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Welcome to Issue #50 of *The AMEDD Historian*! This issue coincides with the 250th anniversaries of the Army's creation and the founding of Army Medicine in 1775. Appropriately, the newsletter's focus is on medical treatment and organization during the American Revolutionary War. Through images, medical tools, and contemporary accounts we explore medical support to the new American Army.

The early Continental Army had great difficulties, but what about their physicians? There were similar Army problems of minimal supplies, funding, and organizational strain, but the most troubling item was their medical proficiency. Knowledge of physiology was very limited. Causes of diseases were either unknown (germ theory of disease) or mistaken (miasma and humors of the body). Nutrition, camp sanitation, and rest were known to be important, but the reasons were unknown.

The biggest medical achievement of the war was the protection of the troops from smallpox through variolation. Advised by physicians (whom he trusted) General George Washington gave the order to proceed and minimize the disease's effects. Risk (smallpox death) and timing (recovering from variolation) were considerations. An innovative move, having all troops in an army protected from smallpox increased effectiveness.

As you read on, note the earnestness of the accounts and journals. These are medical professionals determined to save lives and keep the Soldiers in the fight.

(continued on last page)

1775-1783: Another War for America

American independence started as lengthy political discussions that turned into arguments and protests. Neither side would compromise, and a struggle for equal rights as Englishmen changed into a war for independence. The war would be felt in every colony.

Escalating to Rebellion

From 1756 to 1763 most European powers were engaged in a conflict that extended to theaters around the world. In North America it was known as the French and Indian War and was fought between the British and French, their respective colonies, and their Native American allies. The British were ultimately victorious, taking possession of French lands in Canada and east of the Mississippi River. The American colonists gained valuable military experience serving alongside British regulars. The British increased their national debt from £74 million to £133 million, an enormous sum for the time, and they were determined to recoup some of that cost from their colonial holdings.

In 1765 Parliament passed the Quartering Act and the Stamp Act. The first required colonies to house and feed British troops, something many in the colonies rejected because they saw the continuing presence of the troops as unnecessary. The Stamp Act required all printed materials in North America to be printed on paper imported from England and carrying a revenue stamp. The colonists, who were not represented in Parliament, saw this as a violation of their rights as English citizens. Violent

protests, a petition from six of the colonies, and pressure from British merchants convinced Parliament to rescind the Act but Parliament had not given up on collecting revenue from the colonies.

The Townshend Acts, enacted 1767-1768, were a series of five acts intended to extract revenue from the colonies, punish New York for its refusal to accede to the Quartering Act, and enforce trade regulations. Resistance to the acts was greatest in New England and centered on the port of Boston. In 1768 the British sent troops to occupy the town and bring order to the population. The Boston Massacre (1770) occurred when discontent led to a confrontation between Bostonians and British forces, who opened fire, killing five. As resistance to British measures grew, Patriot leaders in the colonies began communicating through letters to coordinate resistance among the colonies. The Tea Act (1773) required colonists to purchase tea only from the British East India Company leading to the Boston Tea Party that December.

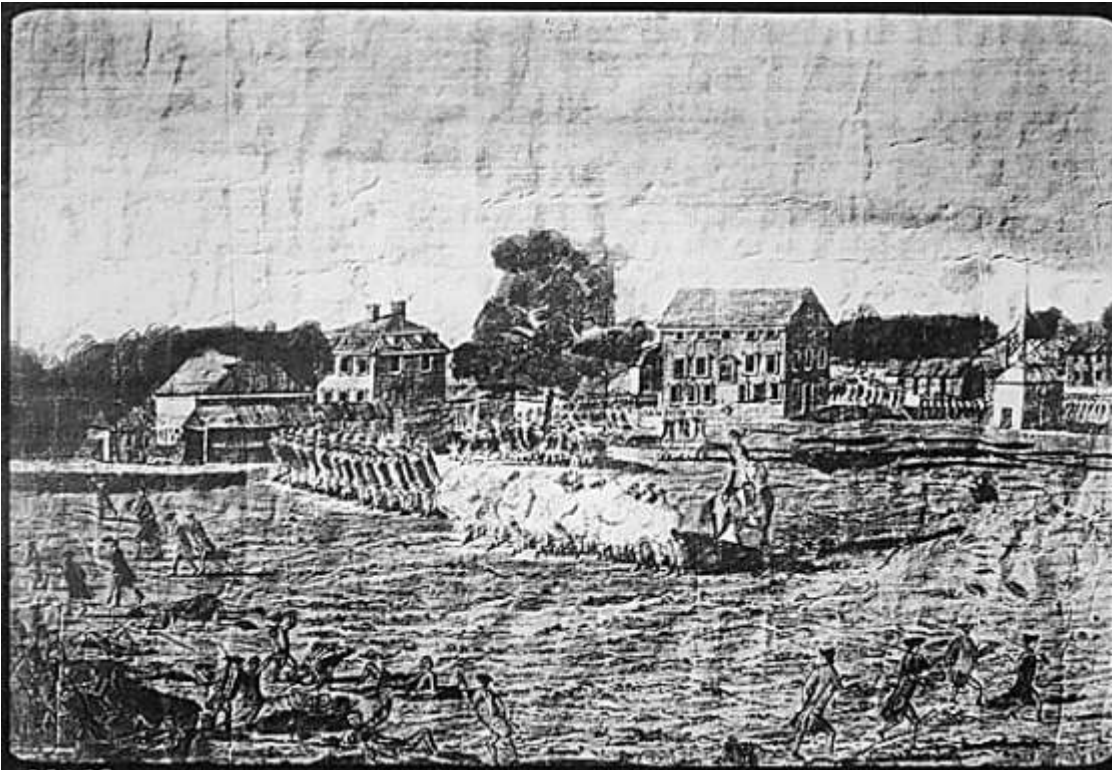
Determined to bring Boston to heel, Parliament passed the Coercive Acts (1774), known in the colonies as the Intolerable Acts, which closed the port of Boston until colonists paid for the tea they had destroyed, rescinded the Massachusetts colonial charter and the right to self-government, expanded the quartering act, and permitted the governor to remove court trials to Great Britain if he felt someone could not receive a fair trial in Massachusetts, which the colonials viewed as a means to shield British officials. The Intolerable Acts incensed colonists throughout the colonies: it seemed the British Government had abandoned any pretext of treating the colonials as British citizens. In the fall of 1774, the First Continental Congress convened in Philadelphia and wrote a petition to the King requesting that he rescind the intolerable acts and address the violations to their rights as subjects of the crown. The king declined to respond. In Boston, relations between the colonists and the British continued to deteriorate.

The first year of the American War of Independence

In April 1775 the military governor of Massachusetts, General Thomas Gage, issued orders to capture John Hancock and Samuel Adams and destroy a reported cache of arms in Concord, Massachusetts. The Patriots dispatched Paul Revere and William Dawes to warn the countryside of the imminent British operation. At Lexington, the British were confronted by a militia company. Nobody knows who opened fire, but eight militia were killed and ten more wounded. The British marched on with only one wounded man. In Concord the militia took up a position north of town. When the British accidentally set fire to a building while searching for arms the militia began marching back towards town, ran into three companies of soldiers at the Old North Bridge, and again a fight broke out. The British fired first but were outnumbered and escaped to the main force in town leaving their dead and wounded behind. The colonials, unsure what to do, did not follow. When the British finished searching the town and destroying what contraband they found they began their march back to Boston. Militia throughout the countryside had been alerted both to their presence and to the fighting and converged on the return route sniping at the British. By the time they returned to Boston the British had lost around 400 killed, wounded, or missing. The Patriot militia lost fewer than 100.

Militia converged on Boston from throughout New England establishing a perimeter around the town bottling the British inside. The line was thin initially but strengthened as more troops arrived. On the 10th of May the Second Continental Congress convened in Philadelphia to consider how the united colonies should respond to the increasingly punitive legislation and the confrontation developing around Boston. On the same day the Congress convened a militia group led by Colonel Ethan Allen and accompanied by Colonel Benedict Arnold captured the British-held Fort Ticonderoga, significant because of the artillery pieces it held which later would be transported to Boston. On the 14th of June the Congress declared the colonial militias surrounding Boston a Continental Army and, on the 15th, unanimously selected George Washington to lead it.

Before Washington could travel to Boston the British moved to attack a hill north of Boston across the Charles River. General Artemas Ward, commanding the Army around Boston, learned of the British intentions and had sent men to fortify the heights. On the 17th of June the British crossed the river and twice attempted to take the redoubt built on Breed's Hill, forward of Bunker Hill. Twice they were driven back but the third attempt, with the patriots nearly out of ammunition, carried the fortification. The Continental Army's retreat was orderly, but the British held the heights, although at significant cost: British casualties totaled over 1,000, nearly a third of their force, while the colonials suffered 450, less than 20% of their men. One of patriot casualties was Joseph Warren, long a leader in Boston's resistance to the British and the man



Amos Doolittle, a Connecticut militiaman, drew this image of the fight at Lexington in 1775 based on local testimony and visiting Lexington. Photography was not invented until the 1840s. The first depictions were drawn and circulating in newspapers and other media by the end of 1775.

Courtesy National Archives.

who had sent Paul Revere to warn Lexington and Concord. Warren, a physician recently appointed as a Major General who chose to serve as a private on Bunker

Hill, was killed during the withdrawal.

By the time Washington arrived to take command the British and Continental forces had reached a kind of equilibrium. The Continentals lacked the arms and ammunition to force the British out of Boston. The British, having been bloodied twice and unwilling to further inflame the conflict, remained in Boston. Activity was limited to a few minor skirmishes. Washington used this time to improve the discipline of the Army and incorporate new units from other colonies into the organization. In July the Continental Congress authorized Major General Philip Schuyler (in command of the Northern Department) to seize Quebec City to prevent the British from using it as a base for operations into New York. In September Washington sent Benedict Arnold in command of 1,100 men to move on Quebec City along a separate route and advised Schuyler so the two could coordinate their operations.

