03:30 there was still no sign of the stretcher bearers and the regimental aid post had no orderlies to help keep it running. Since they had succeeded in making the

[22] Do.

wounded warm and more comfortable, Strathy left the men with Holmes and went to find assistance. He had travelled a mere twenty yards when he came across a soldier stuck in the mud of a shell hole, desperately trying to pull himself out. Strathy was able to help the man out and sent him to the RAP so that Holmes could look him over. Fifty feet further on, Strathy ran into a party of stretcher bearers who were searching for his aid post. The stretcher bearers had difficulty seeing anything in the mud and the road to the post had been destroyed by shelling, so Major Strathy led them back to his aid post to evacuate the wounded men. This was not an easy task in the mud and darkness. The bearers picked up the femur case first and set out. Unfortunately one of the bearers slipped in the mud, causing the squad to drop the wounded man into a shell hole, with painful consequences. Strathy witnessed the event and decided to call off the evacuation until daylight, to spare the other wounded men the same fate. By 07:00 more stretcher bearers had reached the RAP, and with daylight they managed to empty the RAP of all wounded by noon.[23]

As Strathy's experience demonstrates, the work at the regimental aid posts and dressing stations was similar to that experienced in previous battles. There was little reprieve from the stream of wounded and most of the doctors and staff kept in reserve had been sent forward to assist the medical units in managing the tremendous strain. The diary of No. 11 Canadian Field Ambulance described the scene:

> Like most dressing stations it was a medley of sounds – the groans of suffering, the wheeze of those hit in the lungs, the call for stretcher bearers and requests for something to drink. There was seldom any respite for the M.O.s. and dressers during a push of the magnitude of Passchendaele. The business of evacuating wounded in such cramped and dangerous spots taxed the body, mind and soul. Fatigue was forgotten and one was conscious only of a fierce burning

[23] Do.

> of the soles of one's feet as one handled the stretcher in the constant endeavour to make space for the stream of new arrivals.[24]

In contrast to the RAPs, the field ambulances and casualty clearing stations performed well and had no troubles with congestion during the battle. This was most likely due to the length of time it took the bearers to carry the wounded through the mud to these stations. This did not mean that these units did not endure their fair share of horrors, for each had a tremendous number of wounded to treat. Harvey Cushing described the wounded coming into a casualty clearing station during the Battle of Passchendaele "so caked in wet mud … that it's a task even to strip them and find out what they've got."[25]

All the casualties did not occur as a direct result of the battle. It was clear that the war was taking a toll on the Medical Officers and staff of the CAMC. Harvey Cushing noted this when he went to visit his friend from civilian life, now Lieutenant-Colonel John McCrae, shortly after the hostilities at Passchendaele ceased. While the casualties from disease were fewer in the First World War than in any previous war, Cushing noticed there were still a number of "strange bacilli and viruses, and mental pathogens too," adding that "few soldiers came out completely untouched or unbroken." McCrae was no different. Cushing found his friend had transformed from a "sunny companionable colleague into a brooding, asthmatic loner."[26] Soon after Cushing's visit McCrae would die as a result of atypical pneumonia and meningitis. It was a bitter loss for the CAMC; unfortunately, McCrae was not the only Medical Officer or member of the staff to die throughout the war.

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[24] Canada, *Diary of the Eleventh,* 86.
[25] Michael Bliss, *Harvey Cushing,* 322.
[26] Michael Bliss, *Harvey Cushing: A Life In Surgery* (Toronto: University of Toronto Press, 2005), 335.

The efforts of the medical corps did not go unrecognized. Privates John Ritchie and Harold Riley, both twenty years of age when they served at Passchendaele, were respectively a window dresser and a student in civil life. Both of them were originally from Montreal but had relocated to Calgary, where they joined the CAMC. They, along with Fred Smithers, a twenty-three-year-old printer who was originally from England but had emigrated to Calgary, were awarded the Military Medal for their work at Passchendaele. The privates were found to have performed exceptionally well throughout the battle, even being "blown over twice" by exploding shells while trying to evacuate a stretcher patient. Miraculously, they all escaped injury, put the patient back on the stretcher, and carried him to the relay post before returning to the RAP to collect more of the wounded.[27]

The after-action reports regarding the medical service during the Battle of Passchedaele Ridge were glowing in their praise. A note regarding the work of the stretcher bearers described their contribution:

> They were not the men whose gallantry expressed itself in the storming of PASSCHENDAELE RIDGE, and in the great achievement of chosen objectives, but following these men - the infantry - in the trail of their doings, sharing their dangers and possessing their courage, they again proved themselves valiant soldiers and worthy of the humane cause they represent.[28]

Harvey Cushing served with No. 4 Canadian Casualty Clearing Station during the Passchendaele battle. He was so impressed with the work in the Canadian station that he hoped he would be able to remain in the unit after the battle had ended. Cushing

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[27] LAC: DMD Records, War diary, No. 8 Canadian Field Ambulance, November 1917, Appendix 1, sheet 5.

[28] LAC: DMD Records, War diary, No. 8 Canadian Field Ambulance, November 1917, Appendix 1, sheet 9.

provided some insight into how the various medical corps of the Empire were perceived when he wrote to his wife that he had "from the beginning of the war ... admired the Canadians." This was because they were "all citizen soldiers ... That's why they have been so good from the very start." He went on to state, "That's the main reason the British don't like them – the best organized, the most dependable, the best fighting unit on this Western Front."[29] It is not clear whether this was only Cushing's personal opinion or whether it was held by many people, since issues such as this were rarely discussed in the front-line units.

The accolades continued when Major-General Louis James Lipsett, C.M.G., commanding the Third Canadian Division, visited No. 8 Canadian Field Ambulance. The General complimented all the officers and men on what they had accomplished in the battle. After spending an afternoon touring the unit and the area it patrolled, the general addressed all personnel: "The men behind the lines had to be possessed of as much courage and endurance as the men who went over the top ... it was a point of honour that so long as a wounded man was waiting he was never left behind."[30] The Medical Director of the First Army also visited No. 8 Field Ambulance to inspect the men. Afterwards, he gave a speech that brought

> ... a message from the Army Commander to congratulate them on their excellent work during the past 14 days. The wounded had been cleared in record time, and they had never arrived at the Casualty Clearing Stations in better condition. The handling of casualties reflected great credit on the Medical Services of the Third Division, and he had no doubt that if called upon the Ambulance would again acquit itself equally well.[31]

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[29] Bliss, *Harvey Cushing,* 343.
[30] LAC: DMD Records, War diary, No. 8 Canadian Field Ambulance, November 1917, Appendix 1, sheet 9.
[31] Do.

While the medical units had been lauded for every battle in which they participated, the praise for the work at Passchendaele was especially welcome. The work had been so difficult and harrowing that every diary from the medical staff that wrote about Passchendaele referred to it as the worst and toughest battle of the war that they had seen.

The medical service could be proud of its achievements. The system had stood up without congestion and the patients had flowed through the wards in a timely fashion. While the stretcher bearers did suffer from fatigue, it was not a result of anything the medical service did; rather, exhaustion occurred due to the deep mud that the men had to wade through and despite the system of rotation and hand trucks that were designed to make the bearers' work easier. The constant striving to create an effective and efficient Medical Corps had come to fruition. There were no criticisms of the Canadian Army Medical Corps during this battle despite the strain and difficulties experienced. As the report stated, "We feel happy with the efforts made and the results achieved ... we are confident that the Medical Services did not fail in its not minor part of the work that fell to them in these, the first Canadian attacks on PASSCHENDAELE RIDGE."[32]

Unlike the Second Battle of Ypres, which spawned research into the treatment of gas casualties, the Third Battle of Ypres necessitated no radical new changes in treatment. Rather, doctors and scientists continued to work in a more general way throughout the year in the front lines, rear-area hospitals, in England, and in Canada towards better solutions and systems for medical problems to save more soldiers' lives and find treatments that would give the wounded the best chance to return to normalcy.

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[32] Ibid, sheet 9-10.

To this end, the stretcher bearers found a new way to carry stretchers on duckboards, the inoculation orders changed, the casualty clearing stations were completely reorganized, journal articles were published in civil medical journals, more inventions for ambulances and shock treatment were submitted, and new ideas for surgical treatments, such as the use of x-rays to locate foreign bodies and advances in chest surgery, emerged in 1917. The year would see so many new medical ideas that the Canadian Army Medical Corps would have to undertake a large-scale effort to re-educate its doctors and orderlies before the campaigns of the following spring. The efforts made to advance medicine and to assist the wounded demonstrate enormous dedication to the patients and a willingness to work constantly towards a better medical system.

An interesting systemic change to the way stretcher bearers carried the wounded in situations like that experienced at Passchendaele was brought about by the Canadians in the winter of 1917. Normally, when there were four bearers carrying a stretcher, each one would place a stretcher handle on his inner shoulder, leaving open the area between the handles. As a result, the bearers were farther apart, making it easier to slip off the slender duckboards. The distance between the bearers holding the stretcher had to be made smaller, but obviously the stretchers themselves could not be made smaller. A simple solution was found during the fighting at Passchendaele that could still use four men, but was easier when two men could handle carry alone. Rather than place the stretcher handle on the inner shoulder, the two bearers positioned themselves between the handles and placed them on their shoulders. This simple innovation meant that the

bearers would require less space while walking and be better able to stay on the duckboards.[33]

Another simple yet significant systemic change made demonstrated a continuing desire to improve preventative medicine. Routine order 2966 of November 1917 made the refusal of vaccinations a punishable military offence. All members of the CEF would now have to allow themselves to be vaccinated against smallpox and inoculated against typhoid fever, dysentery, cholera, "and other such infectious diseases."[34] In addition, all soldiers would have to submit to blood examinations when required to do so by a superior authority. Any soldier who refused to comply would be liable to prosecution under the Army Act. Previously soldiers who refused vaccination were discharged from the military or allowed to work in rear areas.[35] The change in military discipline came as a result of the proven success of vaccination and inoculation: the First World War was the first war in which disease was not the primary cause of casualties.

The most significant change to any unit in the war was completed in 1917. The casualty clearing station had grown in its role from a clearing hospital with the primary purpose of sorting and evacuating the wounded, to the surgical epicentre of the war. Limited efforts had been made throughout the war to create an effective surgical unit by sending surgical teams from base hospitals to the CCSs before major attacks, by creating chest wards, and through small increases in the number of Medical Officers. No. 1 Canadian Casualty Clearing Station, with the agreement of the ADMS, thought that 1917 was the time to perfect this unit and provide it with the capabilities to function as a true

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[33] Bliss, *Harvey Cushing,* 339.
[34] LAC: DMD Records, RG 9 III A1, volume 92, file 10-12-39, Routine Order 2966, Vaccination and Inoculation, November 1917.
[35] Ibid.

surgical unit. To that end, in November 1917 the ideal casualty clearing station was designed and built by the Canadians at Pernes. Several officers from other Canadian units were sent to the new CCS to study the site so that they could model their own clearing stations after the one at Pernes.[36]

The casualty clearing stations had grown to ten Medical Officers and seven Nursing Sisters on permanent staff, with an additional seven officers and thirteen Nursing Sisters added during major actions in 1916. By July 1917 the permanent staff grew to twenty-two Medical Officers, eight of whom were surgeons, and twenty-nine Nursing Sisters. At the same time, the treatment capacity of the hospital grew from 200 to 900 patients.[37] While the CCSs were able to move and open quickly, like all front-line medical units, they were rarely called on to do so. Instead, it was found to be more efficient to reinforce the units closest to the front in busy times. Buildings were often adapted to the needs of the unit, but the most effective layout was achieved under canvas tents and huts made of corrugated iron and wood. It is important to grasp the size and scope of the casualty clearing stations since their ability to move and open quickly creates a misleading picture. The receiving and dressing tents were constructed from seven large hospital tents that were laced together to form one large room. The dressing area had two wings, each constructed from two large hospital tents laced together to form one room. The wings housed the preparation and light operative tents. The operating theatre was a twenty-seven-by sixty-foot hut with a resuscitation tent nearby that was also built out of two large hospital tents. In addition, there was a sterilization hut, an x-ray hut, a splint hut, a dispensing hut, a dental hut, an officers' ward made of three large hospital tents,

[36] LAC: DMD Records, RG 9 III B2, volume 3602, file "24-3-2," Medical History of the War.
[37] Do.

seven wards each constructed from eight large hospital tents for the other ranks, a mortuary made from two large hospital tents, and an isolation area that consisted of one large hospital tent and six bell tents. These structures merely comprised the hospital section. There were also sections for the quartermaster, nursing sisters, officers, sergeants, other ranks, the sanitation section, and miscellaneous areas for the orderly room hut, the water piping system, the electric system, the cesspools, and the drainage system.[38]

The greater size and scope of the casualty clearing station meant that many new systems had to be adopted to ensure that it functioned effectively, although in some cases the procedures operated the same way they always had. The Motor Ambulance Convoy vehicles still arrived at the receiving tents to unload the wounded. Once unloaded, the ambulance proceeded to the stretcher and blanket dump to obtain stretchers, blankets, pillows, splints, and hot water bottles, to replace those left behind with the incoming patients. This scheme of replacement was used throughout the British and Canadian lines to ensure that units would not run out of equipment. The stretcher bearers assigned to the CCS carried the stretchers from the ambulances to the receiving tents while a Medical Officer stationed outside looked for cases of shock and severe wounds to ensure that they went to the proper wards. The receiving room kept records of all the wounded who came through the unit; separate admission and discharge books were kept for the various nationalities and prisoners of war that the unit treated. Upon admission, the soldiers turned over their kit and rifles, which were stored in a special room in the CCS; they were returned to the soldier when he returned to his unit. If he was unable to rejoin his unit,

[38] LAC: Thomas Brenton Smith Papers, MG 30 E31, Clearing: The Tale of the First Canadian Casualty Clearing Station, British Expeditionary Force, 1914-1918.

the effects were put in a draw-string bag, supplied by volunteer organizations, and placed on his stretcher; this was also the case if the wounded man was not conscious. If the soldier died at the CCS, his personal belongings were inventoried and sent to a rear-area depot to be dealt with.[39]

The wounded were moved through the receiving room to the dressing room where they were examined and dressed. Any soldier who had not received anti-tetanus serum was given it here. Those requiring dressings or bandages were treated and all the wounded were then sent to the ward designated for their ailment to await evacuation or receive further treatment. All the dressings were supervised by a Medical Officer, but a large number of them were performed by dressing-room attendants with special training in dressing wounds. As Thomas Brenton Smith wrote, "The dressing room attendants became so proficient that the majority of casualties could be looked after by them with just a prescribing word or two from the officer."[40]

Soldiers who required surgery were sent to the preparation ward, where attendants readied a patient for surgery by removing his clothes and washing him. He was made as comfortable as possible, and waited for a surgical team. Some of the surgical cases could not proceed to the operating room as a result of shock; they were instead sent to the resuscitation ward where blood transfusions, rest, and warmth were administered in the hope that they would become stable enough to undergo the required surgery. A large percentage of these cases would die before or after the operation, though hope was always held out that they would recover.[41]

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[39] Do.
[40] Do.
[41] Do.

