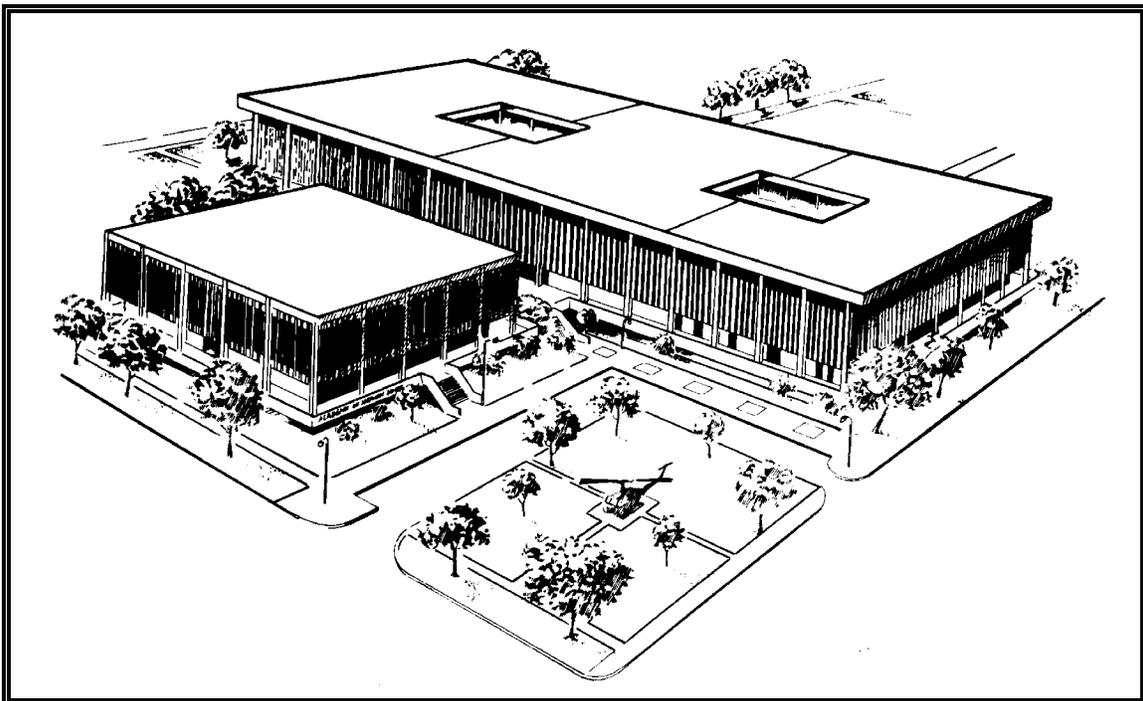


MD0405

**UNITED STATES ARMY
MEDICAL DEPARTMENT CENTER AND SCHOOL
FORT SAM HOUSTON, TEXAS 78234**



MILITARY MEDICAL HISTORY

**CORRESPONDENCE SUBCOURSE
DECEMBER 1995**

DEVELOPMENT

This subcourse is approved for resident and correspondence course instruction. It reflects the current thought of the U.S. Army Medical Department Center and School and conforms to printed Department of the Army doctrine as closely as currently possible. Development and progress render such doctrine continuously subject to change.

The instructional systems specialist responsible for the development of this subcourse was Mr. Don I. Atkerson, DSN 429-6090 or area code (210) 916-8901; COMMANDER, U S ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL, DEPARTMENT OF TRAINING DEVELOPMENT, ATTN MCCS-HTI BLDG 4011, 1750 GREELEY ROAD, FORT SAM HOUSTON TX 78234-6122.

FAX: DSN 471-1202 or FAX Commercial (210) 221-1202
AMEDD Bulletin Board System: DSN 471-0153/9876/0384; Toll Free 1-800-344-2395

The subject matter experts responsible for content accuracy of this subcourse were furnished by the Medical Operations Branch, Department of Healthcare Operations, DSN 471-6047 or area code (210) 221-6047; COMMANDER, US ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL, DEPARTMENT OF HEALTH CARE OPERATIONS, ATTN MCCS-HHO BLDG 2841, 2250 STANLEY ROAD, FORT SAM HOUSTON TX 78234-6100.

The editorial assistant for this edition of the subcourse was John L. McIntosh.

