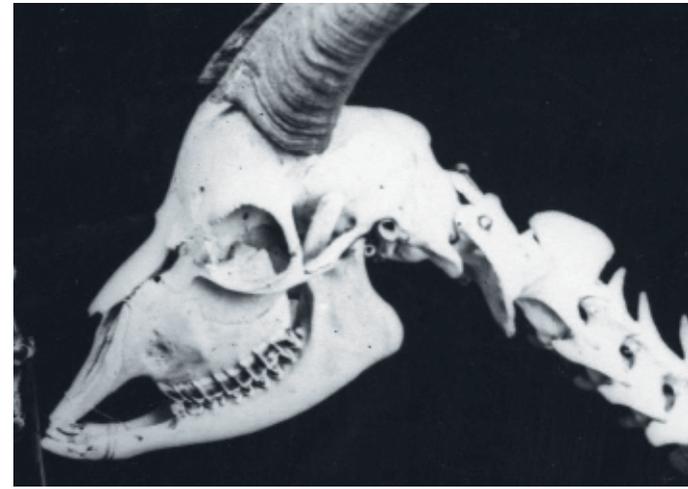
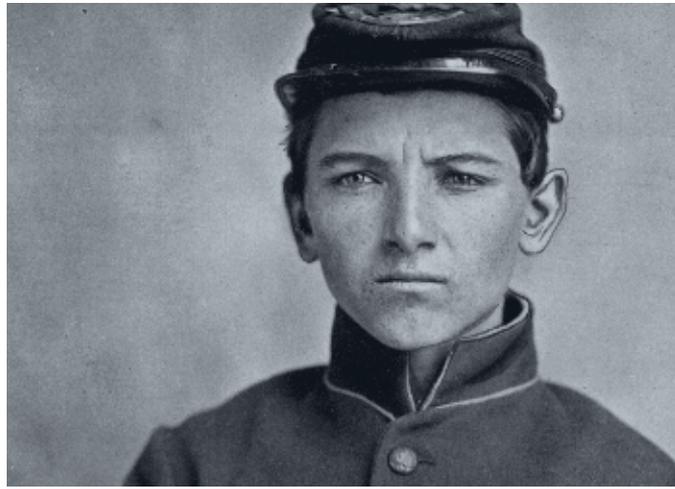
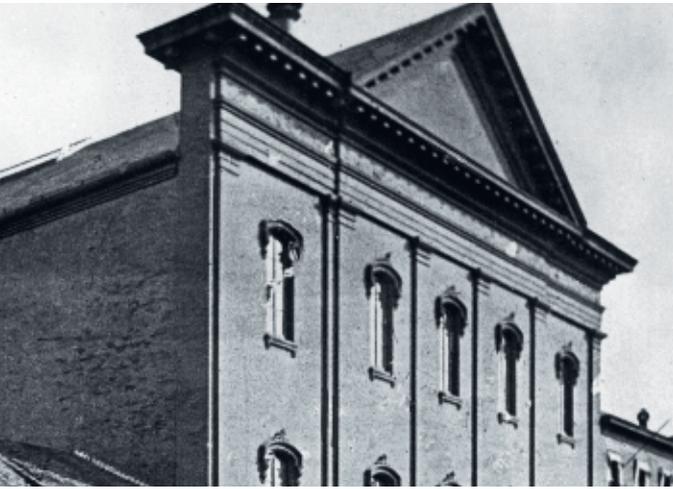


CHAPTER 1



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## THE ROOTS OF EXCELLENCE, 1862–1882

[Opposite] *Brigadier General William Alexander Hammond, surgeon general of the US Army, 1862–1864, founder of the Army Medical Museum, which became the Armed Forces Institute of Pathology. Hammond was 33 years old at the time of his appointment. His selection over officers who were his seniors in age, rank, and experience was due in large part to the recommendation and persistent pressure by officials of the US Sanitary Commission (an unofficial but government-sanctioned organization that functioned in much the same way as today's American Red Cross), who were impressed by the tireless energy and administrative ability Hammond demonstrated in the organization and operation of hospitals in Maryland and Virginia. (MIS 61-4774)*



Starting out as little more than three dried and varnished specimens placed on a shelf above an ink stand on a desk, the Armed Forces Institute of Pathology, like most institutions that achieve excellence, was guided by a visionary—someone who saw a critical void to be filled; someone committed to improving the health and well being of the nation’s military, and ultimately its civilian population as well; someone who could envision a future of life-saving discoveries based on detailed anatomical and disease research, and a centralized institution devoted to such research. The roots of the Institute, eventually a world leader in pathology consultation, education, and research, date to May 1862, when a visionary Army surgeon general, Brigadier General William Hammond, issued orders to establish the Army Medical Museum. The museum’s mission: to collect and properly catalog all specimens of morbid anatomy, both medical and surgical, that had accumulated since the commencement of the Civil War in the various US hospitals, or that were retained by any of the medical officers of the Army.