The casualty clearing stations continued to be reinforced during heavy actions by surgical teams from quiet areas or base hospitals. In addition to the teams sent from the bases, each CCS had to have two surgical teams available at all times. Each team consisted of a surgeon, an anaesthetist, a nursing sister, two operating attendants, a batman, three stretcher bearers, and four nursing orderlies. The teams were supposed to work a rotation of sixteen hours on and eight off while the casualties were streaming through the hospital, although this was not always possible. The schedule was intended to allow the teams the opportunity to rest and recover, but the surgical wards were so busy during battles that a surgeon often worked two tables at once to save time. As soon as the surgery on one table was at the point where the orderlies could complete the stitching and bandaging, the surgeon turned to the patient on the other table. The orderlies would finish dressing the other man and send him to the appropriate ward to recover. They would then clean the table and prepare the next wounded soldier while the surgeon completed the other operation.[42]

The recovery period for most major operations was five to fifteen days, after which the men were evacuated to base or returned to duty, whichever the Medical Officer deemed appropriate. Patients recovering from minor surgery were usually held at the casualty clearing stations where they performed light duties until they were fit to return to their units. The movement of patients was managed with a large blackboard that kept track of the numbers and types of wounded; it was constantly updated by the non-commissioned officers. The information on the blackboard was used to keep the Medical

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Directors of the army advised of the station's situation, so they could use the information to arrange for the ambulance trains necessary to clear the CCS.[43]

Figure 19 – An operating room in No. 3 Canadian Casualty Clearing Station, July 1916. Demonstrates the growth of the operating theatres and the need to bring surgical teams from the rear. The surgical rooms in 1917 were similar to that shown in this picture. PA000104

The routines of the casualty clearing stations could not be too rigid since the system could break down under stress, as No. 1 Canadian Casualty Clearing Station had at Vimy Ridge. To prevent this, the Medical Corps created "safety valves" that were to be used during times of heavy strain. Before and during any action, the light cases were evacuated instead of remaining in the hospital until they could return to the front. During a battle it was decided that only patients who absolutely required it would be bathed and disinfected at the CCSs; the others would have to wait until they reached a stationary or

[43] Do.

general hospital. Many of the light wounds were not re-dressed at the CCS; they, too, would have to wait until they reached the rear-area hospitals. In addition, the hours worked by the medical staff would be increased to twenty-four or thirty-six, depending on the need created by the military situation.[44]

The creation of the ideal CCS streamlined treatments by creating an efficient hospital system that allowed the CCS to provide kinds of treatment that were not envisioned at the war's beginning. In 1914, no surgery was performed at the CCS and very little medicine was practiced. This changed after the fighting in 1915 demonstrated a need for faster surgical intervention to help save the wounded. By 1916 surgery was being performed at the CCS, but it was not until the ideal station was designed that the unit became a well-oiled machine. The ideal station allowed for a wide variety of treatments, such as eye-glass repair and dentistry that was not previously part of the unit. In addition, the wards were now specialized meaning that patients with similar wounds were housed together. Finally, the larger surgical room allowed more surgical teams to move forward before a big push since they had room to work.

The transformation of the CCS represented the most important systemic change of 1917, but other contributions demonstrating a spirit of innovation in the medical corps were made to military medicine that year as well. One of the most interesting ideas presented to the Canadian Army Medical Corps in 1917 came from one of its own members, Sergeant Jesse Dale Nixon, a thirty-six-year-old carpenter originally from England who moved to Victoria where he joined the CAMC. Sergeant Nixon suggested changing the interior of the motor ambulances so that they could accommodate six

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[44] Do.

stretchers instead of the four they normally carried. The suggestion was passed on by his Commanding Officer on 6 October 1917, although the unit had already been using the design since late 1916. After almost a year's use, No. 1 Canadian Field Ambulance found "good results and universal approval of those serving in the field that used it or came into contact with it," so the suggestion was passed on to the CAMC.[45] The ambulance was so well received that an additional four motor ambulances of the unit were converted and used at Vimy. Nixon had even changed the way the stretchers were attached to the ambulance walls to make it easier to get a wounded man in and out of the truck by installing rails that allowed the stretchers to slide in and out. The new system had three stretcher racks on the top and three on the bottom in the back of the ambulance. Nixon built rotating seats in the front of the ambulance so that the orderly and driver could turn around and check on the patients without leaving their seats. The design addressed several other difficulties that motor ambulances had encountered throughout the war. The forward area was difficult to traverse since the roads were usually churned up from shell fire. The ambulances also had to drive while the shells fell, producing concussions that shook and jolted them. This demanded a perfectly balanced load in the back of the ambulance that was difficult to achieve. One stretcher case took up the whole wall of an ambulance, forcing the sitting cases to use the bench on the other side of the truck. This meant an imbalance of four or five men sitting on one side to one stretcher case on the other side of the ambulance. The new design allowed a variety of options to balance the load, including placing one stretcher in the top middle rack, which allowed sitting cases to be placed on both sides of the ambulance. The final benefit was improved

[45] LAC: Department of Militia and Defence [DMD] Records, RG 9 III, volume 3686, file 30-1-1, containing all the details of Jessie Nixon's ambulance ideas.

efficiency clearing the wounded, because the ambulance's stretcher capacity was increased by fifty per cent.[46]

While Nixon's design addressed needs of the medical service, it was not approved for front-line use. The sole reason was that the new design did not permit an orderly to ride in the back of the ambulance when it held six stretchers. Stretcher cases were the most severely wounded and had the greatest chance of complications arising while travelling in the jostling ambulance. The authorities wanted an orderly watching these men while they were in transport to ensure that they could intervene as soon as any emergency occurred. Still, the design was not completely rejected as it was thought to be valuable in England where the roads were in good repair and the wounded were not tossed about in their stretchers as they rode in the ambulances. The distances that the ambulances travelled in England were generally much shorter than in France and the wounded had already been tended, which usually meant that they had less severe injuries to worry about; as a result, the orderly did not have to sit in the back with the patients in case of emergency. Still, Nixon was upset when his modifications were rejected for front-line use. He stated that his unit was not going to change its ambulances back to the old style and pledged to continue altering the ambulances of his unit to his design.[47] Unfortunately, there are no records to indicate whether No. 1 Field Ambulance continued to use Nixon's design or not.

By 1917 it was becoming clear that some of the ideas that had been implemented were tremendously successful in saving soldiers lives. For example, No. 1 Canadian Casualty Clearing Station was compiling statistics on the success of rechauffement in the

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[47] Do.

treatment of shock. Captain Charles Sears McKee, a surgeon from Hamilton, Ontario, stated that the station was now able to save approximately forty per cent of the men who, the year before, would have been considered hopeless cases and would have been sent to the moribund ward. McKee had studied a soldier's urine, pulse, and other factors to understand his health level; this allowed for an educated decision as to when the soldier was well enough to undergo surgery. While the clearing stations still used hot water bottles and blankets to warm the men, McKee preferred the Canadian rechauffement table since it performed well and saved the orderlies and nurses a great deal of work.[48]

The Canadian rechauffement table was invented by Captain Leopold Grier, a thirty-seven-year-old surgeon from Regina, Saskatchewan, and improved with the help of members of No. 3 Canadian Field Ambulance throughout 1917. The table was first assembled and used at Jenks Siding in December 1917 with the primary aim of treating shock. It consisted of two ordinary stretcher trestles placed five feet apart and joined by cross pieces. A six-inch piece of stove piping was perforated along the top with holes or slits and was secured by a blanket attached to the cross pieces. The pipe had an elbow joint that allowed the open end to be placed over a primus stove. Water was boiled on the stove, sending steam through the pipe that issued from the perforations on top of the pipe, blowing on the patient and warming him. The pipe could be raised or lowered depending on the amount of heat the patient required. The design created a practically air-tight chamber that allowed for even distribution of heat, and was so effective that the Medical Officers of No. 3 were asked to give many lectures on the appliance to various units and at medical training schools. The Canadian rechauffement table was quickly

[48] LAC: DMD Records, RG 9 III B2, volume 3752, file 3-3-2-1, George Adami personal diary, Interview with Captain McKee, No. 1 CCS, 12 December 1917.

adopted by all the dressing stations in the Canadian Army Medical Corps, and spread throughout the majority of the dressing stations of the Allies.[49]

Medical research had also improved the ability of the Medical Officers to use x-rays to locate foreign objects in wounded soldier's bodies. In order to lessen surgical trauma, the surgeon had to know the precise location of the object embedded in the soldier. However, Canadian radiographic workers devising a way to find foreign bodies of known dimensions (such as rifle bullets or shrapnel balls) made another discovery. They found that the size of the object increased as the x-ray plate was moved away from the soldier's body. Captain Alexander Howard Pirie, a Toronto physician who was originally from Scotland, placed the plate so that it touched the wounded man's skin, allowing the object to be seen in its actual size, which provided a strong indication of the depth of the object in the tissue.[50] Building on Pirie's methods, the Mackenzie-Davidson method of using triangulation to find the depth of the foreign body in the tissue was developed. It was much more precise than Pirie's method, further limiting the invasiveness of surgical procedures. The method was based on the discovery that, while all bullets were magnetic, German bullets were also electromagnetic, while British and French bullets were not. To find the location of the German bullets a large electromagnet was run across the skin and made a steamboat-like whistle that indicated the point of the object that was closest to the surface. The skin was marked accordingly and the surgeon could proceed.[51]

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[49] LAC: DMD Records, War Diary, No. 3 Canadian Field Ambulance, 17 January 1918. For description of the table see LAC: DMD Records, RG 9 III B2, volume 3753, file 6-3-4, Rechauffement Table No. 3 FLD AMB, n.d.

[50] LAC: John Taylor Fotheringham Papers, MG 30 E 53, volume 5, file 22. Clinical Progress in Medicine and Surgery.

[51] Do.

The treatment of chest wounds saw a great deal of progress in 1917 as well. As previously noted, surgery on chest wounds was discouraged by the medical authorities in favour of conservative treatment. At various points in the war, it had been thought that the chest should be stitched up before evacuation, that it should be bandaged and left alone, and that the wound should be tightly packed and cleansed at intervals to help it heal. This last practice was instituted in 1916 but did not become standard until after the Battle of Vimy Ridge. Major Strathy had questioned the treatment of chest wounds in January 1917. His work with chest wounds at a casualty clearing station had taught him that all fatal chest wounds died from haemorrhage within forty-eight hours of admission to the CCS; practically all chest wounds that haemorrhaged externally died since the bleeding was difficult to control. Strathy posited, "If the wounds were sutured before being sent down by Field Ambulances there would be fewer deaths."[52] He spoke to Colonel Watson, an army consultant, who agreed with Strathy and thought that all field ambulances should be instructed to sew up chest wounds before evacuation.[53] These instructions were not immediately sent out or adopted, as a diary entry for No. 2 Canadian Casualty Clearing Station of 10 May 1917 makes clear: "The chest wounds as a rule reach us in bad condition from haemorrhage. [The wounded soldier] usually gets immediate relief when the wounds are stitched up, preventing an air current moving in and out, and stopping haemorrhage."[54] Obviously chest wounds were still not being sewn up at the field ambulances after the Vimy battle, despite the recommendation having been presented in January.

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[52] LAC: DMD Records, Personal Diary of Major Strathy, January 1917.
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[54] LAC: DMD Records, War Diary, No. 2 Canadian Casualty Clearing Station, 10 May 1917.

While Strathy's recommendation to sew up chest wounds was not acted upon promptly, a method was developed in 1917 that allowed the chest cavity to be closed immediately at the field ambulance. The patient was given a general anaesthetic of nitrous oxide and oxygen, though if he was in particularly poor condition novocaine was injected along the line of incision and the general anaesthetic was given after the rib was exposed (nitrous oxide was the anaesthetic of choice since the patient's condition varied less than when any other anaesthetic was employed). A four-inch section of the rib cage was excised, making room for the surgeon's hand to enter the chest cavity. All of the blood and any clots were removed and the chest was washed out with a eusol solution, leaving a small amount of eusol in the cavity, which was then completely closed. After forty-eight hours the chest was aspirated to get rid of any air that had gathered in the cavity and to allow the surgeon to get some of the chest fluid for tests. If there was no improvement after three days or if the patient was getting worse, the incision was reopened and drainage tubes were inserted. Once drainage was being used, the chest cavity had to be washed every three to four days with eusol. To accomplish this the patient was rolled onto his side (the side that was least wounded) and the solution was slowly poured into the drainage tube; then the patient was returned to his back and the eusol was allowed to run out the drainage tube. This method became universally used at field ambulances and casualty clearing stations due to its positive results. Stitching up the chest created negative pressure inside the chest cavity that produced favourable conditions for a quick return of normal lung function. This method of treatment also

reduced the incidence of secondary infection, which had occurred in a great number of the cases where the wound was not sewn closed.[55]

The medical advancements were disseminated in a variety of ways such as visiting units, circular memos, and through other military systems. But they were also shared through medical systems, especially the major medical journals. As in other years, they wrote numerous articles on medicine in war for various journals, both military and civil, during slow periods in the trenches, while serving in the rear, and while seconded to libraries to catch up on medical reading. The Canadian Army Medical Corps had its own journal, the *CAMC Bulletin* that was circulated to keep doctors informed of new medical advances and ideas from doctors in theatre, in England, and in Canada that they could implement at their stations. Many of the articles published in the *Bulletin* were also published in British or Canadian medical journals. The topics covered a wide range of medical conditions. When military doctors were seconded for research and learning or were transferred to England for any time, they often caught up on their medical reading at hospital and university libraries through the *British Medical Journal*, the *Canadian Medical Association Journal,* and the *Journal of the Royal Army Medical Corps.* This was part of the education program that the CAMC encouraged. Many of the articles the MOs would read had been written by Medical Officers they knew or had served with.

The number of journal articles and the variety of topics was immense. For example, Captain Alan Bart Jackson, a twenty-three-year-old physician from Simcoe, Ontario, published an article on the "Importance of the Early Diagnosis of Syphilis";

[55] LAC: DMD Records, RG 9 III B2, volume 3752, file 3-2-5, Major J.W. Hutchinson, Treatment of Chest Surgery, n.d.

Percy Bell, after his promotion to Lieutenant-Colonel, wrote on "Eye Injuries from Broken Eye-glasses"; Captain Thomas Willoughby Walker, a forty-year-old physician originally from Bethany, Ontario, who had relocated to Saskatoon, Saskatchewan, co-wrote and published an article with Lieutenant-Colonel John Meakus on the "After Effects of Wounds and Their Treatment." Other articles such as "Administration Notes: Organization of Canadian Military Laboratories" written by Major Fred Bowman, a thirty-four-year-old physician from Dundas, Ontario, discussed problems beyond wound treatment. Military doctors wrote articles on every ailment and aspect of organization from shell shock to food services in the hospitals.[56] Front-line doctors were able to work on their articles while on leave, during periods out of the line, and in periods of calm at the front. The publication of the articles in a wide variety of fora as well as being seconded for learning allowed the Medical Officers to remain current with civil and military medicine by providing access to a wealth of information to help them treat the wounded.

In 1917, the Canadian Army Medical Corps fought through several difficult campaigns, re-outfitted the casualty clearing station to allow it to function according to its new role, and saw a host of medical advances and discoveries that would have to be implemented before next year's campaigns. The experiences at Vimy and Passchendaele, while difficult in a variety of ways, fostered a great deal of pride, evident in the after-action reports of the CAMC, in the ability of the service to respond to the intense pressures of battle. Vimy gave the medical service confidence in its ability to adapt and

[56] LAC: DMD Records, RG 9 III B2, volume 3602, file 24-3-1, containing a number of articles to be published by members of the CAMC.

change its systems to effect positive change, while Passchendaele reminded the medical staffs that the weather could interfere with their plans. With each battle there would have to be a new plan to take account of the terrain, weather, and military situation in the area. The experiences to date demonstrated that the CAMC was flexible and adaptable both in the systems it employed and in incorporating medical knowledge, valuable assets in the new style of open warfare of 1918 that would bring many more wounded through the medical units.