Schuyler's force had the easier route north. They mustered at Fort Ticonderoga but while Schuyler was absent his subordinate Brigadier General Richard Montgomery received reports that the British were fortifying Montreal. Montgomery moved his 1,200 men northward over Lake Champlain to an island fort about 30 miles southeast of Montreal on September 4th where he was joined by another 1,000 men. Schuyler fell ill and command passed to Montgomery who continued north taking Fort Saint Jean on November 3rd. After that he approached Montreal and after much of that city's force deserted, he took Montreal without a fight on November 13th. Arnold, meanwhile, was traveling over rivers through the wilderness of what is now Maine and encountered numerous difficulties, losing boats, supplies, and men to desertion in the rugged terrain. Arnold arrived outside Quebec City on November 14th with 600 hunger-weakened men. He demanded the fortified city's surrender, which was refused, then withdrew his force to wait for Montgomery's arrival. That was December 2nd, with 500 troops and much needed supplies. On the last day of 1775 the two officers launched an attack on the city. The attack was repelled, Arnold was wounded, Montgomery killed. Many of the Continental Army soldiers were captured. Although Arnold technically besieged the city until spring, the British commander was content to remain inside the city walls and wait for the reinforcements he expected with the spring thaw. The Continental Army received reinforcements during the winter, but smallpox struck, leaving many too sick to fight. When British reinforcements arrived in May the Continental Army was obliged to withdraw, fighting disease and the British. Overall, the campaign was a disaster and cost the Continental Army about 2,500 men killed, wounded, or captured.

Not all was disaster during that winter, though. Washington had placed Colonel Henry Knox in charge

of transporting the artillery and ammunition from Fort Ticonderoga to Boston. Knox transported 59 artillery pieces together weighing about 60 tons by land and flat-bottomed boat. The “noble train of artillery” set out from the north end of Lake George by boat on December 6th. Knox floated and hauled the cannon 300 miles to deliver them to Framingham, Massachusetts, and then rode the 20 miles to Washington’s headquarters in Cambridge to report his success. During the 50-day trip from Fort Ticonderoga, he lost only one cannon when it broke through ice on the Mohawk River.



Artist's rendition of Knox moving the guns to Boston. Courtesy National Archives.

Washington initially intended to use the cannon to draw the British out of Boston and, overnight, emplaced some of the artillery in positions to bombard the town. The British returned fire, but refused to come out. After two nights expending precious gunpowder and ammunition without causing significant damage, Washington moved to occupy Dorchester Heights south of the town which would give his artillery a commanding view of British troops in Boston and ships in the harbor. The guns already emplaced opened fire for a third night, distracting the British from the Continental troops moving heavy artillery to Dorchester Heights and constructing obstacles and structures to protect the guns and their crews once emplaced. On the morning of March 5th, 1776, 3,000 soldiers manned the fortifications constructed in one night on Dorchester Heights. It was an incredible feat in so short a time. The British commander, General William Howe, ordered transports loaded in preparation for an assault on Dorchester but the weather was unfavorable, and the assault cancelled. The British position was untenable, and Howe began preparing to evacuate the town. Howe informed civilian leaders in Boston that if the Continental Army attempted to attack while the British were departing he would burn the town. The departure was not contested. By the 17th of March the British finished loading ships with soldiers and loyalists who wanted to leave. After nearly a year of war, and nearly four months before the Continental Congress would decide on the issue of independence, the Continental Army had achieved its first significant victory.

Medical Care in the Revolutionary War
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Before the American Revolution there were only two hospitals in the American colonies. The war required the rapid development of new hospitals and a system to care for soldiers who were sick and wounded in the field. Based largely on the British army's hospitalization plan, the Hospital Department developed regimental hospitals, general hospitals, and 'flying' hospitals to care for thousands of soldiers. However, the hospitals were chronically understaffed, undersupplied, and were squalid. Infectious disease, such as the "putrid fevers" of typhus and typhoid fevers, were more common than trauma. Perhaps the single greatest challenge of the war was caring for the overwhelming smallpox epidemic, until Washington implemented an audacious, world's first mass inoculation of the Continental Army. At the end of the war, malaria became a challenge that overwhelmed the British and was a contributing factor to the surrender at Yorktown.

Eighteenth Century Hospitalization in the American Colonies

When the Revolutionary War started in April of 1775, there were only two organized hospitals in the colonies, in New York and Philadelphia. Healthcare was primitive, as the Germ Theory, recognizing microorganisms as the primary cause of infectious disease, was 80 years in the future. Physicians believed the causes of disease required expulsion via bleeding, inducing vomiting, sweating, diarrhea, or other purges; such treatment often worsened the patient's condition. The colonists avoided hospitals if possible.

The colonies had rudimentary hospitals. The predecessors of hospitals were almshouses, which mainly housed those in need. Since many of their inhabitants were children and older adults, many almshouses added a healthcare space. Some of the colonies' almshouses became the United States' first hospitals. The Pennsylvania Hospital was established by Dr. Thomas Bond in 1751 and was followed by New York Hospital, newly constructed at the time of the revolution. The current paradigm for hospitalization did not exist in 18th Century America. The two hospitals were associated with poor urban populations who had no one to care for them or no place where they could be cared for. Most people were cared for in their own homes, indeed in their own beds, by family members and a visiting physician. Because they only cared for the destitute, the two hospitals were not even a consideration of the middle- and upper-class colonists of Philadelphia and New York.

Formal healthcare training was rare. In 1775, there were an estimated 3,000 physicians in the Colonies, less than 10% of whom had either attended a medical college or had received formal education. There were two medical schools, Philadelphia Medical College founded in 1765 and King's College Medical College in New York in 1767. Most physicians instead learned their trade in a few years of on-the-job training. Nursing was yet to become a profession. Nurses' responsibilities included basic tasks such as food preparation, housekeeping, and some rudimentary care. Nursing was largely provided by women seeking employment or religious orders. There were no allied health professions or pharmacists, although apothecaries performed some healthcare roles in the absence of other providers.

Conceptualization of an Eighteenth-Century Field Hospital

The army realized that fielding a force for combat required field hospitalization. In 1776, Dr. John Morgan, Director General of the Hospital of the Army, developed a plan for hospitals that would be "floored above, so as to make two stories each, and to have a stack of chimneys carried up the middle ... It is further required that bed bunks be made and straw be always in readiness." In reality, the hospitals tended to occupy civilian buildings such as large homes, community centers, university buildings, and churches. They occasionally used tents. In the latter parts of the war, hut-like hospital buildings were designed and built specifically for the purpose.

The hospitals needed supplies such as linens, clothing, and bedding; equipment such as the utensils for cooking and serving food; and medical equipment such as surgical sets, bedpans, and scales. A carpenter would be employed to build the beds and other necessary items.

A hospital's medication needs reflected the contemporary philosophy of disease. Most eighteenth century clinicians believed in the Humoral Theory, which stated that imbalances of four bodily fluids – blood, phlegm, yellow bile and black bile – were responsible for disease. By ridding the body of excesses of these

substances, homeostasis could be restored. Expelling the humors required cathartic medicines such as bark (cinchona bark, which contains quinine), ipecac, camphor, and calomel. Bleeding was a common treatment. Few 18th Century medicines are still used today, although opium was a frequent and effective treatment for pain.



A medicine chest of the Revolutionary period. Courtesy American Institute of the History of Pharmacy.

Development of a Field Medical System

The newly organized Continental Army required the rapid development of a field medical system. The Hospital Department was created in 1775 with Dr. Benjamin Church as its inaugural director. As many of the senior officers had served with the British in the French and Indian War, hospitalization was based on the British model. Hospitalization existed at three levels: A regimental hospital, embedded in each regiment; general hospitals, intended to be better resourced and a referral destination; and ‘flying hospitals,’ which were able to hastily move and operate proximal to large concentrations of troops.

A Continental regiment had a full complement of around 700 soldiers. Each regiment was authorized a surgeon and two surgeons’ mates. Because regimental hospitals operated independently, the Hospital Department could not prevent them from employing the lower quality, more poorly educated physicians. Since regimental hospitals were organic to the units, they traveled with the regiment they served.

General hospitals were thought to be of higher quality, more efficient, and more cost-effective. General hospitals were larger and were fixed in their location. Their physicians were hired by the Hospital Department, met more rigorous accession standards, and were considered (by Department leadership) to be more highly skilled than their regimental hospital peers.

Flying hospitals were a distant precursor to the modern mobile hospital. They were intended to be light, small, and have minimal personnel, to easily follow the combat units. Staffing consisted of a director who could also serve as a surgeon, four surgeon’s mates, and a few nurses. Like regimental hospitals, they operated independently of the Hospital Department. The initial

intent was for one flying hospital per army. However, Gillett notes the definition of flying hospital evolved over time and becomes a “large and more formal version of the regimental hospital.” Although the flying hospital was meant to occupy tents or a small building, at Valley Forge Washington prioritized construction of heated, well-ventilated huts for the flying hospital located 100 to 300 yards away from the brigades.

Field Hospitalization in Practice

The intent was for regimental hospitals to evacuate their patients to general hospitals if the patient needed more elaborate care or the regimental hospital had to prepare to move. The sick and wounded soldiers, however, preferred (and sometimes demanded) to stay with their regiment. The regimental surgeon was often from the same town or area as the soldiers in the regiment, and regimental hospitals kept soldiers with their buddies. Additionally, patients often associated general hospitals with the poor care and social stigma of almshouses and the first hospitals. The regimental hospital might also have been associated more closely with the colonies’ preferred model of homecare. Moreover, moving to a general hospital might not improve a patient’s condition and would remove him from a known environment.

Patient movement was difficult as there was no patient evacuation plan and poor record keeping. Evacuation was done by horse-drawn wagons, often in short supply. Evacuation problems were likely compounded by the Hospital Department lacking command and control over regimental hospitals. At one point in 1778, Washington issued general orders which placed regimental hospitals under the control the Chief Surgeon of that unit’s flying hospital. The “death of several men” had resulted from patients being inappropriately assigned

to hospitals that were overcrowded or undersupplied.

