Growing political differences and mounting controversies made everyone aware that war between the North and the South could break out at any time. It was no surprise then when the first shots on April 12, 1861 signaled the beginning of war. Initially thought to be a short military event, it quickly became obvious that this would be a long drawn-out war.

American urology did actually benefit greatly from the Civil War and its aftereffects. Hugh Hampton Young, born in 1870 in San Antonio and considered the Father of American Urology, would not have become a urologist had it not been for the Civil War. His father was a general of the Confederate Army, and his grandfather had been a general before him. Both staunch supporters of the Confederacy, they were appalled at the idea that young Hugh would become a military officer at the “damn Yankee” stronghold in West Point. They adamantly refused to let him go there, and Hugh Young, as we all know, finally settled on a career in medicine. By happenstance, he was pushed into urology, again not his first choice. The rest is history.
Pre-Civil War Medical Training

Medical education of physicians who volunteered for service during the Civil War was sketchy at best; even in 1900 only 90% of American physicians had a formal education as Hugh Young wrote in his autobiography. Instead they entered a “preceptorship” and learned by “reading with the doctor and riding with the doctor,” that is, perusing the few books a preceptor might have had at that time and making house calls with him. Some of the major medical texts from that time are highlighted in this exhibit. At the beginning of the Civil War, 63 medical schools existed in the States; most of these were in the Northeast and 14 in the Southern states. All southern schools closed with the beginning of the war except for the Medical College of Virginia in Richmond.

Most medical schools were proprietary, owned by the teaching faculty, who derived their income from fees paid by their students. Little money was given to medical schools from the colleges granting medical degrees. Funds from public or private sources were rarely sufficient to support a medical school.

Formal education consisted of two years of classroom teaching and three years of preceptorship; candidates had to be 21 years old to obtain a medical degree. Knowledge of Latin and Greek was the primary entrance requirement, but education beyond secondary school was not. The students bought individual course tickets from each professor whose lectures they attended at $15 to $20 a year for a total of $100 to $120. At that time the annual income for a physician was rarely more than $600 per year.

While strenuous or heroic medicine was the philosophy of the older physicians, the younger ones were greatly influenced by different philosophies: Thompsonianism taught an herbal approach to medical therapy but began to fade and give way to botanical medicine. Homeopathy taught that minimal amounts of medications causing symptoms similar to a disease would be curative (similia similibus) for it. Another philosophy was that of eclecticism, a development of Thompsonianism, sharing the rejection of the old heroic medicine.

Medical education continued to change and improve. Subjects were added in the degree-granting schools, including Jurisprudence, Obstetrics, Women’s Diseases, Diseases of Children, and Ophthalmology. At the same time new European inventions were introduced such as the thermometer, the stethoscope, and the microscope.

After several attempts to convene a medical convention to work on improvements in medical education, Nathan Davis, MD from New York organized meetings in 1846 and 1847, leading to the founding of the American Medical Association.

Melvin John Hyde was born on May 19, 1828 in Vermont, the eighth of twelve children. Initially a teacher in the public schools, he decided to study medicine at Dartmouth College in 1850. Medical school was inexpensive by today’s standards and took only two years. After graduation Hyde went to Isle La Motte in 1852 to practice.

In 1856 Dr. Hyde married Phoebe Lupe Hill Holcomb, a widow; her oldest child was Alice. Dr. Hyde was active in the town’s affairs and was Superintendent of Schools from 1860 to 1861. In 1861 he was elected as a representative to the State House of Vermont and served through 1862.

Medical education continued to change and improve. Subjects were added in the degree-granting schools, including Jurisprudence, Obstetrics, Women’s Diseases, Diseases of Children, and Ophthalmology. At the same time new European inventions were introduced such as the thermometer, the stethoscope, and the microscope.

After several attempts to convene a medical convention to work on improvements in medical education, Nathan Davis, MD from New York organized meetings in 1846 and 1847, leading to the founding of the American Medical Association.
Sam Gross’ education began on his parent’s farm in Dutch Pennsylvania with a distinct botanical interest. Because he wanted to become a physician, he went to a local physician for a preceptorship. He quickly realized that he did not learn anything other than housekeeping and switched to another local physician, again without any positive result. Since his local one-classroom school did not offer Latin or other advanced education, Gross went to the Wilkes-Barre Academy in Pennsylvania and from there to a school in the New York Bowery to advance his classical studies. He took lessons in Latin and Greek, and finished his high school education in Lawrenceville, New Jersey. Eventually he became a private student at the Jefferson Medical College in Pennsylvania, finished his studies in 1828 and shortly thereafter opened his own office.

At the same time James Paget delivered his anatomy lectures at the Royal College of Surgeons in London; by 1860 the second American edition of his text had been published. This volume of over 700 pages discusses kidney problems very briefly with a paragraph on inflammation and also renal cysts. Nowhere is any surgical procedure of the upper tract mentioned.

In Samuel D. Gross’ textbook of 1851, A Practical Treatise on the Diseases and Injuries of the Urinary Bladder, the urinary tract consisted of bladder, prostate, urethra, and perineum, each of which is dealt with in a separate chapter, as is the urine. The upper tracts are not mentioned at all. Gross considered bladder injuries to be generally fatal yet added in survivors: “balls, pieces of cloth, fragments of bone, and other foreign bodies if retained in the bladder generally serve as nuclei of calculi and should, therefore, be as speedily extracted as possible, either through the perineum, or by means of the forceps or lithotriptor.”

In a short chapter on urethral injuries he states, “the treatment of this accident must be prompt and decisive, otherwise great, if not irreparable mischief must inevitably befall both part and system.” And finally, “Hesitancy...must yield to decision...the patient is saved or lost in a moment.”

**Pancoast & Paget**

In his “Treatise on Operative Surgery…” Joseph Pancoast, Professor at the Jefferson Medical College in Philadelphia, described in 1844 what he called “the various processes of the art, including all the new operations.” This beautifully illustrated text has a very small chapter on the genitourinary system. He discusses surgery of the hydrocele, penile operations such as phimosis, cancer of the penis, hypospadias and epispadias, stricture of the urethra, and more than a third of this chapter is devoted to various types of lithotomies in both males and females. The kidneys are not mentioned at all.

James Paget, M.D. included a brief discussion of kidney problems in his 1860 text. The first American urological text by Gross in 1851 did not include any mention of the upper tracts. Pancoast & Paget
At the onset of the Civil War, a treatise on battlefield medicine was published in England. George MacLeod, Glasgow, wrote in his Notes on the Surgery of War in the Crimea (1853 – 1856) in detail about the deplorable sanitary conditions in the field, the poor medical care, lack of supplies and poor provisions. However, it seems that little if any of this advice was translated into practice on the battlefields or in the camps. On wounds, he stated: “The fatality of penetrating wounds of the belly will depend much on the point of their infliction. Bullets entering the liver, kidneys or spleen are well known to be usually mortal... Wounds of the great gut are also always recognized as much less formidable than those which implicate the small...”

That same year Gross published A Manual of Military Surgery. He had visited several battlefields at the beginning of the war and clearly was distraught by the catastrophe he encountered. This pocket-sized handbook was, in his own words, “Designed to mitigate some of the horrors of the Civil War now impending over our once happy and glorious country.” He refers to the book by MacLeod, designed a folding litter, recommended early and rapid classification of the wounded and disabled, and cautioned that those with similar injuries not be placed close together lest they “be seized with fatal despondency.” He refers to “a flying ambulance” designed by the French J.D. Larrey, surgeon general of Napoleon I, during their campaign in Italy, which consisted of 12 light wagons on easy springs for the transportation of the wounded. Under the surgical armamentarium Gross lists a small pocket case with a screw catheter and also a full amputating case including trephining instruments, saws, and silver catheters. Referring to Florence Nightingale for care of the wounded, Gross recommends frequent change of posture, dressing changes, wholesome food... “Whether this duty should be performed by men or women is of no material consequence, provided it be well done.”