First located in a room in Hammond’s office in Washington, DC, the museum moved three times in its first 2 years of existence: first to the old Riggs Bank Building at the corner of President Place (now Pennsylvania Avenue) and 15th Street NW, then to 180 Pennsylvania Avenue; and then to what was known as “Mr. Corcoran’s School House” at H Street NW between 13th and 14th Streets. There it stayed until 1866, when it moved to Ford’s Theatre, which had been renovated following President Lincoln’s assassination.



The challenges of multiple moves were complicated by political struggles with Army and congressional leaders as the early curators were repeatedly forced to make the museum's case for relevancy and funding. Indeed, differences between Surgeon General Hammond and the secretary of war threatened the museum's continued existence. Major John Brinton, the first curator, argued strongly for the museum's value, writing to the acting surgeon general: "It is unnecessary for me to urge upon you the value of our National Medical Museum. Its claims to usefulness are recognized by the civil profession throughout the country and it is by them weekly and almost daily considered. The cabinet as it stands is not a mere Museum of curiosities. It is a collection which teaches. It is practical," he continued, "and has already powerfully influenced for the better treatment of the wounded soldier."<sup>1(p21)</sup> Brinton's arguments prevailed and the museum's immediate future development and growth was secured.

As was common among museums in the 19th century, the Army Medical Museum functioned as a reference collection, with open storage on display. Groups of gunshot-damaged bones, arranged by body part, filled shelves of the exhibit cases like an array of books on a specific theme. Specimen labeling was minimal, and printed catalogs were provided for consultation. Labels were written to be understandable by doctors.

The material collected by the museum during the Civil War was primarily used to produce the *Medical and Surgical History of the War of the Rebellion*.<sup>2</sup> This project set the tone for the museum's public and professional outreach for nearly 30 years. A systematic, statistical compilation of the types of injuries and diseases a military doctor could expect to treat, the multivolume history contained 6,000 pages, weighed 56 pounds, and took 26 years to finish; the final part was published in 1888. Its publication filled a critical void in medical knowledge, and its painstaking attention to detail served as the standard for museum publications for decades to come. The specimens collected for the preparation of the history, whether shattered bones or diseased organs, were cataloged, studied, and displayed to the public in the Army Medical Museum. And the books purchased in support of the research formed the foundation for the Surgeon General's Library, and eventually the National Library of Medicine.

Opened to the public on April 16, 1867, the museum drew about 6,000 visitors by the end of the year. Mary Clemmer Ames, writing in a guidebook in 1874, felt, “It cannot fail to be one of the most absorbing spots on earth to the student of surgery or medicine; but to the unscientific mind, especially to one still aching with the memories of war, it must remain a museum of horrors. No! The museum is very interesting, but can never be a popular place to visit.”<sup>3</sup> In spite of Ames’s concerns, by 1874 the number of monthly visitors sometimes reached more than 2,600.

By 1876, the 10th year of the museum’s residency in Ford’s Theatre, the surgical collection contained 6,539 specimens; the medical section 1,279; the microscopical section 7,275; the human anatomical section 1,254; the comparative anatomical section 1,522; and the section for miscellaneous articles, 2,400.

The primary emphasis remained on preserving specimens illustrative of the wounds and diseases that produced death and disability in the military, with the purpose of reducing mortality and alleviating suffering among soldiers. But slowly and steadily, the museum’s curators and researchers had been moving beyond this collection mission. Pioneering work was performed in microscopy, resulting in the use of aniline dyes for staining microscopic slides, one of the most important basic techniques of the pathologist. This was complemented by groundbreaking work in photographing objects visible under the microscope—another indispensable tool of present day pathology.

As the museum neared its 20th year, General Hammond’s original vision of a museum collection that would “embrace all forms of injuries and diseases, so that eventually it would become a general pathological museum, accessible for study to all medical men who are prosecuting original inquiries,”<sup>1(p65)</sup> was becoming a reality. And by 1882, the Army Medical Museum—with its roots of excellence firmly established—was poised to pursue a path that led to the establishment of the Armed Forces Institute of Pathology. 🌱



AS THE CIVIL WAR BEGAN the need for creation of the Army Medical Museum was clear to General Hammond, who was keenly aware of the lack of knowledge on surgical and medical problems facing the US Army. As would be expected, at that time medicine was still what would now be considered primitive. The Union Army did not even have an ambulance, and it wasn't until the second year of the war that Dr Jonathan Letterman developed a standard procedure for removing the wounded from the battlefield. Most doctors trained by short apprenticeships, and medical schools consisted of two years of instruction that would now be undergraduate work. Bacteria and viruses were not recognized as the cause of disease, and vague particles called "formites," which emanated from unhealthy areas or infected material, were thought to be the cause. Few sanitary measures were instituted, so camps were foul places. Blood typing and transfusions did not exist and the discovery of penicillin and antibiotics was 80 years away. Although surgical instruments did exist, they weren't always available and doctors often had to resort to extracting bullets from wounds by reaching in with their fingers and cleaning out the bullet and any other loose material. They then wiped their hands on their clothes and went on to the next case.