ADMINISTRATION

For comments or questions regarding enrollment, student records, or shipment of subcourses, contact the Nonresident Instruction Branch: **DSN 471-5877**, toll-free **1-800-344-2380**, commercial **(210) 221-5877**; COMMANDER, US ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL, NONRESIDENT INSTRUCTION BRANCH, ATTN MCCS-HSN BLDG 4191, 2105 11TH STREET, FORT SAM HOUSTON TX 78234-6199.

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**CORRESPONDENCE COURSE OF THE
UNITED STATES ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL**

SUBCOURSE MD0405

MILITARY MEDICAL HISTORY

INTRODUCTION

Military medicine refers to the science and art of medicine as used for the benefit of the military. It closely resembles many aspects of civilian health care, but has several differences. In combat situations, for example, military medicine incorporates the philosophy of the greatest good for the greatest number. Treatment of casualties with massive life-threatening injuries with little hope of survival may be delayed in order to treat casualties with lesser injuries. Also a casualty may receive emergency treatment at a battalion aid station and be evacuated to another facility for additional treatment in order to free the medical personnel at the battalion aid station to treat additional casualties.

It is recommended that you read Appendix A, "Military History: Is It Still Practicable?" by Jay Luvaas before beginning the first subcourse lesson.

Subcourse Components:

This subcourse consists of three lessons and an examination. The lessons are:

Lesson 1, Military Medicine Through the Eighteenth Century.

Lesson 2, Military Medicine During the Eighteenth and Nineteenth Centuries.

Lesson 3, Military Medicine During the Twentieth Century.

Credit Awarded:

Upon successful completion of this subcourse, you will be awarded five credit hours. You must receive a score of 70 percent or higher on the examination in order to successfully complete this subcourse.

Materials Furnished:

Materials provided include this electronic booklet, an examination answer sheet, and an envelope. Answer sheets are not provided for lesson exercises. All lesson exercises and solutions are contained in this subcourse booklet.

You must furnish a #2 lead pencil to be used in marking the examination answer sheet. You may keep the electronic subcourse booklet.

Procedures for Subcourse Completion:

You are encouraged to complete the subcourse lessons in the order they are presented. When you have completed all of the lessons to your satisfaction, complete the examination sheet and mail it to the Nonresident Instruction Branch along with the Student Comment Sheet (if completed) in the envelope provided. **Be sure you name, rank, social security number, and return address are on all correspondence.** You will be notified by return mail of the examination results. Your grade on the examination will be your rating for the subcourse.

Study Suggestions:

Here are some suggestions that may be helpful to you in completing this subcourse.

--Read and study each lesson carefully.

--Complete the first subcourse lesson. After studying the text portion of the lesson, work the exercises at the end of the lesson. Record your answers to the exercises on paper.

--After completing the lesson exercises, compare your answers with those in the "Solutions to Exercises" following the exercises. For each exercise answered incorrectly, reread the text material cited after the solution to determine why your response was not the correct one.

--After completing the first lesson and exercises, repeat the process for the following lessons.

--Be sure to read the materials included in the appendixes. This material can be read before, during, or after the lessons. Read the appendixes before taking the examination since the answers to some of the examination items will be found in these materials.

--When you have completed all of the lessons and appendixes, complete the examination. You may print the examination (click the printer icon and when prompted, select pages and enter the first to last page number of the examination). Mark your responses on your printed copy of the examination. When you are satisfied that you have answered all of the examination items to the best of your ability, transfer your responses to the examination answer sheet. Then mail the examination answer sheet and Student Comment Sheet (if completed) to the Nonresident Instruction Branch.

Student Comment Sheet:

Provide us with your suggestions and criticisms by filling out the Student Comment Sheet found at the back of this booklet and returning it with your examination answer sheet. In this way, you will help us to improve the quality of this subcourse. Please review the comment sheet before beginning this subcourse. (NOTE: If you need a reply to an inquiry, call or write a separate letter. Use the Student Comment Sheet only for remarks which do not require a reply.)