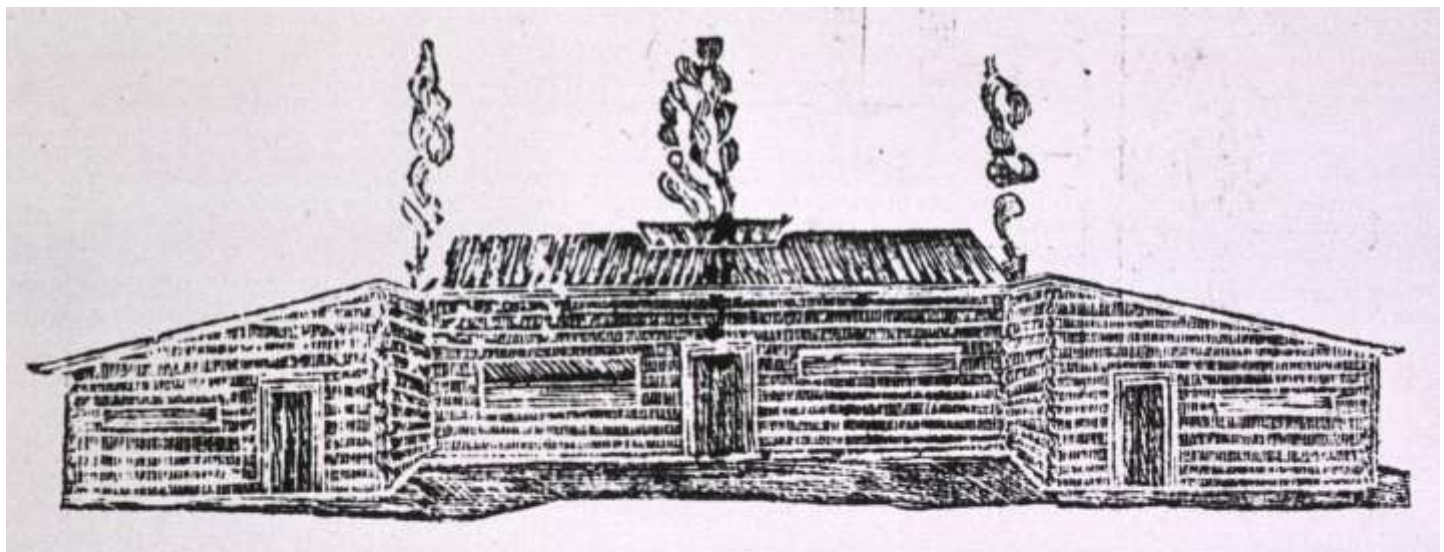
Almost without exception, the hospitals were an awful place to be. The patients often were crammed into dark, damp quarters. At times, “hordes” of patients would who were sick, unclothed, emaciated and “vermin-ridden” would descend on small communities. At one point the Brethrens’ House (a large community building in a Moravian colony in Bethlehem, Pennsylvania) was commandeered for use as a hospital; 360 patients were afforded only four square feet of space each. Dr. James Thacher, a physician with the Continental Army on the Canadian Expedition wrote on June 7th, 1776, “Visited many of the sick in the hospital. Was moved with a compassionate feeling for the poor, distressed soldiers, who, when they are sick are thrown into this dirty, stinking place and left to take care of themselves.”

Colonel William Smallwood, commanding the 1st Maryland Regiment, wrote in 1776, “The men being often moved, and have been to exposed to lie on the cold ground ever since they came here; often lying without their tents for several nights.” The squalid conditions were questioned by some physicians who, despite a lack of knowledge of modern disease theory, found a lack of cleanliness to be problematic. Some felt the sick would fare better being in an environment open to fresh air and that clean soldiers would be healthier. (See extract from Benjamin Rush’s medical advice on page s 14-17.)

The acquisition of medications was a problem throughout the war in the absence of adequate congressional funding and a poorly functioning medical logistical system. Available medicines were stockpiled by the Hospital Department at the general hospitals. Requests by regimental surgeons for supplies and medicines were often denied by the general hospitals, increasing the tension within the hospitalization system. On November 7th, 1776, by Maryland regimental surgeon James Pine recounted his experience of trying to obtain supplies from a general hospital: “...I waited on Doctor Morgan, Director-General of the hospitals here, for medicines, etc. He told me he had nothing to say to the Maryland troops and that it was not his business to supply the regimental surgeons with medicines...” Ironically many patients benefitted from medication scarcity since most medications administered at the hospitals did not help or even worsened the patient’s condition.

Staff were in short supply as well. Nurses served in both the regimental and general hospitals. Nurses at the time were not formally trained. Sometimes, they were volunteer nuns or members of religious orders such as the Moravians. Ideally, each hospital employed a supervisory “matron” who had managerial responsibility of the nurses and ensured the food was prepared, wards were kept clean and in order, and utensils were neat and clean. Nurses staffed each ward, ideally at a ratio of 10 patients to each nurse, and were responsible for administering medications and washing and feeding soldiers. Nurses were paid \$2 per month, reduced from \$4 a month, making staffing hospitals even more difficult. There were many attempts to recruit nurses within the colonies, but units often had to be tasked with providing troops to serve as nurses, usually detailing their worst soldiers.

Dr. James Tilton, later a Surgeon General, was concerned about unsanitary conditions in military hospitals. He designed isolation wards and improved ventilation to avoid contagion. His design of a hospital made with logs featured fireplaces in each of the isolated wards, and vented roofs to draw in clean air and vent air with contagions. U.S. Army image.



When the army was in the field, they were often trailed by a group of civilians referred to as “camp followers,” primarily the soldiers’ wives and children. Many of the women served as nurses because the pay and additional rations helped them provide for their families. Although they provided essential services of cooking and cleaning, the camp followers were viewed primarily as a burden, as they required food and supplies and often became hospital patients themselves. Generals preferred that women stay home, care for the families, and tend to the farms and small businesses.

Patient Care

Most of the patients in the hospitals were suffering from infectious diseases. It was not uncommon during the war for one-quarter of the army to be ill and infirm at any moment. Cirillo refers to the period prior to World War II as the “Disease Era”, when disease killed more soldiers than combat. In the Revolutionary War, disease killed an estimated 2.6 soldiers for each who died in combat. Since the Korean War, the ratio has been a constant 1:50, with only one soldier dying from disease for every 50 dying from combat. An estimated 25% of patients admitted to a hospital died, prompting Dr. Benjamin Rush to state in 1786, “Hospitals are the sinks of human life in the army. They robbed the United States of more citizens than the sword.”

“Putrid Fevers” Typhus and typhoid fever constituted what was known as the “putrid fevers.” Typhus is a rickettsial disease that is transmitted by bacteria from the bite of lice, causing fever, headaches, rash, and confusion. Typhus was passed from patient to patient in the Continental hospitals through infected bedding, not sufficiently cleaned between patients. Dr. Benjamin Rush wrote “there were many instances of patients with slight sicknesses who fell dead after being removed from a hospital.” Typhus patients were treated by bleeding, blistering, and purging. Some patients were given Cinchona bark mixed with wine, salt, and mercury.

The other putrid fever was typhoid fever. Caused by the bacteria *Salmonella typhi* in an infected water supply, the associated illness consists of fevers, chills, abdominal pain, and diarrhea. In some patients, the illness eventually results in septic shock and death.

The conditions in the hospitals no doubt contributed to spread of the putrid fevers. The hospitals that were overcrowded and poorly supplied with proper bedding and clothing were particularly susceptible to the presence of infectious disease. Unfortunately, the staff also frequently contracted these diseases as well. Rush wrote to Washington in 1778, “That so violent was the putrid fever in the hospital, that nine out of 11 surgeons were seized with it one of whom died, that out of three stewards two died with it and the third narrowly escaped with his life, and that many of the inhabitants of the village caught & died with the said putrid fever.”

Smallpox While the putrid fevers were often acquired because of hospitalization, it was naturally occurring smallpox that arguably had the largest impact on Continental Army readiness. Smallpox is caused by the variola virus. A particularly destructive disease that was responsible for deaths of millions worldwide, smallpox has been eradicated since 1977 through an effective global vaccination program. For those who were infected with the severe variola major form of the disease, mortality rates ranged from 30 to 50 percent.

Smallpox was arguably the single largest healthcare challenge of the war. John Adams wrote that smallpox was, “ten times more terrible than the Britons, Canadians, and Indians together.” In 1776 when Boston was occupied, there were rumors that the British were expelling the sick from the city perhaps as an early attempt to engage in biological warfare, perhaps simplifying their supply situation. Entire hospitals had to be established for nothing but smallpox patients. Soldiers afflicted with smallpox would be quarantined in a smallpox isolation hospital that was guarded by men who had previously contracted the disease. On his second day in command of the Continental Army, Washington put the smallpox isolation hospital off-limits to troops.

Smallpox was primarily transmitted through respiratory secretions spread by coughing and sneezing. Smallpox resulted in high fevers, headaches, and backaches which would be followed by characteristic lesions in the mucous membranes and on the skin. The lesions were numerous and fluid-and pus-filled. If the patient survived, the skin lesions would heal in a few weeks and would leave scars. George Washington contracted smallpox while in Barbados in 1751 and was scarred on his nose. Washington - like all patients who survived smallpox - developed natural, lifelong immunity.

It is thought that smallpox was particularly problematic for the colonists because many lived in rural, agrarian communities that were isolated and were therefore never exposed. The British, however, with more towns and cities, were often exposed to smallpox as children, developed immunity, and the disease was significantly less of a burden.



Modern depiction of what Revolutionary War bleeding looked like. ACHH image.

Hospitalizing smallpox patients was, arguably, the primary function of the Hospital Department in the first half of the war, until widespread inoculation. At times, caring for smallpox patients was overwhelming, particularly during the Canadian campaign. On May 26, 1776, Dr. Lewis Beebe wrote, "If ever I had a compassionate feeling for my fellow creatures who were objects of distress, I think it was this day; to see large barns filled with me in the very height of the smallpox and not the least thing to make them comfortable was almost sufficient to excite the pity of brutes." A month later he wrote, "The regiment is in a most deplorable situation, between 400 and 500 now in the height of the smallpox. Death is now become a daily visitant in the camps, but as little regarded as singing of birds."

Treating smallpox was based on the severity of the symptoms. Dr. William Buchanan in his book *Domestic Medicine* recommended bleeding the patient. Patients should be kept cool by getting them out of bed in light clothing. If a patient's kidneys stopped producing urine, taking them out of bed and walking them in bare feet was claimed to be effective. It was con-

sidered a poor prognostic indicator if a patient developed a "secondary fever," requiring immediate bleeding and surgical opening of the pustules.

A person who had never been exposed to smallpox could become immune through a somewhat common yet controversial practice of inoculation. Inoculation is different than vaccination. An individual would become inoculated by having a sample of pus taken from an actively ill patient introduced through a puncture. Put in isolation, hopefully they would acquire a much milder form of the disease and would recover and become immune. Smallpox inoculation killed about .1% of those undergoing the procedure. At one point, it was believed that those undergoing inoculation benefitted from being given mercury, bled, and purged.