[Opposite] *Posed amputation scene depicting the use of anesthesia, the widespread use of which was documented in the Medical and Surgical History of the War of the Rebellion. (CP 1563)*

[Top Left] *Amputation of third, fourth, and fifth metacarpals: Private Robert Fyer, Company G, 52 NY Infantry Regiment. (CP 1041)*

[Bottom Right] *Remains from amputations following a Civil War battle. (CP 1043, "Field Day," cropped)*







SURGEON GENERAL'S OFFICE,

WASHINGTON CITY, May 21, 1862.

[Circular No. 2.]

In the monthly Reports of Sick and Wounded, the following details will be briefly mentioned in accompanying remarks :

SURGERY.

*Fractures.*—The date of reception, the situation, character, direction, treatment and result in all cases.

*Gauche wounds.*—The date of reception, the situation, direction, and character; the foreign matters extracted (if any); and the result in all cases.

*Amputations.*—The period and nature of the injury; the character of the operation; the time, place, and result.

*Excisions.*—All operations for, with a statement of the injury demanding them; the date of injury, the date of operation; the joint or bone operated upon, and the result.

MEDICINE.

*Fever.*—Their character and symptoms; an outline of the plans of treatment found most efficient, with remarks on the location and sanitary condition of camps, or quarters, during the prevalence of these disorders.

*Diarrhœa and Dysentery.*—Grade, and treatment, with remarks on the character of the ration, and the modes of cooking.

*Scarific Diseases.*—Character and symptoms, with observations on causation, and a statement of the means employed to procure exemption.

*Respiratory Diseases.*—Symptoms, severity, and treatment, with remarks on the sheltering of the troops, and the atmospheric conditions.

Similar remarks on other preventible diseases.

Important cases of every kind should be reported in full. Where post-mortem examinations have been made, accounts of the pathological results should be carefully prepared.

As it is proposed to establish in Washington, an *Army Medical Museum*, Medical officers are directed diligently to collect, and to forward to the office of the Surgeon General, all specimens of morbid anatomy, surgical or medical, which may be regarded as valuable; together with projectiles and foreign bodies removed, and such other matters as may prove of interest in the study of military medicine or surgery.

These objects should be accompanied by short explanatory notes.

Each specimen in the collection will have appended the name of the medical officer by whom it was prepared.

WILLIAM A. HAMMOND,

*Surgeon General*

NOTE.—Medical Directors will furnish one copy of this circular to every medical officer in the departments in which they are serving; and they will hereafter forward to this office with their consolidated monthly reports, all the monthly reports of the medical officers under their supervision. They will also immediately transmit, all back monthly reports, and papers of every kind relating to the above subjects of medicine and surgery, which may have accumulated in their respective offices since the commencement of the rebellion.

In this circular dated May 21,  
1862, Surgeon General Hammond  
announces his intention to estab-  
lish the Army Medical Museum.  
(MIS 62-2214)

[Opposite] Ward in Armory  
Square Hospital, Washington,  
DC. (CP 2241)



10 | ARMED FORCES INSTITUTE OF PATHOLOGY, 1862–2011

## EARLY HOMES of the Army Medical Museum.

[Opposite] *The first home of the museum, Riggs Bank Building, Pennsylvania Ave. and 15th St, NW, 1862–1863. (Reeve 32783)*

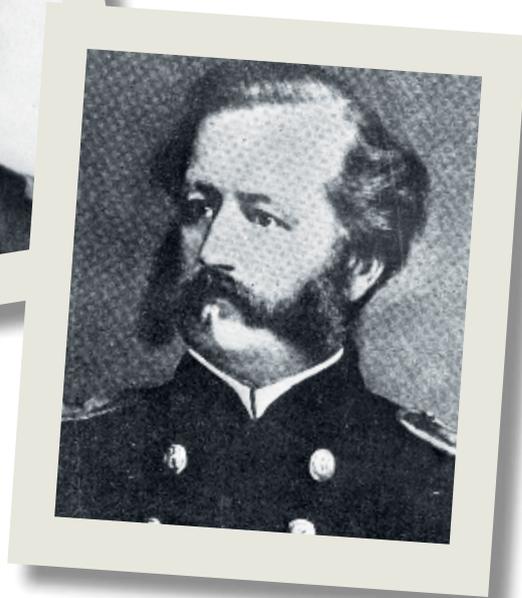
[Bottom Left] *The second home of the museum, 180 Pennsylvania Avenue, NW, 1863. (Reeve 32780)*

[Bottom Center] *The third home of the museum, Corcoran Schoolhouse, 1325 H St, NW, 1863–1866; engraving by HH Nichols, a member of the museum staff, circa 1863. (Reeve 32789)*

[Bottom Right] *The fourth home of the museum, Ford's Theatre, 511 10th St, NW, 1866–1887. (Reeve 32782)*



AT THE TIME OF HIS APPOINTMENT as the museum's first curator, Major John Brinton had been a teacher of anatomy at the Jefferson Medical College in Philadelphia and had served with General Ulysses S Grant during the western campaign of the Civil War. Embracing his new duty of collecting specimens and diseased tissues for the museum, Brinton personally visited field hospitals after the battles of Antietam, Sharpsburg, Fredericksburg, and Gettysburg. He also issued detailed instructions to medical officers for forwarding pathological objects to the museum, including bony specimens and wet tissue preparations following amputations or operations. Specimens were to be labeled, numbered, wrapped in cloth, and immersed in a keg or small cask of diluted alcohol or whiskey. When filled, the cask was to be forwarded to the Office of the Surgeon General.