LESSON ASSIGNMENT

LESSON 1	Military Medicine Through the Eighteenth Century.
LESSON ASSIGNMENT	Paragraphs 1-1 through 1-10.
LESSON OBJECTIVES	After completing this lesson, you should be able to: 1-1. Identify the developments in military medicine prior to the collapse of the Roman Empire. 1-2. Identify how the use of gunpowder affected military medicine. 1-3. Identify the developments in military medicine in Europe from the fifteenth through the eighteenth century.
SUGGESTIONS	Read Appendix A first, then read the first lesson . After studying the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

LESSON 1

MILITARY MEDICINE THROUGH THE EIGHTEENTH CENTURY

1-1. ANCIENT MILITARY MEDICINE

Military medicine is the application of medicine in a military setting for the benefit of the military. It is an outgrowth of "civilian" medicine as practiced in the civilian community.

a. The ancient military physician knew that the battlefield would yield casualties with predictable injuries such as cuts from sharp swords, penetrating wounds from arrows, broken bones caused by blunt weapons, and head injuries caused by rocks hurled from slings. The same types of wounds occurring to many similar individuals over a short period of time gave the military physician an opportunity to experiment and to find out which treatments helped the casualties and which did not.

b. The ancient military physician found that rituals performed by shamans and priests in the civilian community were not helpful on the battlefield. Instead, he found that certain treatments, such as the application of honey and salt mixtures to wounds, were helpful in aiding soldiers to recover from their wounds.

c. The ancient military physician observed what worked and what did not. He discarded treatments which failed and improved upon those that worked. This does not mean that he knew why they worked. The fact that certain mixtures had bactericidal (kills bacteria) or bacteriostatic (inhibits growth of bacteria) properties were not understood by the early military physician, but he could observe the recovery rates of casualties and determine which treatments were most likely to help future casualties. Likewise, he could form associations which had a bearing on health, such as the connection between locating latrines near the source of drinking water and the subsequent outbreak of disease. Preventive medicine, then, became part of the domain of the military physician.

d. The military physician did not limit his patients solely to soldiers. An important part of military campaigns involved animals -- those that drew the army's chariots, those that carried supplies and other burdens, and those that were butchered to provide the troops with meat. The military physician often served as the military veterinarian and the military food inspector.

1-2. ANCIENT WARFARE

Wounds inflicted on the battlefield fell into basic groups such as cuts to the arms, legs, and scalp; penetrating wounds to the limbs and trunk caused by arrows or javelins; simple fractures of the limbs caused by impact from swords and other weapons; and concussions caused by missiles from slings. The types of wounds most often treated by military physicians were those in which the soldiers survived long enough to reach medical treatment. Soldiers who had survived that amount of time usually had wounds that were treatable and survivable. The treatment often consisted of cleaning the wound, controlling bleeding, and preventing contamination.

a. One factor which limited the injuries treated was the type of warfare practiced by the armies. A soldier fighting another soldier face-to-face can generate only so much force. A single hit with a weapon to the arm or leg could generate enough force to cause a simple fracture, but was unlikely to cause multiple fractures or crushing injury.

b. A soldier who became injured was often slain by his opponent on the battlefield. Most of the casualties were generated when one side broke the formation of the enemy, causing the enemy soldiers to flee from the battlefield in a disorganized rout. The victorious soldiers would follow the defeated army, striking down and killing the fleeing soldiers. This resulted in maximum casualties to the enemy with little danger to the victorious soldiers. Usually, only commanders who could be ransomed were spared from slaughter.

c. Once an army achieved victory, casualties could be evacuated and treated. Soldiers with serious injuries such as severed arteries and crushed skulls died on the battlefield. Some soldiers, such as those with penetrating abdominal wounds in which the intestines were pierced, died regardless of the medical treatment they received.

d. Cuts caused by a sharp, clean blade had a minimum of contamination. Simple fractures which involved a single break with no break in the skin could be successfully splinted. Fractures involving several breaks in the bone or major open wounds were rare and were often treated by amputation.

1-3. ANCIENT CIVILIZATIONS

Medical knowledge often spread as a result of warfare. As one empire fell and another grew to power, medical information was passed from the conquered to the conqueror.

a. **Mesopotamia and Egypt.** The beginnings of recorded medicine can be traced back to various city-states of Mesopotamia (modern Iraq) and Egypt well over four thousand years ago. Some ancient records refer to physicians who were apparently assigned to army garrisons and treated soldiers. Many of these writings were apparently instructions from experienced physicians to other physicians. These writings dealt with the preparation and use of medications in treating different diseases, splinting fractures, surgical procedures, extracting teeth, treatment of infected wounds, and sanitation. The Egyptian army also appears to have physicians assigned to military units since some of the documents dealt with treating injuries which would be common in battle, but not in civilian life (a type of early military medical manual).

