1. The st least fill and the second states with the

War

Hom Times & Files

Compiled by the William P. Didusch Museum of Urologic History with special contributions from the National Museum of Civil War Medicine

ledeine

J1V1

Civil War Medicine

The U.S. Civil War (1861-1865) brings many images to mind-blue and gray uniforms, the Southern Cross and the surrender at the Appomattox courthouse, but none are quite as compelling as those of the wounded. Both on the battlefield and in field hospitals, physician surgeons with little medical training were given the enormous task of treating thousands of men over the course of the four-year war.

Many initially believed the conflict would be shortlived but early Union defeats and an ultimate stalemate between the North and South resulted in massive call-ups for soldiers, and within the first year both sides had a draft procedure in place.¹ The result was hundreds of thousands of men in place to be injured and require medical attention. Lessons on sanitation learned from the recent Crimean War (1854-1856) had crossed the Atlantic-and though included in texts used by the military, were rarely applied by the surgeons working on both sides of the Mason Dixon Line during the War Between the States. Major discoveries and social advancement from the Civil War included: the use of anesthesia and pharmaceuticals, triage implementation, urgent care transport, the role of woman as nurse and prosthetics.

Letter from Dr. Melvin Hyde to his family, December 1864



Original case and Ambrotype of Dr. Hyde on his horse, "Major"

n of 2 d 17 m

From the Battlefield: One Surgeon's Story

Melvin John Hyde, M.D. was among the many selfless physicians who served in the Civil War to aid his fellow soldiers. For nearly three years he served as a surgeon of the Second Vermont regiment–leaving his family and the comforts of home to assist his wounded, dying comrades on the field. With special thanks to his second great granddaughter Geraldine Frances Chittick, and her contribution *In The Field: Dr. Melvin John Hyde*, we are able to share with you Dr. Hyde's journey through the Civil War through the ongoing sidebar of this book.



he Confederacy attacked Fort Sumter in Charleston, South Carolina on April 12, 1861, igniting the bloodiest war in U.S. history. Within a week, President Abraham Lincoln had issued a proclamation calling for 75,000 militiamen to fight for the Union, offered Robert E. Lee command of the Union Army and issued a Proclamation of Blockade on Southern ports." Lee, a former superintendent at West Point and a southerner by birth, declined the offer-choosing instead to join the Confederate Army. He resigned his commission in the U.S. Army on April 20, eventually to assume command of Virginia forces. By July, Congress had called for more than 500,000 men to join Union forces in fighting the Confederacy and the Union suffered its first major loss at the Battle of Bull Run in Manassas, VA. The battles had begun, as had the casualties.

Many historians agree that the Civil War took place at a transitional period in tactical planning, weaponry and medicine. The fact that weaponry was far more advanced than tactical planning and medicine resulted in devastating war casualties.



Minie Balls

Firearms in the Civil War had shifted from bayonets, swords and cannons, to rifles (some with telescopic sights), revolvers and rapid-fire guns. Each weapon had its own style of ammunition—from conical bullets to buckshot; but no Civil War ballistic projectile was quite as devastating to the human body as the minie ball.

Made from soft lead that expanded when it hit bone, the minie ball caused large gaping holes in its victim-destroying arteries, muscles and tissues. This treacherous projectile-lethal at long distances- was responsible for many of the amputations performed during the war. It was written by surgeons at the time that "interior human organs tended to evacuate rapidly from a minie ball's hot path, literally tearing themselves apart."ⁱⁱⁱ The fact that officers conducting maneuvers were still making tactical decisions using ranges for the close-combat bayonet made the minie ball all the more fatal.

Physician training, on the other hand, was not advanced. Despite the fact that medical training had existed since very early in the country's development, it lagged far behind weapons technology. John Morgan, M.D., the first surgeon general of the Continental Army, founded the Philadelphia College of Medicine in 1765. Prior to the Civil War, there were 63 medical schools in the country: 48 in the North, 14 in the South and one in San Francisco on the West Coast.^{iv} All but one Southern teaching institution– the Medical College of Virginia in Richmond–closed at the start of the Civil War. To obtain a medical degree, a student needed two years of classroom teaching

and three years of preceptorship. Prior to the war, there were only 114 surgeons in the United States Surgeon General's Office; when the war began, 24 resigned to the Confederate medical services.^v



F10. 93.-Comminuted shot fracture of femur. Spet 1279

During the American Civil War, two out of three deaths were the result of disease, rather than injury. Physicians treated six million illnesses compared to 400,000 battle wounds.^{vi} In many ways, the disease mirrored that of the Crimean War (1854-1856). However, while much was learned during the Crimean War, many lessons – though documented in medical texts – were not applied immediately during the War Between the States. Rather, they were learned first-hand.



Born May 19, 1828 in Vermont, Dr. Hyde obtained his medical degree after attending Dartmouth College from 1851 to 1852. In 1863, Dr. MLATE LXXVI

Hyde was commissioned assistant surgeon in the Second Vermont Volunteers. In September of that year, he joined his regiment in New York and served as an assistant surgeon and later as surgeon from September 1863 to June 1865.



One Surgeon's Story...

LACCHATION OF MIDNE LED BY BOXID BAS

After just a month of being on the front, Dr. Hyde grew accustomed to marching through rain and storms, preparing insufficient meals of bread and cold meat and lying in blankets on the earthy ground. Regardless of the hardships endured, Dr. Hyde nevertheless admired the soldiers, falling in step to their cadence. He wrote his wife:

I tell you it was a fine sight to see them on the march, our column extending, for miles or as far as the eye could see. To give you something of an idea I will explain by saying that a Corps consists of 3 Divisions, and each division consists of 3 Brigades, and each Brigade of 5 regiments, each regiment of 1,000 men, comprising in all about 45,000 men, but as our Corps during the war has lost men by sickness and in battle it does not number now over twenty thousand . . .

In October 1863, Dr. Hyde witnessed battles from Centerville to Fairfax, VA. Men, horses and supply trains were captured, and Dr. Hyde came very close to being killed. He marched with his men to Warrenton, VA. where in a brick church, the wounded lay restless.