Initially, there was widespread resistance to inoculation. Some of the colonists had a religious opposition, believing that it actively avoided God's will. A smallpox infection might be God punishing them for their sins. Others were concerned that the inoculated soldiers could spread the disease to their town's populace. In 1778, the town of Springfield, Massachusetts forbade the Army from a mass inoculation program because the town was concerned that the inoculated soldiers could spread the disease to their populace, despite an aggressive quarantine plan. At one point, a physician in Massachusetts was jailed for inoculating soldiers.

In the winter of 1777, when Washington had been convinced that he had no choice but to institute a mass inoculation program, and less than 1% died from inoculation. Arguably the first widescale inoculation program in the United States, the initiative was so successful that it would be repeated with new recruits throughout the war.

Malaria At the end of the war, malaria became problematic, particularly for the British. Malaria was endemic in the southern portion of the United States at the time and many soldiers from Southern colonies had developed immunity to the disease in their youth. Malaria is caused by the *Plasmodium* species of parasite. It is transmitted by the female *Anopheles* mosquito and is found in tropical areas. It remains a devastating disease worldwide, causes an estimated 249 million cases and 608,000 deaths per year. Symptoms of malaria include chills, fever, malaise, headaches, nausea, and vomiting. Malaria is diagnosed using blood tests and is treated with medications such as chloroquine. Travelers can prevent infection with prophylactic medications such as mefloquine and doxycycline.

Having no possible way of understanding the pathophysiology of malaria or any reliable method of diagnosis, physicians at the time simply classified it as an "intermitting fever." Buchanan wrote: "intermitting fevers, under proper regimen, will often go off without medicine; and when the disease is mild, in an open dry country, there is seldom any danger from allowing it to take its course; but when the patient's strength seems to decline, or the paroxysms are so violent that his life is in danger, medicine ought immediately to be administered." Eighteenth century physicians treated intermitting fevers with quinine-containing bark from the Cinchona tree, which was known as Peruvian or Jesuit bark. Like other medicines, the bark was scarce.

During the siege of Yorktown, Washington himself was actively involved with finding hospital beds for malaria patients in the area around Williamsburg. In 1780, the British army was so overwhelmed with malaria that half of the army was unable to maneuver while facing combined American and French forces

Amputation instruments belonging to Dr. Benjamin Tredwell Jr. Tredwell served in the Seven Years War and War of 1812, but his service in the American Revolution is uncertain. The smaller knife was used for small digits such as fingers, the medium knife was used for legs and arms, while the largest was used for cutting near the thigh. Each sickle-shaped knife cut in a circular fashion around the limb. Tenaculum were used to pull blood vessels to move out of the way or tie off. The tissue retractor enabled the surgeon to pull away soft tissue to have access to an area. The forceps held tissue while the bullet extractor could pull a lead ball once discovered in the patient's wound. Courtesy National Museum of Health and Medicine.



and was an important factor in Cornwallis' surrender.

Trauma While hospitalization was predominantly oriented towards infectious disease, it also included trauma care. Of the estimated 25,000 Continental Army soldiers who died in the war, it was thought that about one-quarter of them died from wounds. Many wounds were due to hand-to-hand fighting, including penetrating injuries from knives and swords. The muskets, pistols and rifles of the time were not particularly accurate and there were not as many gunshot wounds as today.

Soldiers who suffered an extremity wound would frequently have the limb amputated, a surgical procedure with an estimated 65% mortality rate, largely from post-operative infections. Amputations were done without anesthesia and could be completed in as little as 30 seconds by a skilled surgeon. After the limb was removed, the vessels were ligated by tying them with wound linen. Dressings were created from lint, which soldiers found to be comfortable, and provided some absorption. Wounded patients were often given laxatives, medications intended to induce sweating, and were bled.

Conclusion

The Revolutionary War called for the rapid development of a hospitalization system to care for the thousands of sick and wounded. The effectiveness of hospitalization was limited by a poor understanding of disease and treatment, poor supplies, and poor sanitation. The squalid conditions in the hospitals resulted in them becoming reservoirs for "putrid fevers" such as typhus and typhoid fever. Despite the challenges, the hospitals cared for large numbers of patients suffering from infectious disease and battlefield trauma.

Hippocrates' Four Fluids	blood	yellow bile	black bile	phlegm
Associated Elements	air	fire	earth	water
Associated Seasons and Qualities	spring, hot and moist	summer, hot and dry	winter, cold and dry	autumn, cold and moist
Galen's Four Humors, or Temperaments	sanguine	choleric	melancholic	phlegmatic
Associated Animals	goat	lion	owl and cat	tortoise
Associated Physical Characteristics When Each Humor Predominates	airy, young, pink and white complexion	swarthy yellow, meager face, young	pale faced, cold, dry complexion, closed mouth	coughing, dropsy, gross body, coarse clothes
Associated Activities and Emotional and Moral Characteristics When Each Humor Predominates	fit for studies, prone to wine and women, merry, loving, beloved, gentle, benign, meek, fair spoken, bashful, seldom angry	fit for war, passions, reign, heedless, brave, cruel, angry	fit for solitary activities and studies, plodding constancy, silent, avaricious	fit for inactivity, sleeping, lazy, slothful, not educated or high-minded

The humoral theory of medicine traced back to the ancient Greek idea that the world was composed of earth, air, fire, and water. Infographic courtesy National Institutes of Health.

Extracts from Dr. James Thacher's memoirs

James Thacher had just completed his medical training in 1775, age 21, and joined the 16th Massachusetts Regiment as surgeon's mate. Serving until 1781, he saw action in several battles and many of the camps and hospitals of the war. He died in 1844. Image of Dr. Thacher as an older man courtesy National Library of Medicine.



1775. Near Boston, MA.

On the day appointed, the medical candidates, sixteen in number, were summoned before the board for examination. This business occupied about four hours; the subjects were anatomy, physiology, surgery, and medicine. It was not long after that I was happily relieved from suspense by receiving the sanction and acceptance of the board, with some acceptable instructions relative to the faithful discharge of duty and the humane treatment of those soldiers who may have the misfortune to require my assistance. Six of our number were privately rejected as being found unqualified. The examination was in a considerable degree close and severe, which occasioned not a little agitation in our ranks. But it was on another occasion, as I am told, that a candidate under examination was agitated into a state of perspiration, and being required to describe the mode of treatment in rheumatism, among other remedies he would promote a sweat, and being asked how he would effect this with his patient, after some hesitation he replied, "I would have him examined by a medical committee." I was so fortunate as to obtain the office of surgeon's mate in the provincial hospital at Cambridge, Dr. John Warren being the senior surgeon. He was the brother and pupil of the gallant General Joseph Warren who was slain in the memorable battle on Breed's Hill. This gentleman has acquired great reputation in his profession and is distinguished for his humanity and attention to the sick and wounded soldiers, and for his amiable disposition. Having received my appointment by the Provincial Congress, I commenced my duty in the hospital, July 15th.

1776. Boston MA.

May. As the smallpox is in many parts of the town among both the inhabitants and soldiers, I was advised by my friends to have recourse to inoculation for my own safety, though contrary to general orders. I was accordingly inoculated by my friend Dr. John Homans, and have passed through the disease in the most favorable manner, not suffering one day's confinement.

1777. Albany NY.

October 24th. This hospital is now crowded with officers and soldiers from the field of battle; those belonging to the British and Hessian troops are accommodated in the same hospital with our own men, and receive equal care and attention. The foreigners are under the care and management of their own surgeons. I have been present at some of their capital operations, and remarked that the English surgeons perform with skill and dexterity, but the Germans, with a few exceptions, do no credit to their profession; some of them are the most uncouth and clumsy operators I ever witnessed, and appear to be destitute of all sympathy and tenderness towards the suffering patient. Not less than one thousand wounded and sick are now in this city. The Dutch church and several private houses are occupied as hospitals. We have about thirty surgeons and mates and all are constantly employed. I am obliged to devote the whole of my time, from eight o'clock in the morning to a late hour in the evening, to the care of our patients. Some of our soldiers' wounds, which had been neglected while on their way here from the field of battle [Saratoga NY, 7 October, about 45 miles from Albany], being covered with putrefied blood for several days, were found on the first dressing to be filled with maggots. It was not difficult, however, to destroy these vermin by the application of the tincture of myrrh.

Here is a fine field for professional improvement. Amputating limbs, trepanning fractured skulls, and dressing the most formidable wounds, have familiarized my mind to scenes of woe. A military hospital is peculiarly calculated to afford examples for profitable contemplation, and to interest our sympathy and commiseration. If I turn from beholding mutilated bodies, mangled limbs, and bleeding, incurable wounds, a spectacle no less revolting is presented of miserable objects, languishing under afflicting diseases of every description. Here are those in a mournful state of despair, exhibiting the awful harbingers of approaching dissolution; there are those with emaciated bodies and ghastly visage, who begin to triumph over grim disease and just lift their feeble

heads from the pillow of sorrow. No parent, wife, or sister, to wipe the tear of anguish from their eyes, or to soothe the pillow of death, they look up to the physician as their only earthly friend and comforter, and trust the hands of a stranger to perform the last mournful duties. Frequently have I remarked their confidence in my friendship, as though I was endeared to them by brotherly ties. Viewing these unfortunate men as the faithful defenders of the liberties of our country, far separated from their dearest friends, who would be so lost to the duties of humanity, patriotism, and benevolence as not to minister to their comfort, and pour into their wounds the healing balm of consolation?

It is my lot to have twenty wounded men committed to my care by Dr. Potts, our Surgeon General; one of whom, a young man, received a musket ball through his cheeks, cutting its way through the teeth on each side, and the substance of the tongue; his sufferings have been great, but he now begins to articulate tolerably well. Another had the whole side of his face torn off by a cannon ball, laying his mouth and throat open to view. A brave soldier received a musket ball in his forehead, between his eyebrows. Observing that it did not penetrate the bone, it was imagined that the force of the ball being partly spent, it rebounded and fell out, but on close examination by the probe, the ball was detected, spread entirely flat on the bone under the skin, which I extracted with the forceps. No one can doubt but he received his wound while facing the enemy, and it is fortunate for the brave fellow, that his skull proved too thick for the ball to penetrate. But in another instance, a soldier's wound was not so honorable; he received a ball in the bottom of his foot, which could not have happened unless when in the act of running from the enemy. This poor fellow is held in derision by his comrades, and is made a subject of their wit for having the mark of a coward. [It took three months for the wounded under Thatcher's care to recover, or not.]

April 1781. Near West Point, NY.

I received orders to return to the high lands near West Point, to inoculate the troops with the smallpox.