[Left] *Major John Hill Brinton, US Volunteers, first curator of the Army Medical Museum, 1862–1864. Most units during the Civil War consisted of volunteers from the individual states, but individuals who were brought into service at the federal level, such as Brinton, were referred to as “US Volunteers.” (MIS 63-85-2)*

[Right] *Major General Joseph K Barnes, surgeon general of Army for 18 years, 1864–1882. General Barnes carried forward much of the program initiated by General Hammond. (MIS 53-14501-1)*

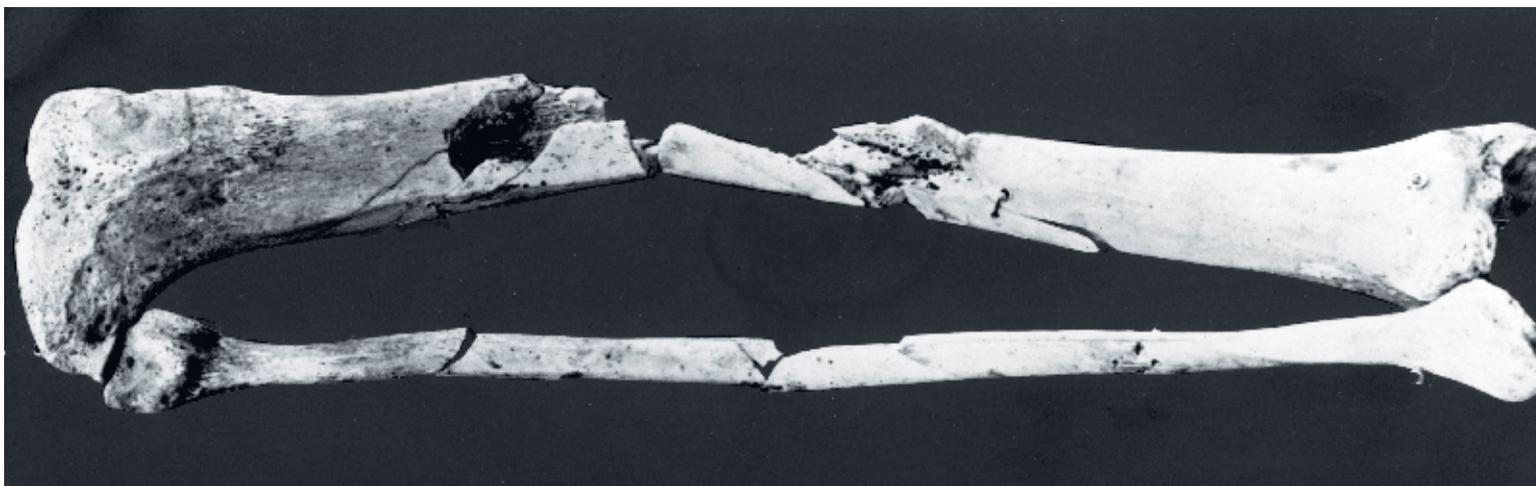
[Opposite] *This group of US Army medical officers includes several who became prominent in the history of the Army Medical Museum and the Library of the Surgeon General. Standing (left to right): Lieutenant Colonel William G Spencer, Assistant Surgeon Alfred A Woodhull, Surgeon General Joseph K Barnes, Assistant Surgeon Edward Curtis. Seated (left to right): Assistant Surgeons George A Otis, Charles H Crane, John S Billings, and Joseph J Woodward. (Woodward 3944)*



THE FIRST CATALOG of the museum was simply a numerical list of the objects in the collection, with no attempt to classify the various injuries or describe in detail the preparations included. Of the nearly 1,000 surgical specimens listed, all but a handful were the result of gunshot wounds, and the vast majority of these were caused by the conoidal bullets widely used by both sides in the Civil War. Egg-shaped with an indentation behind the penetrating head, designed to expand when the gunpowder combusted and engage the barrel rifling, these bullets were particularly accurate and lethal. Few American surgeons at the time had experience with gunshot wounds, and fewer still had seen wounds from conoidal bullets. The bullets themselves were also collected by the museum, eventually forming the largest collection of conoidal bullets in the world. Other categories of specimens included pathology caused by diseases such as typhoid fever and “Chickahominy diarrhea” (named after Chickamauga National Park, where 60,000 soldiers were encamped in 1863 amid a high prevalence of camp fever). The catalog was highly illustrative of the effects of military action and camp conditions upon the life of soldiers during the Civil War.