I went up there yesterday and witnessed several amputations—a good many poor fellows were shot through the lungs and were still alive and apparently doing well...

Lighting the Path for Nurses: Nightingale and Seacole

One of the most recognizable images from the Crimean War is that of Florence Nightingale carrying a dim lamp and tending to wounded soldiers. In a day when nursing duties were handled by working-class women and disabled army veterans^{wi} and held in low regard, it was a shock to Nightingale's upper-class family when she announced her desire to become a nurse—rather than marry and take her presumed role in society. Instead, she would go on to be one of the most notable nurses in history, revolutionizing the hospital system with a series of changes that included the call-bell system.

When the Crimean War erupted in 1854,

Nightingale—and a contingent of 38 nurses—was dispatched by British Secretary of War (and family friend) Sir Sidney Herbert to the battlegrounds to tend to wounded. What they found in the field hospital was deplorable: no running water, overflowing latrines and wounded soldiers shivering while blankets rotted in a warehouse. Realizing that more wounded were dying from infection rather than the wounds themselves, Nightingale once again instituted much-needed change, working to befriend the doctors (who were concerned nurses would usurp authority) and reform hospital procedures.

Beyond her work in sanitation, Nightingale also arranged a letter-writing area and a means for men to send money home to Britain. She received a hero's welcome upon her return to England following the war, but her work on sanitation continued.

> Nightingale would go on to lobby for legislation in the British Parliament, working to demonstrate that the

major cause of death during the Crimean War was disease from improper sanitation and campaigning to improve the quality of military hospital nursing.^{svii} Following the war, Nightingale authored two books published in 1859, *Notes on Nursing* and *Notes on Hospital* and ultimately went on to found the Nightingale School & Home for Nurses at St. Thomas's Hospital.^{svii}

A contemporary of Nightingale, Mary Seacole would also make invaluable contributions to nursing during the Crimean War. The daughter of a free Black woman and a Scottish soldier, Seacole held an awkward social position in her home town on Kingston, Jamaica.* Her mother managed a boarding house for invalid British soldiers, so Seacole grew up with contact with military doctors and observations on patient care. She was helping her mother tend to patients at the tender age of 12, and ultimately established her own facility when she came of age.^{xviii} Her later experiences treating cholera and yellow fever epidemics in Jamaica and Panama were a testament to her skill as a healer.

After the Crimean War broke out, Seacole traveled to London to volunteer her services to military agencies, the War Office and Florence Nightingale's nursing contingent. However, after being told she was not needed, Seacole traveled on her own to the front—and began her legendary work on the battlefield aiding the sick and wounded.^{xviii} Seacole, like Nightingale, held the belief that sanitation, warmth, isolation and nourishment were key treatments for the sick and wounded, and she focused these tenets through her own boarding house near Balaclava—where she offered cleanliness and healthy food to soldiers and officers.^{xix}

Though her initial contribution to the war effort came with the boarding house, The British Hotel, Seacole also spent evenings volunteering with Nightingale and worked with enlisted men who did not want to spend time in a hospital. While Nightingale was known for walking hospital wards with her lamp, Seacole was known for walking the battlefield in her colorful attire and blue bonnet with red ribbons. She rivaled Nightingale's "administrative and statistical achievements" by working at the front lines to tend to wounded.xix In fact, she was the first woman to enter the city of Sebastopol and tend to the injured when it fell on September 8, 1855.xviii War journalist William Russell wrote that Seacole justified her proficiency in healing "by many cures and by removing obstinate cases of diarrhoea, dysentary and similar camp maladies."xix

* Slaves were not freed in the West Indies until 1834. However, although Seacole was not a slave, she was still subject to the prejudices against Blacks at the time.

lbeit relatively short, the Crimean War (1854–1856) is considered by many to be one of the most disorganized, bloody conflicts in the 19th century.vii Arising from a dispute over holy places in Jerusalem, the war pitted the Muslim Ottoman Turks against the Eastern Orthodox Russians and, ultimately, the Roman Catholics of France. Britain entered the fray to control Russian expansionism in the Mediterranean, despite its long-standing disagreement with France. While wars between Russia and Turkey had existed back to the 15th century, the Crimean War introduced an entirely new style of warfare to the civilized world: the use of deadly accurate rifles."

While there were other new technologies used initially during the Crimean War-significant telegraph use, trench combat, tactical railway usage, battlefield journalism, wet collodion photography and undersea mines-it was rifle technology that made the conflict fraught with injury.viii The extent of these casualties led to many life-saving medical innovations; many of these advancements were used by physiciansurgeons during future conflicts. However, despite the great strides made during the Crimean War, nearly 120,000 men were killed in battle and nearly 500,000 "succumbed to disease and other hazards."ix The Crimean War also put in place stepping stones for the role of the woman as nurse-in hospitals and on the battlefield. Two women who left major marks on medicine as a result of their work in Crimea were Florence Nightingale and Mary Seacole.

The Civil War opened up a new profession for women in the United States—on both the Union and Confederate fronts.^x Offering their services to the Sanitary Commission, women were eager to assist. "The month of April 1861," wrote the commission president, "was distinguished not more by the universal springing of the grass than by the uprising of the women of the land." Prior to the Civil War, the nursing profession was made up almost entirely of soldiers or invalid veterans.^{xi} This brought a

Lessons from Crimea

series of problems: Invalid veterans could be too feeble to tend to patients; able-bodied men were called back to the lines as soon as they learned enough to be valuable; and men were against cleaning—seeing it as women's work.^{sii}

Dorothea Dix, who played a major role in the development of insane asylums prior to the war, offered her assistance to the Union Secretary of War in April 1861, and was appointed Superintendent of Female Nurses by that June. That same year, Congress legalized "female" nurses and acknowledged that women could be substituted for men "in general or permanent hospitals when it seems desirable to the Surgeon General or the surgeon in charge."^x While a social debate about the role of women in the hospitals ensued, an "irrefutable argument" was that women would make sure the hospitals were clean.^{xiii}

Dix placed strong qualifications and restrictions (including age and appearance) on her team of nurses, and applicants were personally examined to ensure they met her standards. Nuns also worked as volunteers, and in some cases were more satisfactory to the surgeons than Dix's nurses. However, despite social taboo, by and large women nurses in general were welcomed by both the Union and Confederate armies.^{xiv, xv}

By the end of the war, the woman-to-man ratio of nurses was one to four or five.