20 April. All the soldiers, with the women and children, who have not had the smallpox, are now under inoculation. Of our regiment, one hundred and eighty-seven were subjects of the disease. The old practice of previous preparation by a course of mercury and low diet, has not been adopted on this occasion, a single dose of jalap and calomel, or of the extract of butternut, *juglans cinerea*, is in general administered, previous to the appearance of the symptoms. As to diet, we are so unfortunate as to be destitute of the necessary comfortable articles of food, and they subsist principally on their common rations of beef, bread, and salt pork. A small quantity of rice, sugar, or molasses, and tea, are procured for those who are dangerously sick. Some instances have occurred of putrid fever supervening, either at the first onset, or at the approach of the secondary stage, and a few cases have terminated fatally. Many of our patients were improper subjects for the disease, but we were under the necessity of inoculating all, without exception, whatever might be their condition as to health. Of five hundred who have been inoculated, four only have died, but in other instances, the proportion of deaths is much more considerable. The extract of butternut is made by boiling down the inner bark of the tree; the discovery of this article is highly important, and it may be considered as a valuable acquisition to our materia medica. The country people have for some time been in the practice of using it, and Dr. Rush, who was for a short period at the head of our hospital department, has recommended the employment of it among our patients, as a mild, yet sufficiently active cathartic, and a valuable and economical substitute for jalap. It operates without creating heat or irritation, and is found to be efficacious in cases of dysentery and bilious complaints. As the butternut tree abounds in our country, we may obtain at a very little expense, a valuable domestic article of medicine. Though there is much reason to suppose that our own soil is prolific in remedies adapted to the diseases of our country, the butternut is the only cathartic deserving of confidence, which we have yet discovered.

16 October 1781. Outside Yorktown, VA.

Our New England troops have now become very sickly, the prevalent diseases are intermittent and remittent fevers, which are very prevalent in this climate during the autumnal months.

January 1782. Near West Point, NY.

The huts which we now occupy were erected the last winter by some of the Massachusetts troops, a short distance from the banks of the Hudson, and called New Boston, they afford us a very convenient and comforta-

ble accommodation. Orders having been received for all the troops that have not gone through the smallpox to be inoculated, I commenced this business a few weeks since, and inoculated about two hundred, including women and children. Their accommodations were not such as their circumstances required; we were unprovided with proper articles of diet, and a considerable number were seized with putrid fever, which proved fatal in several instances. [The inoculated patients had all recovered by 5 April.]



Most medical practitioners in the colonies had not performed major surgery before the Revolutionary War; they may have lanced a boil but little more. Before anesthesia and before an understanding of germs, surgery was a desperate measure. Surgical sets were scarce and expensive. Knives would be sharpened, and replaced when they wore out, so matched sets are rare. This set lacks the trephination burr used to drill through the skull and relieve pressure for brain wounds. Courtesy National Museum of Health and Medicine.

There was no diagnostic equipment beyond fingers and probes; even stethoscopes were decades in the future. Any building could be used as a hospital, and surgery was done on the battlefield, simply looking for a location safe from direct fire. Tourniquets were used during surgery, with blood vessels tied off (ligated) or cauterized to prevent post-operative bleeding.

Modern depiction of what Revolutionary War surgery looked like. ACHH image.



Prevention

With no scientific knowledge of the causes of disease, there were still ideas - some good - on how to prevent disease. One of the best educated and most eminent physicians in the colonies, Dr. Benjamin Rush, wrote a short pamphlet (*Directions for Preserving the Health of Soldiers*) outlining ideas on how to keep troops healthy for duty. Rush would sign the Declaration of Independence, perform battlefield surgery in 1776-77, and head of Continental Army hospitals in the middle colonies. This is his advice on preventive medicine

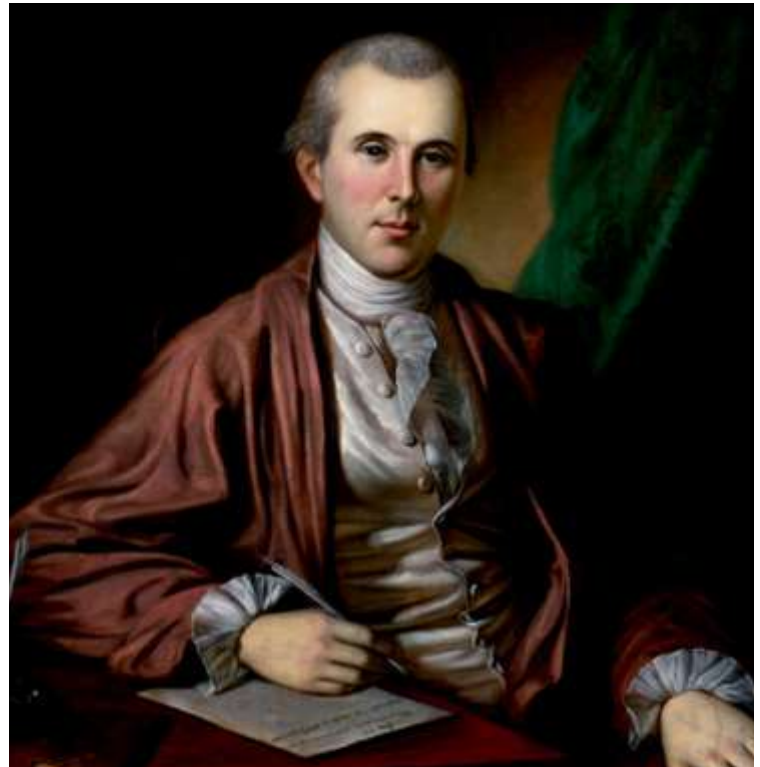
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Fatal experience has taught the people of America that a greater proportion of men have perished with sickness in our armies than have fallen by the sword. The two last campaigns produced melancholy proofs of this assertion. But we ought to consider upon this occasion, not only the mere loss of those worthy citizens who perished in this manner. The complicated distress, which accompanied their sickness and death, should never be forgotten. The gallant youth who had torn himself from the arms of his parents, or the partner of his joys, who had plighted his life to his country in the field, and who perhaps, in the enthusiasm of his military ardor, has courted death from a musket or a cannon ball, was often forced from the scene of action and glory by the attack of a fever, and obliged to languish for days or weeks in a hospital; and, at last, to close his eyes, deprived of the sweet consolation of a dying soldier, the thoughts of ending his life in the arms of victory, or in an act of just resentment against the enemies of the liberties of his country.

The munificence of the congress has made the most ample provision for lessening the calamities of war from sickness in their armies, and, if possible, to prevent it altogether; for I maintain that the mortality from sickness in camps is not necessarily connected with a soldier's life: It was unknown to the armies of ancient Greece and Rome. Their armies had no diseases peculiar to themselves; nor were the diseases, to which their soldiers were subject, attended with any peculiar symptoms. But the munificence of the congress, and the skill of physicians and surgeons, will avail but little in preventing mortality from sickness among our soldiers, without the concurrence of the officers of the army. Your authority, gentlemen, is absolutely necessary to enforce the most salutary plan, and precepts for preserving the health of the soldiers. Your own personal safety is concerned in concur ring in the plan adopted by the congress. But if this were not the case, I am persuaded humanity and patriotism would not plead in vain in favour of those brave men, whose lives are committed to your care by the suffrages of your country.

The art of preserving the health of a soldier consists in attending to the following particulars: 1 Dress. 2 Diet. 3 Cleanliness. 4 Encampments. And, 5 Exercise.

1. The *Dress* of a soldier has a great influence upon his health. It is to be lamented, that the peculiar situation of our country, from the infancy of our foreign trade and domestic manufactures, has obliged us to clothe our soldiers chiefly in linen. It is a well known fact, that the perspiration of the body, by attaching itself to linen, and afterwards, by mixing with rain, is disposed to form miasmata, which produce fevers. Upon this account I could wish the rifle shirt was banished from our army. Besides accumulating putrid miasmata, it conceals filth, and prevents a due regard being paid to cleanliness. The Roman soldiers wore flannel shirts next to their skins. This was one among other causes of the healthiness of the Roman armies. During the last



Dr. Benjamin Rush, c.1783. Oil on canvas by Charles Willson Peale. Courtesy Smithsonian Institution via Wikipedia.

war in America, general (then colonel) Gage obliged the soldiers of his regiment to wear flannel shirts, from an accidental want of linen; and it was remarkable, during a sickly campaign on the lakes, not a single soldier, belonging to that regiment was ever seen in any of the military hospitals. I have known several instances where the yearly visits of the intermitting fever have been checked in the state of Pennsylvania, in places most subject to that disease, by nothing else but the use of flannel shirts.

The hair, by being long uncombed, is apt to accumulate the perspiration of the head, which by becoming putrid sometimes produces diseases. There are two methods of guarding against this evil: the first is by combing and dressing the hair every day; the second is by wearing it thin and short in the neck. The former is attended with delays often incompatible with the duty of a soldier; and therefore the latter is to be preferred to it. This easy mode of wearing the hair is strongly recommended by Count Saxe, and by all modern writers on the military art.

2. The *Diet* of soldiers should consist chiefly of vegetables. The nature of their duty, as well as their former habits of life, require it. If every tree on the continent of America produced Jesuit's bark, it would not be sufficient to preserve or to restore the health of soldiers who eat one or two pounds of flesh in a day. Their vegetables should be well cooked. It is of the last consequence that damaged flour should not be used in the camp. It is the seed of many diseases. It is of equal consequence that good flour should not be rendered unwholesome by an error in making it into bread. Perhaps it was the danger to which flour was always exposed of being damaged in a camp, or being rendered unwholesome from the manner of baking it, that led the Roman generals to use wheat instead of flour, for the daily food of their soldiers. Caesar fed his troops with wheat only, in his expedition into Gaul. It was prepared by being husked and well boiled; and was eaten with spoons in the room of bread. If a little sugar or molasses is added to wheat prepared in this manner, it forms not only a wholesome food, but a most agreeable repast.