Charles S. Tripler, U.S. Surgeon General and then Medical Director of the Army of the Potomac, stated in the 1861 Hand-Book for the Military Surgeon that most of the disease seen in the military could be attributed to “bad cooking, bad police, bad ventilation of tents, inattention to personal cleanliness, and irregular habits.” His book also contains a chapter “On the Use of Chloroform reprinted from the valuable work of MacLeod on the Crimean War.”

John J. Chisholm, Leading surgeon of the Confederacy, states in his military manual also, “Continued exposure and fatigue, bad and insufficient food, salt meat, indifferent clothing, want of cleanliness, poor shelter, exposure at night to sudden changes of temperature, infected tents and camps, form a combination of causes which explains the fatality of an army in the field.” Dysentery accompanied by diarrhea was one of the major diseases in both armies. Factors mentioned by both Chisholm and Tripler such as undercooked bread and beans, fried foods, spoiled food, and unrelenting stress combined to result in these often-fatal problems. It was treated with the “blue pill”, calomel (both containing mercury), strychnia, opium and acetate of lead, which in themselves were the cause of major tissue ulceration throughout the entire intestinal tract.
Medical Problems in Field and Camp

Diarrhea and Dysentery

Neither military nor medical staff, be they Confederate or Union, were prepared for the onslaught of problems facing them with the Civil War. Casualties during the war were huge, and 2/3 of those deaths were caused by diseases. Foremost among these were diarrhea, dysentery, and malaria. The Armies had not heeded the advice of physicians such as Gross, Chisholm, Tripler, or others.

After the War, in 1870 the Office of the Surgeon General began to publish “The Medical and Surgical History of the War of the Rebellion” (MSH). This large 6-volume publication presents in detail medical and surgical problems and very descriptive case histories. Information from the Confederate Army is scant: most documents burned when the retreating Confederate forces set fire to Richmond in 1865.

The MSH is full of various treatment suggestions from individual surgeons for these overwhelming intestinal problems. Such treatments included sweet gum, heliathemum, silver nitrate animata, peanuts, subnitrate of bismuth, bromine, and others. Some individual reports added that “mercurials, opiates, and the ordinary astringents have been worse than useless except so far as the opiates served to relieve pain or temporarily check the bowels.”

Elsewhere the MSH states, “The point in the treatment of chronic dysentery is not so much the particular drug given as the general management of diet and hygiene. The mildest and blandest food should be given and that in moderate quantity. The patient should have rest as far as possible and be kept in a dry moderately warm atmosphere...” The use of finely hashed raw meat, cooked oysters or eggs were found very advantageous in diarrhea, but probably only because they were thought to be more digestible. Yet again another report states, “Opium, of course, has been necessary, a favorite method of administration being injections of the tincture into the rectum. When ulcerations of the rectum have been suspected, injections of the sulphate of zinc with laudanum or nitrite of silver with the same have been ordered...”
A major medical problem was called “periodic fever” – we know it as malaria! Quinine was used successfully for this by Civil War physicians. Originally from South America, “peruvian bark” was purified in 1820 in France and available as powdered bark extract or in pill form. Soldiers clearly did not like to take this bitter medication, but by mixing it in whiskey and giving it daily, surgeons had good success with malaria control. Quinine was widely available for the Union forces, but the Confederate Army had difficulty obtaining it due to Union blockade and tried, albeit unsuccessfully, to use herbal preparations for these “intermittent fevers” of malaria. American physicians had begun to look beyond “strenuous medicine” of earlier centuries, with their chief therapeutics of bleeding, cupping, leeching, blistering, and purging.

By the time of the Civil War, bloodletting was decreasing, though cupping and blistering as “counter-irritation” for the body’s excitability was being used consistently, mustard plasters being the most commonly used. Purgatives were thought to not only rid the body of noxious substances but also to draw fluid away from the rest of the body and into the bowel.

Scurvy, or vitamin C deficiency, was considered a disease requiring stimulation for which the standard treatment was a diet rich in animal and vegetable products. Physicians recognized scurvy in its more advanced stages with bleeding under skin and gums as a problem of deficient nutrition and prescribed fruit and vegetables as cure (oranges, lemons, even potatoes and onions).

**Anesthesia**

Contrary to common belief, most operations during the Civil War were performed under anesthesia, a field of medicine most surgeons had no experience with, and one they gradually learned to use and improve.

Samuel Guthrie (London, UK) was the first to distill chloride of lime with alcohol in a copper still in 1831. He called this “chloric ether” which became “chloroform”. It was the most widely used anesthetic on both sides of the Civil War. Chloroform anesthesia initially causes excitement - muttering, wild eyes, crying, and delirium – followed by violent struggles with attempts to rise and rigid contractions. Spasms could involve the larynx, and since intubation during anesthesia was unknown, could lead to asphyxiation. The anesthetist had to “pay strictest attention to the condition of the respiration, pulse, and countenance.” The great advantage was that chloroform was not flammable, did not have the intense odor of ether, and acted rapidly. Ether, first used in this country by Crawford Long of Athens, Georgia in 1842, saw its first public demonstration by William Morton in 1846 in Boston. Ether caused only four deaths in the Union Army while the records state that there were 4.4 deaths per 1000 in those soldiers receiving chloroform. Available medical records show that Union surgeons administered anesthesia well over 80,000 times. The Yankee blockade and the lack of adequate manufacturing facilities limited the Confederate supply of ether and chloroform. Chloroform and ether were usually dripped onto a rag held over the face of the soldier undergoing surgery, but much of the anesthetic dissipated into the air with this administration. This led Julian J. Chisholm to develop his inhaler, a small device with two nose-tubes that delivered an adequate amount of chloroform without significant evaporation.
The Symes Staff was used to treat strictures. Medical and Surgical History, Vol. 2, Surgery, 1870.

In addition to treating patients, John Shaw Billings organized hospitals in Washington, D.C. during the Civil War.

Genito-Urinary Operations

The MSH presents surgery of the urethra and bladder using a number of instruments such as the foreign body forceps, metal loops and curettes, metal and gum-elastic catheters, suprapubic trocars, dilators of various descriptions, and various instruments to incise urethral strictures. Surgical field sets included most of these instruments. Urethroplasties are discussed as are long-term perineal cannulation. Even cystoscopy was advocated, showing the endoscope of Desormeaux and a discussion of Cruise’s “The Utility of the Endoscope as an Aid in the Diagnosis and Treatment of Disease.” However, in the field cystoscopy was probably never used.

Treatment of strictures, due to injuries or gonorrhea, required not only surgical skill but frequently led to a medical discharge from the Army. John S. Billings, in a 1905 paper reminisced about the Civil War and remarked that he had three things that none of the other surgeons had—“A set of clinical thermometers, a straight one and one with a curve; a hypodermic syringe, and the Symes staff for urethral stricturotomy.” His results with this instrument were so good 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, Dr. Tripler sent that case to me.”

Gross, Chisholm, Tripler and others all state the need for immediate catheter insertion for any suspected urethral injury. Only when this was not possible did the surgeon resort to a suprapubic drainage using a trocar. It took time before they realized that leaving a catheter for any length of time could lead to secondary problems, such as stone formation. Their catheters were not the soft instruments of today but were made of metal or a stiff woven material impregnated with caoutchouc.
The MSH cites eminent authorities such as Sir Henry Thompson: “that a catheter can rarely pass through a lacerated urethra except by accident; while meriting the most thoughtful consideration, is yet not fully sustained by the experience acquired in shot lacerations.” While some incomplete disruptions were converted to complete ones, immediate catheter drainage saved many a life.

A number of reports discuss stone formation around a piece of bone, bone splinters, or bullets in the bladder: Lt. William Palmer was wounded September 17, 1862 by a bullet entering the lower pelvis, breaking the body of the left pubic bone and lodging inside the bladder. On September 25, Palmer was “chloroformed” and bullet and bone fragments were extracted through a suprapubic incision; a urethral catheter was placed in the bladder and also a suprapubic tube. Dressings were applied; however, the patient continued to slough tissue; he “sank exhausted, and died October 13.” The extracted bullet already showed significant encrustation.