Dorothea Dix



Florence Nightingale

Tent city in the Crimean War

Lpplied Sanitation ollowing the lessons on sanitation learned and preached by Florence Nightingale during and after the Crimean War, the U.S. Sanitary Commission was organized at the beginning of the Civil War, and was funded and supplied through the efforts of volunteer women. Officially recognized by President Lincoln on June 9, 1861, the group gathered commodities such as bandages, quilts, food, clothing and medicines and delivered them-to Confederate soldiers in hospitals and to Union soldiers on the battlefield. The commission included a group of inspectors who toured camps and hospitals to report on supplies and conditions.



Beyond the Sanitary Commission, both the Union and the Confederate armies also took additional steps to help fight disease in general hospitals and cleanliness was insisted upon. New admissions in hospitals were bathed as soon as their condi-

tion warranted, beds were arranged a certain distance apart and infected padding was removed from bedding when need-

ed.xx Additionally, officers were tasked with inspecting both general and field hospitals.

many physicians did understand a connection between "malarial miasms" and swamps, "crowd poisoning" among camps where men packed together in stuffy tents and "mephitic effluvia"-which

The "sanitarians" of the time preached the hygienic qualities of fresh air, sunlight and dry ground to fight these conditions, and urged a war on dirt and bad smells.xxi However, despite the movement toward more sanitary conditions in camps, many surgeons attempting to implement hygienic procedures were snubbed.

In the Peninsular and Bull Run campaigns, it was said that filth led to the excessive sickness that may have caused the Army of the Potomac's defeat.

"When garbage lies everywhere in the company streets and the air has a noisome odor both within and without the tents," one medical director wrote, "We have found, also that the men are dirty, ragged and sickly-their muskets are rusty and out of order."xxii

By May 1863, an order had been issued to the Army of the Potomac that formalized Union Army sanitary practice – both for camps and for personal hygiene.^{xxiii} Men were to keep their hair cut short, change their clothing at least once a week and bathe twice a week. Tents were taken down twice a week to allow sunlight to reach the floors and contents. Refuse was burned or buried on a daily basis, and

everywhere in the company streets and the air has a noisom While medical theory at the time odor both within and without the did not include the concept of bacteriology, tents, we have found, also that the men are dirty, ragged and sickly hovered around privies and unburied carbage xi _ Thim A wine Modical Director

When garbage lies

J.S. Sanitary Commission, Washington, D.C., taken during the war.

garbage was placed in a centralized area. Latrines were also given regulatory depths, and were covered by six inches of dirt each evening. Similar progress was also being made with other regiments throughout the Union–with Generals Ulysses S. Grant and George T. Sherman making hygiene an enforceable priority for their troops. However, many units needed to learn from experience the value of cleanliness and there were multiple large outbreaks of typhoid, dysentery and diarrhea (nicknamed the "Tennessee Quick Step"), which affected the majority of troops yearly.^{xiv}

The same lessons on cleanliness applied by soldiers in the camps were also applied in the hospital setting in treating battle wounded. One of the most horrible "surgical diseases" was hospital gangrene. While many are still at odds over its cause, an "overwhelming majority" of cases appear to have been bacterial.xxv In 1861, a statement from the British was released by the U.S. Sanitary Commission indicated that hospital gangrene was "contagious and infectious" and should be treated in isolation.xxvi The statement was based on Crimean War experience. When two outbreaks of the infection flared in 1862, the first among the Antietam wounded in Maryland and the second later that year in west Philadelphia, attention was paid to the contagion and steps were taken to contain the infection. One surgeon in Philadelphia, W.W. Keen, implemented sanitary guidelinesrequiring handwashing in diluted soda water, no re-use of bandages and dressings and nurses to tend and dress gangrenous wounds last when tending a patient.xxvi

Hospital gangrene was treated in numerous ways by surgeons – both excising the rotten tissue and covering it with turpentine-soaked lint; or applying nitric acid (recommended by the British Surgeon General), charcoal, yeast or carrot poultices. However, it was the use of bromine by a Louisville surgeon, Middleton Goldsmith, which changed the way hospital gangrene (which is different from gas gangrene)

19

was treated. Goldsmith began using bromine to treat the gangrenous injuries in 1862, injecting pure bromine in the edges of a freshly sloughed wound while the patient was under anesthesia. The surgical site was then covered with lint soaked with a diluted bromine solution. After three to 10 days, surgeons saw the healing of the wounds. The use of the solution was extremely effective-in one series of 334 cases of hospital gangrene, there was only a 2.6 percent mortality rate. The popular nitric acid remedy had a mortality rate of 61.5 percent.xxvii



Gangrene was one of the most horrible secondary infections of the time.

One Surgeon's Story.

In Fredericksburg, VA, Dr. Hyde was witness to one of the bloodiest battles of his career. Dr. Hyde's regiment was 1,000 men strong when it left, and on May 18 that number had dwindled to 140. He showed great selflessness; when all but 300 of the wounded men in the Brigade were permitted to go to Fredericksburg (along with the surgeons), he alone stood by the last 300 men, refusing to leave wounded men behind without food or medical aid. He wrote to Alice:

I accordingly remained and rode all night around the field to keep straggling horsemen from trampling on the wounded who lay all over the field without shelter or even a blanket. In the morning I cooked them some coffee which was left with me for them and passed it



around with some hard tack- I then detailed some stragglers to carry 33 of them on stretchers to a house about a quarter of a mile off as the poor fellows lay with the hot sun streaming into their faces, many of them half naked their clothes having been torn off to dress their wounds which were now covered with matter and smelt horribly.