b. **India.** Hindu society developed a fairly advanced level of medicine by the fifth century B.C. Among the developments of Hindu medicine were the treatment of various snakebites and the beginning of plastic surgery of the face and nose. Hindu military surgeons also became proficient in extracting missiles that had penetrated the body, suturing, and amputation. Hindu armies developed codes of conduct for conducting warfare. Among the agreements was the recognition of physicians and surgeons as noncombatants and medical treatment for captured enemy soldiers.

c. **Greece.** Probably the best known Greek physician was Hippocrates of Cos who lived around 400 B.C. He stressed that medical practice should be based on clinical observations (pulse, temperature, respirations, sputum, etc.). He also stressed the ability of the body to heal itself. Through the military conquests of Alexander the Great (fourth century B.C), Greek culture and Greek medical practices spread throughout the known world, including Egypt, Persia, and part of India. Documents record the presence of Greek and other physicians with the armies under the command of Alexander during their long campaigns.

d. **Rome.** The Roman legions obtained the highest level of military medicine in the ancient world. Roman armies were needed at first to constantly defend their city-state and, later, to conquer other city-states and empires.

(1) In 90 B.C, the Roman Republic expanded its military force by allowing many of the poorer Roman citizens to join the army where food and shelter were provided by the state. These soldiers became professional soldiers of a standing army which existed during peacetime as well as time of war. During the period of the Republic, military physicians mainly treated the rich officers within the army. The common soldier was usually left to purchase medical treatment from local civilian physicians or be treated by fellow soldiers.

(2) After the formation of the Roman Empire under the leadership of Octavian (Augustus) Caesar in the last half of the first century B.C., Rome hired physicians to furnish medical treatment for the entire army, not just officers. Physicians were given an honored position in the army and certain benefits after retirement. Manuals were developed to help standardize medical treatment in the legions. Physical examinations were conducted to ensure that only healthy recruits were accepted into the military. Military physicians were also responsible for sanitation and preventive health measures such as constructing and maintaining latrines, encouraging daily bathing by troops (even in the field), providing netting for protection against mosquitoes, and ensuring that soldiers exercised daily and had an adequate and nutritious diet.

(3) One Roman innovation was providing limited medical training to certain soldiers who remained with the troops. These soldiers functioned as combat medics who provided far-forward care to injured soldiers, such as using bandages to control bleeding. The army also had special units which evacuated soldiers from the battlefield to the field hospitals where they were treated by medical personnel.

(4) Medical knowledge and treatment in the ancient world (military as well as civilian) reached its peak in the Roman legions. The development of the tourniquet and ligation to control bleeding allowed amputations to be performed with far greater safety than ever before. New surgical instruments were developed to help extract missiles such as arrowheads. Strong wine (almost vinegar) was applied to wounds which reduced the risk of infection. Drugs were used as pain-killers and as sedatives prior to surgery.

1-4. MIDDLE AGES

The decline of the Roman Empire lasted centuries. By the time the Roman Empire fell in the fifth century, military medical support was almost nonexistent. Following the collapse of the Roman Empire, much of the ancient civilized world regressed to a state of barbarism. However, some of the new political structures served to preserve Roman medical knowledge.

a. **Byzantine Empire.** The Byzantine Empire, ruled from Constantinople (Istanbul), existed from the fourth century A.D. to the fifteenth century. This remainder from the eastern part Roman Empire preserved much of the cultural and medical knowledge of Rome, but did not add to that knowledge.

b. **Islamic Empire.** The Islamic religion provided a bond that united Arab armies to create a new empire. Islamic armies increased their medical knowledge from conquered lands and from trade with the Byzantine Empire.

c. **Feudal Europe.** Western Europe slowly recovered from the fall of the Roman Empire. In A.D. 800, Charles the Great (Charlemagne) created a loose confederation under the Holy Roman Empire that lasted until the fifteenth century.

(1) During this period, Europe launched several wars (the Crusades being the most famous) against the Islamic Empire. This resulted in increased contact with the Islamic and Byzantine Empires and in some of the medical knowledge of the Greeks and Romans flowing back into Europe. The lack of cleanliness in personal hygiene and in everyday urban living in Europe, however, led to increased disease. Epidemics such as the Black Death (bubonic plague) killed large numbers of the European population during the fourteenth century.