Chapter Eight

The Transition to Open Warfare: The Canadian Army Medical Corps in 1918

The Germans opened the 1918 campaign with a massive spring offensive in March that saw them break the Allied lines before being pushed back into the traditional stalemate conditions. From that time until the armistice was reached on 11 November, the Canadians would fight several major battles,[1] including Amiens from 8-11 August and the Canal Du Nord and Cambrai from 22 August to 11 October. While each of these battles brought to the fore a variety of issues specific to the areas where they were fought, the main challenge for the medical service was adapting to the new style of open warfare after three years of fighting static warfare. Throughout the year, the Canadian Army Medical Corps continued to evaluate and research the conditions that its units faced, and was able to overcome many of the difficulties brought about by the new warfare. Most of these were found in the main dressing stations of the field ambulances. This was a result of the constant forward movement that was required to keep up with the fighting men and the lack of experience that this unit in particular had in this regard. Open warfare also created problems between units and organizational structure, such as in the relationship between the CAMC and the transport units, that would have to be dealt with in order to keep the casualty evacuation system functioning. Familiar challenges from previous battles remained, such as traffic congestion, but new solutions were put into place that finally helped move the casualties along in a timely fashion. None of these solutions

[1] For more information on the battles of 1918, see N.M. Christie, *The Canadians at Cambrai and the Canal du Nord, September-October, 1918: A Social History and Battlefield Tour* (Nepean, Ontario: CEF Books, 1997); J.F.B. Livesay, *Canada's Hundred Days: With the Canadian Corps from Amiens to Mons, Aug.8-Nov.11, 1918* (Toronto: T. Allen, 1919); James McWilliams and R. James Steel, *Amiens: Dawn of Victory* (Toronto: Dundurn Press, 2000); John Terraine, *To Win a War: 1918, The Year of Victory* (London: Sidgwick and Jackson, 1978).

emerged fully formed; all of them evolved throughout the year out of the same combination of institutional and experiential learning that had characterized the CAMC's war. In addition to adjusting to a new style of warfare, the CAMC continued to find more and better methods of medical and surgical treatment. This was especially true in the areas of treating patients who had been gassed and in performing blood transfusions. Compounding all of the issues of 1918 was the developing flu pandemic and the question of what to do with civilians whom the Canadians were liberating.

Before any of the battles of 1918 occurred, a rigorous education and training program was instituted for all members of the CAMC through the winter of 1917-1918. Much of the training used lectures to teach the Medical Officers, orderlies, and stretcher bearers the new techniques of medicine and surgery that had been developed in response to past experience. The topics were vast in scope, with war diaries reporting lectures on fever conditions, anti-gas appliances, rechauffement, surgery of the war, general anatomy, bones, blood vessels, types of haemorrhage, discipline, fractures, injuries of the chest, blood transfusions, the heart, nephritis, purulent bronchitis, venereal diseases, wound shock, and self-inflicted wounds, to name but a few. In many cases, CAMC doctors toured other army areas to lecture on topics, such as the Canadian rechauffement table, in which they were experts; they also lectured to the orderlies or bearers in their sections. All non-commissioned officers and medical officers attended a six-day gas course during the winter.[2]

[2] LAC: DMD Records, War Diary, No. 1 Canadian Field Ambulance, 3 and 5 January 1918; LAC: DMD Records, War Diary, No, 3 Canadian Field Ambulance, 26 December 1917, 6,7,17 and 26 January 1918, 2 and 9 February 1918.

In addition to lectures and medical training, there were many field exercises that were meant to simulate open warfare. Each field ambulance took part in the tactical exercises of its division wherein Medical Officers were called on to take complete charge of the medical arrangements for one force. Problems would inevitably occur during the manoeuvres, offering the units an opportunity to find solutions. The exercises gave the troops much needed experience with open warfare, even if it was not in actual battle situations.[3] This winter training would form the basis of all medical and surgical treatment during the military operations of 1918.

Protection from shelling was high on the agenda for medical training during the winter as well, because of the number of medical units lost to enemy artillery throughout the war. In order to prevent losing more units to shells, medical personnel were taught to build their facilities with certain precautions, the most important of which was to ensure that the lighting was effectively screened. Efforts were made towards this end throughout the war, but they were not always successful. For example, it was ordered that during all raids the lights in the tents and huts would be shut off. Essentially, the best way to hide from bombers and shells was to be invisible by using darkness as a shield; unfortunately, this meant that patients could not be treated during raids since there was no light. To provide greater blast protection, the huts would now be built with walls three feet high in front of them, while the space between the huts was to be filled with earth. The huts

[3] Arthur Snell, *The C.A.M.C.: With the Canadian Corps during the Last Hundred Days of the Great War* (Ottawa: Acland, 1924), 14-15. This is the most detailed work on the CAMC in 1918. Snell was the Assistant Director Medical Services for the Third Division, and kept the unit war diary as part of his duties. This book is based in whole on that war diary, but provides a greater amount of detail than Snell was able to write in the diary under the stress of war.

where the nursing sisters resided were sandbagged as well.[4] The final aspect of protection came on 10 May 1918 when all members of the CAMC in the front lines, from the regimental aid posts to the casualty clearing stations, were issued with steel helmets.[5]

Aside from protecting them from shelling, many units had to be constructed or repaired. While making these preparations for the coming year, a battle erupted between the CAMC and the Royal Army Medical Corps over the ideal casualty clearing station. The CAMC had revealed the blue-print for its ideal station at the end of 1917 at Pernes, but the British had disregarded the plan and created their own ideal station. Then the British provided the Canadians enough supplies to build the British-type casualty clearing station, but not enough to build the Canadian-type station. The chief complaint that the Canadians had about the British blueprint was that it simply did not have enough rooms. The British plan had no dispensary, no dental clinic, no resuscitation ward, and no allowance for separate operating theatres for chest and abdominal wounds. In addition, the Canadian CCSs had to accommodate fifteen nursing sisters, whereas the British only allowed seven nursing sisters to work in its CCSs. Neither medical service was willing to budge from its position so rather than continue to battle, Canadian engineers somehow found sufficient equipment to build the Canadian version. Each country's medical corps was, therefore, able to use its own blueprint.[6]

A continuing commitment to improving sanitation brought changes to the way the sanitary sections would function in 1918. For most of the First World War, the sanitary sections were attached to a division and were responsible for the sanitary

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[4] Library and Archives of Canada [LAC]: Department of Militia and Defence [DMD] Records, RG 9 III, volume 4557, file No. 1 CND CCS, folder 4, letter from Major Bennett to DDMS, 25 March 1918, Protection Against Bombing.
[5] Ibid, Letter from OC 1st CCS to DMS 1st Army, 10 May 1918.
[6] Ibid, Letter from OC 1st CCS to DDMS, 16 February 1918.

inspection and arrangements of the area occupied by that division. This meant that the sanitary units constantly moved from front to front with their division during trench warfare and always had to learn the terrain of the new area when making sanitary arrangements. An example of the problems this created involved the supply of water. There was always fear that the wells in the German-occupied areas had been poisoned, either by arsenic or by gas used in battle. Soldiers had stern and repeated warnings not to drink from any water source that had not been tested and approved by the ambulances. At Vimy village, for example, four wells found to be contaminated were marked "Poisonous, Unfit for drinking."[7] Samples were immediately sent by the sanitary section in the area to the rear for further testing before efforts were made to clean the water or, with the help of the engineers, build new wells.[8] All of the water that the soldiers drank in the front lines was treated with chlorine, which made it unpopular with the men. "Anyone who has had to drink water made sanitary by chlorine will not forget its flavour in a hurry", one stretcher bearer commented, "and it was only a terrible thirst that made us drink it."[9] In practice, each time a sanitary section moved, it had to repeat this water-testing process.

In 1918 it was decided that sanitary sections would have permanent areas instead of moving with a division. This would save time since the units would not constantly have to learn how to run new areas. The sanitary units were placed under the control of the Canadian Corps rather than a specific division to achieve this end. Under the system of trench warfare this change made a great deal of sense, but in the conditions of open

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[7] LAC: DMD Records, War Diary, No. 8 Canadian Field Ambulance, April 1917, Appendix 1, sheet 21.
[8] Do.
[9] R.H. Haigh and P.W. Turner (eds.), *The Long Carry: The Journal of Stretcher Bearer Frank Dunham, 1916-18* (Toronto: Pergamon Press, 1970), 26.

warfare the new system was not effective. In open warfare, the soldiers moved forward quickly and needed the sanitation work to begin immediately in their new areas. But because the sanitary sections were no longer attached to the divisions and could not move with the soldiers, a division had to wait until a sanitation unit was despatched to its new area, which took time due to transport and the availability of units. The divisions complained loudly and demanded a return to the old system, but Canadian Corps headquarters objected to losing control over its own units, despite only having the sanitary units under its control for a couple of months. There was no solution as the divisions and the Canadian Corps fought over the issue for the duration of the war.[10]

The battle over sanitary arrangements was important because of the filthy conditions of the German trenches that the Canadians captured. Manure, kitchen refuse, dead men, and dead horses lay all over the trenches, and the German latrine pits were open and infested with flies. Illness and disease were primary concerns, and Canadian soldiers and medical units did not want to serve in these areas until a sanitary section had cleaned them up. The military authorities decided that all the troops would have to help clean captured German positions. The men were to burn all manure and kitchen waste in incinerators, and bury all the corpses, human and animal (before burial, the horses' stomachs had to be opened to prevent post-mortem bloating). The Canadians were to fill the latrine pits with dirt and build their own latrines to proper sanitary standards. Flies would be destroyed by spraying a cresol solution or vaporizing a cresol solution by boiling it on a primus stove in heavily fly-populated areas. Unfortunately, these orders

[10] Snell, *C.A.M.C.*, 118-119.

were not promulgated until November 1918 when the war was all but over.[11] Still, the new system of having all the men work on sanitation until the sanitary sections could arrive was important since many Canadian soldiers would continue to live in these trench areas into 1919.

All of the institutional learning, the training, teaching, lectures, manoeuvres, and any preparations that could be done behind the lines were completed in time for the Canadians to take over their new front-line area. The major troop movements, including those of the medical corps, were completed under cover of darkness, using routes meant to confuse the Germans and prevent them from gaining any clear knowledge of where the Canadians would attack. The medical units were expected to adhere to the marching schedules, but also had to collect the sick and wounded along the way. This created some difficulty. In order to overcome this challenge and stay on schedule, men who normally had ailments so slight that they would stay with a field ambulance were sent back to recover rather than being carried forward. This meant that those soldiers would be lost to their units, but at least the Canadians would arrive on time.[12] An example of this can be found in the memoirs of Norman Guiou, a twenty-five-year-old from Ottawa who had originally joined the service as a medical student, was then sent back to Canada to complete his studies, and returned in 1917 as the Medical Officer of the 29th Battalion. While on the march, if a man fell out with a minor ailment Guiou would sometimes allow the soldier to ride on his horse. If the soldier did not improve with the rest he would then pin a tag on the man that gave his diagnosis, sign his name, and leave the man by the side

[11] LAC: DMD Records, RG 9 III B1, volume 960, file M-8-3, State of German Trenches Captured, November 1918.
[12] Snell, *The C.A.M.C.,* 20-28.

of the road to be picked up by a returning ambulance or truck.[13] This was the only way to try to keep the men on strength while still allowing for proper treatment.

The Canadians moved to part of the line that was unfamiliar to them, but the areas had been surveyed before they were taken over and arrangements made as to where to situate the dressing stations and regimental aid posts, and which field ambulances would be responsible for which areas. Massive amounts of medical materials were sent forward, including 400 extra stretchers to prevent another stretcher crisis if German prisoners were employed as bearers, and 800 extra blankets to help keep those in shock warm and in case the wounded would have to wait in the open on a cold night.[14] With the supplies and personnel in place, the great push that would open the Hundred Days began.

While there were many battles throughout 1918 that the CAMC participated in, the descriptions that follow were chosen to demonstrate the difficulties that open warfare brought and the ways in which the medical service responded. The Battle of Amiens from 8 to 11 August was a different experience for the medical corps because the land was a rolling plateau rather than a ridge. The Canadians would have to cross the Luce River at one of two available crossings to reach their objectives, which they managed but at a great cost.[15] Between 8 and 13 August the Canadians defeated elements of fifteen German divisions; by 20 August they had advanced approximately 10,000 yards, liberated twenty-seven villages, and captured 9,000 German prisoners. The casualties

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[13] Norman Guiou, *Transfusion: A Canadian Surgeon's Story in War and in Peace* (Yarmouth, N.S.: Stoneycroft Publications, 1985), 22.
[14] Snell, *The C.A.M.C.*, 29-36.
[15] Colonel G.W.L. Nicholson, *Canadian Expeditionary Force, 1914-1919* (Ottawa: Queen's Printer and Controller of Stationary, 1962), 394-395.

from 8 to 20 August were high at 11,822; the majority of these, 9,074, were sustained in the first four days of fighting.[16]

Like the Battle of Amiens, the Battles for the Canal du Nord and Cambrai had water obstacles for the Canadians to overcome. There was the canal itself and a number of marshy areas on its far side; the Germans held the high ground to the east and could view all of the canal approaches, which meant that another difficult battle was ahead. The Canadians would have a two-phase attack; the first phase was to capture the canal and Bourlon Wood; the second phase was to take the high ground at Pilgrim's Rest and La Maison Neuve.[17] The Canadians captured these objectives and moved over a series of slopes towards the road to Cambrai before taking that city. The battle was considered a success since, "besides depriving the enemy of the great distribution centre of Cambrai, the Canadians liberated fifty-four towns and villages."[18] The fighting from 22 August to 11 October was costly, with over 30,000 casualties in fifty-four days.[19] This series of battles created new challenges for the CAMC since there was rapid forward movement over different terrain, from rivers to open fields, and the liberated towns flooded the medical units with malnourished and ill civilians. In the end, the experience gained in previous battles and the willingness to change systems and implement ideas in the midst of the fighting contributed to the success of the CAMC during the campaign of 1918.

Much of the work of the stretcher bearers during the final hundred days replicated what they had experienced in previous battles. Lieutenant Harry Warren

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[16] Ibid, 419.
[17] Ibid, 441-443.
[18] Ibid, 460.
[19] Do.

Baldwin, an accountant from Toronto in civilian life, was injured while serving with the 58th Battalion. He was hit in the leg, but was not sure what had hit him so he called to a stretcher bearer to examine him. To Baldwin's astonishment, "[w]ithin two minutes [the bearer] had cut away my bloody underclothes, [and] smeared the thigh over with iodine." The stretcher bearer thought that Baldwin's artery was cut and dressed the wound. A crowd had gathered since an officer was wounded, so Baldwin hammed it up telling the soldiers that it would be a good "blighty" to make them envious of his wound. But to Baldwin's "disappointment," the bearer told him it was a clean hole that would heal in a week or two. Baldwin lit up a cigarette as he was being taken away by stretcher to "play to the crowd," but actually found it comforting and ended up smoking nearly ten on his journey. The stretcher bearers, as they had done so often during the war, went over the top of the trenches and headed towards the rear, instead of walking in the relative safety of the trenches, in order to save time. This was over the loud and continuing protests of Baldwin, who felt that the trench route would be fast enough and safer since the area had been heavily shelled not an hour before. His protests were in vain.[20]

The first stop was the regimental aid post where the Medical Officer looked over Baldwin's dressings, decided they were in good order, and called for an ambulance to collect the wounded officer. The stretcher bearers once again set out with Baldwin in the open over a frequently shelled road to the crossroads where the ambulance would pick him up. The bearers left him in a bomb-proof shelter where he waited forty-five minutes for the ambulance to arrive. Before the bearers left him he distributed fifteen francs to "the gratified stretcher party," according to the custom for officers.[21]

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[20] LAC: Harry Baldwin Papers, MG 30 E 65, Letter from Harry Baldwin to his Mother, 11 July 1918.
[21] Do.