Pharmaceutical Industry: Birth of an Empire



dward Robinson Squibb, M.D.

ne of the major legacies of the Civil War was the pharmaceutical industry inspired by the need of vast armies for effective, quality medications. In a day and age when herbal therapies were used and quackery was widespread, neither the Union nor Confederate medical corps was prepared for the tremendous demand for pharmaceuticals that would come. Prior to the Civil War, medical and hospital supplies of the U.S. Army were purchased and shipped through the medical purveying depot in New York City to smaller depots in the South and West for distribution. The war required that this system be expanded; Philadelphia became a second axis to the supply system of distributing medicines, surgical instruments, hospital beds and other supplies needed to treat the sick and wounded. Central production facilities for pharmaceuticals were also created, and functioned like commodities markets to drive up prices for articles of need such as quinine, sulphate or potassium permanganate. The warehouse in Philadelphia contained the products of John Wyeth and his brother Frank; the other was the U.S. Laboratory in Astoria, New York.

Pr. Letterman indicated that brigade would receive For the Union Army, pharmaceutical distribution bospital wagon, during the war evolved into a highly efficient manufacturing and distribution system that paved the way for



Dr. Jonathan Letterman made sure each brigade

rar evolved into a highly efficient manufacturing and distribution system that paved the way for today's pharmaceutical industry. For the Confederacy, however, it would turn into a system of blockade running, import from Europe, seizure of enemy supplies and trading with the Northern profiteers.^{xxviii}</sup> The value of mediiteers.^{xxviii}</sup> blockade running in North Carolina alone over the course of the war totaled \$170,933 in Confederate currency.

Much of the changes to medicine distribution and other areas of military medi-

cine were due in part to Surgeon General William Hammond and Jonathan Letterman, M.D., medical director for the Union Army of the Potomac. Following the bloody battle at Antietam, Dr. Letterman ensured that monthly medical supplies would be distributed to each brigade, and instituted a system for requisition and procurement of additional supplies.xxix In his report on the battle, Dr. Letterman indicated that each brigade would receive "one hospital wagon, filled; one medicine chest for each regiment, filled; one hospital knapsack for each regimental officer, filled."xxix Dr. Letterman took supply distribution very seriously and required that all supplies be signed for with receipts-by the surgeon in charge (for medicine chests and knapsacks) and by the ambulance quartermaster (for the hospital wagon, which included a horse and related tack).

Over the course of the war, the use of medicines is astounding: 539,712 pounds of magnesium sulphate, 22.8 million ounces of various opiates, nearly 10 million opium pills, nearly 1 million ounces of ether, nearly 1.6 million ounces of chloroform, 2 million ounces of cinchona (quinine) products and more than 1 million ounces of ipecac were used.^{xxx}

At the time, Edward Robinson Squibb, M.D. was manufacturing portable medicine chests and medications in his Brooklyn, NY facility. Dr. Squibb, a former surgeon in the U.S. Navy and the founder of the Naval Hospital laboratory in Brooklyn, had worked diligently to establish standards of purity and efficacy for medication, and also made key advances in distilling the then-unstable ether to provide a uniform distribution of the anesthetic.^{xxxi} His days in the Navy and time on a Mediterranean tour of duty inspired Dr. Squibb to procure "quality medicines for the Navy, and if they were not procurable, make them himself."xxxii He went on to test, assay and standardize many drugs used by the Navy, and set many standards for production-telling his staff, "Remember you do not kill one, you kill by thousands." He personally signed the labels of products he had tested or made.xxxiii He would go on to propose legislation in 1879 that would ultimately become the model for the Pure Food and Drug Act of 1906.

Major instrument companies were also functioning at the time in New York and Philadelphia, and over the course of the war, the U.S. Army purchased nearly 5,000 amputating and general operating cases; 1,150 trephining, exsecting, postmortem and personal instruments; nearly 13,000 minor surgery and pocket cases; and 64,000 tourniquets.

In addition to the Wyeth and Brother (now known as simply Wyeth) and E.R. Squibb & Sons (which, through mergers and acquisitions has evolved into Bristol-Myers Squibb) companies, other pharmaceutical companies played a role in the war effort. Pfizer (founded in Brooklyn in 1849) expanded production of numerous medicines and treatments to meet demands-including iodine, morphine, camphor and fungicides. Pfizer also produced mercurial compounds-some used for medical purposes and some used in photography. Some, such as Frederick Stearns & Company and William R. Warner & Co. were in business prior to the war. Others, such as Parke, Davis and Company, started business during the war. Still others, such as Eli Lilly, began after the war was over.

Eli Lilly and Company began with one man's war experience. Eli Lilly was only 23 years old when the Civil War broke out—a young pharmacist who had just opened his own pharmacy in 1861 in Indiana. He left a new business and a new wife to join the war effort soon after the start of the war—enlisting as a second lieutenant in the 21st Regiment of the Indiana Volunteer Militia. By 1862, the governor of Indiana granted Lilly a captain's commission and allowed him to form the 18th Indiana Battery of Light Artillery with 156 recruited men. Lilly's experience in the war led him to the Battle of Chattanooga, where his team served the brigade of Colonel John T. Wilder and disabled at least two Confederate cannons without suffering loss of men or guns. After being reassigned to a cavalry unit in 1864, Lilly and his unit attempted to stop what they believed was a small group of Confederate soldiers, but found themselves in the midst of 12,000 veteran Confederate calvalrymen. Vastly outnumbered and with all Union officers killed or wounded, Lilly found himself in charge and surrendered to the Southern troops. He was eventually part of a troop exchange, and left the army in August 1865 shortly after his promotion to full colonel. Following the war, Lilly witnessed personal tragedy at his plantation in Mississippi when his wife died of brain congestion and his business partner swindled his liquid funds.