(2) During the fourteenth and fifteenth centuries, European nationalism increased. In 1453, the Holy Roman Empire ceased to exist at the end of the Hundred Years War. In the same year, the Ottoman Empire conquered the Byzantine Empire.

1-5. RENAISSANCE EUROPE

a. The rebirth of military medicine in Europe began in Spain. During the last part of the fifteenth century, the Spanish forces drove out the Islamic Moors. During the wars, the Spanish military copied the mobile hospitals used by the Moorish armies. Around the same time, surgeons made their appearance in the French armies.

b. As nations began to form in Europe, they formed armies to defend themselves and to conquer new territory. With the new nations also came a rebirth (renaissance) of learning. Old Greek and Roman texts preserved by the Arab and Byzantine cultures were translated and reintroduced into Europe. Unfortunately, the translation of some medical texts were faulty, resulting in improper treatment of certain injuries. For example, infection was introduced into wounds in the belief that infection assisted in healing even though the Greek and Roman physicians knew this idea to be false.

1-6. INTRODUCTION OF GUNPOWDER

In the fifteenth century, gunpowder became an important military tool as mobile siege guns were used to breach city walls. In the sixteenth century, muskets and hand guns were developed for use by individual soldiers. Improved cannons loaded with steel balls, rocks, pieces of metal and glass, nails, and other objects were used against enemy infantry formations. These antipersonnel cannons caused great injury and death. The use of cannon, muskets, and rifles resulted in a major change in the types of wounds that soldiers suffered. Many more injuries to the limbs occurred. Compound fractures, which were rare in ancient times, were common due to the force of the bullet hitting a bone. Opposing armies now inflicted large numbers of nonfatal injuries on each other.

a. The primary problem was that of infection. Almost all gunshot wounds became infected either due to the injury itself (clothing, dirt, and other contamination was often forced into the wound by the musket ball), from unsanitary conditions following injury, by the surgeon probing for the musket ball or shrapnel with his unwashed fingers, or even from being deliberately introduced by the surgeon in an effort to promote healing. Death from infection rather than from the injury itself was the primary danger to the soldier on the battlefield.

b. The force generated by musket balls produced shattered bones, resulting in the need to amputate the injured limb. Amputation often resulted in death from shock or infection.

c. Warfare had changed and military medicine would be required to develop and change also.

1-7. EUROPEAN MILITARY MEDICINE IN THE SIXTEENTH CENTURY

a. In general, European armies were manned by two classes -- the aristocracy who bought their commissions and became officers and the enlisted soldiers who came from the unemployed and poor section of society. These enlisted personnel joined the army in return for food and a little money, but were capable of being trained into an excellent army.

b. Civilian and military medicine were also divided into two general classes -- the physician and the barber-surgeon.

(1) Physicians, some of which also performed surgery, were educated and were primarily concerned with providing care to the noblemen. Often the officers in the army traveled with their private physicians.

(2) The barber-surgeons were skilled workers (usually barbers) who trained by apprenticeship to perform surgical and other medical functions. Young apprentices often trained under skilled barber-surgeons in the army and remained with the army even after mastering the trade.

(3) In time of war, civilian physicians and civilian barber-surgeons were often impressed into the army for the duration of the campaign to treat the enlisted troops.

c. By the sixteenth century, the printing press (a fifteenth-century invention) had resulted in the publication of many medical manuals which could be used by physicians and barber-surgeons. Not only did the printing press allow knowledge to be wide-spread, it also tended to standardize medical procedures since medical personnel from various nations could consult the same medical references. New discoveries and new medical procedures could be disseminated far more rapidly than ever before.

1-8. EUROPEAN MILITARY MEDICINE IN THE SEVENTEENTH CENTURY

In the seventeenth century, European medical knowledge increased greatly. The functions of the circulatory and respiratory systems were understood, the microscope was invented and used to study diseases, and intravenous injections were performed. Discoveries in chemistry and physics were also used to better understand the functioning of the human body. Surgical instruments were made by highly-skilled craftsmen who standardized the design of these instruments. The printing press made another major contribution, this time in the form of medical periodicals.

a. Although there were advances in medical knowledge, the actual treatment of diseases and infections progressed far slower. Although some military surgeons used Roman ligation procedures to control bleeding from arteries, it would not be until the beginning of the eighteenth century that major progress would be made in amputation.

b. A major problem was the failure to use a scientific method of researching medications. All sorts of items were used to treat patients, often being either useless or causing additional harm. A physician, for example, might treat a gunshot wound by applying a mixture of materials to the soldier's rifle. Apothecaries sold salves and powders having no proven benefit to the patient.