What shall I say to the custom of drinking spirituous liquors, which prevails so generally in our army? I am aware of the prejudices in favour of it. It requires an arm more powerful than mine; the arm of a Hercules to encounter it. The common apology for the use of rum in our army is, that it is necessary to guard against the effect of heat and cold. But I maintain, that in no case whatever, does rum abate the effects of either of them upon the constitution. On the contrary I believe it always increases them. The temporary elevation of spirits in summer, and the temporary generation of warmth in winter, produced by rum, always leave the body languid, and more liable to be affected with heat and cold afterwards. Happy would it be for our soldiers, if the evil ended here! The use of rum, by gradually wearing away the powers of the system, lays the foundation of fevers, fluxes, jaundices, and the most of diseases which occur in military hospitals. It is a vulgar error to suppose that the fatigue arising from violent exercise or hard labour is relieved by the use of spirituous liquors. The principles of animal life are the same in a horse as in a man; and horses, we find undergo the severest labour with no other liquor than cool water. There are many instances where even reapers have been forced to acknowledge that plentiful draughts of milk and water have enabled them to go through the fatigues of harvest with more pleasure and fewer inconveniences to their health, than ever they experienced from the use of a mixture of rum and water.

Spirituous liquors were unknown to the armies of ancient Rome. The canteen of every soldier was filled with nothing but vinegar; and it was by frequently drinking a small quantity of this wholesome liquor mixed with water, that the Roman soldiers were enabled to sustain tedious marches through scorching sands, without being subject to sickness of any kind. The vinegar effectually resists that tendency to putrefaction, to which heat and labour dispose the fluids. It moreover calms the inordinate action of the solids, which is created by hard duty. It would be foreign to my purpose, or I might show that the abstraction of rum from our soldiers, would contribute greatly to promote discipline and a faithful discharge of duty among them. General Wolfe, who was a philosopher as well as a general, never suffered a drop of spirits to be drunk by his soldiers, except when they served as sentries or upon fatigue duty in rainy weather. Perhaps these are the only cases in which a small quantity of rum may be useful. It will be of the most essential service if it be mixed with three or four times its quantity of water.

3. Too much cannot be said in favour of *Cleanliness*. If soldiers grew as speedily and spontaneously as blades of grass on the continent of America, the want of cleanliness would reduce them in two or three campaigns to a handful of men. It should extend, 1. To the *body* of a soldier. He should be obliged to wash his hands and face at least once every day, and his whole body two or three times a week, especially in summer.

The cold bath was part of the military discipline of the Roman soldiers, and contributed much to preserve their health. 2. It should extend to the *clothes* of a soldier. Frequent changes of linen are indispensably necessary; and unless a strict regard is paid to his articles, all our pains to preserve the health of our soldiers, will be to no purpose, 3. It should extend to the *food* of a soldier. Great care should be taken that the vessels in which he cooks his victuals should be carefully washed after each time of their being used.

Too many soldiers should not be allowed on any pretence whatever to crowd into the same tent or quarter. The [jail] fever is the offspring of the perspiration and respiration of human bodies brought into a compass too narrow to be diluted, and rendered inert by a mixture with the atmosphere.

It has been remarked that the men are most healthy when the exigencies of a campaign have made it necessary for an army to send off their tents. This must be occasioned by the tents being rendered unhealthy from being too much crowded, or from not being kept clean.

The straw or hay which composes the bed of a soldier, should be often changed, and his blanket should be exposed every day to the sun. this will prevent the perspiration from becoming morbid and dangerous by accumulating upon it.

The commanding officer should take the utmost care never to suffer a soldier to sleep, or even to sit down in his tent with wet clothes, nor to lie down in a wet blanket or upon damp straw. The utmost vigilance will be necessary to guard against this fruitful source of diseases among soldiers.

The environs of each tent, and of the camp in general, should be kept perfectly clear of the offals of animals and of filth of all kinds. They should be buried or carefully removed every day beyond the neighbourhood of the camp.

4. The formation of an *Encampment* is of the utmost importance to the health of an army. It is to no purpose to seek for security from an enemy in the wisest disposition of troops in a country where marshes and mill-ponds let loose intermitting fevers upon them. Sometimes it may be necessary to encamp an army upon the side of a river. Previously to this step, it is the duty of the quarter master to inquire from what quarter the winds come at the season of his encampment. If they pass across the river before they reach his army, they will probably bring with them the seeds of bilious and intermitting fevers, and this will more especially be the case in the fall of the year. The British troops at Pensacola, by shifting their quarters every year, so as to avoid the winds that come over a river in the neighbourhood of the town, at a certain season, have preserved their health in a manner scarcely so be paralleled in so warm a climate.

Frequently changing the spot of an encampment has been found to contribute greatly to the health of an army. It effectually guards the men against the effects of those offal matters which are so small, or so concealed, as to elude the vigilance of an officer.

It is the duty of the commanding officer, of a division or detachment of the army, to avoid as much as possible, exposing his troops to *unnecessary* fatigue, or watchfulness. The daily exercises of the manual, and manoeuvres, (which contribute to the health of soldiers) as also all marches, should be performed in the cool of the morning and evening in summer. Sentries should always be provided with watchcoats; and they should be *often* relieved in very hot, cold, and rainy weather.

It is a good custom for a sentry always to eat a hearty meal before he enters upon duty in cold weather. The gentle fever excited by his food contributes to guard him in a degree against the effects of the cold.

5. Idleness is the bane of a soldier. It exposes him to temptations not only to every kind of military vice, but to every species of military disorder. But his exercise should be *regular*, and performed at *stated* periods; nor should it be suspended during his recess from the toils of war in his winter quarters. "We remark (says Montesquieu in his excellent treatise on the rise and fall of the Roman greatness) in modern times, that our soldiers perish from *immoderate* fatigue, notwithstanding it was by immense labour the Romans preserved their armies. The reason I believe was, their labour was *constant*, whereas among us our soldiers pass from the extremes of labour to the extremes of idleness, than which nothing can be more destructive to the lives of men."

The fire and smoke of wood, as also the burning of sulphur, and the explosion of gunpowder, have a singular efficacy in preserving and restoring the purity of the air. There was an instance in the last war between Britain and France, of a ship in sir Edward Hawke's fleet, that had above a hundred men on board ill with a low fever. This ship was obliged to bear her part in the well known battle between sir Edward and Monsieur Conflans. A few days after the engagement, every man on board this ship recovered, and an entire stop was put to the progress of the disease. This extraordinary event was thought to be occasioned by the explosion and efflu-

via of the gunpowder.

I shall conclude these directions by suggesting a few hints which appear to be worthy of the attention of the gentlemen of the army.

Consider in the first place, that the principle study of an officer, in the time of war, should be to save the blood of his men. An heroic exploit is admired most when it has been performed with the loss of a few lives. But if it be meritorious to save the lives of soldiers by skill and attention in the field, why should it be thought less so to preserve them by skill and attention of another kind in a march, or an encampment? And on the contrary, if it be criminal in an officer to sacrifice the lives of thousands by his temerity in a battle, why should it be thought less so to sacrifice twice their number in a hospital, by his negligence?

Consider in the second place, that an attention to the health of your soldiers is absolutely necessary to form a *great* military character. Had it not been for this eminent quality, Xenophon would never have led ten thousand Greeks for sixteen months through a cold and most inhospitable country ; nor would Fabius have kept that army together, without it, which conquered Hannibal, and delivered Rome.

Consider thirdly, that the discipline necessary to make an army victorious, requires that the principle of self-preservation should in some measure be suspended in a soldier. If he be taught that it is a crime to have a single thought about his life in the field, he will soon transfer the same indifference about his life to the camp, or to his quarters. It argues therefore a want of understanding in an officer to charge his men with carelessness of their health and lives. Julius Caesar wanted nothing but strength in a man to make him a soldier, he supplied every other want from his own great fund of military qualities. Nature has given the Americans strength; and the cause of liberty has given them principle above the common soldiers of any other army upon the face of the earth. The blame, therefore, will only be yours, if they are not made superior to them in all the arts which improve and adorn a soldier's person and character.

Lastly. Consider that your country and posterity look up to you for the preservation of the only means of establishing the liberties of America. The wisdom and eloquence of writers and orators have long since yielded to the more powerful oratory of our sword. All our hopes, therefore, are in our army. But if any thing can be added to these motives, consider further, that there is scarcely a soldier under your command who has not a mother, a wife, a sister, or a child. These helpless members of society made great sacrifices to their country when they urged the beloved objects of their affection to follow the recruiting drum to the camp. Whenever, therefore, your duty requires that you should attend to the health of your men, imagine you see *one* or perhaps *all* of their female and helpless connexions standing at the door of your tents or quarters, and beseeching you by the remembrance of the pleasures you have enjoyed, and by the prospect of the pleasures you expect, in those connexions, to repair immediately to the tents or huts of your men, and to attend to every thing which reason and conscience tell you are necessary for the preservation of their health and lives.

— 27 July 1775 —

Dr Johnathan Potts to Dr John Morgan

... The distressed situation of the sick here is not to be described: without clothing, without bedding or a shelter sufficient to screen them from the weather.

I am sure your known humanity will be affected when I tell you we have at present upwards of one thousand sick crowded into sheds and laboring under the various and cruel disorders of dysenteries, bilious putrid fevers and the effects of a confluent smallpox; to attend this large number we have four seniors [surgeons] and four mates, exclusive of myself, and our little shop does not afford a grain of jalap, ipecac, bark, salt, opium and sundry other capital articles and nothing of the kind to be had in this quarter. In this dilemma our inventories are exhausted for substitutes, but we shall go on doing the best we can in hopes of speedy supply. ...

From Fort George NY, August 10 1776

1775-1783 the Birth of America: Medical Artifacts in the AMEDD Museum Collection

Charles Franson and Paula Ussery, AMEDD Museum

Not surprisingly the smallest number of artifacts in the AMEDD Museum collection are those from the earliest decades of this nation's existence. Although the AMEDD traces its lineage to the creation in 1775 of "an hospital" there are many reasons for the lack of artifacts, including the relatively small population of the 13 colonies and the small number of physicians as a subset of the overall population. It is estimated that there were only about 2,500,000 people (all ages, both free and enslaved) in the 13 colonies. Of that number it is estimated that there were only 3,500 physicians in the colonies. Moreover, not every physician in the colonies served in either a militia unit or in the Continental Army. It is currently estimated that 1,400 physicians served in the Continental Army. This is a fairly small number of potential artifact donors.

Physicians who served during the Revolutionary War used their own personal medical instruments. When the war ended, the physicians returned to their communities and their private practices. In a young country, lacking a manufacturing base for medical equipment, the physicians continued to use their instruments until they wore out or possibly until the advent of antiseptic surgery when their non-sterility made them obsolete. The Humoral Theory was the standard doctrine for medicine based on maintaining the balance of the four humors: blood, phlegm, black bile, and yellow bile. These were treated by removing "excess" quantities of the offending substances by bleeding, blistering, purging with laxatives, or vomiting with emetics.