Unsatisfied with the "poorly prepared, often ineffective medicines of the day," Colonel Lilly returned to Indianapolis, where he became a chemist with a wholesale drug house.xxxiv In 1869, he teamed up with a former Indiana Battery unit sergeant and opened a store that sold patent and veterinary medicines - and operated the "best soda fountain in town." He later expanded his operation and partnered with Dr. John F. Johnston, a dentist, and began to manufacture pharmaceuticals and chemical preparations. Though this endeavor ultimately resulted in another swindle, in 1876 Lilly rented a small two-story building and opened what is now known as Eli Lilly and Company. In 1886, a full-time scientist was hired, and the two men worked to develop new standards for quality evaluation and expanded into the development, research and discovery of new pharmaceuticals. In 1877, Lilly posted a profit of \$1,952.17xxxv and in 1898 launched one of its earliest innovations - the gelatin capsule. After five years in business, sales totaled more than \$80,000; in 1881 the company was incorporated. The company later went on to make other major contributions to medicine including human insulin, the rabies vaccine, Salk polio vaccine and antibiotics. The company remained family-operated-by Colonel Lilly's son and grandsons – until 1953.



Pharmaceutical giant Eli Lilly and Company was founded after the Civil War by veteran Colonel – and pharmacist– Eli Lilly.



arly battles in the Civil War demonstrated a need for means of transporting wounded from the battlefield and an order in which to treat them. Jonathan Letterman, M.D., medical director for the Union Army of the Potomac, has been credited for the many innova-

tions in urgent care transport and triage that were made during the war.

> Early in the war, Dr. Letterman outlined a plan for an ambulance system to transport wounded from the battlefield. The plan arranged for an ambulance corps – "with animals, transportation, personnel, and supplies complete, to be used for succoring and transporting sick and wounded men,

and for nothing else."xxxvi Following the 1861 battle of Manassas, VA, before the ambulance system was established, it took a week to clear the battlefield of wounded. One year later, after the war's bloodiest one-day battle–at Antietam, MD, on September 17, 1862–the battlefield was cleared of wounded in 24 hours through the ambulance corps. According to Dr. Letterman's report on the battle, there were more than 8,000 nitude of the engagement, the length of time the battle lasted, and the obstinancy with which it was contested, causing this to be the greatest and bloodiest action that ever took place on this continent, it is a matter of congratulation to speak of the expeditious and careful manner in which the wounded were removed from the field."xxix

The Union medical corps at Antietam also tended to enemy wounded—working with Confederate medical officers left behind to treat victims. "Humanity teaches us that a wounded and prostrate foe is not then our enemy," Dr. Dr. Letterman wrote. Union assistants were also assigned to aid in caring for enemy wounded, and the ambulance corps did not discriminate between blue and gray uniforms.

Later, following the Battle of Gettysburg in July 1963, Dr. Letterman would go on to further point out the need for proper organization of transport—indicating his ongoing mission of refining the process. "It is scarcely necessary to say," he wrote, "that if the transportation is not sufficient to enable the officers of the department to conduct it properly, the effect must fall upon the wounded."xxxvii

Despite the great advances with urgent care transport, there was still no method in place for casualty sorting. Literary giant Walt Whitman, who became involved in Union Army hospital life when his brother George Washington Whitman was wounded at the Battle of Fredericksburg in 1862, pointed out the need for such a system when he wrote that there was "no system, no foresight, no genius."xxxviii

On the battlefield, there evolved a crude system of triage–wounded men with head, abdominal or chest wounds were in most cases simply moved aside as these conditions were most often fatal. The ambulance corps was designed to bring men from the battlefield to nearby stations for application of tourniquets and dressings before being transported to field and general hospitals–essentially the earliest stages of a formalized triage system.

Jonathan Letterman, M.D.



Zouave ambulance crew demonstrating removal of wounded soldiers from the field



One Surgeon's Story... As the war continued, Dr. Hyde persevered in aiding his fellow

soldiers. He wrote:

I have been detailed since I last wrote by the Med Director to take charge of the Division hospital again together with all the ambulances belonging to it-These ambulances and all the sick in them I have to take charge of on a march besides seeing that all the sick left on the road by different regiments are picked up and conveyed to the ambulance.

-November 11, 1863



Anesthesia mask

ontrary to popular belief, anesthetics such as ether and chloroform did exist– and were used frequently–during the War Between the States. In fact, the first use of anesthesia was in 1842 by Georgia physician Crawford Long, though the first public use of ether did not take place until 1846 at Massachusetts General Hospital. Because surgery was performed so rarely prior to the War Between the States, surgeons had little experience using anesthesia and may not have understood the three distinct stages: the euphoric phase, excitement phase and the surgical plane. Factoring in the possibility of respiratory depression as a result of too much anesthe-



result of too much anesthesia led surgeons to err on the side of caution-with patients spending more time in the excitement phase than in the surgical plane. Hence the misconception that soldiers were not anesthetized for surgery. Chloroform was the most widely used anesthetic on both sides of the war and was administered by placing a chloroform-soaked cloth over the patient's nose. Ether was administered through an "ether cone"–a metal wide funnel with the end packed with gauze or rags. The cone was placed over the patient's nose and mouth, and drops of ether were placed on the gauze or rag. As the liquid evaporated, the patient inhaled the anesthetic. Over the course of the war, innovations were made to help conserve the liquid–including nasal inhalers. Prior to being anesthetized, patients were given small amounts of alcohol and water by mouth.

"During the performance of capital operations on the battlefield, death sometimes ensues from nervous exhaustion produced by excess of suffering," wrote Surgeon J. Julian Chisholm, M.D. in his book, *A Manual of Military Surgery*. "The use of chloroform relieves the patient at least from this risk."xxxix

Painkillers did exist and were used by surgeons during the period to help make patients comfortable following surgery. Available painkillers included morphine, laudanum and opium – as evidenced in the 400,000 post-war cases of "army disease" – morphine addiction.^{xi} ne of the most powerful images evoked by Civil War is that of surgery-battlefield style. The most common operation performed during the war was amputationprompting some to label the surgeons as "butchers." Given the massive numbers of casualties and the small number of surgeons, time was of the essence. It took considerably less time to remove a shattered limb than to repair it and risk having to amputate later due to secondary infection such as pyemia or osteomyelitis (bone infection).^{xii} Over the course of the first year of the war, infection from conservative procedures-which included exploring the wound with undisinfected fingers

and septic probes—was so extensive that the Sanitary Commission issued a pamphlet that stated "excision and resection should be limited under certain conditions."x^{ti} Amputation became a very important surgery—a humane operation completed under anesthesia. In fact, following the battle of Antietam, Medical Director Letterman wrote of the field doctors, "If any objection could be urged against the surgery of those fields, it

would be the efforts on the part of surgeons to practice 'conservative surgery' to too great an extent."