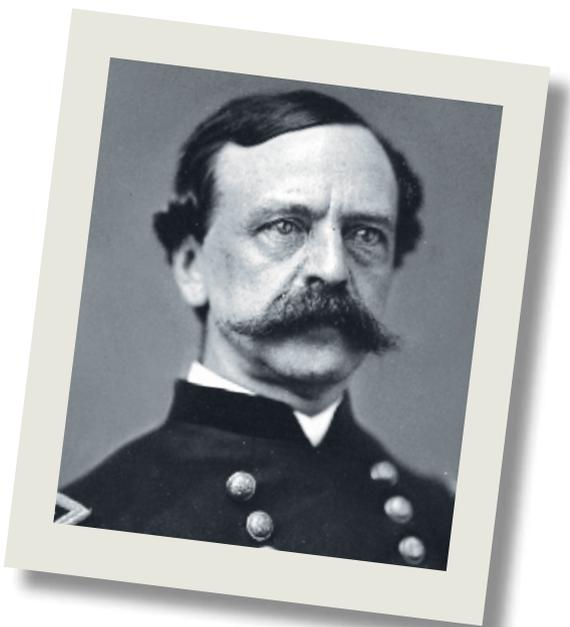
12

No. of Specimen	Description.	Name of Contributor.
72 *	Gunshot fracture of upper third shaft of Tibia.	Surg. J. H. Brinton, U.S.V.
73 *	Gunshot fracture, comminuted; perforation of Humerus.	A. Asst. Surg. W. W. Keen, U. S. A., Gen'l Hosp. No. 1, Frederick, Md.
74 *	Shell contusion of Tibia; great suppuration.	A. Asst. Surg. D. W. Cheever, U. S. A., Judiciary Hosp., Washington, D.C.
75 *	Gunshot fracture, comminuted, of shaft of Femur.	Dr. Bowles, Waters' Warehouse, Georgetown, D. C.
76 *	Gunshot fracture of Femur; perforation above condyles.	Surg. C. H. Page, U. S. A.
77 *	Gunshot fracture of condyles of Femur; deposit of callus.	
78 *	Gunshot fracture of upper half and neck of Humerus.	
79 *	Gunshot fracture of upper half shaft of Tibia and Fibula.	Asst. Surg. S. A. Storrow, U.S.A., Eckington Hosp., Washington, D. C.
80 *	Gunshot fracture of Tarsus and lower extremity of Tibia and Fibula.	Dr. Warner, Waters' Warehouse, Georgetown, D. C.
81 *	Gunshot fracture of Tibia and Fibula.	do.
82 *	Gunshot fracture of extremity of Radius.	U.S.V.
83 *	Gunshot fracture of Tibia with deposit of callus.	U. S. V., Hosp., D. C.
84 *	Gunshot fracture of Tibia.	U.S.V.
85 *	Gunshot fracture of Tibia of ball perpendicular.	U.S.V.
86 *	Gunshot fracture of carpal bones and radius.	U. S. V.
87 *	Gunshot fracture of Tibia.	do.
88 *	Gunshot fracture of Tibia with conoidal ball.	do.
89 *	Gunshot fracture of carpal bones.	ton, U.
90 *	Gunshot fracture, of upper half of Humerus.	U.S.V.
91 *	Gunshot fracture of Tibia.	do.
92 *	Gunshot fracture of Tibia.	do.
93 *	Gunshot fracture; process and head of Tibia.	A. Humeral U.
94 *	Gunshot fracture; 2 1/2 inch of shaft of Humerus.	
95 *	Gunshot fracture of Ethmoid, and Tibia.	
96 *	Gunshot fracture of Humerus.	
97 *	Gunshot fracture of third, fourth, and fifth metatarsal bones.	Asst. Surg. J. J. Woodward, U. S. A.
98 *	Gunshot fracture of Carpus; amputation.	Surg. J. H. Brinton, U.S.V.
99 *	Gunshot fracture of lower half of Femur.	



[Opposite] A collage of two images from the Catalogue of the United States Army Medical Museum (Washington, DC: Government Printing Office, 1866–1867), as printed in Henry RS, *The Armed Forces Institute of Pathology; Its First Century, 1862–1962* (Washington, DC: Office of the Surgeon General, Department of the Army; 1964). The specimen shown is listed as No. 76 in the catalog. (MIS 62-733-4)

[Bottom] General Sickles and [Top] his leg bones. General Sickles, commanding general of the 3rd Army Corps, Army of the Potomac, was wounded at Gettysburg on July 2, 1863. As a result of the efforts of museum staff, specimens arrived regularly during the war, particularly after great battles, but this specimen arrived unsolicited. Packaged in a small, coffin-like box, and bearing the visiting card of the donor with the message, “With the compliments of Major General D.E.S.,” was the general’s amputated leg. This personal donation testified to the growing reputation of the Army Medical Museum. The general’s bones are still on display in AFIP’s National Museum of Health and Medicine. (Woodward 6202; Woodward 3861)