Another soldier, wounded near Hatcher’s Run on March 31, 1865, was hit by a minie ball entering just above the pubis and lodging in the bladder. He was discharged in June of that year with the bullet still lodged in the bladder, causing a good bit of pain and discharge. Four years after the injury, a perineal lithotomy was performed, and a conoidal musket ball was removed that had two “pieces of phosphatic deposit attached.” He healed and apparently continued to do well.

Of the 21 cases of lithotomy for the extraction of projectiles or traumatic vesical calculi, 3 died following surgery, the others recovered. Two patients had a suprapubic and 18 a perineal approach; both patients with the suprapubic approach died.
The following is a stunning case report of a penetrating pelvic surgery from the MSH: **Joshua Lawrence Chamberlain**, also called “The Lion of the Union” for his tenacious and skillful tactics, was wounded at the Battle for Petersburg, Virginia in June of 1864. A minie ball entered his pelvis just below the right greater trochanter, coursed obliquely upward to disrupt bladder and urethra, and embedded itself behind the left acetabulum. Chamberlain bled profusely and was removed from the field despite his objections. He reached the field hospital three miles to the rear after several hours. Word of Chamberlain’s injury reached his brother Tom, who served with the 20th Maine Regiment. Tom in turn recruited doctors M.W. Townsend and A.O. Shaw, who eventually found Colonel Chamberlain. The surgeons performed a daring exploratory operation in the field hospital. Though Chamberlain received both morphine and chloroform, he became only sedated; yet despite the tremendous pain, he encouraged the surgeons to continue. They removed the minie ball and reconstructed his bladder, yet thought that recovery was hopeless. A catheter was placed, and Chamberlain was moved by litter-bearers 16 miles to the hospital ship Connecticut and transported to the Naval Academy Hospital in Annapolis. General Ulysses Grant, upon hearing of his feat, promoted Chamberlain to Brigadier General. By July, it was thought he would die from complications, yet miraculously he began to recover (though not before he had read his own obituary released by the Army to the New York newspapers!). The MSH report states that surgeon Vanderkieft sent a catheter to surgeon J.H. Brinton with a note:

“I send you a catheter used by Brigadier General JLC... as you will perceive, it is covered by calculous deposit. This catheter was but five days in the bladder, and was repeatedly covered in the same way. I think it is a very important specimen, illustrating the necessity of often renewing catheters when they are to be used demure.”

The catheter image in the MSH shows that it was metal, presumably silver, similar to the ones exhibited in our display. Chamberlain received total disability and was paid $30 per month up to June 4, 1873.

His injury required four further operations, of which few details are known, though Joseph Pancoast performed the first of these in February 1865 in Philadelphia. Ten years later Chamberlain underwent an attempted flap closure. This failed, however, and the fistula remained open. Aside from constant pain in both hips and the lower abdomen, Chamberlain suffered recurrent episodes of epididymoorchitis. He became Governor of Maine for four terms and died in 1914 at age 85 from bacteremia, presumably secondary to recurrent urinary tract infections.
Women in the War

Medicine today is unthinkable without the complementary force of nursing. Yet, at the time of the Civil War, nursing as a profession did not exist.

The birth of modern nursing began with the establishment of the Order of Deaconesses in 1836 by Pastor Theodor Fliedner in Kaiserswerth, Germany to care for the sick and the poor. Well-educated but desirous to enter the profession as it existed then, and against the express wishes of her family, Florence Nightingale went to Kaiserswerth in 1851 to learn nursing. During the Crimean War (1851-1853) she gained much battlefield experience, and in her “Notes on Nursing” (1859) gave a number of recommendations dealing with sanitary conditions still valid today. She talked about the need to have cleanliness, light, pure air, pure water, and efficient drainage:

“They think that a sewer in the street and a pipe leading to it from the house is good drainage. All the while the sewer may be nothing but a laboratory from which epidemic disease and ill health is being distilled into the home...I have met just as strong a stream of sewer air coming up the back staircase of a grand London house from the sink as I have ever met...”

She discussed in detail the hospitals in the Crimea with their enormous mortality rates, fever epidemics that broke out in hospitals, and she took issue with the overcrowding of beds in institutions such the venerable Guys Hospital in London.

In a report to a Royal Commission which inquired into the sanitary condition of the British Army, she described the diseases seen during the Crimean War, virtually the same as those of the Civil War: diarrhea, dysentery, rheumatism, scurvy, typhoid fever, and intermittent fevers. Sanitary precautions were few, if any, and the mortality rate was over 45%. Her recommendations on how to improve conditions, though known, were not heeded in the United States. Telling of clashes between female nursing staff and hospital stewards, Nightingale took issue with one other problem:

“the orderlies do not bring skilled labor to the work, and the medical staff corps far less. There is little or no training...”

In the States, no nursing schools existed; a woman’s place was at home and military protocol barred women from field hospitals. Within three weeks of the President’s call for militia volunteers in April 1861, hundreds of women had volunteered and 100 were selected to take a special short course in providing nursing care. On June 10, 1861 Dorothea Lynde Dix, who had already led the effort to modernize the care of the mentally ill, was appointed Superintendent for Women Nurses by the Secretary of War for the Union. In a circular of 1862 she stipulated that no women under 30 need apply; they had to be plain looking and wear simple brown or black dresses without bows, jewelry, or hoops. Many women wanting to provide nursing care disregarded Dix’s stringent rules and performed their work independently. Later, when she worked with the US Sanitary Commission, Dix led the formation of the first formal nurses’ training service in the U.S.
WOMEN IN THE WAR

In April 1861, numerous groups of women from New York churches, schools and others eager to help met to discuss the creation of one large group to provide direction and organization to their work. “Articles of Organization” were written and sent to Washington with representatives of this group. Supported by the Acting Surgeon-General, they presented their goals to the Secretary of War. The document creating the United States Sanitary Commission was signed by the President on June 18, 1861, before the first major battle of the war.

In the Confederacy, nursing duty was simply assigned to infantrymen regardless of their capabilities. Many of these were convalescent soldiers, unfit for field duty. While women had worked already for a year and a half in southern hospitals as volunteers, it was not until September 1862 that the Confederate Congress gave them official status.

All told, close to 10,000 women (nearly 1,000 of them nuns) served as nurses during the war, most of them uncompensated volunteers. About 9,000 of these women of every background served as nurses for the Union Army and about 1,000 for the Confederate Army.

Kate Cumming, who had never been inside a hospital, wrote that, although she was wholly ignorant of what needed to be done, “I knew that what one woman [Florence Nightingale] had done, another one could;” and volunteered as a nurse.

The U.S. Sanitary Commission, created to coordinate the activities and goals of numerous relief societies formed by women in their hometowns, had three major work branches: General Relief, to deliver supplies and commodities; Preventive Service, which inspected camps and hospitals, made recommendations concerning their findings and also published pamphlets on sanitation for the soldiers; and Special Relief, which created Soldiers’ Homes to provide shelter, food and medical care for soldiers and veterans.

This commission reported on October 12, 1861,

“...It is to be regretted that a more favorable account of the way in which the nurses have been received and treated in the hospitals cannot be given. They have not been placed, as they expected and were fitted to be, in the position of head nurses. On the contrary, with a very efficient force of male nurses, they have been called on to do every form of service, have been over tasked and worn down with menial and purely mechanical duties....They have encountered a certain amount of suspicion, jealousy, and ill treatment, which has rendered their situation very trying...Nothing but the most patriotic and humane motives could sustain women in this position.”