When the ambulance finally arrived, it was "ominously pitted with shrapnel holes," which caused more concern for the wounded officer. The ambulance took Baldwin to the advanced dressing station where a doctor loosened his dressings, did not actually look at the wound, and then put him back in the ambulance. He travelled for another hour, during which time they picked up four sitting cases, before arriving at the main dressing station. There, he was carried into an operating room where his field dressings were removed along with his breeches, puttees, and boots. The wound was examined and re-dressed, and then Baldwin was given a set of woolly pyjama trousers, biscuits, tea, chocolate, and cigarettes.[22]

Figure 19 –Busy scene at a Canadian advanced dressing station, Arras, September 1918. PA003248

[22] Do.

Figure 20 –Another angle to view the difficulty of carrying a stretcher case down a hill, Arras, September 1918. PA003298

Later, Baldwin and three other wounded soldiers were placed in another ambulance to go to the casualty clearing station for further treatment. He was examined, had his wound re-dressed, and was carried into another ward. There Baldwin received a pyjama top, woolly socks, and a red flannel coat from a Nursing Sister who took the rest of his bloodied clothes and washed him up. Before the surgery he was x-rayed to ensure there was no shrapnel in the wound. He was then stitched up with drainage (what he described appeared to be the Carrel-Dakin method of wound treatment), and sent to England since the wound was deep and would need some time to heal.[23]

Baldwin's evacuation was quick and efficient and demonstrated the degree to which the stretcher bearers learned, over a period of years, to improve their procedures. But things did not always go so smoothly. A reality that did not change was the danger

[23] Do.

that front-line medical workers faced. No. 1 Canadian Field Ambulance lost six stretcher bearers between 8 and 10 August to a variety of wounds from bullets and shells.[24] Lieutenant-Colonel Heber Moshier had been a professor of physiology at the University of Alberta who was twenty-nine years old when he and his driver were killed; a shell exploded above their heads while they were travelling to the front to survey an area that their unit would soon take over.[25] Another horrifying incident occurred on 7 August 1918 when Private Spencer Given, a stenographer from Toronto, was working as a stretcher bearer in a forward area. He and his bearer party had crossed a small bridge that was previously in No Man's Land and noticed that it was mined. They looked up to see a Canadian ambulance coming towards the bridge and motioned frantically to the driver not to cross. The driver misread the signal and, seeing Canadians on the other side, proceeded across the bridge. As the ambulance was crossing the bridge, the mine exploded, wrecking the vehicle. Several Canadians died in the ambulance, as well as the whole bearer party that followed it; many more were injured.[26]

Open warfare also brought new challenges to the way the bearers worked. For example, in previous battle conditions there was little danger of overlooking a wounded man since the field of battle was relatively small. Open warfare, with its long advances, left much more ground to search than had previously been the case. That is not to say that it was more difficult than collecting a man at the front in the mud and rain of Passchendaele, just that there were different problems that open warfare across dry ground caused. Now if a man was wounded, one of his comrades was to stick the

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[24] LAC: DMD Records, RG 9 III B2, volume 3749, file Adami No. 1 FLD AMB, War Diary, No. 1 Canadian Field Ambulance, 10 August 1918.
[25] Snell, *The C.A.M.C.*, 114.
[26] Guiou, *Transfusion,* 51.

wounded man's bayonet into the ground and hang his helmet on the rifle butt to make him easier to find. This was especially helpful when the field crops were fully grown for harvest. When the wheat or grass was high, large bearer parties were spread out with ten paces between them. They would then carefully walk forward through each field looking for the wounded.

Figure 21–Rendering first aid to a wounded Canadian, Arras, September 1918. The picture demonstrates the change in terrain as the area is grassy, not merely mud with shell holes. PA003231

An important change in the way the stretcher squads were organized occurred in September 1918. A stretcher squad was re-designed so that a team consisting of one Medical Officer with several stretcher bearers and dressers was stationed behind the battalions at a collecting station. Four squads of regimental stretcher bearers were sent with the battalion to bring the wounded to the collecting posts where the Medical Officer and dressing teams would attend to their wounds in the open; the posts were similar to a

regimental aid post, but had more staff and no building or dugout. The ambulances then collected the wounded at these points and took them to the dressing stations of the field ambulance.[27] Also, by not waiting for dugouts to open up for medical use the medical service was able to provide more places of medical care that could move quickly to allow for fast intervention and treatment by a doctor. Another issue the bearers tried to help with was traffic congestion. The stretcher bearers, along with horse-drawn ambulances, used the fields beside the roads to travel on, allowing the road traffic to move more quickly. There were times when the terrain was so chewed up by shells or inclement weather that this was not possible, but it was done whenever conditions permitted.[28]

Another example of change occurred in August 1918 when the CAMC decided to discontinue attempts to maintain regimental aid posts. This is an example of a positive change being dropped to adjust to the conditions of open warfare. The units were proceeding forward quickly and the RAPs had to follow, but there was simply no way to build the RAPs while moving and no lull in the fighting to permit construction. Instead, the regimental stretcher bearers picked up the wounded and took them to protected points on roads called collecting posts that were marked with large strips of white bandages. Horse and motor ambulances then picked up the men and evacuated them to the advanced dressing stations. This created a rapid clearing system that was much quicker than anything previously experimented with by the CAMC.[29]

The use of regimental aid posts was not entirely abandoned; in the few lulls between battles, they were again constructed and used. The scene at the RAPs and

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[27] LAC]: DMD Records, RG 9 III B2, volume 3749, file Adami No. 3 FLD AMB, War Diary, No. 3 Canadian Field Ambulance, Appendix C: Reports of the work of unit during operations of the 27th September 1918.

[28] Snell, *The C.A.M.C.,* 57.

[29] LAC: DMD Records, RG 9 III B2, volume 3753, folder 1, file 3, New Features in Evacuation, Amiens August 8 to 10.

collecting stations had changed little. On 11 October 1918, Private Deward Barnes was hit, the bullet passing through the butt of his rifle into his right thigh. Two Canadians helped him get to the RAP where "there were dozens of men lying around outside, as it was not a deep dug-out, on stretchers. Some dead and nearly so." He went into the dugout where his wound was dressed. He was then told "if [you] can possibly walk, to get out as it may be three days before you get out if you wait here. They just couldn't get the ambulance up, because the shelling was too heavy." Barnes decided to try to walk, though his progress was very slow; still, he "dared not sit down" for fear that he might not be able to get up and keep going. Fortunately for Barnes, a motor truck passed him after about three kilometres of walking, picked him up, and drove him to the dressing station.[30]

A serious problem for which the CAMC already had a solution (learned at Vimy) was how to cope with the growing distance between the front lines and the medical units caused by the forward movement of open warfare. The medical units were not able to pick up and move as quickly as the infantry. By the end of August the carry from the front to a dressing station was 3000 to 4000 yards, which was too much for the stretcher bearers to manage. As at Vimy, relay stations were made out of what had once been regimental aid posts to shorten the distance and prevent bearer exhaustion.[31] The CAMC again used German prisoners as stretcher bearers, as it had in the past. A marked feature of the fighting in 1918 that also led to relief for tired bearers was the ratio of wounded to German prisoners. During the Battle at Amiens, for example, the Canadians suffered 1,476 casualties in one day, while they captured 2,970 German prisoners. While

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[30] Bruce Cane (ed.), *It Made You Think of Home: The Haunting Journal of Deward Barnes, Canadian Expeditionary Force: 1916-1919* (Toronto: The Dundurn Group, 2004), 266-267.
[31] Ibid, 109.

there were not always more German prisoners than wounded, the numbers were very similar in all of the battles of 1918. The use of these prisoners, combined with the increased number of bearers (from 1917), permitted speedy evacuation of casualties and allowed the bearers to take breaks for food and sleep throughout the battles.[32]

Figure 22 –Wounded soldiers arrive at a Canadian dressing station where they await a train or ambulance to take them to the rear, Battle of Amiens, August 1918. PA002930

In terms of the Canadian field ambulances, the most significant obstacle that their advanced dressing stations had to overcome, beyond shelling and safety concerns, was mastering the forward movement that open warfare demanded. To that end, many preparations were undertaken that had not been considered in the stalemate conditions of trench warfare. The first issue was how to move supplies, since the ambulance had to have access to all the supplies it needed while at the same time being able to pack up and move forward at a moment's notice. The field ambulances kept reserve supplies packed

[32] LAC: DMD Records, RG 9 III-D-3, volume 5026, microfilm reel T-10912, War Diary, ADMS 3rd Canadian Division, 8 August 1918.

in such a way that they could rapidly be brought into the unit if needed, but were otherwise ready to go forward with the advance. General Service wagons were loaded with blankets and stretchers, one horse ambulance was loaded with surgical supplies, and a limber was stocked with Sawyer stoves, rations, and medical comforts. In addition to these carts, a full water-cart was held in readiness.[33]

The stream of patients coming through the field ambulances was just as intense as in previous battles. For example, from 26 to 29 August, during the fighting at Amiens, No. 8 Canadian Field Ambulance alone treated 2,108 patients in its wards.[34] While the semi-permanent buildings and dugouts used throughout trench warfare had grown to accommodate such numbers, the controlled chaos of open warfare created some difficulties in finding places to hold the wounded (see figure 23). Forward movement meant that, like the regimental aid posts, an advanced dressing station could not always be constructed. In addition, there were not usually buildings or suitable dugouts for use in the forward areas. Sometimes this was due to the Germans looting and burning cities and villages as they retreated. When No. 8 Canadian Field Ambulance entered Cambrai in October 1918, the centre of the town was burning. The war diary described the desolation:

> Civilian furniture and general belongings were scattered all over the floors of various houses. Upholstered furniture had suffered considerably, the upholstering having been stripped off or deliberately slashed. In one place, which had probably been a museum, a large pile of Picture Frames was noticed, from which many of the paintings had been cut … things had been wantonly thrown in heaps in the yards.[35]

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[33] LAC: DMD Records, RG 9 III-D-3, volume 5030, microfilm reel T-10918-10919, file 831, War Diary, No. 8 Canadian Field Ambulance, August 1918, Appendix 2, Sheet 3.
[34] Ibid, Sheet 4.
[35] Ibid, Appendix 2, Sheet 2.

The whole town had been destroyed and set on fire, rendering most of the buildings uninhabitable; nothing of comfort was left behind for billeting the soldiers, let alone for the massive numbers of wounded.

Figure 23–Major Harold Wigmore McGill and assistants of No. 5 Canadian FLD AMB dress the wounded outdoors, Battle of Amiens, August 1918. PA002890

The state of the cities and towns that the Canadians entered was not the only cause of difficulty in treating the large numbers of casualties. Sometimes the advanced dressing stations moved forward into large fields where they had to set up care stations (see figure 23). In September 1918 in the Arras-Cambrai sector, No. 8 Canadian Field Ambulance had its advanced headquarters set up near Haucourt. This station was also an advanced dressing station being used as a relay or collecting post where the horse and motor ambulances picked up the wounded to take them to the main dressing station. There was very little accommodation here: "the only available room [was] a very small one in the side of the road, so that it was really necessary for all dressings to be done in

the open, and any cases waiting for transportation were placed in another small shelter, which it was also necessary to use as a store for surplus supplies."[36] Dressing the wounded in the open was now a common feature of warfare since the buildings available were either too small or too badly damaged to be used and it took too long to open a unit under tents.

Danger from shelling and bombing remained part of life in the field ambulances and continued to cause many casualties in 1918. Like the collecting post at Haucourt, the forward advanced dressing station at Cagnicourt in September 1918 had insufficient room for the number of casualties it was treating. There was no suitable cellar or underground room to turn into a bomb-proof dressing room, so the unit had to use rooms in a house. On 6 September 1918, a shell "took [a] corner out of the Dressing room, wounding slightly the Officer Commanding, and 5 of our men, and wrecking one motor ambulance."[37] In the unit's time at Cagnicourt, it lost another ambulance and a water cart to shelling; the buildings surrounding them were smashed to rubble. The men tried to build a cellar for protection, but were unable to complete it before they were called on to move forward behind the infantry.[38]

Another example of the danger that artillery caused for the medical units occurred on 27 September when No. 1 Canadian Field Ambulance moved forward to take over the regimental aid post of the 14th Battalion in Bourlon Wood and turn it into an advanced dressing station. When the forward party arrived, it found several Canadians, including some of the unit's own stretcher bearers, lying in shell holes and in open fields

[36] Ibid, October 1918, Appendix 1, Sheet 1.
[37] Ibid, Sheet 2.
[38] Do.

after having been caught in a barrage. Four of the men were dead and eight were wounded in a variety of ways. Before they could open the advanced dressing station, the men of No. 1 Field Ambulance had to bury, care for, and evacuate their own.[39]

The medical units continued to move quickly through the final hundred days of the war. As a result of the movement, signalling instructions were not always relayed properly and communication lines could not be built quickly enough to help maintain contact. Regardless of the communication problems, the assistant directors of the medical services still had to get orders to the front and remain apprised of the situation in the medical units. To do so, the assistant directors borrowed motorcycles from units not in action and drove back and forth between the rear and front areas. An example of the importance of communication occurred on 9 August 1918, when No. 3 Canadian Field Ambulance was on the move and marched right into heavy machine gun fire. The assistant director had "no time or means to provide the urgent notification" that the hour of attack for that morning had been changed. As a result, the unit came under fire because the attack time had changed without them knowing.[40] Communication back to the assistant directors was important as well. They needed to be made aware of any difficulties arising in the units or of any assistance that the units required so that they could take the appropriate measures to keep the medical service running efficiently.[41]

Throughout 1918, the main dressing stations of the field ambulances grew due to changes in the evacuation system. There would no longer be a main dressing station for each field ambulance. Instead, one large main dressing station was built to serve a geographical area by dealing with the walking wounded or lightly wounded, while all

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[39] Snell, *The C.A.M.C.*, 164.
[40] Ibid, 84-85.
[41] Ibid, 86-87.

surgical cases were sent directly to the casualty clearing stations whenever possible. Some main dressing stations still took in stretcher cases, but that became rarer through 1918. To accommodate the number of casualties that the new larger centres would treat, the station was built differently than in the early years of the war. Traffic had to be regulated both inside and outside the station to ensure there was no confusion between in- and out-patients and to allow ambulance cars to enter by one route and leave by another. This was primarily to maintain order and prevent congestion. The dressing room in the stretcher stations was a large ward with pairs of trestles along the walls and an improvised operating area in the middle of the room. If it was a station to treat walking wounded, then the dressing room was filled with long lines of benches that were roped off to keep the patients sitting in the order in which they arrived.[42] Each table in the stretcher ward had a Medical Officer who dressed the wounded and sent them to the exit to await an ambulance. In walking stations, the men were sent through to a small room with several tables where MOs worked in similar ways to the stretcher stations, but performed fewer surgical procedures. Most of the dressings that had to been done at the main dressing stations were delicate and could not be done in the forward medical units. In addition, the main dressing stations were better equipped with the Canadian rechauffement tables to deal with shock and could take more time to change and apply intricate dressings.[43]

The number of Germans captured by the Canadians continued to be large throughout the final hundred days. Some of the new prisoners captured were doctors, nurses, and orderlies, and like at Vimy, they were put to work on German casualties in

[42] Ibid, 136-137 and 140.
[43] Ibid, 141.

the Canadian wards, although now it was at the main dressing stations. Separate rooms were provided for dressing and performing surgical procedures on the German prisoners by their own medical staff. This was beneficial since the doctors spoke German and English. For the first time in the war the Canadians were able to maintain accurate medical records and accumulate better knowledge of the Germans they had captured. It also meant that the Germans with less obvious injuries received better care since their doctors spoke their language.[44]

The final change that the main dressing station would see during the First World War was its removal from the evacuation system. This began in some areas as early as September 1918, and was completed by November. Now that the casualty clearing station had become the main area in which surgery and major treatment was handled, the work of the main dressing station seemed redundant. The medical authorities and Medical Officers began to wonder how many dressing stations a wounded man should have to pass through. The new system of evacuation saw the wounded move from the collecting posts, which had replaced the regimental aid posts, to the advanced dressing stations "from which point they were cleared direct to the Casualty Clearing Station Group by Motor Ambulances, Lorries and Light Railways according to existing facilities and situation."[45] The reasoning behind the elimination of the main dressing station was summarized in the war diary of No. 3 Canadian Field Ambulance: "By this means wounded were enabled to reach the C.C.S. more quickly, and the delay and multiplicity

[44] Ibid, 135.
[45] LAC: DMD Records, War Diary, No. 3 Canadian Field Ambulance, September 1918, Appendix C, Sheet 1.

of dressings occasioned by having to pass through a Main Dressing Station was thereby avoided."[46]

The long distances between the medical units that resulted from open warfare created a new and unforeseen problem. The heavy use of ambulances necessitated repairs, but there were no units in the front lines that could help repair the vehicles. This was because of changes made earlier in the war, during the trench warfare phase. The motor ambulance workshops had been transferred to and integrated into the mechanical transport companies under the administration of the Canadian Corps. This change was made in March 1916 when it was argued that "highly skilled mechanics should not be under the authority of Medical Officers."[47] In trench warfare there were no serious issues with the arrangement, but in open warfare this was a serious problem. The repair shops for the ambulances were "always hopelessly out of reach" since they could be as far as forty miles behind the front lines.[48] No solution was found to the problem before the armistice; many ambulances that were desperately needed sat in fields waiting for a mechanic.