[Opposite, Top and Bottom] *Early “dry” exhibits in comparative anatomy, which included skeletal remains of various mammals, birds and reptiles, as well as “wet” specimens, which were preserved in liquid and enclosed in glass. By 1871, the surgical section of the museum consisted of about 6,000 mounted specimens, the medical section had 1,150 specimens, the microscopical section contained more than 4,000, and the anatomical section included nearly 1,000 human skulls and skeletons. The majority of the surgical specimens came from military surgery, although non-military surgical cases were also being added to the collection. (Woodward 1856-A; Woodward 1856-B; MIS 62-2966-1)*



[Top and Opposite] *Main exhibit hall, Ford's Theatre building in the early 1870s. (Reeve 32786)*

By the 1870s the MUSEUM had not only become a major attraction in Washington, DC, it was also becoming a focus for the intellectual and scientific life of the city. The fortnightly meetings of the city's Philosophical Society, the oldest scientific society in Washington, were held at the museum, and the charter meeting of the Cosmos Club was also held there. When the American Medical Association met in the capital in 1868, the museum was the scene of a reception hosted by the surgeon general. A similar courtesy was extended to members of the National Academy of Sciences in 1870.

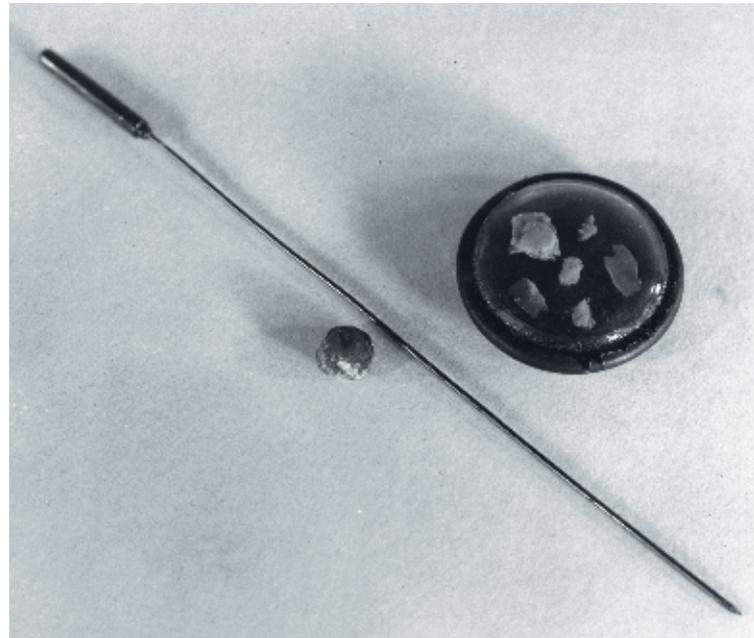
The most melancholy mission assigned to the museum in its early years occurred when doctors Joseph Woodward and Edward Curtis were assigned to perform the autopsy on President Lincoln. The two pathologists were summoned to the White House at 11 AM on April 15, 1865, with the task of removing the bullet fired into the president's head by assassin John Wilkes Booth. After describing the condition of the wound and surrounding tissue, their report traced the course of the bullet, which entered through the occipital bone about an inch to the left of the median line, and just above the left lateral sinus, which it opened. It then penetrated the dura mater, passed through the left posterior lobe of the cerebrum, entered the left lateral ventricle and lodged in the white matter of the cerebrum just above the anterior portion of the left corpus striatum. Both orbital plates of the frontal bone were fractured, and the fragments pushed up toward the brain.

Museum pathologists also performed the autopsy on President James Garfield when he was shot and fatally wounded in 1881. The autopsy disclosed the course and location of the fatal bullet, which had entered the president's back about 4 inches to the right of his spine, broken the eleventh and twelfth ribs, passed through the first lumbar vertebra, grazed the splenic artery, and stopped behind the pancreas, about 10 inches from the point of entrance.





I hereby certify that the  
 within pistol bullet was, in  
 the presence of Surgeon  
 General J. K. Barnes, Surgeons  
 J. J. Woodward, Robert  
 Reyburn, Frank H. Hamilton,  
 D. Hayes Agnew, S. A. Boynton,  
 D. S. Lamb ~~who made the autopsy~~  
 General D. G. Swain, Col.  
 A. F. Rockwell and Mr.  
 C. O. Rockwell, taken from  
 the body of James Abram  
 Garfield, late President  
 of the United States at the  
 post-mortem examination  
 held in Franklyn Cottage,  
 Elberon N. J. <sup>during</sup> in the afternoon  
 of September 20, 1881.  
 D. M. Ship