We can only imagine how many soldiers owed their survival to the untiring work of these women, who dressed wounds, fed the crippled, calmed those in agony, and comforted the dying.
Women in the War

Sally Louisa Tompkins
1833 - 1916

Born into a wealthy family in Virginia in 1833, Sally Tompkins labored tirelessly for the wounded soldiers of the Confederate Army. After the first battle at Bull Run, the Confederate government asked citizens to open their homes to care for the wounded. Receiving help from a Richmond judge, Tompkins quickly responded and transformed the house into a hospital that became one of the South's most important institutions. The wounded called her, “The Little Lady with the Milk-White Hands;” she was eventually recognized by Confederate President Davis, who appointed her a captain of the cavalry in September 1861 so that she could continue to run her successful hospital. Tompkins worked unceasingly until the hospital closed on June 13, 1865. Her ideas of cleanliness were almost revolutionary; she insisted on handwashing and the cleaning of instruments. Of the 1333 patients admitted to her hospital, only 73 died, a remarkably low mortality rate in the Civil War era. Tompkins’ lifelong philanthropy wiped out her fortune, forcing her to live out her final years in the Richmond Home for Confederate Women. When she died in 1916, she was buried with full military honors.

Dr. Esther Hill Hawks
1833 – 1906

Esther Hill Hawks, after marrying a physician, began to read his medical books and decided—against her husband’s advice—to study medicine. In 1857 she graduated from the New England Medical College for Women. Going into practice with her husband, Esther moved with him to Hilton Head, South Carolina after its occupation by Union forces. There they provided medical service for freed slaves and worked as contract surgeons at General Hospital #10, a facility for black soldiers in Beaufort, South Carolina.

Harriet Tubman
1820 - 1913

She is best known among the many blacks who rendered distinguished service as Civil War nurses. Famed for her courageous exploits with the Underground Railroad, Tubman was admired by many leaders during the Civil War era including Secretary of State William Seward and poet Ralph Waldo Emerson. Born Araminta Ross, she was born into slavery in Dorchester County, Maryland. As a child she was hired out as a nursemaid for a small baby and was whipped if she fell asleep during the night. She was hit by a heavy iron weight thrown by the slaves’ overseer who had aimed for a young slave running away. She sustained a skull fracture and suffered from seizures the rest of her life. In 1844 she married the free black John Tubman and took her mother’s first name. She escaped slavery by running to Philadelphia in 1849, though her husband refused to follow her.

During the Civil War, she worked for the Union army as a nurse, cook, and a spy. With a group of former slaves, she ventured out Confederate camps and reported their movements to the Union forces. Nineteen times she went back south to gather slaves and send them north to freedom. Working as a nurse during the war, she was struck by the loss of so many lives from dysentery and went to find roots and herbs in Maryland. She boiled a brew of water-lilies and cranesbill that cured a number of soldiers dying from dysentery.

She wrote that when she was about to be sold away from her family she had this thought, “I had reasoned this out in my mind; there was only two things I had a right to, liberty or death; if I could not have one, I would have the other; for no man should take me alive; I would fight for my liberty as long as my strength lasted...”
Women in the War

Mary Ann Ball Bickerdyke 1817 – 1901

Born in Ohio in 1817, Mary Ann Bickerdyke was widowed shortly before the war and supported her three children by practicing as a “botanic” physician in Galesburg, Illinois. One of the Union volunteer physicians wrote home about the chaotic conditions in military hospitals, the lack of supplies, and the unsanitary conditions; Galesburg citizens collected $500 worth of supplies and Mrs. Bickerdyke was chosen to deliver them. She stayed on as an unofficial nurse and organized the hospital, gradually becoming known as “Mother Bickerdyke” to the troops. Grant appreciated her efforts and sanctioned her work, and William T. Sherman in particular was fond of this woman who went onto the battlefield as a volunteer nurse. It is said that she was the only woman allowed in Sherman’s camp.

She doggedly pursued her goals of improving sanitary conditions, proper diets, and medications by traveling to many cities to raise funds for the sick and wounded, and was well known for persistently disregarding the Army’s red tape and official military procedures to do what she thought necessary.

Phoebe Yates Levy Pember 1823 – 1913

Born August 18, 1823 as one of six daughters in a wealthy Jewish family, Phoebe Pember grew up in Charleston, South Carolina. Widowed early, she moved to Richmond at the beginning of the Civil War. She was offered the position of matron at the Chimborazo Military Hospital and started her work in December 1862. Chimborazo Hospital was then the largest military hospital, 150 wards with 40 to 60 patients in each. By the end of the war 76,000 patients had been treated at Chimborazo Hospital.

Meat was virtually impossible to obtain and patients resorted to providing their own delicacies for meals whenever they could catch a squirrel or rat. Pember described in her memoirs how she learned to prepare both rodents and found them similar in taste.

Despite the primitive facilities and severe shortages of personnel, food, dressings, medicine, and equipment, Pember dedicated herself to relieving suffering, assisting with operations, and helped the dying.

Dr. Elizabeth Blackwell 1821 - 1910

Dr. Elizabeth Blackwell, born in England, moved with her family to the United States in 1832. Several years later, wanting to study medicine, she applied to a number of medical schools and was rejected. Eventually accepted in Geneva, New York, she graduated first in her class in 1849. After further studies in Paris, she returned to England, where she met Florence Nightingale.

In 1851 Blackwell returned to New York and opened a clinic for women and children. Other women began to study medicine, including Blackwell’s sister. Together they helped to organize the “Women’s Central Association of Relief”, which led to the formation of the United States Sanitary Commission. Together they spent the war training nurses in Dorothea Dix’s US Army Nurse program.

Suzie King Taylor 1848 - 1912

Suzie King Taylor was born into slavery as Susie Baker in Savannah, Georgia in 1844. Her grandmother sent her to a friend to learn how to read and write, though it was a crime to educate black children. At the age of 14, she was taken by Union soldiers to serve in the First Regiment of South Carolina Volunteers, which was comprised of freed slaves. She began work as a laundress, taught soldiers to read and write, and also nursed injured soldiers. She recorded her thoughts in a diary stating, “I gave of my services willingly for four years and three months without receiving a dollar. I was glad however, no care for any sick and afflicted comrades.”

She often visited sick and injured black soldiers in a special hospital in Beaufort, South Carolina. After the war she moved to Boston and married. She maintained an active interest in care for the sick and eventually joined the Women’s Relief Corps, of which she became President.
Clarissa Harlowe Barton 1821 - 1912

Clara Barton was born December 25, 1821 in Oxford, Massachusetts. Educated at home, she started teaching school when she was 15 and eventually established a free public school in Bordentown, New Jersey.

In 1861 she was living in Washington DC when the 6th Massachusetts Regiment arrived, after the Baltimore riots when Southern sympathizers had opened gunfire on the regiment as they crossed town. Barton organized a relief program for the soldiers and continued to do so for most of her life. She advertised for donations in Massachusetts after the first Bull Run battle and started an independent organization to distribute relief goods. Surgeon General William A. Hammond granted her a pass to travel with Army ambulances "for the purpose of distributing comforts for the sick and wounded, and nursing them." She followed Army operations through Virginia into Charleston and cared for casualties from many of the battles at that time. She also served as superintendent of nurses under Major General Butler's command. The first to organize a program to locate those missing in action, Barton was quite successful in this endeavor. In the summer of 1865 she traveled to Andersonville, Georgia "for the purpose of identifying the graves and enclose the grounds of a cemetery created there during the occupation of that place as a prison for Union soldiers in Rebel hands." Approximately 13,000 unidentified Union soldiers died at this prison camp.

The stress of her work led her doctor to recommend a stay in Europe; Clara Barton arrived in Switzerland in 1869 where she first encountered the concept of the Red Cross. The idea was the culmination of the efforts of Henri Dunant, who had observed the Battle of Solferino in the French-Austrian War. Barton accompanied volunteers to observe the Red Cross in action during the Franco-Prussian War (1870 – 1871). When Barton returned, she worked to have the U.S. join, eventually founding the American National Red Cross. In 1882 the U.S. finally signed the Geneva Agreement. Initially designed as a wartime relief and aid organization, the U.S. quickly realized the value of this organization. To include victims and workers in the Ohio and Mississippi River flood of 1882 and 1884, the Texas Famine in 1886, yellow fever epidemics in Florida in 1887, an earthquake in Illinois in 1888, and the 1889 disastrous dam break and flood in Johnstown, Pennsylvania, the U.S. suggested an amendment to the Geneva Agreement to cover such catastrophic events; it was adopted in 1884 into the Geneva Convention.