Another cause of tension, this time between the medical corps and engineering corps, was roads. The Germans destroyed the roads as they retreated, making them impassable for the motor and horse ambulances that were often the first units needing to use them. Medical personnel and willing civilians tried to repair the roads by patching up the holes, but they were not engineers, as their work showed. On one occasion a Canadian ambulance flipped over when a patch in the road gave way. The medical authorities wanted engineering groups attached to the field ambulances to advise and

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[46] Do.
[47] Snell, *The C.A.M.C.*, 204.
[48] Do.

supervise the road repairs, but the engineers did not feel that they should be under the authority of the medical service and refused. Again, no solution was found. The medical service continued to try and patch the roads or find alternate routes with the help of civilians. The engineering corps would eventually arrive to fix the roads, but often long after the medical units had moved forward into new areas that also required engineers to perform road work.[49]

While the CAMC battled with the mechanics, engineers, and Germans, there were other issues to deal with that mainly affected the members of the field ambulances. The first was the influenza epidemic that began to surface in No. 8 Canadian Field Ambulance in June 1918 while it was on the move from Rely to Le Fermont. While at a rest station, soldiers who came down with the flu remained with their units since the rest stations had excellent facilities to quarantine and treat the men. Once the men were in the front lines, however, they had to be evacuated to prevent any further outbreaks. At one point an ambulance train arrived to find 280 influenza cases waiting for evacuation to the rear, and the numbers would continue to grow. To try to prevent the spread of the flu, the men were instructed to gargle with potassium permanganate twice a day in hopes that it would act as a prophylactic. The bulk of the influenza outbreak at the front was contained by July 1918, but it would continue to resurface throughout the year, leading to the influenza pandemic that killed so many in the post-war months.[50]

Adding to the strain of war and influenza was the large number of civilians who were in dire need of medical care and nutrition. These people had suffered untold hardships under the German occupation and had been deprived of many of the basic

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[49] Ibid, 205.
[50] LAC: DMD Records, War Diary, No. 8 Canadian Field Ambulance, August 1918, Appendix 1, Sheets 1-3.

necessities of life. There were not enough civilian doctors to help these people and those who tried had no supplies to treat them. So, the task of caring for the civilians was given to the forward units of the CAMC. No. 10 Canadian Field Ambulance set up a civilian care centre where anyone could obtain treatment and food. In addition, each field ambulance detailed Medical Officers to go to people's homes to treat their ailments. In areas that were too far from No. 10, outdoor medical clinics were set up "which countless inhabitants used for care."[51] All local doctors were freely given supplies to open up their own treatment centres or to assist in the work of the medical clinics established for civilians. Any civilian who was in serious condition was evacuated back to hospitals that the French government had set up. A bigger problem was feeding some 70,000 civilians who had so little food under the German occupation that many had become very ill. The International Committee of the Red Cross was the key to securing the supplies needed. It sent truckloads of milk, cocoa, soups, jellies, rice, Bovril, canned chicken, biscuits, and any other foodstuffs that were available, and the Canadian field ambulances distributed it to the needy.[52]

Through October and into November 1918, the number of Canadian casualties decreased but the work of the units did not. This was because the civilians, "unable to repress their enthusiasm left their shelters and lined the roads, with the result that a considerable number were killed and wounded, thus necessitating the care and evacuation of the latter."[53] It was no wonder the civilians took to the streets in jubilation, despite the danger. They had been living under German occupation for four years; their joy at

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[51] LAC: DMD Records, RG 9 III, volume 4750, 3rd Canadian Division Report on Operations: Foret de Raismes (France) Mons (Belgium), 22 October to 11 November.
[52] Do.
[53] Do.

liberation was so great they could not contain themselves. Although this caused many injuries and deaths, it also created unforgettable memories for the Canadian medical staff and soldiers who witnessed the joy that their arrival created.[54]

The first civilians that No. 11 Canadian Field Ambulance encountered was a group of seventeen who had hidden when they heard the Allied guns, hoping that the Germans would retreat and forget all about them. It worked. When the Canadians found the civilians, they immediately took them to the dressing station for aid. For the medical staff in the unit, the sight of civilians represented a turn in the war, a feeling that they were winning and that the war might actually end. For their part, the civilians all "laughed, they cried, [and] they kissed everyone indiscriminately" upon realizing that they were free. The seventeen civilians, like so many who would come after them, loaded all their worldly possessions into wheelbarrows or carried them on their backs. A girl among them was injured and brought to the dressing station on a stretcher where she was treated and given food and warm drinks. An older woman from the group of civilians immediately began to work in the medical unit, bringing hot coffee to the wounded Canadians; she refused to bring anything to a wounded German. The tension between the Germans and the small group of civilians went beyond the older woman in the wards. As the civilians were being put on ambulances and trucks to be evacuated to safety, one of the German prisoners tried to help a young girl by handing her bag of belongings to her. As a Canadian diarist reported, "If looks could kill, her look of concentrated hate and loathing for one of her late captors would have finished him then

[54] Snell, *The C.A.M.C.*, 205-206.

and there."[55] Much time would be needed to heal the emotional scars that the war left on these and many other civilians, but for now the CAMC could help by tending to their health and nutrition and by giving them safe quarters.

The casualty clearing stations saw few changes to the way they functioned, were built, or used in 1918. The main problem they faced was the growing distance between the forward medical units and these stations. It could take five to seven hours to make the trip from the main or advanced dressing stations to the casualty clearing stations, which was simply too long if timely treatment was to occur. The reason the casualty clearing stations were placed so far back was because several had been lost to the Allied medical forces during the German spring offensive. The need for safety was clear, but the stations had to be closer to the front to be effective and save lives. In response, the concept of a forward surgical treatment centre came into being, as an alternative to moving the clearing stations forward. An advanced operating theatre would be built in a school or other building previously held by the Germans. First, though, the advanced operating centres had to be cleared of booby-traps. The Germans placed these all over the buildings they occupied before their retreat; they were mainly small explosive charges arranged so that opening a gate, working a pump, or sitting in a chair would trigger the charge. Once the engineers had carefully combed the buildings for traps, the operating theatres could open, with a staff of five Medical Officers, a chaplain, nine nursing sisters, and nine other ranks, as well as two trucks of equipment. These forward stations were complete operating centres that only handled urgent cases as selected by the field

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[55] Canada. Militia. Canadian Expeditionary Force. 11th Canadian Field Ambulance. *Diary of the Eleventh: Being a Record of the XIth Canadian Field Ambulance (Western Universities) Feb. 1916 - May 1919* (Winnipeg, 1919), 114-115.

ambulances. The patients were moved back to the CCS as soon as they were stable.[56] Outside of the forward operating theatres, the CCSs continued their work under the procedures that developed over the course of the war.

Figure 24–Slightly wounded sitting in the sun outside a casualty clearing station east of Arras, August 1918. PA040220

Throughout the year, the CAMC continued to review its progress and the conditions that its front-line units faced, actively seeking ways to improve and save more lives. The issues with the mechanics and the engineers were addressed in much the same way; it was argued that there must be some support staff from these units attached to the medical units in order for them to function effectively. In terms of communications, it was recommended that the assistant directors have their own motorcycles and runners attached to them to help maintain communication with the front-line units. The issue of the casualty clearing stations being too far back to be of assistance appears in every after-action report. At Canal du Nord and Cambrai, the nearest clearing station was seventy miles behind the front lines, which meant that it could be ten to eighteen hours before a casualty received surgical intervention. The solution was the forward operating theatres, which were successful in helping to alleviate the situation. The after-action reports were

[56] LAC: Thomas Brenton Smith Papers, MG 30 E31, "Clearing: The Tale of the First Canadian Casualty Clearing Station, British Expeditionary Force, 1914-1918."

also congratulatory of the many things that proceeded smoothly or had been improved upon from previous battles. During 1918 the problem of traffic congestion was finally dealt with, except when shelling or bombing made it impossible to get to an area to evacuate the wounded. In 1918 more railway lines, both regular, light, and lines for hand trucks, were used than at any other time in the war. This was of great benefit since the railways did not use the roads and block supplies coming forward, and could carry larger numbers of wounded men.[57] Ultimately the changes applied in 1918 solved all of the crises of evacuation; finally allowing for timely medical intervention, proper triage decisions, and speed in moving through the streamlined medical system.

The medical service continued to try to formulate better treatments by studying the wounds of war and how best to repair them since no one knew when the war's end would come. The biggest achievements of the medical science in 1918 involved the care of gassed patients and the development of the blood transfusion as a common treatment in the forward areas.

Phosgene and mustard gas were the gasses employed most frequently by the Germans through 1917 and 1918. While the properties of the new gasses changed the way they effected the soldiers, the effects were still brutal and much work continued into preventing gas casualties from occurring through equipment and treating the wounds. To understand better the effects of gas, many autopsies were performed on soldiers who had died as a result of gas. These autopsies led to a clearer picture of what was actually happening to the body, and to better treatments for those who survived gas attacks.

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[57] LAC: DMD Records, RG 9 III, volume 960, War Diary, ADMS 1st Division, Canal du Nord / Cambrai Operations, October 1918. Also see LAC: DMD Records, RG 9 III B2, volume 3752, file 4-4, Medical Report on the Battle of Cambrai (Canal du Nord), n.d.

Phosgene gas caused many outward and some internal symptoms. These were labelled and taught to the Medical Officers as part of the winter education seminars and lectures. Outward signs of phosgene gas included a marked ashen cyanosis, intense sweating, dyspnoea, a cough, a frothy, mucous blood-tinged expectoration from the cough, headache, tightness in the chest, and delirium. The best treatment for a patient gassed with phosgene and displaying these symptoms included warming to prevent or treat shock, administering oxygen, and bleeding the patient of fifteen to thirty-five ounces of blood. Then ten to fifteen ounces of warm saline along with fifteen ounces of adrenaline were administered through intravenous solutions. The adrenaline was given every four hours for the first twenty-four hours after being gassed. A study of gas wounds and treatment was undertaken at No. 1 Canadian Casualty Clearing Station. There were forty-eight cases of phosgene gas treated during the study, with a death rate of twenty-nine per cent or fourteen soldiers.[58] The study indicated a minor improvement over earlier treatments such as those performed in No. 3 Canadian Casualty Clearing Station in August 1916, when fifty-four of 178 gassed patients, or thirty per cent, died after receiving treatment.

A soldier had a much greater chance of surviving a mustard gas attack. The symptoms of mustard gas were conjunctivitis that varied from a mere reddening to an intense oedema, though there was no ulceration of the eyes. Mustard gas cases had photophobia, pain in their eyes, a dry throat, a cough that only had an expectoration in severe cases, vomiting, and blisters that could take as long as ten days to show up on the body. Blindness was the most frightening symptom for the men to endure, and created

[58] LAC: DMD Records, RG 9 III B2, volume 3752, file 3-3-2-1, No. 1 CCS Report on Gas, April to November 1918.

problems for stretcher bearers both in the wards and the field. The men were moved around by joining hands and following the stretcher bearer at the front of the line. In terms of treatment, addressing the blindness was important to calming the men. It was explained that the blindness was temporary, though there was no typical time when a soldier's sight would return. Morphine was freely given to manage pain, and the soldier's eyes were irrigated with sodium bicarbonate, saline, or cool water every four hours to treat the conjunctivitis, after which a drop of castor oil was placed in the eyes. The gassed soldiers wore eye shields and used cold compresses to help relieve the pressure on the eyes and prevent light from bothering them. All soldiers were encouraged to drink cool water to help calm the throat irritation. Finally, all the blisters were dressed. A soldier suffering from mustard gas poisoning was incapacitated for at least ten days and required much more nursing care than most of the wounds that the medical wards saw, since the men were quite helpless due to their blindness. Still, the study conducted by No. 1 Canadian Casualty Clearing Station demonstrated that treating mustard gas was much easier than phosgene gas. Of the 2,183 cases the unit saw as part of the study, seven men died, a mortality rate of 0.32%. Clearly the care of soldiers who suffered from gas poisoning had greatly improved since the Second Battle of Ypres in 1915 when gas was first employed.[59]

The issue of blood transfusion had been contentious throughout the war as doctors could not agree on its effectiveness as a treatment. Those who believed in the procedure continued to research and practice it with more and more success. One such Canadian doctor was Norman Guiou, who began his service as a medical student and was returned home at the end of 1915 with other medical students to complete his studies. He

[59] Do.

returned to McGill University where he studied blood transfusions under his mentor and became convinced of the procedure's importance in medicine. When Guiou returned to the war in 1917, several cases convinced him of the need to use blood transfusions in the front lines, not just at the casualty clearing stations where they were employed at that time. While working with No. 6 Canadian Field Ambulance during the winter of 1917-1918, Guiou found "[i]t was the badly wounded, however, who really distressed me. I felt something more could be done for them before shipping them back."[60] Then a soldier was brought in who was pale, had lost a lot of blood, and was suffering from a shell wound in his thigh. The soldier had his wounds dressed and packed, was "given intravenous saline, rallied, then died." Guiou knew that this man "had a wound that was amenable to surgical repair. He had died from loss of blood." He thought that the soldier could have been saved by a prompt blood transfusion.[61]

That same winter, a soldier of the 6th Canadian Infantry Brigade was wounded from shell fire while moving up to the front at night. A motor ambulance found the man quickly and rushed him to the advanced dressing station, where Guiou noticed that "blood was trickling out of the back of the car." The wound was behind the knee where haemorrhage could be controlled, but the soldier was described as "pulse less, starry-eyed and dying." They sent the soldier on the twenty-nine-mile journey back to the casualty clearing station, but there was little chance that the soldier would live long enough to receive treatment at the station.[62] These two cases moved Guiou. It was now obvious to him that a number of wounded men died of haemorrhagic shock before they could receive the treatment that they needed at the casualty clearing stations. Blood

[60] Guiou, *Transfusion,* 27.
[61] Ibid, 27-29.
[62] Ibid, 29.