Bleeding was a very common therapy, with a specified amount of blood to be let depending on symptoms. Bleeding was usually performed on the forearm. A constricting band was applied to make the engorged veins stand out. The vein was then opened ("phlebotomy") with a fleam or lancet, and the blood caught in a bowl or basin until the required amount was removed. Unfortunately, this often weakened an already ill patient, even resulting in death. Although this theory of illness seems very unscientific to us in the early 21st Century, there was progress in the realm of public health.

A major concern to (all) armies was loss of effectives due to diseases such as smallpox. A smallpox outbreak could run through a camp and severely affect the number of troops available for operations. A case of smallpox conferred immunity, but only if the patient survived this deadly infection. Although controversial, inoculation or variolation offered a way to avoid epidemics. The procedure involved taking pus or exudate from an active case of smallpox and introducing it by way of scratches or superficial incisions into the upper arm of the subject using a lancet or small scalpel. The practice was initially forbidden by General Washington, but as the army grew and the disease began to be an issue an order was given to inoculate the Continental Army in 1777 during winter quarters. The newly inoculated soldiers were held in quarantine until the wound had healed.

There were no dedicated medical museums until the mid-19th Century. In 1863, the Philadelphia College of Physicians opened the Mütter Museum as a teaching resource for the college. The previous year, Surgeon General William Hammond established the Army Medical Museum to serve as a center for the collection of research specimens for military medicine and surgery. Army surgeons forwarded specimens of wounds (mostly bone) and projectiles to the collection. In both instances, the purpose was only to provide researchers and students with anatomical specimens for training. Medical equipment and other medical related items were not sought.

Following WWI, the US Army set up the Medical Field Service School at Carlisle Barracks, PA. It was intended to train physicians in field operations, and to evaluate the equipment that had been used during WWI and refine or replace as needed. By 1944 a "Museum of Field Equipment" had been established at Carlisle Barracks. The collection consisted of current-issue training items, and equipment designed and tested by the Medical Department Equipment Laboratory, including commercial items that had not been adopted. This collection was supplemented by captured medical equipment sent to Carlisle for evaluation. Its purpose was to stimulate ideas (and stop ideas that had failed before) for field equipment, not to collect all kinds of AMEDD artifacts.

When the MFSS was moved to Ft. Sam Houston in 1946, the Museum of Field Equipment moved with the school. The museum was renamed the Medical Field Service School Museum and was initially opened to the public in 1954. Since the legacy collection only goes back to the mid-20th Century, the earlier time periods

have been accumulated via donation.

The deterioration of surviving medical instruments is also an issue for the AMEDD Museum. The manufacturing process for steel had been developed centuries before the American Revolution, but it was complex and costly. Steel implements of all sorts were cared for, used and re-used until no longer functional. Additionally, British laws prevented steel production in the colonies so all steel products had to be imported.

While in use, instruments were kept oiled or waxed to prevent corrosion, but with use, deterioration was inevitable. Blood is highly corrosive to carbon steel (no stainless in the 1700s), and coupled with ambient humidity and improper storage conditions, rust was a common threat. Another threat was simple usage. Knife and saw blades become dull and resharpening over time removes material, resulting in wearing out. On a knife, it does not become an issue for a very long time, but saw teeth become unserviceable much sooner, so most surgical saws of the time were of the “frame” type consisting of a metal frame with a replaceable blade attached with screws. Replacement saw blades could be purchased rather than a whole new saw. Even suture needles had to be imported and were thus subject to repeated sharpening until useless. Examples in the AMEDD Museum show heavy use and signs of significant deterioration.



The wood used in instrument handles tended to be ebony, a hard, dense tropical wood, favored for its durability. The ebony handle on our large saw shows longitudinal splits from both shrinkage and the pressure exerted in its original use, while the frame shows extensive pitting.



The steel blades on our fleams show varying degrees of corrosion, from (stabilized) scale rust to pitting to extensive damage.



The pewter bleeding bowls have fared better. 18th Century pewter was an alloy of tin, usually with copper and/or lead. If kept in a reasonably temperate environment, the tin or lead will form a protective patina on the surface, as with ours.





The saw blades, while mostly lightly corroded, are held in frames that exhibit evidence of severe rust in the past, with pits on surfaces that were once quite smooth.

—27 July 1775—

COL William Smallwood to the Maryland Council of Safety:

... We want medicine much; none can be had here. Our sick have and are now suffering extremely. The number you'll observe from the list is very considerable, owing in a great measure to the bad provision made for and care taken of them, the men being often moved, and have been exposed to lie on the cold ground ever since they came here; often lying without their tents for several nights, as is now the case, having been five nights and days without them ...

Our greatest suffering proceeds from the great neglect of the sick; and [Washington's] orders ... are most salutary, were they to be duly attended to; but here, too, there is not only a shameful but even an inhuman neglect daily exhibited. The Directors of the General Hospitals supply and provide for the sick, who are extremely remiss and inattentive to the well-being and comfort of these unhappy men; out of this train they cannot be taken. I have withdrawn all mine long ago, and had them placed in a comfortable house in the country, and supplied with only the common rations; even this is preferable to the fare of a General Hospital. Two of these Regimental Hospitals, after I have had them put in order, one has been taken away by the Directors for a General Hospital, and my people turned out of doors, and the other would have been taken in the same manner, had I not have applied to General Washington, who told me to keep it. The misfortune is that every supply to the Regimental Hospital of necessaries suitable for the sick must come from an order from these Directors, and is very seldom obtained. I have more than once applied that my Quartermaster might furnish and make a charge for what was supplied, by which mean I could have rendered the situation of the sick much more comfortable, at a less expense, but could not be allowed. I wish this could be obtained.

Philips' Heights NY, October 1776.

The Trouble with Collecting: A Race Against Time

Angelique Kelley, AMEDD Museum

As the U.S. celebrates the 250th anniversary of the Revolutionary War, and the Army's 250th birthday, many historic sites and museums are setting up exhibits to commemorate these important events. If you have visited any of these exhibits though, you may have noticed fewer historic artifacts on display than you might see for other U.S. history events. This is due to the scarcity of artifacts and documentation from this 18th Century war compared to those that followed. So why are Revolutionary War artifacts so scarce? To answer that question, you first need to understand the challenges that museums and collectors around the world face when trying to preserve history, to include the biggest threat: time.

When visiting a military museum or historic battle site, most visitors expect to see a blend of everyday soldier items and the military gear used during notable battles. Unfortunately, many everyday items, and some military equipment, were never designed to withstand the test of time. These are items that were intended to be used until they became worn out or were otherwise destroyed. No one expects their hairbrush, undershirts, or cooking utensils to last forever. These are the types of items that are intended to break down due to regular use and then be replaced. In some cases, even if the items survived the war, they remained in use by the soldier or their family, and were eventually discarded.

Although there were early preservation attempts following the war, these typically focused on the historic sites of battles, rather than the everyday items used by the troops. While families of Revolutionary War soldiers sometimes held onto uniforms and other gear to honor their loved ones' legacies, without implementation of long-term preservation methods, many of these items continued to break down and deteriorate, eventually being lost forever. Even those items sent to museums in the 1800s were not necessarily safe as we did not know then what we do now about some environmental factors that can destroy objects over time. Additionally, a great many items were left behind on the battlefields, and as nature reclaimed those spaces over the following decades, the items ended up buried under layers of dirt and rock. Thankfully, modern day archeology teams, historians, and museum professionals are still discovering artifacts, while actively working to preserve the ones already in historic collections.

Discovering new artifacts is only part of the challenge though. All artifacts, regardless of time period, continue to decay due to natural factors such as light, humidity, temperature, dust, pollution, chemicals, and pests, as well as the risk of damage resulting from human error. Museums and collectors must therefore fight against this deterioration by storing these items in special cases or boxes designed to mitigate outside factors, prevent new damage, and slow the overall rate of decay. For some items, such as metals, the degradation process can be slower, but environmental threats are even more significant when the items are made from organic materials such as natural fibers, untreated wood, or paper, which all decompose much faster.

For example, wool, which was often used in coats and breeches during the Revolutionary War, can decompose in as little as a few months under the right conditions. Light and pollution can cause fabric to fade, high humidity can cause mold growth, and low humidity can cause fibers to turn brittle. Wool is further susceptible to pests such as clothes moths that feed on animal fibers. Leather, another material used frequently in the Revolutionary War, is also prone to environmental damage. Although sturdier than wool when properly maintained, if it dries out due to high temperatures and low humidity, leather can crack and turn brittle, or mold can grow if the leather exposed to high temperature and high humidity. These types of damage are often irreversible. Other common materials of the 18th Century that have been challenging to maintain include wood used for



Gen. George Washington's Valise, 1776, showing cracks and breaks in the leather, and failing seams.
Museum of the American Revolution, 2003.00.0899

building supports, furniture, and object handles (prone to dry rot, warping, shrinking, and pests), linen and felt used for shirts and hats (prone to pests and accelerated decay from the same factors mentioned for wool), pewter used for tableware and buttons (prone to breakage and corrosion), and glass used in many everyday objects (prone to accidental breakage and cracking due to temperature and humidity fluctuations).

The good news is that science has come a long way, and conservation specialists around the world have discovered new and innovative ways to slow the natural progression of time, even repairing preexisting damage in some cases. Additionally, historians and museums now actively strive to preserve historic sites, documents, and artifacts as quickly as possible so that we can begin the preservation process as early as possible. While there is no way to completely stop an object's natural breakdown over time, careful attention to high-risk objects, and use of mindful preservation efforts, can allow museums and collectors to ensure the significant objects of our past remain intact for generations to come.



An British red uniform coat, 1799–1800, undergoing conservation to repair insect damages.
Los Angeles County Museum of Art.



Glass bottles undergoing conservation assessments. They show varying degrees of dealcalization, cracking, and surface separation.

Historic Jamestown Visitor Center, 30 April 2025

Image links:

Washington's valise: <https://www.amrevmuseum.org/collection/washington-s-valise-or-portmanteau>

Glass bottles: <https://historicjamestowne.org/handle-with-care-glass/?srsltid=AfmBOoqUyAJpIZH3y0TdYpbd16lGZ6QRKBPlXeP4P4PjomaseRLkptr>

Wool damages: <https://unframed.lacma.org/2013/12/25/winter-wool-and-moths-repairing-a-museum-grade-textile>

— 27 July 1775 —

Medical men in the Revolution conducted research, within their understanding of how disease worked.