Prior and during the war, little was known about the kidney, bladder or other organ systems in the abdomen. As noted previously, wounded soldiers with injuries in the head, abdomen or chest were often left on the field to die. Nearly 4,000 penetrating abdominal wounds were suffered during the war and 87 percent of patients died. However, the Medical and Surgical History (MSH) reports on 26 men who survived with flank wounds that injured the cortex of the kidney without intra-abdominal injury. Surgery



Wounded soldiers from the battles in the "Wilderness" at Fredericksburg, VA., May, 1864



Surgical Amputation Set



One Surgeon's Story...

Dr. Hyde was stopped at a camp near Rappahannock Station, VA. where he applied his medical training to some of the 300 wounded men and wrote:

I had surgery to my heart's content this time -I stood knife in hand at the operating table from four o'clock in the afternoon till eight o'clock next morning. I have had to stop since I commenced this to attend the burial of a poor fellow who had just died with typhoid fever...

-November, 1863

Miracle Man: The Lion of the Union



Major General Joshua Lawrence Chamberlain was a colonel in command of the 20th Regiment Infantry, Maine Volunteers during the Battle of Gettysburg in 1863–the bloodiest overall battle of the war and the ending of General Robert E. Lee's second invasion of the North. While Chamberlain survived Gettysburg with only minor injury, a pelvic wound sustained a year later in the Battle for Petersburg, VA would forever place Maj. Gen. Chamberlain in the annals of urologic history.

While leading the Union charge at the Battle for Petersburg in June 1864, Chamberlain–who was now brigade commander of the 1st Brigade, 1st Division, 5th Corps of the Army of the Potomac–was struck from the front below the right greater trochanter with a minie ball.^{stiii} Internal ricochet took the bullet up through the bladder and urethra, fracturing his pelvis and severing arteries, and the minie ball ultimately embedded behind his left hip.^{stiii} Despite his injury, Chamberlain stayed with his men. He ultimately collapsed from blood loss and was evacuated to a field hospital–but not before several hours had passed.^{stiv}

Conservative medicine at the time indicated that "gut wound" soldiers would not survive, but Joshua Chamberlain was fortunate to avoid this fate. Tom Chamberlain, who was with the 20th Maine regiment formerly led by his brother, got word of the injury and recruited two surgeons–A.O. Shaw and M.W. Townsend–to tend to the wound. Drs. Shaw and Townsend began a "groundbreaking exploration" of the wound–"cleaning it, extracting the bullet, and controlling the bleeding."^{xiv} However, following the procedure, it was noted that urine was leaking from the lower part of the wound.^{xiv} Anecdotal reports indicate that a catheter may have been used during the original surgery in the field hospital.^{xiv}

Upon hearing about his injury, a recommendation was made-and approved by General Ulysses S. Grant-to promote Chamberlain to Brigadier General, and litter bearers were sent to carry him to the hospital ship *Connecticut*, which took him to the Naval Academy Hospital in Annapolis, MD.^{stv} He spent weeks recuperating, but even on July 5, his condition was described as dire by General Gilmore.

"The ball severed the urethra so near the bladder that by no artificial means can all the urine be conducted without some escaping and passing out the wounds," Gilmore wrote. "It is feared that ulcers will form in the abdomen and terminate his life."

Chamberlain defied medical reason of the time, and eventually recovered, returning to battle in November 1864. Ultimately, his men would participate in the final battles of the war, and Chamberlain himself was selected by General Grant to represent the Union at the Appomattox surrender. He also served four terms as the governor of Maine. Recurrent infection was one of the many legacies of the injury which plagued him for 50 years—which also included fistula, incontinence, osteomyelitis, epididymo-orchitis and impotence. According to his death certificate, he died from "bacteremia, probably secondary to a urinary tract infection." He was 85 years old.^{stvi}

elvic injuries involving the bladder (which often involved the rectum) were usually fatal, though there were isolated cases of perforating gunshot wounds to the bladder reported. Such injury required prompt drainage by a catheter-which was standard issue in field medical kits-and though some instances of incomplete urethral disruption resulted in complete separation, the procedure probably saved many lives over the course of the war. Patients with these injuries often suffered from bladder fistula that persisted for months or years, and in some cases bone or bullet fragments sometimes extruded from the wound.

One case report from the Manual of Surgical History outlines an injury sustained by a young private near Hatcher's Run in March of 1865; he was hit by a bullet just above the pubis that then lodged in his bladder. Four years after the injury, in 1869, a lithotomy was performed and a conoidal musket ball was removed that had two "pieces of phosphatic deposit attached."

RESIGNL CALCULI FORMED UPON PROJECTILES

Bladder stones occasionally formed around bullets, buttons or aterial that lodged in the bladder.



Lithotomy was rare during the war, though 21 cases were performed to extract projectiles or traumatic vesical calculi. Of the 21 cases, only three died, and two of those were operated on using a suprapubic approach.

Arts Case Instruments

3121162

That I have received the

described articles

One Surgeon's Story ...

Dr. Hyde received orders to man the field hospital for the coming summer. His outlook on the war and his own state of mind deteriorated as is seen in a letter to his wife:

A Surgeon's life is not worth a straw during a battle now... I am disgusted with the service in every way, and intend to leave it as soon as possible—Money is no object when one's life is constantly in danger to obtain it—Every man I see fall bleeding, and mangled, and sometimes torn by shells limb from limb, I think it will be my turn next. *–March.* 1864

ex and the

owever, while abdominal injuries were considered fatal, one abdominal affliction-gonorrhea-was rampant during the war and surgeons regularly faced the challenge of treating the disease and the strictures and other complications it caused in patients.

General Ambrose Powell "A.P." Hill, a legendary Confederate leader, contracted gonorrhea during his days at the United States Military Academy at West Point in the 1840s.^{slvii} Lack of effective treatment at the time led to advanced disease, and General Hill was known for his ill health throughout the war, and

it has been speculated that he suffered from gonorrheal stricture and prostatitis-leading to impaired kidney function and uremia.