1-9. MEDICAL ADVANCES IN THE EIGHTEENTH CENTURY

Some of the major medical advances of the eighteenth century are given below.

a. In 1718, Jean Louis Petit, a French surgeon, invented a screw tourniquet to control bleeding. The screw tourniquet made thigh amputations possible and reduced the risks associated with amputations below the knee. The screw tourniquet was still in use during the American Civil War. As amputations became safer, military surgeons gave greater emphasis to preparing limbs for prosthesis. Flap and lateral incision amputations became common procedures. The death rate from amputation remained high until methods were developed in the nineteenth century to control infection and shock.

b. Specialized medical instruments for removing musket balls were developed (but were still not sterilized before use). Locked forceps made their appearance. Wound dressing and bandaging became a skilled art. Styptics were used to stop minor bleeding. Pressure sponges, alcohol, and turpentine were used to treat minor wounds.

c. John Pringle, physician general to the British forces in 1740, identified jail fever, ship fever, and hospital fever as being one disease, now known as epidemic typhus.

d. Pierre-Joseph Desault, a military surgeon, developed the debridement technique for treating traumatic wounds in which only the necrotic tissue was cut away to remove a source of infection.

e. Percival Pott, also a military surgeon, reduced the risk of infection in head wounds by extracting blood from extradural and subdural spaces by cranial draining.

f. Physicians and surgeons began to introduce thoughtful publications about the health of armies, military medicine, and camp diseases. In 1752, John Pringle wrote the first English text on military medicine. In 1764, Richard Brockelsby, an English physician, wrote a book on controlling contagious diseases in military hospitals. In 1794, John Hunter, a military surgeon from Scotland, published his treatise in which he argued against the normal practices of enlarging gunshot wounds and blood-letting.

Pringle wrote the first English text on military medicine in 1752. In it, his purpose was clear:

"My chief intention was to collect materials for tracing the remote causes of military distempers, in order that whatsoever depended upon those in command, and was consistent with the service, might be fairly stated, so as to suggest proper measures for preventing in any future campaign."

1-10. MILITARY CHANGES IN THE EIGHTEENTH CENTURY

At the beginning of the century, the pattern of military medical care remained essentially as it had been in the previous century. By midcentury, however, all major armies of the period had moved considerably toward establishing institutionalized systems of military medical care in which providing paid medical care to all soldiers became a recognized function of the national government. This including the provision of food, shelter, and clothing needed to maintain the health of the troops.

a. **Physical Examinations.** Armies encouraged voluntary enlistments for limited periods of military service. Large numbers of marginally healthy adults with poor sanitary habits entered the military service, leading military officials to introduce physical examinations for recruits. At first, the recruit was provided only a cursory examination by his commander. In 1726, the French army began regular medical examinations for recruits. By 1764, each French recruit was examined by a regimental surgeon for physical fitness. In 1788, Prussia required medical officers to conduct physical examinations of all soldiers on a regular basis. In 1790, mandatory medical examinations were instituted in the British army.

b. **Rations.** The standard military ration greatly improved the general health of the soldier. Most soldiers ate better in the military than they had in civilian life. Rations were provided to the soldier at government expense. Unfortunately, the quality and quantity of food was often less than promised. Armies relied on a contract supply system which lead to fraud, theft, and pressure to reduce expenditures by reducing the quantity or quality of food purchased for troops in the field.

c. **Barracks.** In addition to providing troops with regular meals, the military began providing soldiers with buildings specially designed for soldiers to live and sleep. Barracks replaced the old practice of billeting troops with the citizenry or in rented inns. Moreover, the new barracks made control over desertion easier. The first British barracks were introduced in Ireland in 1713 due to a shortage of barns and inns. The first military barracks constructed in England proper were build in 1723.

d. **Uniforms.** Regulation uniforms were issued to make it easier to identify friendly units in the smoke of the battlefield. Uniforms were designed without considering the effects on the health of the soldier. Uniforms were often made of cheap cotton which did not provide sufficient warmth in cold climates and rain. Tight stockings restricted blood circulation in the legs and did not provided sufficient padding to the bottoms of the soldiers' feet. The shoes provided little protection from frostbite and trench foot. Tight buttons and belts often restricted the soldier's breathing, Heavy headgear added to the soldier's load without providing protection from shell fragments and bullets.