Solferino

The Battle of Solferino, fought between the Napoleonic armies and their allies against the Austrian empire, was fought June 24, 1859 in Lombardy (Italy); 14,000 Austrians and 15,000 French lost their lives and caused Napoleon to seek a truce. It would have been all but forgotten had it not been for the young Swiss man Henri Dunant, who described the battle in *A Memory of Solferino*.

He described the sheer butchery, crushing of skulls, ripping bellies open with sabers or bayonets, felling each other with rifle butts or trampling the enemy under the hooves of advancing cavalry. His publication made a tremendous impact on the European nobility, which had always sung the praises of the glory of dying for your country. Dunant’s “Memory” emphasized the gore of the mutilating death in battle. It took three weeks to collect the approximately 40,000 wounded soldiers. Many waited up to four days for transport. Some died while dragging themselves to a field hospital and others were reportedly buried while still alive. Triggered by Dunant’s book, the “Convention for the Amelioration of the Condition of the Wounded Soldiers of Armies in the Field” took place in 1863 in Geneva, eventually leading to the formation of the International Red Cross. Twelve nations signed the document of this convention, while the United States declined the invitation to join.
GROWTH OF A NEW INDUSTRY
Pharmaceuticals and Instruments

Neither the Union nor the Confederate medical corps was prepared or had even anticipated the tremendous demand for pharmaceuticals when the war began. This had also been true in Europe, where the sick and wounded of Napoleon’s army were often left to die on the field or in nearby barns without medical care.

The numbers of the diseased tell part of the brutal story of the Civil War: there were more than 6,000,000 reported cases of disease and 5,000,000 reported battle injuries and accidents. While statistics for the Negro troops exist for only a short period, we know that white soldiers of the Union had 1,213,685 cases of malaria, 139,638 cases of typhoid fever, 109,397 cases of gonorrhea and 73,382 of syphilis (totalling 182,779 cases of venereal disease), 67,763 cases of measles, and 61,202 of pneumonia. Specific treatments such as antibiotics, intravenous fluids, and blood replacement did not exist, and in these days prior to Lister’s discoveries, the application of disinfectants was non-existent. Yet, Civil War medicine brought about one major change: the Army’s medical department evolved from an inefficient bureau into an efficient and well-organized cadre through a supply system and organization created by William Hammond and Jonathan Letterman. The statistics of some of the medications used are staggering: 539,712 pounds of magnesium sulphate, 2,841,596 ounces of various opiates and 442,926 dozen opium pills, 987,687 ounces of ether, and 1,588,066 ounces of chloroform; 2,072,040 ounces of various cinchona products were shipped, and 1,905,779 ounces of ipecac (in various preparations, including a mixture with opium) were in high demand for the treatment of dysentery.

Many surgeons did not have any formal training and, lacking knowledge of these drugs, relied heavily on the herbal and eclectic treatments they had learned from their preceptors, such as fluid extract of red bud mixed with aromatic syrup of rhubarb, and other village nostrums.

Prior to the Civil War, medical and hospital supplies of the United States Army were purchased and shipped through the medical purveying depot in New York City to smaller depots in the South and West for further distribution. The War necessitated a tremendous expansion and reorganization of this system. New York and Philadelphia became the nodes of the Union’s new supply system distributing medicines, surgical instruments, hospital beds, and everything else needed to care for the sick and wounded.

Medications were carried in light mobile medicine wagons constructed from plans drawn by Jonathan Letterman. Several modifications preceded the 1864 “Autenrieth Wagon” eventually adopted by the Army Medical Board. Letterman had created a Standard Supply Table for drugs to be shipped to the troops, which was periodically revised to ensure a constant, reliable and safe stock of medications. Escalating prices for “articles of need,” particularly drugs such as quinine, sulphate, or potassium permanganate (used for the treatment of gangrene), accelerated the creation of two new facilities to produce specific medications for the Union Army: one a former warehouse in Philadelphia containing products of John Wyeth and his brother, and the other, plagued from the products of Jonathan Letterman. The statistics of some of the medications used are staggering: 539,712 pounds of magnesium sulphate, 2,841,596 ounces of various opiates and 442,926 dozen opium pills, 987,687 ounces of ether, and 1,588,066 ounces of chloroform; 2,072,040 ounces of various cinchona products were shipped, and 1,905,779 ounces of ipecac (in various preparations, including a mixture with opium) were in high demand for the treatment of dysentery.

Many surgeons did not have any formal training and, lacking knowledge of these drugs, relied heavily on the herbal and eclectic treatments they had learned from their preceptors, such as fluid extract of red bud mixed with aromatic syrup of rhubarb, and other village nostrums.

Prior to the Civil War, medical and hospital supplies of the United States Army were purchased and shipped through the medical purveying depot in New York City to smaller depots in the South and West for further distribution. The War necessitated a tremendous expansion and reorganization of this system. New York and Philadelphia became the nodes of the Union’s new supply system distributing medicines, surgical instruments, hospital beds, and everything else needed to care for the sick and wounded.

Medications were carried in light mobile medicine wagons constructed from plans drawn by Jonathan Letterman. Several modifications preceded the 1864 “Autenrieth Wagon” eventually adopted by the Army Medical Board. Letterman had created a Standard Supply Table for drugs to be shipped to the troops, which was periodically revised to ensure a constant, reliable and safe stock of medications. Escalating prices for “articles of need,” particularly drugs such as quinine, sulphate, or potassium permanganate (used for the treatment of gangrene), accelerated the creation of two new facilities to produce specific medications for the Union Army: one a former warehouse in Philadelphia containing products of John Wyeth and his brother, and the other, plagued from the beginning by political squabbling, in Astoria, New York.
Growth of a New Industry
Pharmaceuticals and Instruments

Emulating the Navy, which had already developed its own manufacturing laboratory in Brooklyn in 1852, William Hammond, Surgeon-General, created a US Army Laboratory to test and manufacture medical supplies. As the success of the naval laboratory was due in great part to the guidance of Dr. Edward Squibb, Hammond likewise relied on him in the design and directorship of the U.S. Army Laboratory in New York.

When the war started, Edward Robinson Squibb in Brooklyn, New York had rapidly expanded his facilities to keep up with the demand for pharmaceuticals, producing $40,000 worth of panniers (portable medicine chests) in 1863 and the medications to fill them. The laboratory in Astoria manufactured drugs from 1863 to 1864 before burning to the ground on February 13, 1865. The company Squibb had founded in 1856 to produce consistently pure medicines continued in Brooklyn. He passed the leadership on to his sons, Charles and Edward Squibb.

By November 1867 preparations were being made to sell all equipment and close the Philadelphia establishment. One of the last shipments was for 10,000 bottles of whisky as alcohol was being used extensively by the Army, not only for sedation, but in large quantities to make quinine palatable to soldiers as an anti-malarial agent.

Chloroform was one of the few drugs to receive significant criticism. After the Astoria laboratory burned, the Philadelphia laboratory was compelled to work overtime, and quality control suffered. In addition, it was found that the chloroform from Philadelphia did indeed decompose more rapidly than that of other companies due to its higher specific gravity and its being exposed to light. Following the example of Squibb in New York, a small amount of alcohol was added to prevent this decomposition.

Several of today’s pharmaceutical companies date back to the Civil War era and each experienced major expansion at that time. One of these is Pfizer, founded in 1849 by the German immigrants Charles Pfizer and Charles Erhart in Brooklyn. Beginning with a very successful anti-parasitic product, they soon began to expand their product list.