About the beginning of April 1776, the American army ... marched from Boston for New York, at which place they arrived near the middle of the month. The sick and invalids having been left behind, the whole army were in perfect health. They took up their quarters in the barracks and houses of the citizens till about the first of May, when they all went into tents, except the 22nd Regiment, under the command of Colonel William Wylls, who for want of tents continued in their quarters in Smith Street. This regiment was very healthy until about the middle of the month, when upwards of one hundred of the men were taken down with the dysentery in the space of one week.

Such a sudden invasion of this formidable disease alarmed me greatly. As I found upon inquiry that there was

not a single dysenteric patient besides in the whole army, I conduced that the disease arose from some cause peculiar to the city; but after a careful inquiry, I could not that there was a single inhabitant in the whole city that was sick with the distemper. Those who lived in the same street, and many of them in the same houses with us, were entirely free from this, or indeed any other disease.

For several days I was much perplexed and greatly at a loss as to the cause. At length I observed that not only the citizens with whom we lived were free from the disease, but that some whole companies of the same regiment had nothing of it. This led me to consider more minutely the situation and circumstances of those who were sick; all of whom, I found, lived either in low underground rooms, or else in garrets, so situated as not to admit of a free circulation of air. The rooms were also considerably less in proportion to the number of men than normal. [I.e., troops were crowded in.] Struck with these discoveries, I concluded at once that the difference arose from a confined stagnant air, deprived by this means of its natural elasticity, and loaded with putrid effluvia from the bodies of the unhappy people who lived in it.

Having communicated my discoveries to the Colonel, I requested that the men (both sick and well) might be removed out of those rooms into such as were more airy and capacious. This measure was attended with the most salutary consequences. Those who were sick recovered in a short time, except one or two that died; and no more being seized with the disease, in a few weeks the regiment became entirely healthy. ...

Dr Ebenezer Beardsley

Farewell to Bob Ampula (1950-2025)

On 29 July 2025 Robert L. “Bob” Ampula, SGM (ret.), and Administrator of the AMEDD Regiment passed away. He was in the process of retiring. He had been a part of the ACHH since 2010, but his service to the Regiment, and the Army goes back further. Mr. Ampula served as the AMEDD Regimental Administrator since 2002, first in uniform and then after 2006, as an AMEDD civilian. A relentless proponent of the Army Medical Department’s Regiment for over 20 years, his work on regimental recognitions, the uniform loan program, and the online listing of AMEDD valor awards were instrumental in promoting the esprit de corps and heritage of Army Medicine.

Before ACHH and the Regiment, there was the Army. After growing up in Florida and working a series of interesting jobs, Bob joined the Army in 1975. He was the Distinguished Honor Graduate for the Fire Control Instrument Repair Course and then worked on the early night vision sights and laser range finders for the prototype Abrams tank. He continued in maintenance and then moved to the optical field. He was again the Distinguished Honor Graduate, this time for the Optical Laboratory Specialist course at Fitzsimons Army Medical Center and later worked and instructed within optical fabrication.

At ten years in service, he was given a new challenge and began recruiting duty. After further training he was the Honor Graduate for his Army Recruiting Course. He would then have success in the next four years recruiting soldiers and then Nurse Corps Officer candidates in Florida. Afterward he returned to Fort Sam Houston as a doctrine writer and Subject Matter Expert for MOS 42E, Optical Laboratory Specialist. He wrote the 42E soldiers’ manual, training packages, and was a consultant to OTSG on the capping of MOS 42E. He was also a Subject Matter Expert for all doctrinal matters relating to Optical Laboratory Specialists, including a study to merge 42E with 91Y MOS.

Then he was selected as the NCOIC for the largest optical laboratory outside of CONUS at Pirmasens, Germany. The laboratory was responsible for all spectacles for the tri-service population in Europe and the Middle East. Under his supervision the lab reduced turn-around time on spectacles from 14 days to 2. He worked military-to-military missions to Hungary and Belarus and created the first modern mobile Optical Field Laboratory utilizing all plastic lenses and dry cut edgers, eliminating glass lenses to cut the weight and reduce stock. Ampula also served as the First Sergeant, for A Company, 226th Medical Logistics Battalion,



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A newspaper clipping from 1988. SFC Ampula was a successful recruiter.

Pirmasens..

He then served as the Operations Sergeant for the 261st Area Support Medical Battalion, 44th Medical Brigade, XVIII Airborne Corps, and helped lead the 261st on two successful rotations at the Joint Readiness Training Center. He planned and co-wrote OPOARDS for major exercises and events such as Operation Uphold Democracy in Haiti (1994-1995), Bright Star, Purple Dragon, Royal Dragon, division and corps warfighter exercises, and Hurricane Fran (1996) relief efforts. The battalion was responsible for all non-division drop zone medical coverage including the Golden Knights parachute demonstration team.

He was selected as Sergeant Major, the first 42E selected as a 91B Sergeant Major after the capping of the MOS. Serving as the Plans Sergeant Major for 44th Medical Brigade, he assisted in war plans for the Korean Peninsula and Middle East to reflect the change in medical doctrine and co-wrote OPLANS for XVIII ABN Corps directed exercises, both real world and notional. Ampula served as the G3 Sergeant Major for the 44th Medical Brigade, working under Brigadier Generals Porr, Farmer, and Fox. Some major events and locations that the 44th participated in during his tenure were operations in: Kuwait, Israel, Hurricane Mitch relief (1998), JTF Bravo, multiple division and corps warfighter exercises, JRTC and NTC rotations, National Boy Scout Jamboree, Bright Star, Golden Medic, Ulchi Focus Lens, and Bosnia, Kosovo, and later Afghanistan rotations. Sergeant Major (ret.) Ampula is a graduate of all the NCOES courses culminating with the United States Army Sergeants Major Academy. He held a Bachelors of Science Degree in Computer Science and Associate of Science Degree in Ophthalmic Dispensing.

At the close of his uniformed service, SGM Ampula was selected by The Surgeon General to become the Director of Regimental Affairs. In this capacity he managed the regimental recognition program: the Distinguished Member of the Regiment, Honorary Member of the Regiment, and the Friend of the Regiment. From 2005-2024, all personnel who received AMEDD Regimental recognitions were processed by Mr. Ampula. He also managed the Traveling Regimental Flag program and Historic Uniform Program. Bob built up the historic uniform collection from originally fifteen uniforms to a program that encompasses uniforms for all of America's major conflicts.

The position had other features as he delved into the details of the AMEDD Medal of Honor and other AMEDD valor awards. Bob supervised the animal caretaker, responsible for all the animals located in the Quadrangle, and coordinated with the Institute of Heraldry and the Center for Military History on historical questions and information. Other interesting duties included various interviews, overseeing the combat medic documentation team, and supporting video programming.

He researched and wrote articles for the AMEDD Center of History and Heritage Newsletter, assisted in AMEDD memorialization program, and started the AMEDD Awards for Valor databases covering from the Certificate of Merit and Medal of Honor to the ARCOM with "V" device. It is a great resource, and is the only online database dedicated to exclusively AMEDD personnel.

Bob Ampula was married to his wife Nora for 52 years and they have 2 sons and 3 grandchildren. Known in his civilian career for professionalism and always wearing a tie, having a good sense of humor, an expert on MST3000, as well as being dedicated to the AMEDD Regiment, he will be greatly missed. Thanks Bob!



Returning to his "roots", Bob Ampula receives a Certificate of Appreciation from MAJ Ong for his publication "History of the Army and Navy Optical course" in 2016.



FORMATION OF THE ARMY MEDICAL DEPARTMENT REGIMENT

Robert L. Ampula, U.S. Army Medical Department Regiment

In 1986 all the heritage, history and traditions of the AMEDD was encapsulated under one organization and united under one flag. That year saw the activation of the Army Medical Department Regiment.

It actually began in 1981 when the United States Army Regimental System (USARS) was created by direction of the Chief of Staff of the Army, General Edward C. Meyer. The original concept was to provide each soldier with continuous identification to a single regiment and to support that concept with a personnel system that would increase a soldier's probability of serving recurring assignments with his or her Regiment. The concept encompassed the active Army, the National Guard and the Army Reserve. Unlike the Combat Arms which have multiple Regiments, the Special Branches had a "whole branch" concept: all troops would be in one regiment. On 30 June 1986 General Order 27 established the Army Medical Department Regiment effective 27 July 1986 and established the home of the Army Medical Department Regiment at Fort Sam Houston, Texas.

Today, as in 1986, the AMEDD Regiment stands as the one binding element that unites all members of Army Medicine under one flag. The Regiment includes all AMEDD personnel, whether active duty, Army Reserve, National Guard, or AMEDD civilian employees who elect to affiliate with the Regiment. It includes TOE, and TDA personnel in the continental United States as well as those serving overseas, all sharing the same traditions and history. A history that starts during the War for Independence through the dark days of the Civil War; from the Meuse-Argonne offensive in the Great War to the beaches of Normandy and the Philippine Islands during WW II; enduring the bitter cold of Korea and the sweltering heat of Vietnam; from Grenada and Panama, and the liberation of Kuwait, to the long conflict in Afghanistan, members of the Army Medical Department have always persevered in their mission to care for the sick and wounded.

Although they lack the tools, technology, and medical information of our day, they are dedicated to finding solutions through their challenges with the information at hand.

Be sure to pick up the latest issue of the *AMEDD Medical Journal* (Spring 2025) which delves into medical support during the Revolutionary War! It can also be accessed online at

A special edition of the Medical Center of Excellence's *Medical Journal*, about Army medicine in the Revolutionary War, will be online at <https://medcoe.army.mil/the-medical-journal-archive#2025>

Writing for *The AMEDD Historian*

We are seeking contributions! We believe variety is the way to attract a variety of audiences, so we can use:

Photos of historical interest, with an explanatory caption

Photos of artifacts, with an explanation

Documents (either scanned or transcribed), with an explanation to provide context

Articles of varying length (500 word minimum), with sources listed if not footnotes/endnotes

Book reviews and news of books about AMEDD history

Material can be submitted usarmy.jbsa.medical-coe.mbx.office-of-medical-history@army.mil Please contact us about technical specifications.

The opinions expressed in *The AMEDD Historian* are those of the authors, not the Department of Defense or its constituent elements. The bulletin's contents do not necessarily reflect official Army positions and do not supersede information in other official Army publications or Army regulations.

AMEDD Center of History and Heritage

Chief, Mr. Nolan Watson

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