e. **Military Hospitals.** During the eighteenth century, a number of improvements took place in the establishment and organization of military hospitals, especially in the wide-scale introduction of mobile field hospitals that accompanied the armies on the march. Although every army had a hospital medical

organization to provide treatment and administration, these organizations were seldom fully staffed and there was a notorious lack of coordination between hospitals. Mobile hospitals were often little more than rapidly constructed huts in the field. Military hospitals remained unsanitary and disease continued to be the major threat to military manpower. Few armies had any organized and dedicated transport to move the wounded to the rear-area hospitals. It often took several days for the casualty to reach the rear hospital and it was not unusual for a third of the patients to die in transit from the front to the rear hospitals.

f. **Dettingen Agreement.** In 1743, at the completion of the Dettingen campaign, an agreement was made by opposing forces in which military medical personnel were declared to be noncombatants and that wounded enemy soldiers were to receive medical treatment and be returned after they recovered from their injuries. The Dettingen agreement resulted in the need for larger medical staffs since medical personnel had to treat enemy soldiers as well as their own wounded soldiers.

EXERCISES: LESSON 1

INSTRUCTIONS. The following exercises are to be completed by writing the lettered response that best answers the question or best completes the incomplete statement or by writing the answer on paper that you provide. After you have completed all the exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers.

1. Sixteenth century skilled workers who were trained to perform surgery under the apprenticeship method rather than formal education were called _____.
2. Which of the following statements best describes military medicine in the ancient world.
 - a. Physicians and surgeons developed medical and surgical procedures based upon a firm understanding of anatomy and physiology, physics, and microbiology.
 - b. Physicians and surgeons used procedures that worked and discarded those that did not without a firm understanding of why the treatments worked.
3. Ancient physicians and surgeons usually treated casualties who survived because:
 - a. Soldiers with major wounds usually died on the battlefield.
 - b. Medical science was highly developed in the military as opposed to its civilian counterpart.
 - c. Effective, rapid evacuation ensured quick treatment of both friendly and enemy soldiers.
4. Which of the following ancient empires is known to have trained soldiers to provide basic medical treatment, such as using bandages, to fellow soldiers?
 - a. Egypt.
 - b. Greece.
 - c. India.
 - d. Rome
5. The major medical problem introduced by the use of gunpowder in war was:
 - a. Infection from gunshot wounds.
 - b. Toxic effect of lead bullets.
 - c. Toxic effect of gunpowder residue.

6. Which of the following statements is/are true concerning the Dettingen Agreement?
 - a. Medical personnel were recognized as noncombatants.
 - b. Captured enemy soldiers were to be given medical treatment.
 - c. Both "a" and "b" above are true.

7. Which of the following is noted for developing the debridement technique for treating traumatic wounds?
 - a. Desault.
 - b. Hippocrates.
 - c. Petit.
 - d. Pringle.

8. Prussia required regular physical examinations of all soldiers beginning in:
 - a. 1650.
 - b. 1714.
 - c. 1788.
 - d. 1812.

SOLUTIONS TO EXERCISES: LESSON 1

1. Barber-surgeons (para 1-7b(2))
2. b (para 1-1c)
3. a (para 1-2)
4. d (para 1-3d(3))
5. a (para 1-6a)
6. c (para 1-10f)
7. a (para 1-9d)
8. c (para 1-10a)

LESSON ASSIGNMENT

LESSON 2	Military Medicine During the Eighteenth and Nineteenth Centuries.
LESSON ASSIGNMENT	Paragraphs 2-1 through 2-25.
LESSON OBJECTIVES	After completing this lesson, you should be able to: 2-1. Identify major military and medical events associated with the American Revolutionary War, including the people associated with the "Hospital." 2-2. Identify major military and medical events associated with the French Revolution and the Napoleonic Wars, including the accomplishments of Larrey. 2-3. Identify major military and medical events associated with the American Civil War, including the accomplishments of Letterman. 2-4. Identify major military and medical events associated with the Spanish-American War, including the Dodge Commission.
SUGGESTION	After studying the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

LESSON 2

MILITARY MEDICINE DURING THE EIGHTEENTH AND NINETEENTH CENTURIES

Section I. AMERICAN REVOLUTIONARY WAR

2-1. BEGINNING OF THE AMERICAN REVOLUTION

After the defeat of the French forces during the French and Indian War (1754--1763), Great Britain needed to tax the colonies in North America to produce additional income. The king also removed some local governors and increased British troop strength. These actions angered the colonists who had become used to governing themselves with minimum interference from Great Britain. Soon colonial politicians like Samuel Adams began to gather support for independence.