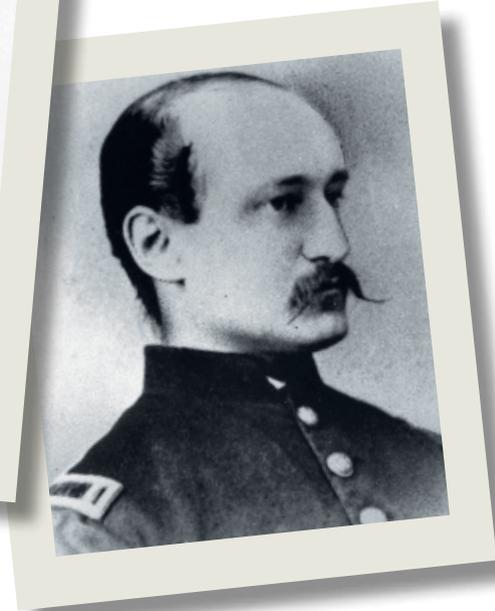


[Opposite] This sketch, made by Hermann Faber immediately after the removal of President Lincoln's body from the house in which he died, was approved for accuracy by Surgeon General Joseph K Barnes. Faber was a staff medical artist at the museum. (Accession no. 29719)

[Left] Bullet from the body of President Garfield, located during autopsy. (Woodward 7082)

[Right] The bullet that ended President Lincoln's life, the instrument used to locate it, and bone fragments that adhered to it. Both the bullet and instrument are on display today at AFIP's National Museum of Health and Medicine. (MIS 62-1021)

*This Joseph Zentmayer microscope is one of those issued by the Surgeon General's Office at the time the Army Medical Museum was established, and used by Dr Woodward to make photomicrographs. The model was introduced in 1862 for use by US Army hospitals and was produced until 1876. (MIS 60-4713-76)*



[Top Left] *Lieutenant Colonel Joseph Woodward, Medical Corps, who had been hired by Brigadier General Hammond to work on the Medical and Surgical History, pioneered the use in the United States of aniline dyes for staining microscopic slides and creating photomicrographs, in the mid-1860s. During independent histological studies of fever and diarrhea among soldiers, Dr Woodward began using the newly discovered aniline dyes to stain tissue, so that certain parts became more visible under the microscope. While the idea of staining specimens to stand out was not new, the unstable nature and limited range of colors of most of the vegetable and animal dyes available had limited their use. In 1865 Woodward published a paper in the American Journal of the Medical Sciences called "On the Use of Aniline in Histological Researches With a Method of Investigating the Histology of the Human Intestine and Remarks on Some of the Points To Be Observed in the Study of the Diseased Intestine in Camp Fevers and Diarrheas." Dr Woodward had identified and developed one of the central techniques of modern pathology. (NCP 3608)*

[Top Right] *Major Edward Curtis, US Volunteers, who collaborated with Dr Joseph Woodward in photomicrography in the mid-1860s. (Woodward 3659)*



Lieutenant Colonel George A. Otis, second curator of the Army Medical Museum, 1864 to 1881. Under Otis's leadership, the stupendous task of compiling and writing the *Medical and Surgical History of the War of the Rebellion* came close to completion. In May 1877 Dr Otis suffered a stroke; he passed away 4 years later, at the age of 51. He was succeeded by Army Surgeon David Low Huntington, who served as the museum's third curator, from 1881 to 1883. (MIS 05-6764-3)