transfusions were being introduced to casualty clearing stations and were not common to all the units that winter. Guiou was upset that "there had been no suggestion of its adoption for Field Ambulance use, where it was so badly needed, and no equipment was available."[63]

Over the winter, Guiou attended lectures by Medical Officers of both the Royal Army Medical Corps and the CAMC on blood transfusions. These lectures convinced him that blood transfusions were "feasible" in the forward areas, so he returned to his unit and wrote to the Lister Institute in London to request typing sera, especially groups A and B. Then he and the other Medical Officers of his unit typed all of the men of their field ambulance and began making their own serums. The opportunity to try the procedure came in the form of a sucking chest wound sustained by a Canadian soldier who was in severe shock. They performed the transfusion, but the soldier died. Guiou was severely reprimanded and told that he had killed a man, which he took "very hard."[64]

Guiou persevered when more opportunities to attempt transfusions presented themselves in the spring of 1918 during the German offensive. A Canadian soldier from the 24th Battalion was brought to the medical unit on a blood-soaked stretcher with a shattered humerus. His upper arm was also "swathed in copious blood-soaked dressings." He barely had a pulse, was starry-eyed, and thrashed about on the stretcher. The dressers thought the soldier was dying and summoned the chaplain, to come to the soldier. The chaplain "possessed the rare quality of being able to speak words of hope and comfort to men who may be dying. [Guiou] could not help but hear him as [he] worked." They performed the transfusion while the comforting padre talked to the young

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[63] Do.
[64] Ibid, 30-31.

soldier. Colour immediately came to the soldier's cheeks. The wounded man was able to raise himself on one elbow and enjoy some tea and biscuits before being sent to the casualty clearing station in stable condition.[65]

It was difficult to trace cases through the medical system from the front lines, and Guiou was only able to trace three men he had transfused. The first reached the casualty clearing station in good condition, had his leg amputated, and later died from gas gangrene. The second soldier perished before reaching the CCS, and the third made it to England and a full recovery. Since Guiou had performed the transfusions at the main dressing station, the soldiers had already travelled some distance before receiving his treatments. It was possible that the time before they reached him was crucial to their survival, so Guiou began to argue that the transfusions had to be performed at the advanced dressing stations. Unfortunately, there were problems with the syringe method used to give transfusions. The method required two operators, but they could not always be spared from treating other casualties. In addition, the donor and patient had to lay side by side, which was not always possible. Guiou had practiced another method of transfusion while at McGill called the citrate method, which used a bottle to hold the blood to transfuse instead of the person-to-person method. The citrate method was fully described by Captain Oswald Robertson of the American Base Hospital in Boulogne in the *British Medical Journal* of April 1918, and the article encouraged Guiou to try and use it in the field ambulance. The problem with the Robertson bottles that Guiou made was that they were glass and would break when transported. He solved the problem by

[65] Ibid, 34-35.

going to a cabinet maker to have special cases made for the bottles, then passed the idea onto the Medical Research Council where his ideas "spread fast."[66]

Word of the work of the field ambulance with blood transfusions spread and Medical Officers of other units began to take notice. However, it was not clear to Guiou how the word was getting around. The first visitor who was interested in the unit's work and came to observe it in action was an Australian Medical Officer. He was impressed with what he saw at the station and became determined to start forward-area transfusions in the Australian Medical Corps.[67] Then Guiou heard of a British Medical Officer, Captain Walker[68], who was working with blood transfusions so he went to visit him at the casualty clearing station where he was posted. Guiou found that Walker was "a pioneer in the use of preserved refrigerated blood, a research development of Doctors Rous and Turner, and recently introduced in France by Captain Oswald Robertson." The blood was mixed into a dextrose and citrate solution, which would allow it to stay liquid under refrigeration for three weeks.[69]

Captain Walker then visited Guiou at his field ambulance on 14 June 1918, when a raiding party was scheduled to go over the top. During the raid the two doctors went to the regimental aid post, but no transfusions were needed. Guiou promised to send for Walker again using the message "come up for tea;" if they wanted him to bring some refrigerated blood, they would add "and bring your tennis racquet."[70] It was not long before the message was sent and in late June Captain Walker returned to the Canadian unit to help the medical staff perform transfusions during another raid. In order to help

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[66] Ibid, 36-38.
[67] Ibid, 35.
[68] Guiou does not provide a first name or any further information about Captain Walker.
[69] Ibid, 39.
[70] Ibid, 41.

the experiment along, a forward resuscitation unit was created and placed in front of the advanced dressing stations. Medical Officers of the various regimental aid posts were given white discs about the size of a tea saucer to pin to the tunic of the severely wounded who would benefit from the treatment at the resuscitation centre. The centre had rechauffement tables, acetylene light, and transfusion outfits, among other supplies to help treat the seriously wounded. Walker brought up his stored blood in special boxes that prevented the glass bottles from breaking. Many serious cases came in from the raid and in no time "the tables were continuously busy, with white-tagged cases waiting outside. We deeply regretted sending some of these on" but there was not enough space or supplies in the unit to take on the large number needing their help. To make matters worse, the doctors had no structure in place to find out how their patients did as they passed through the medical system. The only results they saw were those on the table in front of them, which meant that no meaningful conclusion could be drawn from the treatment.[71]

In July 1918, a "high ranking staff officer" told the assistant director medical services of the Second Canadian Division that he did not approve of the Canadian field ambulance performing blood transfusions, though he did not specify why. The assistant director replied that "The Canadians are going to do blood transfusions on their badly wounded or someone else can be found to look after this section of the front."[72] With institutional support for the first time, Guiou was temporarily transferred to No. 7 British Casualty Clearing Station to set up a resuscitation ward. The British CCS had become intensely interested in the subject of blood transfusions, and welcomed Guiou and his

[71] Ibid, 47-48.
[72] Ibid, 45.

teachings. For Guiou, the CCS enabled him to see the donors for a few days after donation; he learned that young donors tended to need three weeks' leave to recover completely from giving blood, whereas middle-aged men seemed fine by the end of the day. The reason was not clear, but the official policy became two weeks' leave for any soldier willing to provide blood for transfusions.[73] By the end of July, army stores officially carried Robertson Citrate Bottles. To honour the work that Guiou had accomplished, Sir Cuthbert Wallace presented him with the first official army transfusion needles that came in a small box with a sharpening stone. Blood transfusions were now to be common practice in the CAMC and would occur in forward area resuscitation wards as well as all other medical units.[74]

Fortunately for all of the Allied medical services, fighting men, and support staff, the war came to an end on 11 November 1918 when an armistice was signed. The most noticeable change for the medical units was that they could use lighting at night without carefully screening every window and crack. Patients continued to flow, though in much fewer numbers, as influenza and broncho-pneumonia began to become a serious problem in the civilian and military populations.

Through its final year of battle, the CAMC continued to demonstrate a spirit of innovation, a desire to become more effective, and the will to be more efficient in achieving timely treatment for the wounded soldiers. From the systemic changes, to the introduction of new medical treatments, to the education systems, to the creation of advanced operating theatres, to the elimination of the main dressing station, the CAMC continued to shape its force so that it could face and adapt too many different kinds of

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[73] Ibid, 49-50.
[74] Ibid, 50.

warfare and treat many more kinds of injuries with greater success. Open warfare created new issues and problems that the CAMC would have to face, and yet the corps found a way to deal with the changed situation and institute new treatment facilities to accommodate it. The coming of the armistice was a great relief to the soldiers and all of the medical staff who would no longer face the horrific sights they had endured throughout the war. Soon they would be able to return home to their loved ones and civilian medical practices and hospitals.

Conclusion

Five Years with the Canadian Army Medical Corps

From training and building the beginnings of the Canadian Army Medical Corps at Valcartier in 1914, to the first fire-fight during the Second Battle of Ypres, to the relief that was the armistice in November 1918, the medical corps demonstrated tremendous professionalism, pride in its work, and an institutional and personal desire to make the strongest, most effective, and most efficient force possible. The motivation was clear: it was the young Canadians who spilled their blood on the fields of France and Belgium. The work of a front-line Medical Officer was to care for the soldiers under his command and, if they became ill or were wounded, to return them to the field of battle in a timely fashion. But the doctors wanted to accomplish much more than merely returning the young soldiers to battle. They wanted the young men, bodies smashed and torn, to be able to return to a normal life at home when the war was over by finding ways to heal their wounds and ailments. Ultimately these desires made for a steep and inspired learning curve in the Canadian Army Medical Corps that saw a great deal of improvement in the way in which casualty evacuation and front-line treatments were performed, meaning better survival and recovery odds for the wounded men.

Systemic changes that occurred throughout the war were the key to receipt of timely medical treatment, which improved the odds of survival. Several issues arose as the battles wore on, the most significant and earliest of these being stretcher bearer exhaustion. Merely sixteen in number in 1915 with limited training, the stretcher bearers simply could not handle the workload expected of them. Increasing the numbers,

however, was not enough. The stretcher bearers needed better training in order to make sound triage decisions. To accomplish that end, the squad was re-designed each year until 1917 when the success at Vimy Ridge demonstrated that the medical service had found a way to solve the training issues by adding an orderly from a FLD AMB to lead a squad. In addition, the introduction of railways and hand-trucks during that same battle were key developments in curbing exhaustion.

The re-creation of the units in the medical system was also of utmost importance in allowing for timely care. In this case it was not about getting the wounded to the unit quickly, but about introducing more treatment to the forward areas and increasing the capacity of the units to treat the numbers that were flowing through them during battles. The casualty clearing station is the unit in which this transformation is clearest. Growing from a sorting and evacuation unit with bed space for seventy-five wounded to the surgical epicentre of the war with the capacity to treat 900 allowed the CCS to provide better treatment in the forward lines rather than forcing the wounded to wait for the same treatments in the rear. In addition to the growth of the CCS, the movement of treatments such as Paraffin No. 7, oxygen therapy, and blood transfusions into forward medical units helped increase the survival and recovery rates by allowing for timely medical intervention with many treatment options.

Beyond moulding the medical system into an efficient evacuation system, the medical services (including the CAMC) would have to find innovative ways to treat wounds and ailments. This was because known treatments were not always working under the conditions of war and new ailments with no cures or treatments found their way into the medical wards. Gas attacks are the clearest example of a wound of war that had

no known treatments. From breathing through a chemically treated pad, to bleeding the patient, to oxygen therapy, work began on how best to treat those wounded by gas and protect others from their fate. Other important advances in medicine from the discovery of the Carrel-Dakin method of wound treatment, to the improvements in abdominal and chest treatments, to the inclusion of blood transfusions as a common treatment, among so many other advances, were just as important as the evacuation system to saving lives and increasing the odds of a full recovery. All of these medical advances the systemic changes were possible due to the ability of the medical service to perform as individuals and to work outside of the military structure that had to be followed in every other front-line branch of the military.

The systemic changes and growth in medical knowledge forced the CAMC to facilitate ways to educate and train its members throughout the war. Many doctors were seconded to study and catch up on their reading of medical journals. They were also invited to units to learn new procedures that had been perfected so they could return to their own areas to teach the new ideas. Training during the winter months through lectures and exercises along with memorandums were also important ways to keep the medical service members up to date on all new procedures and treatments.

Part of the education needed was to keep up with developments in sanitation and preventative medicine. Sanitation was a great focus of the war with every area having sanitation sections to help the fight against disease. The discovery by Doctors Amyot and Orr of ways to disinfect uniforms filled with lice, making inoculation mandatory for every man who served, and systemic changes to the sanitation sections were all part of

the fight against disease, which was the cause of the majority of casualties and death of soldiers in previous wars:

War	Force	Died Disease	KIA or Died of Wounds	Ratios	
				Disease	Wounds
South-African	British	14,653	7,792	65%	35%
Russo-Jap	Russians	20,890	31,458	40%	60%
	Japanese	27,000	59,000	31%	69%
Present War	Canadians	2,815	51,853	5.14%	94.85%

Table One – Rates of soldiers who died from wounds and disease through three wars. [1]

In order to fight disease throughout the First World War, the medical services of the Empire spent £2,000,000 on vaccines and made them mandatory to all those who served by 1917.[2] As the chart demonstrates, the vaccines and preventative measures against disease made an enormous difference in keeping casualties down and soldiers alive during the Great War.

The final factor to consider in the learning curve of the CAMC was that of learning to be both a doctor and a soldier. Doctors had to learn to cope with capital punishment, sick parade issues, and to report and perform military discipline in the medical wards. It was important that the medical service assimilate into military culture so that its members would command respect and the medical wards would not become a refuge for malingerers and those trying to escape military discipline.

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[1] LAC: Fotheringham Papers, Admissions to Canadian Hospitals in the Great War: Covers August 1914 to December 1918. This chart demonstrates the difficulty of keeping accurate statistics regarding casualties in the First World War. All the secondary sources read for this project contained different statistics as to the number of dead and wounded; the primary sources also contain different figures. This can also be due to the number of lightly wounded soldiers who elected to stay with their units and did not receive treatment from a medical unit. Regardless of the exact numbers, the range found in the primary sources supports the assertion that the rate of death by disease was extremely low compared to other wars. Finally, the "present war" referred to in the chart is the First World War.

[2] Library and Archives of Canada [LAC]: John Taylor Fotheringham Papers, MG 30 E53, volume 6, file 29," Modern Methods at Millbank: The Royal Army Medical College: How it Helped Win the War."

Through constant evaluation and changing of systems, the incorporation of new medical knowledge, the development of a training and education system, strict adherence to sanitation and preventative measures, and assimilation into military culture the CAMC grew into an effective and efficient medical service that was better able to tend to the needs of the wounded. This progress allowed for more timely treatment of the wounded men, raised survival rates and allowed for fuller recoveries for a number of different wounds. It also ensured that disease was not the main cause of death.

Ultimately, the Canadian Army Medical Corps would treat 220,182 Canadian soldiers who were wounded in action throughout the course of the First World War. The death toll was heavy at 60,383 soldiers: 35,666 were killed in action, which meant that they never received any medical treatment, 5,405 died of disease, and 12,420 died from wounds or accidents after receiving medical intervention.[3] Notwithstanding the seemingly large number of casualties treated, the Canadian medical units did not treat Canadian soldiers alone; they also treated the soldiers of the Allied armies, their enemies, and civilians. In all, Canadian medical units treated 493,064 patients in five years.[4] The variety of wounds translated into varying prognoses for the soldiers. For example, 7,602 wounded soldiers were able to remain on duty despite their wounds. The number of soldiers treated due to gas exposure was 11,356; those hit in the chest numbered 3,780, head or neck injuries accounted for 22,284, abdominal wounds accounted for 1,395, injury to the upper extremities numbered 51,508, and 43,652 men sustained wounds in the lower extremities. The wound rates demonstrate that a soldier was most likely to be

[3] Library and Archives of Canada [LAC]: Department of Militia and Defence [DMD] Records, RG 9 III, volume 10, file 10-15-2, *Canadian Daily Record*, 7 January 1919.
[4] LAC: John Taylor Fotheringham Papers, MG 30 E53, volume 6, file 29, Admissions to Canadian Hospitals in the Great War: Covers August 1914 to December 1918.

hit in the extremities than any other part of the body; 2,780 amputations were performed on hands, feet, arms, legs, and, on rare occasions, multiple limbs. In addition to casualties caused by enemy action or accident, there were also 729 reported cases of self-inflicted wounds.[5] While the statistics seem grim, the First World War saw a notable improvement in the wound mortality rate compared to any previous war; the general rate for all armies in the Crimean War was twenty per cent, in the American Civil War it was thirteen per cent, and in the Great War it was eight per cent.[6] This was due to the many systemic changes and medical advances that allowed for fast medical intervention and better medical care.

