

for Wounded Soldiers

50,000 Civil War Amputations Spurred Medical Advances

Stories by David McCormick

Recollecting his experience in the Battle of Philippi, Va., during the American Civil War, Confederate Pvt. James E. Hanger said: "The Federals were moving in on us ... and were entirely too strong." His dream of serving in the Churchville Cavalry of the Confederate Army was quickly taken from him that third day of June, 1861. Union artillery let loose two canister shots followed by a grapefruit-size, 6-pound solid shot that struck Hanger, shattering his leg below the knee.

The leg, so badly injured, was amputated 7 inches below the hip. The removal of Hanger's leg was one of the first two amputations of thousands performed during the war, but probably of greater import was that the loss of Hanger's leg would directly affect the thousands who followed with empty sleeves and tattered trousers [see sidebar, page 51].

During the Civil War, the number of amputations was about 50,000, compared to about 16,000 during World War II. The high incidence was perhaps due to a number of causes. The biggest culprit, the lead minié ball, was at its deadliest when tearing into tendon and shattering bone. Add to this the better accuracy afforded by the rifled barrel. These two factors, when combined with outmoded European military tactics that had soldiers advancing on the enemy shoulder to shoulder, accounted for the large number of casualties.

The high numbers have often been attributed to field surgeons' inexperience and time constraints. Lack of experience, however, cannot be laid directly at the surgeons' feet. At the time, dissection of human bodies was illegal. Of the 11,000 Union doctors enlisted to serve the troops, 500 had performed surgery. The situation the Confederates were facing was even more disquieting: Only 27 of their 3,000 field physicians had any operating room experience.

Hope for the Disabled

The development of prosthetics followed: arms, legs, hands, feet and, to a lesser extent, artificial eyes. The years following 1861 realized several advances, but these strides hinged on centuries of medical developments. Cautey (burning tissue to eliminate infection) had become an accepted practice, replacing the habit of crushing the end of



National Museum of Health and Medicine

A tintype immortalizes Civil War veteran Pvt. Charles Lapham, who received specially made prosthetics 11 months after battle wounds necessitated the amputation of his legs.

the stump to close off the open wound. This was followed by the discovery of ligation (tying off) of individual blood vessels and the use of the tourniquet. These techniques, combined with the use of anesthetics, allowed Civil War surgeons the luxury of time needed to complete a clean amputation. This allowed a healthy surface upon which an artificial limb could be attached.

At the time of the Civil War, a number of companies offered hope to those surviving loss of limbs. These patients could look forward to being fitted with artificial replace-

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Confederate Gen. John Bell Hood's right leg was amputated after he was wounded in the Battle of Chickamauga, Ga., depicted at right.

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ments and regaining normal mobility by getting out of a wheelchair or off crutches.

Dr. B. Frank Palmer incorporated concealed tendons in a leg that exhibited a more realistic appearance. The *Manual of Artificial Limbs*, compiled by prosthetic manufacturer A.A. Marks, became the "bible" followed by those selling, fitting and wearing artificial limbs. In addition to Hanger's company, the Virginia company G.W. Wells and Brothers provided artificial limbs for Confederate amputees. Gen. John Bell Hood "stood" on a Wells leg after losing his at the Battle of Chickamauga.

The issue of artificial eyes was another matter. The development of ocular prosthetics and treatments addressing eye and facial injuries progressed much more slowly than replacement of missing extremities. The trade in artificial eyes initially was a cottage industry, fueled by independent artisans crafting their own idea of an ocular prosthesis.

Meeting the Need

Addressing the question of treatment for disabled soldiers in America was a point of fact as early as 1636. Plymouth Colony avowed to care for those severely injured during the Pequot War. In 1776, the Continental Congress authorized half-pay to severely disabled servicemen. In 1873, the U.S. government authorized that pensions be paid according to degree of disability, not rank.

The U.S. government made efforts to provide prostheses to all needy veterans. In 1862, the federal government passed legislation addressing the specific amounts paid

for each artificial limb. The amount of \$50 was allowed for an arm prosthesis and \$75 for a leg. In 1876, an act authorized servicemembers who lost a limb or the use of one to receive an artificial one once every five years. In subsequent legislation, the time frame was shortened to three years.

During the war, the Confederacy struggled with the issue of providing artificial limbs to amputees. Charitable associations attempted to fill the void. Former Confederate states created programs addressing the problem. After the war, the Commonwealth of Virginia issued a contract for J.E. Hanger Company—run by the same James E. Hanger who lost his leg at Philippi—to furnish prosthetics to that state's veterans. In 1867, Alabama began providing Confederate veterans with artificial limbs.

According to the U.S. Surgeon General's report of May 11, 1866, several thousand Union veterans were fitted with prosthetic arms and legs; a lesser number received hands and feet. Information on the distribution of artificial limbs to Confederate veterans is scant at best.