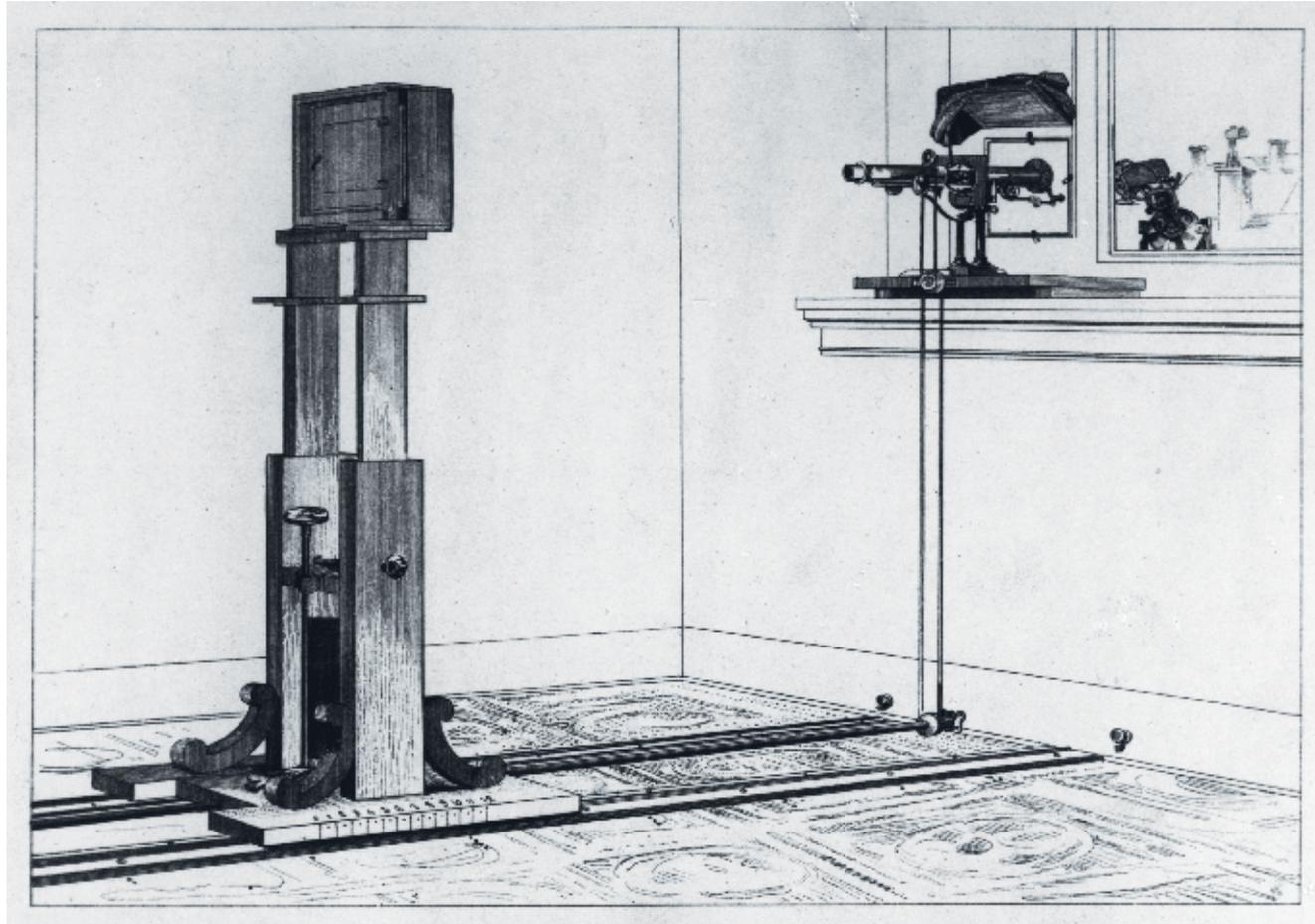
IN THESE EARLY PHOTOMICROGRAPHY EXPERIMENTS by Curtis and Woodward, the source of illumination was the sun itself, ingeniously harnessed to ensure a perfectly steady and intense light. The room in which the photography was to be taken—darkened so as to dispense with a light-tight bellows—became the “camera,” with a window facing south as the “shutter,” through which the direct rays of the sun, caught in the mirror of a heliostat mounted outside the window, were reflected upon the plane mirror of a microscope mounted horizontally just inside the window. From the mirror, the reflected rays of the sun were thrown upon the object to be photographed, placed upon the stage of the microscope. Light passed through the barrel of the microscope to the object-glass, where it was magnified. The magnified image was brought to a focus upon a sensitive photographic plate, mounted on a stand that was moved back and forth along a 10-foot track, which was provided with a scale for measurement of distances from the microscope. Pictures were taken by opening an aperture in the light-tight shield fitted on the window. These first photomicrographs were nearly as accurate and detailed as those taken a hundred years later. Further experiments by the two doctors successfully employed electric lights and magnesium lamps.

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#### REFERENCES

1. Henry RS. *The Armed Forces Institute of Pathology; Its First Century, 1862–1962*. Washington, DC: Office of the Surgeon General, Department of the Army; 1964.
2. *Medical and Surgical History of the War of the Rebellion*. Washington, DC: Office of the Surgeon General, Department of the Army; 1870–1888.
3. Clemmer M. *Ten Years in Washington: Life and Scenes in the National Capital as a Woman Sees Them*. Hartford, CT: AD Worthington & Co; 1874: 477.





[Opposite | Top] A photograph and drawing of the equipment used in the Army Medical Museum's pioneering photomicrography, mid-to-late 1860s. In these early photomicrography experiments by Curtis and Woodward, the source of illumination was the sun itself, ingeniously harnessed to insure a perfectly steady and intense light. The room in which the photography was to be taken—darkened so as to dispense with a light-tight bellows—became the “camera,” with a window facing south as the “shutter,” through which the direct rays of the sun, caught in the mirror of a heliostat mounted outside the window, were reflected upon the plane mirror of a microscope mounted horizontally just inside the window. From the mirror, the reflected rays of the sun were thrown upon the object to be photographed, placed upon the stage of the microscope. Light passed through the barrel of the microscope to the object-glass, where it was magnified. The magnified image was brought to a focus upon a sensitive photographic plate, mounted on a stand that was moved back and forth along a 10-foot track, which was provided with a scale for measurement of distances from the microscope. Pictures were taken by opening an aperture in the light-tight shield fitted on the window. These first photomicrographs were nearly as accurate and detailed as those taken a hundred years later. Further experiments by the two doctors successfully employed electric lights and magnesium lamps. (Woodward 1580; Reeve 72508)

“As the Army Medical Museum entered its third decade of service to the nation, its shelves, cases, and storage rooms housed an ever-expanding collection of skeletal remains, mounted surgical specimens, anatomical examples, medical instruments, and volumes upon volumes of literature.”