With money borrowed from Pfizer’s father, they bought a small brick building that served as office, factory, laboratory, and warehouse. When the Civil War broke out, they increased their production of tartaric acid, used as a laxative and skin coolant, as well as iodine and cream of tartar, used as a diuretic and cleansing agent. They expanded the production facilities for other drugs such as morphine, chloroform, camphor, mercurial agents and fungicides, all in great demand.

Mercurial compounds were used in photography as well as medicine; Mathew Brady and others who chronicled the Civil War in images benefited from the increase in Pfizer’s production. Shortly after the Civil War the company moved into new headquarters and remained at their address in Manhattan for nearly a century.

Founded in 1860 by John Wyeth and his brother in Philadelphia, Pennsylvania, the Wyeth Company was both a drug store and a research laboratory. Wyeth supplied medicines to the Army on a large scale through a process they called “advance manufacture.”

Upon John Wyeth’s death, most of the Wyeth Company was purchased from his son by Howard University. The company has grown through acquisitions and mergers with other companies such as Lederle, Ayerst, and A.H. Robins.
Growth of a New Industry
Pharmaceuticals and Instruments

In 1862 Dr. Samuel P. Duffield started a drug manufacturing business and joined four years later with Hervey C. Parke. In their early years, the company began research into drugs, a virtually unknown practice in those days. Plants were the principle source of medicine, and Duffield-Parke's research expeditions into the jungles of Brazil were a revolutionary idea. In 1867 George S. Davis joined the firm as a salesman and later became one of the three owners. Two years after Duffield retired, the company became known as Parke, Davis, and Company.

Though the Eli Lilly Company was created after the Civil War, its founder was greatly influenced by the war. Young Eli, born in 1838 in Baltimore, Maryland was raised first in Kentucky and later in Indiana. Intrigued by a shop sign for the “Good Samaritan Drug Store,” Lilly decided to become a pharmacist. He apprenticed himself to a local pharmacist and learned the duties of the trade. After working in several different drug stores, he opened his own drugstore in 1861 and married his childhood sweetheart Emily Lemon. When the Civil War broke out, Lilly, though reluctant to leave the new business and his young wife, felt strongly that he needed to volunteer.

He enlisted with the 21st Regiment of the Indiana Volunteer Militia as a second lieutenant and they were sent to Baltimore as garrison for the harbor. After six months of inactivity, Lilly resigned his commission, hoping to form an artillery unit. He besieged the Indiana governor for permission to organize an artillery battery and studied artillery practice. By the summer of 1862 the governor awarded Lilly a commission as a captain and granted permission to start a battery. Captain Lilly recruited 156 men and established the 18th Indiana Battery of Light Artillery. They only had three days to train before they were sent into battle, and for the next six months they were involved in many small skirmishes but not a single major battle. Lilly lost over 30 men to disease in these months. Later, the unit joined the brigade of Colonel John T. Wilder. Lilly performed admirably during the Battle of Chattanooga without loss of men or guns. Reassigned, Lilly was in Tennessee when his unit tried to stop what they believed to be a small Confederate force that turned out to be nearly 12,000 veteran Confederate cavalry soldiers. Vastly outnumbered and with all Union officers killed or wounded, Lilly found himself in charge and eventually had to surrender. He was exchanged later while a number of the troops captured with him died in the explosion of the steamship Soltana on April 26, 1865, as it was taking prisoners-of-war back to their homes. Lilly mustered out in August 1865 shortly after he had been promoted to full colonel.
Growth of a New Industry
Pharmaceuticals and Instruments

Lilly’s wife and son joined him on a plantation in Mississippi, but his life as a plantation owner was a disaster; drought ruined his crops, his business partner made off with all liquid funds, and Lilly, his wife and son suffered from malaria. His wife died from “congestion of the brain” during the eighth month of her second pregnancy. Colonel Lilly then abandoned the plantation and returned to Indianapolis where he became a chemist with a wholesale drug house, returning to his pre-war career. In 1869 he formed a partnership with a former Indiana Battery unit sergeant; they opened a store selling patent and veterinary medicines. Like all good drugstores, this also had a soda fountain, which developed a reputation for being the best in town. The same year Lilly married again.

Lilly soon became restless and wanted to start his own drug manufacturing business. He wanted to expand his skills and do more than simply sell herbal concoctions. He entered into partnership with an old friend, Dr. John F. Johnston, a dentist in town, and they began to manufacture “pharmaceuticals and chemical preparations.” Lilly became frustrated when Johnston did not actively participate in the venture, and when he discovered that Johnston had withdrawn more than half of the profits, Lilly suggested they dissolve the partnership. He was left with approximately $1,000 in cash and $400 worth of fluid extracts.

Lilly then applied for a job as a clerk with an Indianapolis wholesale druggist who refused to take him, believing he was too experienced, but encouraged him to start his own business again. He promised support by placing orders and in addition garnered commitments from several other wholesale druggists to support Lilly’s new business. Lilly rented a small two-story building and in May 1876 opened his doors for business.

These are the commitments he made to himself and to society:

- To manufacture pharmaceutical products of the highest quality.
- To develop only medicines that would be dispensed at a physician’s request.
- To base his pharmaceuticals on the best science of the day.

The company has continued to grow – Colonel Lilly saw the beginning of this. In 1890 following a year’s illness, he died in Indianapolis. His home town named its Civil War Museum in Colonel Lilly’s honor.

Obviously surgical instruments were also needed in huge numbers, with the major instrument companies also located in New York and Philadelphia. During the course of the war, the U.S. Army purchased over 4,900 amputating and general operating cases; 1,150 cases of trephining, exsecting, postmortem and “personal” instruments; 12,700 minor surgery and pocket cases; and 64,000 tourniquets. This huge demand led to the rapid growth of several instrument producers, particularly Tiemann and Company. Many instrument sets were brought over from Europe, produced by companies like Charriere in Paris or Evans of London.

A large military surgery case in a mahogany brass-bound case lined with oiled velvet cost $160, and the largest pocket set produced by Tiemann in a compact case of Turkish morocco with silver lock ran $33.
In January of 1865 a sick Dr. Hyde went home to Vermont and returned late to his regiment, from which he was reported to be “absent without leave” at a time when executions for desertion were frequent and swift. By the spring of 1865 Hyde wrote home that he was “disgusted with the service in every way and intend to leave it as soon as possible — every man I see fall bleeding, and mangled, and sometimes torn by shells limb from limb... The fight continues until noon yesterday when the rebs sent in a flag of truce requesting the cessation of hostilities for one hour to bury their dead and carry off their wounded, which was granted. We met halfway, and mingled in conversation the while. This ended the fight for this time... I don’t know when I have been more alarmed, the rebels crawled in the dark close up to the picket lines and then rushed with horrid yells upon us firing as they came...”

Hyde’s health began to suffer again, and he was bedridden with “rheumatism in my heart.”

During the Civil War a relatively new bullet was used: the French “minie ball.” Breaking into fragments on impact, it would shatter bone and make it nearly impossible to stabilize and salvage the injured limb, leading to thousands of amputations. “Better to live with three than die with four limbs,” said one surgeon.

A number of prosthetic devices – albeit cumbersome – existed, but the huge number of amputations during the Civil War led to a new industry, and the story of the oldest such company follows.

James Edward Hanger of Churchville, Virginia, enlisted in 1861 at age 18 in the Churchville Cavalry of the Confederate Army, over the objections of his mother. He joined the unit in which his brothers served. The very first night his unit, billeted in a barn, unexpectedly came under attack. Hanger was hit by a cannonball; his leg was shattered, and hours later it was amputated by a Union surgeon.

After he was discharged home, Hanger began to design his own artificial leg using tools and leather straps his mother bought for him. Eventually he was able to walk down the stairs with his new device. Word of his accomplishment spread, and soon a government official came to commission Hanger to make artificial limbs for handicapped Confederate veterans. After the war in 1866, North Carolina became the first state to start a program for thousands of amputees to receive artificial limbs. The program offered veterans free accommodations and transportation by rail; 1,550 veterans contacted the program by mail.