A.P. Hill was not the only soldier suffering from sexually transmitted diseases. It was estimated by federal surgeons that there were 80,000 cases of syphilis and gonorrhea during the war.xlviii Some hospitals set aside separate wards for patients with venereal disease, and remedies included wild sarsaparilla, sassafras, jessamine, poke roots or berries, elder and prickly ash.xlix One pharmacist, Joseph Jacobs, apprentice to Dr. Crawford Long, presented a paper to the American Pharmaceutical Association in 1898 that outlined various treatments for venereal disease used during the war, including ink injection and "Silk weed root put in whiskey and drank, giving at the same time pills of rosin from the pine tree, with very small pieces of blue vitrol."[†]

The Union Army took these diseases seriously, as the class of disease was "a fruitful source of the disqualification of men for active service."¹ One surgeon, Freeman J. Bumstead, M.D., wrote extensively on the subject of venereal disease early in the war. publishing in 1861 an essay entitled "The Pathology and Treatment of Venereal Diseases; including the results of recent investigations upon the subject." Dr. Bumstead recommended the Union Army follow these regulations enforced by the Belgian army to contain venereal disease:

Every soldier who contracts venereal disease, should be required to give the name and address of the woman who infected him; and if, upon examination, she be found diseased, her removal from the neighborhood should be enforced by the military authority.

Every inducement should be presented to lead men to report themselves at the earliest possible moment after infection; and delay should be visited with appropriate penalties.

No person with any venereal disease, however slight, should be allowed to remain in quarters, but be at once transferred to the hospital.¹

One comment by a post-war surgeon clearly outlines popular thought at the time about the connection between masturbation and venereal disease. "Gonorrheas are numerous and quite difficult to treat," he wrote. "The permanency of the cure are unsatisfactory...the frequency of masturbation among the troops interferes, in a great measure, with the medical treatment, as many cases apparently cured have broken out anew from the local irritation consequent upon this cause."

In a pre-antibiotic world, the connection made sense: the connection would not be made between bacteria and sexually transmitted diseases until the early 20th century. In the meantime, surgeons relied on containing outbreaks and treating secondary complications such as strictures. One physician at the Union Hotel Hospital in Georgetown, John S. Billings, M.D., became so adept at treating urethral stricture secondary to gonorrhea that "whenever any surgeon of troops about Washington applied for the discharge of one of his men for the reason that he had an impermeable stricture of the urethra, instead of granting the discharge, [Medical Director Charles S.] Dr. Tripler sent that case to me [Dr. Billings]."^{1x} Unlike other surgeons, Dr. Billings had in his supplies a Symes staff that he used to treat urethral stricturotomy.

Tracake also twosonts the following remodule "A grimony tea and as a last



John S. Billings, M.D. used a Symes Staff to treat urethral stricture



nother area of medicine that truly exploded following the Civil War was the concept of prosthetics. Though limited prosthetics have existed since antiquity, it

Post-war Life: Prosthetics and Plastic Surgery

wasn't until the late 1800s that major steps were taken to revolutionize the industry beyond armor-like devices. Because of the high amputation rate during the war, there was a tremendous need for artificial limbs following the war; in fact, the government had guaranteed artificial limbs, as early as 1862 to veterans who lost limbs.

One of the most notable prosthetics manufacturers was a veteran himself: James Edward Hanger. As an 18-year-old Confederate volunteer in the Churchville Cavalry in Virginia, Hanger became one of the first amputees of the war when he lost his leg to a six-pound cannonball in 1861.¹⁶ At home, Hanger designed an artificial leg with tools, barrel staves and leather straps; the device was so functional he was able to walk down stairs using it, and he was ultimately commissioned to make prostheses for all handicapped Confederate veterans. He patented his devices in 1871; the Hanger Orthopedic Group still exists and is based in Virginia.

While Hanger's artificial limbs were prevalent during and after the war, plastic surgery to repair devastating wounds to the head and face-not to mention repair tissue ulceration, gangrene and other infection-was rare. Little over 30 procedures are reported to have taken place. It did, however, exist, and with remarkable success, given the limits of the day.

One significant case in which tremendous strides were made in reconstructive surgery is the case of Ephraim Dawes, a member of the 53rd Ohio Infantry. In May 1864, Dawes was struck with a minie ball in the lower jaw. One private described the injury by saying the bullet "took off his lower lip, tore the chin so that it was hung down, took out all the lower teeth but two and cut his tongue."^{IIII} Dawes was able to receive surgery on his smashed mandible— with a wire framework, and his skin sliced and stretched over an artificial chin.^{IIII} Following the surgery, he was able to speak clearly and maintain a normal appearance by growing a beard.^{IIII}

E. HANGER.

Patented Feb.

riv.1

Other cases are even more extreme. Carleton Burgen was admitted to the military hospital in Frederick, MD, in August 1862 with a bedsore over his sacrum and teeth covered in sores-a product of nearly two months in a field hospital receiving treatment for pneumonia with calomel, mercury with chalk and 65 grains of blue pill (all of which contain mercury) and a slough that had rapidly spread on his gums, cheek and palate. He was transferred to The New York Hospital on December 31. During his stay in New York, Dr. Gurdon Buck was able to stop the ulceration by the end of August, but not before the patient had lost quite a bit of soft tissue necessitating the removal of his superior maxilla, right palate and a narrow strip of his left maxilla. As a result, Burgen's right eye was destroyed and sunken; he underwent numerous plastic surgery operations, and ultimately Dr. Buck performed several that gradually restored some of Burgen's facial features.

black wash (made by squeezing the juice out and adding a little copperas). This black wash is not only a splendid ink, but is a destroyer of syphilitic sores,

Lessons Carried Forward

In the century writer Victor Hugo wrote about necessity being the mother of invention, and the adage has no better basis in truth than in wartime medicine. Medicine during the Civil War was like nothing surgeons had witnessed previously, and is like nothing physicians have experienced since. The growth of medicine and evolution of the system during the four years of internal conflict remains a testament to the eternal flexibility of physicians, entrepreneurs and patients both in this country, and around the world. Physicians in the 20th century saw further innovation by having stood on the shoulders of surgeons in and around the battlefield, and becoming equipped with antibiotic therapy and other advances spawned by the war experience. Just as medicine in the Crimean War set the stage for developments in the Civil War, lessons learned during the War Between the States has since paved the way for military medicine for nearly 150 years.