The men and women who served the medical corps sustained many casualties. Sixty-one Medical Officers and 4,634 other medical ranks were killed or died while serving.[7] At the same time, the men and women of the medical service were recognized for the work they did, receiving 1,276 decorations. In addition to decorations, members of the CAMC were mentioned in dispatches 576 times and brought to the notice of the Secretary of State for War 373 times.[8] Through these honours, the difficult work of the medical services was recognized by the military and by Canadians at home.

Although the armistice went into effect on 11 November 1918, the members of the Canadian Army Medical Corps remained at their posts for several months. The members of the medical service would begin to return to Canada in March 1919, with the

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[5] Andrew Macphail, *Official History of the Canadian Forces in the Great War, 1914-19: The Medical Services* (Ottawa: F.A. Acland, 1925), 396-397.
[6] Richard Gabriel and Karen Metz, *A History of Military Medicine Volume Two: From the Renaissance to Modern Times* (New York: Greenwood Press, 1992), 240-241.
[7] Macphail, *The Medical Services,* 365.
[8] Ibid, 353-354.

last medical workers beginning their return to Canada on the *Araguaya,* the last hospital ship and Canadian medical unit that remained in Europe, on 11 September 1919.[9]

The Canadian Army Medical Corps had grown from a tiny pre-war unit of just eighteen people to a force of 25,000 men and women. In order to fill the positions that the medical service needed, half of Canada's civilian medical practitioners enlisted.[10] The major battles examined demonstrated that the medical service was always evaluating its work on the battlefield to improve the system of casualty evacuation. The research and work of doctors throughout the war showed a constant desire to improve medical practice by finding better treatments that could be performed closer to the front. This was due to a desire to serve the men at the front better in the hope that they would return to battle or be able to have a normal life at war's end. To this end, the medical service constantly created opportunities to learn new medical ideas and practiced manoeuvres between battles to better the evacuation system. By November 1918, the medical service had demonstrated flexibility in its approach to casualty evacuation, the introduction of new ideas, and a constant desire to become more effective and efficient to save the fighting men.

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[9] Ibid, 402.

[10] Desmond Morton, "Military Medicine and State Medicine: Historical Notes on the Canadian Army Medical Corps in the First World War, 1914-1919," in David Naylor (ed.), *Canadian Health Care* (Montreal: McGill-Queen's University Press, 1992), 38.

Bibliography

Primary Sources

Archival Material

National Archives of Canada

Personal Papers

Harry Baldwin Papers MG30-E65

Hubert M. Morris Papers MG30-E379

John Andrew Macphail Papers MG30-D150

John George Adami Papers MG 40-F4

John Taylor Fotheringham Papers MG 30-E53

John McCrae Papers MG30-D209

Robert James Manion Papers MG27-IIIB7

Thomas Brenton Smith Papers MG30 E31

Government Papers

Canada. Canadian Army. Record Group 150, accession 1992-93/166, box 8549, file 28. Service record of #928728 Harvey Austin Rusk,

Canada. Canadian Army. War diary – 2nd Canadian Casualty Clearing Station. RG9 III-D-3, volume 5032, microfilm reel T-10921-10922

Canada. Canadian Army. War diary – 3rd Canadian Casualty Clearing Station. RG9 III-D-3, volume 5033, microfilm reel T-10922

Canada. Canadian Army. War diary – 1st Canadian Field Ambulance. RG9 III-D-3, volume 5026, microfilm reel T-10913

Canada. Canadian Army. War diary – 3rd Canadian Field Ambulance. RG9 III-D-3, volume 5027, microfilm reel T-10914

Canada. Canadian Army. War diary – 5th Canadian Field Ambulance. RG9 III-D-3, volume 5028, microfilm reel T-10915-10916

Canada. Canadian Army. War Diary – 7th Canadian Infantry Brigade RG 9 III-D-3, volume 4893, microfilm reel T-10688-10689

Canada. Canadian War Diary. War Diary - 8th Canadian Field Ambulance. RG9 III-D-3, volume 5030, microfilm reel T-10918-10919

Canada. Canadian Army. War Diary- Assistant Director Medical Services 1st Division RG9 III-D-3, volume 5024, microfilm reel T-10910

Canada. Canadian Army. War Diary- Assistant Director Medical Service 2nd Division RG9 III-D-3, volume 5025, microfilm reel T-10910-10911

Canada. Canadian Army. War Diary- Assistant Director Medical Services 3rd Division RG9 III-D-3, volume 5025, microfilm reel T-10911

Canada. Canadian Army. War Diary- Assistant Director Medical Services London RG9 III-D-3, volume 5026, microfilm reel T-10912

Military Manuals

Beggs, Capt. S.T. *Guide to Promotion for Non-Commissioned Officers (Corporal to Staff-Sergeant) and the Men of the Royal Army Medical Corps.* Aldershot: Gale and Polden, 1915.

Canada. Department of Militia and Defence. General Orders, Militia Orders and Precis of Headquarters Letters Bearing Upon the Administration of the Canadian Army Medical Service, Published between August 6th, 1914 and December 31st, 1916. Ottawa: The Militia Council, 1917.

-- *Infantry Training for Use of Canadian Militia*, 1915.

--*The Guide: A Manual for the Canadian Militia*, ninth edition, 1914.

Carnegie Endowment for International Peace, Division of International Law, Pamphlet No. 21, "The Geneva Convention of 1906 for the Amelioration of the Condition of the Wounded in Armies in the Field. Washington D.C.: Published by the Endowment, 1916.

Fauntleroy, A.M. *Report on the Medico-Military Aspects of the European War.* Washington, D.C.: Government Printers Office, 1915.

Great Britain. War Office. *Field Service Regulations Part II: Organization and Administration, 1909 (Reprinted with Amendments to October 1914).* London: His Majesty's Stationary Office, 1914.

--General Staff, *Field Service Pocket Book, 1914,* 1914.

--*Manual of Military Law*, 1914.

--*Field Service Pocket Book*, 1914.

--*Field Almanac*, 1917.

Published Material and Memoirs

Adami, J. *War Story of the Canadian Army Medical Corps,* Volume One. Toronto: Musson, 1918.

Baldwin, Harold. *"Holding the Line".* Chicago: A.C. McClurg and Co., 1918.

Bruce, Herbert. *Politics and the Canadian Army Medical Corps*. Toronto: William Briggs,1919.

Canada. Militia. Canadian Expeditionary Force. 11th Canadian Field Ambulance. *Diary of the Eleventh: Being a Record of the XIth Canadian Field Ambulance (Western Universities) Feb. 1916 - May 1919.* Winnipeg, 1919.

Cane, Bruce (ed.) *It Made You Think of Home: The Haunting Journal of Deward Barnes, Canadian Expeditionary Force: 1916-1919.* Toronto: The Dundurn Group, 2004.

Carrel, Alexis. *The Treatment of Infected Wounds.* Toronto: Macmillan, 1917.

Christie, N.M. (ed.) Letters *of Agar Adamson, 1914 to 1919.* Nepean: CEF Books, 1997.

Drummond, Albert. *Rhymes of a Hut-Dweller.* Np:np, 1918.

Guiou, Norman. *Transfusion: A Canadian Surgeon's Story in War and in Peace.* Yarmouth, NS: Stoneycroft Publishers, 1985.

Gunn, John. *Historical Records of No. 8 Canadian Field Ambulance: Canada, England, France, Belgium, 1915-1919.* Toronto: Ryerson Press, 1920.

Haigh, R.H. and P.W. Turner (eds.) *The Long Carry: The Journal of Stretcher Bearer Frank Dunham, 1916-18.* Toronto: Pergamon Press, 1970.

Keene, Louis. *"Crumps": The Plain Story of a Canadian Who Went.* Boston: Houghton

Mifflin Company, 1917.

Livesay, J.F.B. *Canada's Hundred Days: With the Canadian Corps from Amiens to Mons, Aug.8-Nov.11, 1918.* Toronto: T. Allen, 1919.

Manion, R.J. *A Surgeon in Arms.* New York, London: D. Appleton and Company, 1918.

-- *Life is an Adventure.* Toronto: Ryerson Press, 1936.

Mathieson, William (ed). *My Grandfather's War: Canadians Remember the First World War, 1914-1918.* Toronto: Macmillan, 1981.

Nasmith, George. *On the Fringe of the Great Fight.* Toronto: McClelland, Goodchild and Stewart, 1917.

Norris, Marjorie. *Medicine and Duty: The World War I Memoir of Captain Harold W. McGill, Medical Officer, 31st Battalion C.E.F.* Calgary: University of Calgary Press, 2007.

Noyes, Frederick. *Stretcher Bearers... at the Double! History of the Fifth Canadian Field Ambulance Which Served Overseas during the Great War of 1914-1918.* Toronto: Hunter-Rose Co.,1937.

Rae, Herbert. *Maple Leaves in Flanders Fields.* Toronto: William Briggs, 1916.

Roy, Reginald (ed.) *The Journal of Private Fraser, 1914-1918.* Victoria, BC : Sono Nis Press, 1985.

Scott, Frederick. *The Great War As I Saw It.* Toronto: F.D. Goodchild, 1922.

Snell, Arthur. *The C.A.M.C. with the Canadian Corps during the Last Hundred Days of the Great War.* Ottawa: F.A. Acland, 1924.

Wallace, O.C.S. (ed.) *From Montreal to Vimy Ridge and Beyond: The Correspondence of Lieut. Clifford Almon Wells, B.A. of the 8th Battalion, Canadians, B.E.F. November, 1915- April 1917.* Toronto: McClelland, Goodchild and Stewart, 1917.

Wallace, Cuthbert and John Fraser. *Surgery at a Casualty Clearing Station,* London: A. and C. Black, 1918.

Contemporary Journal Articles

Aikens, W.H.B. "The Medical Profession and the War." *Canadian Medical Association Journal* (1915): 157-162.

Anonymous, "Self Mutilation by Soldiers." *British Medical Journal* May 1915.

Archibald, Edward. "A Brief Survey of Some Experiences in Surgery of the Present War." *Canadian Medical Association Journal* (1916): 775-795.

Armstrong, George. "The Influence of War on Surgery, Civil or Military." *Canadian Medical Association Journal* 9 (1919): 396-405.

Beavis, Dr. J. Hartnell and H.S. Souttar, "A Field Hospital in Belgium," *British Medical Journal,* January 1915.

Buist, H. "Motor Ambulances for War Service" *British Medical Journal.* January, 1915.

Forrest, Major. "Sanitation of Camps" *British Medical Journal* March 1915.

Gunn, Colonel J.A. "Lessons from War Surgery." *Canadian Medical Association Journal* 10 (1920): 354-361.

Gwyn, Lieutenant Colonel N.B. "Wounds of the Chest." *Canadian Medical Association Journal* 10 (1920): 50-62.

Hebblethwaite, Stuart. "Treatment of Chlorine Gas Poising by Venesection." *British Medical Journal.* July 1916.

Malloch, T.A. "Correspondence from the Seat of War – Burley-on-the-Hill, Rutland, September 25th, 1915." *Canadian Medical Association Journal* 5 (1915): 1030-1040.

--"Correspondence from the Seat of War – La Panne, Belguim, May 20th, 1915." *Canadian Medical Association Journal* 5 (1915) 728-740.

McCullough, J.W.S., "Sanitation in War." *Canadian Medical Association Journal,* 9 (1919): 783-793.

Primrose, Lieutenant-Colonel A. and Major Ryerson. "Direct Transfusion of Blood: Its Value in Haemorrhage and Shock in the Treatment of the Wounded of War." *British Medical Journal* August 1916.

Roman, C. Lightfoot, "Severe Industrial Injuries to the Fingers and their Treatment." *Canadian Medical Association Journal,* 13, 1923.

Tubby, A.H. "Cases of Nerve Concussion Due to Bullet and Shell Wounds." *British Medical Journal* January 1915.

Wyatt, Bernard. "Industrial Medicine." *Canadian Medical Association Journal* 13 (1923): 114-117.

--"Industrial Medicine: Its Motives and Merits." *Canadian Medical Association Journal* 13 (1923): 660-663.

Secondary Sources

Bamji, Andrew, "Facial Surgery: The Patients' Experience," in Hugh Cecil and Peter Liddle (eds.), *Facing Armageddon: The First World War Experienced.* London: Cooper, 1996.

Barkley, Katherine. *The Ambulance: The Story of Emergency Transportation of Sick and Wounded Through the Centuries.* New York: Expedition Press, 1978.

Bishop, Arthur. *Our Bravest and Our Best: The Stories of Canada's Victoria Cross Winners.* Toronto: McGraw-Hill Ryerson, 1995.

Bliss, Michael. *Harvey Cushing: A Life In Surgery.* Toronto: University of Toronto Press, 2005.

Beatrix Brice. *The Battle Book of Ypres.* Stevenage, U.K.: Spa Books, 1987.

Bremner, J.D. et al. "Chronic PTSD in Vietnam Combat Veterans: Course of Illness and Substance Abuse." *American Journal of Psychiatry,* 153 (March, 1996):139-75.

Bricknell, M.C. "The Evolution of Casualty Evacuation in the British Army 20th Century Part One: Boer War to 1918." *Journal of the Royal Army Medical Corps,* (June, 2002), 148(2): 200-7.

Brooks, Lillie A. (ed). *The Band of Purple: A Collection of Canadian Poems.* Toronto: Oxford University Press, 1915.

Cartwright, Frederick. *The Development of Modern Surgery from 1830.* New York: Thomas Y. Crowell, 1967.

Cassar, George. *Beyond Courage: The Canadians at the Second Battle of Ypres*. Ottawa: Oberon, 1985.

Christie, N.M. *Gas Attack! : The Canadians at Ypres, 1915.* Nepean, Ontario: CEF Books, 1998.

-- *Futility and Sacrifice: The Canadians on the Somme, 1916.* Nepean, Ontario: CEF Books, 1998.

-- *The Canadians at Cambrai and the Canal du Nord, September-October, 1918: A Social History and Battlefield Tour.* Nepean, Ontario: CEF Books, 1997.

Cook, Tim. *No Place to Run: The Canadian Corps and Gas Warfare in the First World War.* Vancouver: UBC Press, 1999.

--*Clio's Warriors: Canadian Historians and the Writing of the World Wars.* Vancouver: UBC Press, 2006.

Cooter, Roger. "War and Medicine," in W.F. Bynum and Roy Porter (ed.), *Companion Encyclopedia of the History of Medicine, Volume Two.* London and New York: Routledge, 1993.

--"Malingering in Modernity: Psychological Scripts and Adversarial Encounters During the First World War," in Roger Cooter et al (ed.), *War, Medicine and Modernity.* Sutton Publishing: Gloucestershire, 1998.

Cooter, Roger and Steve Sturdy. "Of War Medicine and Modernity: Introduction," in Roger Cooter et al (ed.), *War, Medicine and Modernity.* Gloucestershire: Sutton Publishing, 1998.

Corns, Cathryn and John Hughes-Wilson. *Blindfold and Alone: British Military Executions in the Great War.* London: Cassell, 2001.

Cowdrey, Albert. *Fighting for Life: American Military Medicine in World War II.* New York: Maxwell Macmillan International, 1994.

Crerar, Duff. *Padres in No Man's Land: Canadian Chaplains in the Great War.* Montreal: McGill-Queen's University Press, 1994.

Crosby, William. "The Golden Age of the Army Medical Corps: A Perspective from 1901," *Military Medicine* 148, no. 9, September 1983. 707-711.

Dancocks, Daniel. *Legacy of Valour: The Canadians at Passchendaele.* Edmonton: Hurtig, 1986.

Duguid, Colonel A. Fortescue. *Official History of the Canadian Forces in the Great War, 1914-1919.* Ottawa: J.O. Patenaude, Printer to the King, 1938-

Evans, Martin Marix. *The Battles of the Somme.* London: Weidenfeld & Nicolson, 1996.