Beginning in 1871, Hanger’s prostheses were patented by the U.S. government. After he married, he founded the Hanger Company, which expanded its main headquarters to Washington, D.C. When Ed Hanger died, the company had branches not only in the States but also in Paris and London. This company, the Hanger Orthopedic Group, is the oldest orthotic and prosthetic company in the United States.
Gross facial disfigurements were not uncommon during the Civil War. Creative surgeons had long described reconstructive operations. 300 years before the Civil War Ambroise Paré described plastic procedures for harelip closures; Tagliocozzi, a few years later, described a skin flap procedure for replacement of the nose in 1597. Gunshot wounds and infections of facial structures challenged the creativity of Civil War surgeons. Over 30 patients underwent plastic surgery during the War; some of these are shown in detail in the MSH.

Dr. Gurdon Buck, surgeon at New York Hospital for almost 40 years, was the surgeon of Private Burgen, initially admitted on August 4, 1862 to a hospital in Frederick, Maryland with a bedsores over the sacrum, bathed in sweat, and his covered with sores. Burgen’s case was undoubtedly the most dramatic of reconstructive surgical challenges. He had been sick in camp since June 5 and had been treated for pneumonia with calomel, mercury with chalk, and 65 grains of blue pill (all containing mercury). While still in the hospital, a slough appeared on his gum (probably caused by the mercury), rapidly extended to check and roof of mouth, and nearly reached the orbit. By the end of August the ulceration had ceased. He had lost a good bit of soft tissue and by October 1st the right superior maxilla, the right palate, and a narrow strip of the left maxilla were removed. The right eye was destroyed and sunken, and Burgen underwent a number of plastic operations. All this was done without the benefit of intravenous fluids, antibiotics, blood replacement – and the idea of antiseptic procedures had yet to occur to Joseph Lister. Burgen was discharged from the hospital in Frederick, Maryland December 22 and was admitted to the New York Hospital on December 31st under the care of Dr. Gurdon Buck, who then performed several operations that gradually restored some of Burgen’s facial features.

Reconstructive surgery for both congenital and acquired problems has grown ever since and led to the creation of the International Plastic Reconstructive Surgery Association in 1955, and in 1966 the Fédération Mondiale des Sociétés de Chirurgie de la Main.
Letterman - Innovations

In his “Memoir de Solferino,” Henri Dunant, founder of the Red Cross, describes this bloody battle of 1859, telling of the “chaotic disorder, despair unspeakable, and misery of every kind.” It took three weeks to collect all the wounded, and even then some waited days for transportation.

Yet already 50 years earlier J.D. Larrey (1766 – 1842), famous Surgeon-General of the Grand Army of Napoleon I, had stressed the great need for rapid evacuation of the wounded from the battlefield. To achieve this, he designed his “flying ambulances.”

Early in the Civil War, Jonathan Letterman, medical director of the Army of the Potomac, instituted an evacuation program that incorporated ambulances. Each division kept its ambulances together in a train. As a rule, the number of ambulances in any train was about one for every 150 soldiers. His system was so successful that it became the blueprint for the U.S. Army up to the present day. The Battle of Antietam in September 1862 became a proving ground for Letterman’s ambulance plan and clearly showed that the previous uncoordinated and haphazard retrieval and care of casualties was to be part of the past. Letterman’s corps was able to remove each of the 10,000 wounded soldiers from the battlefield to the back of the lines for treatment under adequate shelter within 24 hours. Letterman found the two-wheeled ambulances of Larrey to be too unstable and soon four-wheeled wagons came into use. The Confederate troops eventually adopted Letterman’s system as well.

Two years later, in 1864, the design of his ambulances was seen on battlefield of the German-Danish War. This was also the War that saw the first deployment of the Red Cross onto a battlefield.

The triage system initiated during the Civil War included separating the wounded by the severity of their injuries. In order to concentrate on those whom they thought could be saved among the massive number of the injured, the medical corps learned to make quick evaluations of injuries. Penetrating abdominal chest and head wounds were considered “mortal wounds” and usually left alone. If they did survive, they were evacuated when conditions permitted. Those with the best chance of survival were treated at field dressing stations and evacuated as quickly as possible to the field hospital behind the lines. This triage system was the basis from which modern and more sophisticated systems were developed.
After the War

In 1870 John Shaw Billings, then Assistant Surgeon of the United States Army, published a report of the barracks and hospitals of the United States for the Surgeon General’s Office. Billings stated “The most important structures at a post, in a hygienic point of view, are the barracks proper, or soldier’s quarters, the guardhouse, including the prison rooms or cells, and the hospital...” He was quite concerned with “the evil results of insufficient air supply,” an issue that had already been taken up by Florence Nightingale fifteen years earlier. He showed that few posts had sufficient air space in their quarters. He lamented the problems of bureaucracy, stating “Even after the construction of a hospital was ordered by the War Department, it was very possible that it would not be built, as at Carlisle Barracks, Fort Wayne, and Fort Davis... When hospitals were built it was usually by contract without intelligent supervision, no medical man being consulted either as to the specifications, or during the construction, the sole object being cheapness, and the results appear in the erection of such hospitals as those at Fort Adams, Taylor Barracks, and Omaha Barracks.”

Each post was instructed to submit, beginning in 1868, a record of the medical report of the post, including not only geographic location and topographical details, history, climate, local flora and fauna, but also detailed descriptions of the post buildings themselves (including sanitary facilities, bakery, library, etc.) and prevailing diseases. For Fort Carlisle - today the repository of military records - the report stated, “it is doubtful whether the guardhouse or the hospital at Carlisle Barracks can best claim the bad eminence of being a public nuisance... The sewer – which drains the southern portion of the garrison – empties itself immediately below, and in fearful proximity to the hospital; all that it bears are slops and dirt from the company kitchens and wash houses remaining exposed to the sun during the whole summer.”

Among the most common medical problems were venereal diseases; one surgeon wrote, “Gonorrhoeas are numerous and quite difficult to treat... 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.” He went on to test the relative merits of “nitrite of silver, sulphate of copper, sulphate of zinc, chloride of zinc, subnitrate of bismuth, permanganate of potash, carbolic acid, corrosive sublimate, and a number of other remedies recommended by different writers on the subjects... without being able to fix upon any one as being pre-eminently the most efficacious... of all these described none seemed to have as much effect as a combination of balsam copaiba and the ethereal oil of cubeb.”

Dr. Melvin John Hyde

Finally on June 12, 1865 Dr. Hyde cabled his stepdaughter that he was leaving the army and was on his way to Burlington. He returned to Isle La Motte and resumed his practice of medicine. He remained active in local affairs and in late 1870 he joined the Catholic Church. Shortly thereafter he promised the Bishop of Burlington that he would endeavor to build a church on the island. His health began to wane, and he wrote to his stepdaughter, “My hands have been so swollen a part of the time that of course I could not hold a pen and they are so weak now that I can scarcely write.” By the summer of 1872 he wrote again, “I do not expect to practice much this summer,” and seemed glad to be under the care of his physician friends.

No further correspondence exists for Melvin Hyde following the summer of 1872.

Carlisle Barracks in Pennsylvania was reported to be “a public nuisance” with a sewer that emptied right near the hospital. Surgeon General’s Report on Barracks and Hospitals, 1870.
After the War

Fort McHenry was first occupied for military purposes in 1775 and comprised a water battery with obstructions in the Patapsco River consisting of three massive wrought iron chains and some sunken vessels. In 1794 the Fort was repaired, the star fort of brickwork added and the whole was ceded to the United States. It was named after the Secretary of War in 1798, James McHenry.

During the Civil War Fort McHenry was used chiefly as a military prison. The two men’s sinks even after the war were decidedly objectionable: one 400 yards from the fort at the seawall; the other one within the fort itself. It was impossible to keep the air decent, and in warm weather they were extremely offensive. Officer’s quarters were scattered and not uniform; some of them being very damp and swarming with vermin and exposed to miasmatic exhalation from a swampy piece of ground. The men’s barracks were two substantial brick buildings, two stories high, each with a covered porch that extended the entire length. Too small for the men, who slept four to a bunk, the barracks were deemed to be detrimental to morality, cleanliness, and comfort. The ventilation was insufficient, especially in winter. There were no separate lounging, smoking, or reading rooms, though the fort had a library.