One Surgeon's Story

Dr. Hyde arrived in Washington on May 26, 1865. Although he remained ill, he waited several days in order to receive his pay before obtaining leave. Dr. Hyde then sent a telegraph to his wife requesting the family to meet him in Burlington, VT. On June 13, 1865 Dr. Hyde was discharged from the Army of the United States. He returned to Isle La Motte and practiced medicine until his death December 9, 1874.



- http://www.gilderlehrman.org/teachers/boisterous/section4_8.html. Accessed April 22, 2005
 http://www.historyplace.com/civilwar/. Accessed April 22, 2005
 Harmon, W. J. and McAllister, C. K.: The Lion of the Union: The Pelvic Wound of Joshua Lawrence Chamberlain. J Urol, 163: 715, 2000
- iv Lawson, R. G. Medical Training in the United States Prior to the Civil War. Presented at the NMCWM Annual Medical Conference, Shepardstown, West Virginia, August 2, 2002
- v http://history.amedd.army.mil/booksdocs/civil/gillett2/amedd_1818-1865_chpt8.htm. Accessed March 23, 2005
- vi Adams, G. W.: Doctors in Blue. New York: Henry Schuman Inc., p. 194, 1996
- vii http://www.pvhs.chico.k12.ca.us/~bsilva/projects/russia/Alex_II/Crimean%20War.htm. Accessed March 2005
- viii http://www.lewrockwell.com/vance/vance10.html Accessed April 22, 2005
- ix http://www.militaryhistoryonline.com/civilwar/misc/riversofblood.aspx Accessed March 15, 2005
- x Adams, 176
- xi Adams, 184
- xii Adams, 185-186
- xiii Adams, 177
- Adams, 183
- xv Cunningham, H. H.: Doctors in Gray: The Confederate Medical Service. Baton Rouge: Louisiana State University Press, p. 267, 1986
- xvi http://elvis.rowan.edu/~kilroy/JEK/05/18.html Accessed April 22, 2005
- xvii http://www.spartacus.schoolnet.co.uk/REnightingale.htm Accessed March 15, 2005
- xviii http://www.victorianweb.org/history/crimea/seacole.html Accessed April 22, 2005
- xix http://www.btinternet.com/~ardena/mary_seacole.htm Accessed April 22, 2005
- xx Cunningham, 87
- xxi Adams, 196
- xxii Adams, 197
- xxiii Adams, 198
- xxiv Adams, 199
- xxv Adams, 144
- xxvi Adams, 145
- xxvii Adams, 146
- xxviii Hasegawa, G. R.: Pharmacy in the American Civil War. In: Pharmacy in History. Vol. 42, No. 3, p. 67, 2000
- xxix http://www.ehistory.com/uscw/features/medicine/cwsurgeon/antietam.cfm Accessed March 24, 2005
- xxx http://www.straightdope.com/classics/a990709.html Accessed April 22, 2005
- xxxi Squibb: A History
- xxxii Squibb Sales Bulletin (from file)
- xxxiii House of Squibb, p. 10, 1945
- xxxiv www.lilly.com/about/history Accessed June 28, 2004
- xxxv 125 Years in the Making: Stories of Lilly's Rich History. Indiana: Eli Lilly & Co., 2001
- xxxvi Civilwarhome.com/sicktransportation.htm Accessed June 10, 2004
- xxxvii http://www.civilwarhome.com/lettermanor3.htm Accessed March 24, 2005
- xxxviii Whitman, W. The Wound Dresser: Letters Written to His Mother from the Hospitals of Washington During the Civil War. Edited by R. M. Bucke. New York: Bodley Press p. 39, 1949
- xxxix Chisholm, J.J. A Manual of Military Surgery for the Use of Surgeons of the Confederate States Army, 3rd ed. Columbia: Evans and Cogswell, p. 427, 1864
- xl http://www.bartleby.com/65/mo/morphine.html. Accessed April 22, 2005
- xli Adams, 132
- xlii Harmon and McAllister, 713
- xliii Harmon and McAllister, 713. The bullet actually embedded behind the left acetabulum
- xliv Harmon and McAllister, 715
- xlv http://civilwarmed.home.att.net/october2000 Accessed July 9, 2004
- xlvi Harmon and McAllister, 716
- xlvii http://www.rocemabra.com/~roger/tagg/generals/general57.html. Accessed April 22, 2005
- xlviii http://tigger.uic.edu/~rjensen/cw-2.htm Accessed April 22, 2005
- xlix Cunningham, 211
- 1 http://www.civilwarsurgeons.org/articles/veneral%20diseases.htm. Accessed June 10, 2005
- li http://www.civilwarsurgeons.org/articles/medical%20reminiscences.htm Accessed April 22, 2005
- lii http://www.hanger.com/sections/about/au_history.html. Accessed March 15, 2005
- liii http://www.thehistorynet.com/acw/editorial_03_05/. Accessed March 2005





www.urologichistory.museum

Now, the entire collection of the William P. Didusch Center for Urologic History is on line at **www.urologichistory.museum**—it's almost as fascinating as seeing it in person! See current and future exhibits, search our collection of scopes, books, illustrations, equipment or read about the medical milestones in urology. This new site will captivate "history buffs" and those just entering the field of urology.

Didusch

Published by the



American Urological Association

with special contributions from the National Museum of Civil War Medicine www.civilwarmed.org



March, 2005

With

The William P. Didusch Center for Urologic History of the American Urological Association

Rainer M. Engel, M.D., Curator DISCHARGES ON SURGEON'S CERTIF Wendy Waldsachs Isett, Communications Specialist

Supported by an educational grant from

A Partnership for New Sol

Christian name.

NAME.

RANK.

Private

2

D

ly

2 mel Tr. Tols.