Flannery, Michael A. *Civil War Pharmacy: A History of Drugs, Drug Supply and Provision, and Therapeutics for the Union and Confederacy.* New York and London: Pharmaceutical Products Press, 2004.

Gabriel, Richard and Karen Metz. *A History of Military Medicine* Volume 1*: From Ancient Times to the Middle Ages.* New York: Greenwood Press, 1992.

--*A History of Military Medicine* Volume 2*: From the Renaissance through Modern Times.* New York: Greenwood Press, 1992.

Garrison, Fielding. *Notes on the History of Military Medicine.* Washington D.C.: Association of Military Medicine, 1922.

Garvin, John (ed). *Canadian Poems of the Great War.* Toronto: McClelland & Stewart, 1918.

Gilbert, Martin. *The Battle of the Somme: The Heroism and Horror of War.* Toronto: McClelland & Stewart, 2006.

Godefroy, Andrew B. *For Freedom and Honour?: The Story of the 25 Canadian Volunteers Executed in the First World War.* Nepean, Ontario: CEF Books, 1998.

Godfrey, Charles. *Bruce: Surgeon, Soldier, Statesman, Sonofa.* Madoc, Ontario: Codam Publishers, 2001.

Gooch John (ed). *The Boer War: Direction, Experience, and Image.* London: Frank Cass, 2000.

Greenhous, Brereton and Stephen J. Harris. *Canada and the Battle of Vimy Ridge, 9-12 April 1917.* Ottawa: Deptartment of National Defence and Directorate of History and Heritage, 1992.

Griffith, Paddy. *Battle Tactics of the Western Front: The British Army's Art of Technology and the Canadian Corps, 1914-1918.* New Haven: Yale University Press, 1994.

Haber L.F. *The Poisonous Cloud: Chemical Warfare in the First World War.* Oxford: Oxford University Press, 1986.

Haycock, Ronald, *Sam Hughes: The Career of a Controversial Canadian, 1885-1916.* Waterloo: Wilfrid Laurier Press, 1986.

Hayes, Geoff, et al. (eds.), *Vimy Ridge: A Canadian Reassessment.* Waterloo, Ontario: Wilfrid Laurier University Press, 2007.

Herman, Jan K. *Battle Station Sick Bay: Navy Medicine in World War II.* Annapolis, Maryland: Naval Institute Press, 1997.

Holloway, Harry. "Epidemiology of Heroin Dependency Among Soldiers in Vietnam." *Military Medicine* 139 (February, 1974): 108-113.

Humphries, Mark. "The Myth of the Learning Curve in the 12th Infantry Brigade 1916-1918," *Canadian Military History,* Volume 14, Number 4, (Autumn 2005): 15-30.

Hyatt, A.M.J. and Nancy Geddes Poole. *Battle for Life: The History of No. 10 Canadian Stationary Hospital and No.10 Canadian General Hospital in Two World Wars.* Waterloo: LCMSDS, 2004.

Judd, Denis and Keith Surridge. *The Boer War,* London: John Murray, 2002.

Julliard, J. "Blood Transfusion during the war of 1914-1918." *Revue de Corps dev Santé des Armées:* Terre, Mer, Air, et du Corps Vétérinaire 7 (November1966): 821-38.

Laffin, John. *Surgeons in the Field.* J.M. Dent: London, 1970.

Levy, Howard. "The Military Medicinemen," in John Ehrenreich (ed.), *The Cultural Crisis of Modern Medicine*. London and New York: Monthly Review Press, 1978.

Liddle, Peter (ed). *Passchendaele in Perspective: The Third Battle of Ypres.* London: Leo Cooper, 1997.

Litalien, Michel. *Dans le Tourmente: Deux Hôpitaux Militaires Canadiens-Français dans la France en Guerre (1914-1919)* Outremont: Athéna Editions, 2003.

Macphail, Andrew, Sir. *Official History of the Canadian Forces in the Great War, 1914-19: The Medical Services.* Ottawa: F.A. Acland, 1925.

Macpherson, Sir W.G. et al. *History of the Great War Based on Official Documents: Medical Services. General History*. London: HMSO, 1924.

-- *History of the Great War Based on Official Documents: Medical Services: Surgery of the War.* London: HMSO, 1922.

McWilliams, James and R. James Steel. *Amiens: Dawn of Victory* Toronto: Dundurn Press, 2000.

Miller, Carman. *Painting the Map Red: Canada and the South African War, 1899-1902.* Montreal and Kingston: Canadian War Museum and McGill-Queen's University Press, 1993.

Morton, Desmond. *When Your Number's Up: The Canadian Soldier in the First World*

War. Toronto: Random House, 1993.

--"Military Medicine and State Medicine: Historical Notes on the Canadian Army Medical Corps in the First World War, 1914-1919." Naylor, David (ed). *Canadian Health Care.* Montreal: McGill-Queen's University Press, 1992.

Motion, Andrew (ed). *First World War Poems.* London: Faber and Faber, 2003.

Nicholson, Gerald. *Seventy Years of Service: A History of the Royal Canadian Army Medical Corps.* Ottawa: Borealis Press, 1977.

--*Canadian Expeditionary Force: Official History of the Canadian Army in the First World War.* Ottawa: Roger Duhamel, Queen's Printer and Controller of Stationery, 1962.

--*Canada's Nursing Sisters.* Toronto: Samuel Stevens, Hakkert, 1975.

Norris, Marjorie. *Sister Heroines: The Roseate Glow of Wartime Nursing 1914-1918.* Calgary: Bunker to Bunker, 2002.

Pelis, Kim. "Taking Credit: The Canadian Army Medical Corps and the British Conversion to Blood Transfusion in World War 1." *Journal of History of Medicine and Allied Sciences,* 2001, 56(3): 238-277.

Prior, Robin and Trevor Wilson. *Passchendaele: The Untold Story.* New Haven, CT: Yale University Press, 1996.

--*Command on the Western Front: The Military Career of Sir Henry Rawlingson, 1914-1918.* Oxford: Basil Blackwell, 1991.

Pugsley, Christopher. "Learning from the Canadian Corps on the Western Front," *Canadian Military History,* Volume 15, Number 1, winter 2006, 5-32.

Putkowski, Julian and Julian Sykes. *Shot at Dawn: Executions in World War One by Authority of the British Army Act.* London: Cooper, 1992.

Rawling, Bill. *Death Their Enemy: Canadian Medical Practitioners and War.* Québec: AGMV Marquis, 2001.

--*Surviving Trench Warfare: Technology and the Canadian Corps, 1914-1918.* Toronto: University of Toronto Press, 1992.

Schnieder, W.H. "Blood Transfusion between the Wars." *Journal of the History of Medicine and Allied Sciences.* 58(2): (April 2003): 187-224.

Stevens, H. "The Influence of War on the Craft of Surgery." *Journal of the Royal Army Medical Corps* 62, (1934): 40-46.

Sturdy, Steven. "From Trenches to the Hospitals at Home: Physiologists, Clinicians and Oxygen Thearpy, 1914-1930." In J.V. Pickstone (ed.), *Medical Innovation in Historical Perspective.* Macmillan: London, 1992.

--"War as Experiment: Physiology, Innovation and Administration in Britain, 1914-1918: The Case of Chemical Warfare." In Roger Cooter et al (ed.), *War, Medicine and Modernity.* Sutton Publishing: Gloucestershire, 1998.

Terraine, John. *To Win a War: 1918, The Year of Victory.* London: Sedgwick and Jackson, 1978.

Vance, Jonathan. *Objects of Concern: Canadian Prisoners of War Through the Twentieth Century.* Vancouver: UBC Press, 1994.

Welsh, Jack D. *Medical Histories of Confederate Generals.* Kent, Ohio: Kent State University Press, 1995.

Websites

Nova Scotia medical register
http://www.library.dal.ca/kellogg/digitalcoll/MedicalRegisterNS/mrns.htm

Hague Convention Respecting the Laws and Customs of War and Land of 1907
http://wwi.lib.byu.edu/index.php/Hague_Convention

Appendix "A"- Classification of Wounded Soldiers

A – Fit for General Service

i) Men actually fit for general service overseas in all respects, both as regards training and physical and mental qualifications

ii) Men who have not been Overseas who should be fit for A(i) as soon as trained

iii) Overseas casualties on discharge from Hospital or Command Depots who should be fit for A(i) as soon as hardening and training is completed in Reserve Units.

iv) Men under 19 years of age who should be fit for A(i) or A(ii) as soon as they are 19 years of age.

B – Not fit for General Service, but fit for service overseas or in the British Isles under the following conditions:

i) In railway, C.A.S.C., Forestry and Labour units, and upon work of a similar character.

ii) In Forestry, Labour, C.A.M.C. (Base Units), Veterinary Units and on garrison or regimental outdoor employment.

iii) On sedentary work, as clerks, storemen, batmen, cooks, orderlies, on sanitary duties, etc. or if skilled tradesmen, at their trades.

D – Temporarily unfit for service in Categories "A" of "B", but likely to become fit within six months, and in meanwhile either:

i) In Command Depots

ii) In any unit, under or awaiting medical treatment (who on completion of treatment will rejoin their own original category.)

E – Unfit for service in categories "A" or "B" and not likely to become fit within 6 months, awaiting discharge.[1]

[1] Library and Archives of Canada [LAC]: Department of Militia and Defence [DMD] Records, RG 9 III A1, volume 85, file 10-12-1, Memorandum on Categories of Classification of Wounded Soldiers, January 1918.

Curriculum Vitae

Heather Lea Moran

EDUCATION

2002-2007 **University of Western Ontario** **London, Ontario**
PhD- History

Dissertation:

Stretcher-Bearers and Surgeons: Canadian Front-line Medicine in the First World War.

Comprehensive Exam Fields:

Canada from Confederation to Modern Canada: A field designed for teaching that covered a wide range of topics such as Canadian politics, relations with the United States, social and military history as well as foreign policy.

Twentieth Century United States: A field designed for teaching that covered a wide range of topics such as American politics, relations with Canada, social and military history as well as foreign policy.

International Relations from The Congress of Vienna to Decolonization, 1815-1970: Focused on issues of power, economics, war and peace-making in a global context.

2001-2002 **Wilfrid Laurier University** **Waterloo, Ontario**
Master's of Arts- History

Thesis: *And Still They Answered the Call: The Women of Waterloo County, 1939-1947.*

1998-2001 **University of Waterloo** **Waterloo, Ontario**
Bachelor of Arts- History

AWARDS AND GRANTS

2006-2007 **Associated Medical Services** **Toronto, Ontario**
Hannah Foundation for the History of Medicine Senior PhD Scholarship valued at $20,700.

2005-2006 **University of Western Ontario** **London, Ontario**
Nominated for the Graduate Teaching Assistant of the Year Award

2005-2006 **Associated Medical Services** **Toronto, Ontario**
Hannah Foundation for the History of Medicine Senior PhD Scholarship valued at $20,700.

2004-2005 **University of Western Ontario** **London, Ontario**

Special University Scholarship valued at $7,900.

2003-2004 **University of Western Ontario** **London, Ontario**
Nominated for the Graduate Teaching Assistant of the Year Award

2003-2004 **University of Western Ontario.** **London, Ontario**
Special University Scholarship valued at $7,900.

2002-2003 **University of Western Ontario.** **London, Ontario**
Special University Scholarship valued at $7,900.

2002 **Waterloo Heritage Foundation** **Waterloo, Ontario**
Research Grant for Master's of Arts Thesis valued at $2,500.

2001-2002 **Wilfrid Laurier University.** **Waterloo, Ontario**
Entrance Scholarships.

ACADEMIC ACCOMPLISHMENTS

Forthcoming ***Canadian Bulletin of Medical History*** **(Refereed)**
Article: The Lynch-Pin of the Medical Service: The Evolution of the Canadian Casualty Clearing Station during the First World War.

Spring 2007 **Military History Colloquium**
Presentation of a paper entitled: "Clearing from the Front: The Evolution of Casualty Evacuation in the CAMC During the First World War.

Spring 2007 ***Vimy Ridge: A Canadian Reassessment***
An edited compliation of articles to be published by the Laurier Centre for Military Strategic and Disarmament Studies. Chapter: The Canadian Army Medical Corps at the Battle of Vimy Ridge, 9-12 April 1917.

May 2006 **Military History Colloquium**
University of Western Ontario conference presentation of a paper entitled "The Canadian Army Medical Corps at the Battle of Vimy Ridge, 9-12 April 1917."

Spring 2004 ***Canadian Military History Book Review Supplement.***
Book review of Joan MacDonald, *Our Mornings May Never Be: Memoirs of a WAAF Sergeant... and Beyond* (Burnstown, Ontario: General Store Publishing House).

Autumn 2003 ***Canadian Military History Book Review Supplement.***
Book review of Brent Watson's *Far Eastern Tour: The Canadian Infantry in Korea, 1950-1953* (Montreal and Kingston: McGill-Queen's University Press, 2002).

Autumn 2003 ***Canadian Military History Book Review Supplement.***
Book Review of Michael Stevenson's *Canada's Greatest Wartime Muddle: National Selective Service and the Mobilization of Human Resources during World War II* (Montreal and Kingston: McGill-Queen's University Press, 2001)

August 2000 **Military History Colloquium**
Wilfrid Laurier University conference presentation of a paper entitled "My Grandparents War"

TEACHING EXPERIENCE

2002-2006 **University of Western Ontario** **London, Ontario**
Teaching Assistant
A teaching assistant in History 231, a second year survey course of Canada from colonial times to modern Canada. My duties were to serve as a tutorial leader in order to create discussion and debate about moments and decisions in Canadian history; to grade papers and exams; to create a list of essay topics and exam questions each year in conjunction with the other teaching assistants in the class. Teaching Assistants are also encouraged to give lectures on the various subjects explored. To date I have given three lectures in History 231 on aspects of Canada's involvement in World War II.

2001- 2002 **Wilfrid Laurier University** **Waterloo, Ontario**
Teaching Assistant
My duties were to grade exams and essays for a first year survey course in American History.

VOLUNTEER WORK

2004-2005 **Promotions and Tenure Committee** **London, Ontario**
Graduate Student Representative
In this position I was responsible, as part of a committee of professors, for the hiring of a professor for a tenure track position in the History department at the University of Western Ontario.

2002 **Canadian Institute of International Affairs** **Waterloo, Ontario**
Board of Directors/ Co-Program Director
My responsibilities included overseeing the executive and helping to organize dinners and events with speakers on international affairs as well as student recruitment.

2000-2001 **University of Waterloo** **Waterloo, Ontario**
President, History Society
My responsibilities included overseeing a thirteen person executive, hosting meetings, co-coordinating with the Faculty of History and the Arts Student Union, ensuring the budget was upheld and dealing with student concerns. In addition, I had to plan and see through several events such as a popular trivia night pitting the graduate students against the undergraduates, the annual MacKinnon Dinner, a formal event with a dinner speaker honouring the late Hugh MacKinnon and the department Christmas party.

1998-1999 **University of Waterloo** **Waterloo, Ontario**
Treasurer, Arts Student Union
My responsibilities included writing and maintaining the yearly budget, management of a previous debt, and overseeing the running of the Arts Student Union Coffee Shop.

1998-2001 **University of Waterloo** **Waterloo, Ontario**
Undergraduate Representative to the Arts Faculty Council
My responsibilities were to attend meetings, report to the Arts Student Union Council and voice student concerns with the direction and programming of arts to the Faculty members.

ASSOCIATION MEMBERSHIPS

Canadian Institute of International Affairs
Canadian Historical Association
Canadian Society for the History of Medicine