The hospital building was a substantial brick structure within the fort limits. It was raised about four feet off the ground and was warmed with stoves. It had kerosene oil for night illumination and large windows for natural lighting and ventilation. Each room had a water closet, but on account of their improper construction were rendered inadequate and were no longer used. Water was supplied from the main tank inside the fort; there was also a fine spring near the hospital building which, however, could not be used on account of the proximity of the hospital privy.

Alcatraz Island on the other hand, had excellent drainage with runoff of sewage directly into the Bay. Constructed of brick, the rooms for the soldiers had ample space with ventilators and air-tubes in the wall. They even had a bowling alley and theater for the men, located on the east side of the barracks.

Reading the statistics of each reporting post, one is struck by the fact that the most common diseases are diarrhea and dysentery, typhoid fever and malarial fever, and venereal diseases. In most posts venereal diseases are the second or third most common problem affecting 15 to 50% of the men.

Five years after hostilities had ceased, the barracks for the soldiers and the facilities for the sick and had not changed much.
**After the War**

The post at San Antonio de Bexar, located “wholly within the corporation limits,” appeared to have seen “rapid and fatal spread of the fatal epidemics of cholera that have visited this place.” This was attributed to the fact that small irrigation ditches were dug into the ground criss-crossing the various fields and were used not only for irrigation but also to dump garbage and other refuse into them. “The water supply of the town is so defective, and so little a subject of regulation, that the water of these ditches is commonly used both for drinking and cooking by many living on their banks and their vicinity, except when so muddy as to be repulsive.”

The garrison itself was supplied by cisterns with a total capacity of over 70,000 gallons for its water needs. “The system of drainage, if system it can be called, employed throughout the town is in every way defective and insufficient...As the ground is almost level the surface drainage is reduced to its lowest point of efficiency leaving for slow removal by evaporation and absorption.”

Alcatraz Island on the other hand, had excellent drainage with runoff of sewage directly into the Bay. Constructed of brick, the rooms for the soldiers had ample space with ventilators and air-tubes in the wall. They even had a bowling alley and theater for the men, located on the east side of the barracks.

Reading the statistics of each reporting post, one is struck by the fact that the most common diseases are diarrhea and dysentery, typhoid fever and malarial fever, and venereal diseases. In most posts venereal diseases are the second or third most common problem affecting 15 to 50% of the men.

Five years after hostilities had ceased, the barracks for the soldiers and the facilities for the sick had not changed much.
After the War

John Shaw Billings later became the designer and superintendent of the construction of the Baltimore Johns Hopkins Hospital and the Peter Bent Brigham Hospital in Boston as he clearly had a superb vision of what a “modern” hospital required.

The abundant use of mercury drugs had gradually given way to cautious application and the recognition that these drugs had serious and sometimes fatal complications. Hammond, as Surgeon General, had tried to reduce their use, but his decision was overruled by the Secretary of War, who also dismissed him; after the war Hammond was exonerated as more and more reports showed that his condemnation of mercurial agents was accurate.

The free and unrestricted use of opiates, which could be obtained over the counter, led to thousands of veterans becoming drug addicts. Though this dependency was not immediately recognized as caused by drugs but instead considered a moral weakness on the soldier’s part, restrictions were eventually placed on such agents. However, even by the beginning of the 20th century drugs such as cocaine, morphine, heroin, and opium were still being used to laced herbal preparations, or in wines and sodas!

Two of the lasting innovations of Civil War medicine are the accomplishment of one individual, Jonathan K. Letterman: the triage system and the ambulance system for evacuating wounded from the field.

While the European press was appalled by the carnage of Civil War battles (at Antietam, for instance, over 5,500 soldiers were killed while over 28,000 were wounded), European governments sent physician observers to both sides of the conflict. Rudolph Virchow, the preeminent pathologist in Germany in the late 1800s and early 1900s, also served in the Prussian army; he was quite impressed by the triage system and the administration of the field and general hospital system. Theodor Billroth, who later became the leading Austrian surgeon in Vienna, was a major innovator of abdominal surgery. He was particularly impressed by Letterman’s ambulance system for the evacuation of wounded from the field.
After the War

George Wunderlich, Director of the National Museum of Civil War Medicine in Frederick, Maryland, recently wrote eloquently:

“In 1999, Company Eight of the Frederick County Fire and Rescue Services was called out to I-70 for a multi car accident. The pager screen read...Personal injury accident serious. The snow had been falling for about three hours with little accumulation. The roads had not been too bad, however, just before the call the conditions became severe. As I pulled Ambulance 89 out of the station, I heard the worst news of all: “Multiple car accident, several trapped, one ejected – aviation is not available due to weather.” This was the third accident on South Mountain that week.

Needless to say the accident was a major one. Four cars, eight patients, three fire companies and five ambulances were all on the scene. My company came upon the scene first and started to work with the women who had been ejected and was deemed the most severe according to the triage manual. She was treated at the scene, stabilized and prepared for evacuation. We communicated her condition to the Washington County Hospital Trauma Center and she was transported. Fortunately she survived several life-threatening injuries... From the Civil War medical standpoint, this rescue had been rife with examples of earlier medical practices. The ambulance I drive is part of an organized ambulance service that links the various units to a central command. The triage system we used is still the same system that Dr. Letterman implemented in 1862. The fact that the woman was treated first at the scene is where medicine of the first aid stations began long ago. Finally, she was transported to a hospital that was part of a larger trauma system in the same way that Union hospitals were linked through the division level command structure. Everything that was done for that patient was part of a plan written over a century before her accident. That plan saved her life.”

And Major General Paul Hawley wrote the following in a letter to Reverend Dr. Henry Riddle:

“I was the Chief Surgeon of the European Theater of Operations during World War II, a position similar to that of Letterman in the Army of the Potomac. In that time I often wondered whether, had I been confronted with the primitive system which Letterman fell heir to at the beginning of the Civil War, I could have developed as good an organization as he did. I doubt it. There was not a day during World War II that I did not thank God for Jonathan Letterman.”

We do know how many Union soldiers died during the Civil War; casualties of the Confederacy were similar to those of the Union. Yet, as for the civilian losses of lives, probably in the thousands, we can only guess. War is brutal and leaves both sides with loss and sorrow. Yet medicine benefited greatly—better medications, better care of medical and surgical patients, new surgical procedures, and the realization that medicine was leaving the era of old assumptions and practices to enter an era of scientific evaluation.

<table>
<thead>
<tr>
<th>Civil War Casualties</th>
<th>USA</th>
<th>CSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Died in Battle</td>
<td>110,100</td>
<td>94,000</td>
</tr>
<tr>
<td>Died from Diseases</td>
<td>224,580</td>
<td>164,000</td>
</tr>
<tr>
<td>Died in Prison</td>
<td>30,192</td>
<td>31,000</td>
</tr>
<tr>
<td>Wounded</td>
<td>281,881</td>
<td>194,026</td>
</tr>
</tbody>
</table>
Contributors to the 2005 History Exhibit: Civil War Medicine

Christopher and Martha Campbell, Bay City, Michigan

Geraldine Chittick, Middleburg, Virginia

Robert DeKlotz, Fresno, California

Fritz Moll, Cologne, Germany

Hans Dieter Nöske, Giessen, Germany

Terry Reimer, National Museum of Civil War Medicine

Ryan Rokicki, National Museum of Civil War Medicine

Western Section American Urological Association, Inc.

Howard and Susan Wilson, New Market, Maryland

Jennifer Kennedy, Clarksville, Maryland

Dr. Erwin Rugendorff, New York, New York

Christopher Engel, Cockeysville, Maryland