Those maimed veterans of the Civil War benefited from the technology born from that conflict. Over the three or four decades following the war, a great many amputee veterans returned to normal life as a result of the advances made in artificial limbs. For example, J.F. Baldrige remarked almost 40 years after the war that he had "built a house each year, two of which were two stories high." Another soldier, G.W. Graham, lost his leg just below the knee at the Battle of Nashville, Tenn. Shortly thereafter, the U.S. government furnished him with an artificial leg with a wooden foot. In 1904, A.J. Armstrong stated that he had been wearing an artificial leg for several years, walking the two miles to and from work in the winter months, and in the summer riding his "wheel." Others, including a dance teacher and a tightrope walker, returned to their occupations after being fitted with an artificial leg. ★

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From Amputee to Entrepreneur

James E. Hanger was a teenager when he arrived in Philippi, Va., on June 1, 1861. He had followed his older brothers there to enlist in the Churchville Cavalry. Two days later, he was on guard duty in a local barn when a cannonball soared in and shattered his leg so severely that it had to be amputated. Hanger lay wounded in the blood-soaked hay for hours until he was discovered by Union soldiers. The barn door was torn off its hinges and used as the operating table on which a Union surgeon removed Hanger's leg. Twenty-five percent of amputations resulted in death in those days; that number rose to about 50 percent if the operation was delayed 48 hours. Luckily, Hanger was discovered only a few hours after his injury.

That August, he was exchanged for a Union prisoner and returned to his home near Churchville, Va. Hanger had had a clumsy, heavy, wooden apparatus crudely attached to his stump—nothing more than a peg leg that provided little mobility but a lot of thump. According to Hanger family lore, he was very dissatisfied, locked himself in his room for months and, using wooden barrel staves, created his own artificial leg.

Hanger dedicated himself to winning a patent and in 1861 was issued two by the Confederate government for his creation, which he called the Hanger Limb, a double-jointed prosthetic leg with a hinge at the knee

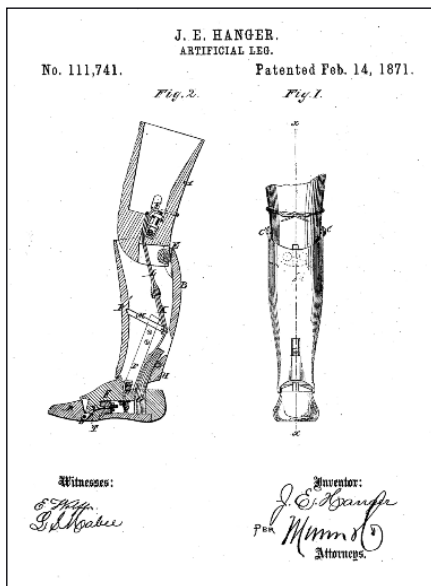
and one at the ankle. In 1871, the U.S. government issued the first of many patents for his artificial leg. Hanger continuously made improvements and was issued several patents for devices that would revolutionize the prosthetic industry.

By the time of his death in 1919, the J.E. Hanger Company, which he had started in Richmond, Va., during the Civil War, had grown into four branches in the U.S.—Philadelphia, Pittsburgh, Atlanta and St. Louis—as well as two in London and Paris, and had serviced some 60,000 amputees. Today, the company that carries his name, Hanger Inc., operates over 700 clinics and serves 1 million patients annually.

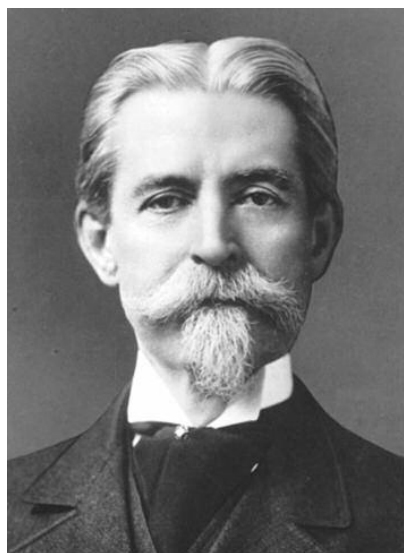
Ivan Sabel, who served as chief executive officer of the company from 1995 to 2008, posed the question: "Had James Hanger not lost his own limb in the Civil War, who knows where prosthetics technology would be today? The Hanger

Limb was far superior [to] anything that was available on the market."

According to Bob O'Connor, author of *The Amazing Legacy of James E. Hanger, Civil War Soldier*, this legacy is why he considers Hanger the most significant soldier of the Civil War. Perhaps Hanger himself said it best: "I am thankful for what seemed then to me nothing but a blunder of fate, but which was to prove instead a great opportunity."



Civil War Profiles



Hanger Clinic



Hanger Clinic

Civil war amputee James E. Hanger, left, developed a prosthetic leg hinged at knee and ankle. Workers produced the Hanger Limb at his workshop, right. Above: A diagram accompanied Hanger's first U.S. patent, issued in 1871.