- a. In 1770, a British patrol defended itself from a mob, resulting in the death of several civilians (the Boston Massacre).
- b. In September 1774, the First Continental Congress assembled in Philadelphia to protest British acts.
- c. In April 1775, a British force met armed resistance from the colonial militia at Lexington and Concord.

d. Alarmed at the armed conflict, the Second Continental Congress assembled in Philadelphia and established a united Continental Army. In June 1775, George Washington was appointed to be commander of the colonial forces.

e. Later in June 1775, British forces attacked colonial forces on Breed's Hill and Bunker Hill near the Boston harbor. Dr. Joseph Warren, a Major General in the colonial militia, was killed in the battle. Thus the first general officer killed in action was a physician.

2-2. THE "HOSPITAL"

Washington wrote to Congress on 20 July 1775:

"I have made inquiry with respect to the establishment of the hospital and find it in a very unsettled condition. There is no principal director, or any subordination among the surgeons. Of consequence, disputes and contentions have arisen and must continue until it is reduced to some system."

In July 1775, the Congress established a "Hospital" (actually a medical department) in Massachusetts with a Director-General (chief physician of the Hospital), four surgeons, an apothecary (pharmacist), and nurses (usually wives or widows of military personnel).

"Hospital" Salaries:

Director-General -- \$4.00 per day
Surgeons -- \$1.66 per day
Apothecary -- \$1.66 per day
Nurses -- \$2.00 per month

a. Congress did not specify the relationship between the new hospital system responsible to the central government (Congress) and the existing regimental systems responsible to the state governments. Staff and command responsibilities for medical matters were left fragmented between the state governments and Congress, between the regimental medical staff and the Hospital, and between military and civilians (physicians were not commissioned).

b. Benjamin Church, a London-trained physician and member of the Massachusetts Legislature, was appointed by Congress as the first Director-General. One of his innovations was instituting examinations for surgeons that did not have a medical degree or certificate (a type of quality assurance).

c. The Congress appropriated insufficient funds for the general hospital and no money for the regimental hospitals. It further confused matters by eventually creating other departments (theaters of operation), each with its own general hospital. Congress said nothing about the relationship between the chief physicians of these hospitals and the Hospital's Director-General. Matters became more confused when a regimental hospital deployed with its regiment. Patients who were too ill to deploy with the regiment were usually sent to the nearest general hospital without notification and without adequate provision being made for their care.

2-3. THE ATTACK ON CANADA

In 1775, the Continental forces attacked Montreal and Quebec. The attack against Montreal was successful. In November, the Continental forces surrounded Quebec, but the siege was eventually abandoned because of an outbreak of smallpox and harsh winter weather. The Continental army retreated to New York in 1776. A hospital was established in New York under Dr. Jonathan Potts to treat the soldiers returning from Canada. His work led to the only Congressional resolution praising a physician during the war.

Excerpt from the Congressional resolution:

"The unremitting attention showed by Doctor Potts and the officers of the hospital to the sick and wounded soldiers under their care is proof not only of their humanity, but also of their zeal in the preservation of the health and lives of the gallant asserters of their country's cause. ... "

Potts only response was to comment, *"My only concern is to preserve the health of the soldier and to tenderly nurse the sick."* Potts died four years later, worn out by his work and his total devotion to the troops.

2-4. THE MEDICAL COMMAND

a. Director-General Church had difficulties with the regimental surgeons. Regimental surgeons, appointed by the colonel of the regiment, wanted to keep their patients in the regimental hospitals, usually field expedient buildings. Church wanted the patients sent to the general hospital and did not give the regimental hospitals the supplies they required.

Director-General Church was found to be in treasonable correspondence with the British in Boston. In October 1775, Church was court-martialed and found guilty.

General John Sullivan, in a letter to Congress, complained that Church's regulations would prevent soldiers from reenlisting:

"They would rather die... under the care of physicians they were acquainted with than be removed from their friends under the care of physicians they never saw."

b. Later that month, John Morgan of Philadelphia succeeded Church as the second Director-General. He had helped found the medical school at Philadelphia. Morgan never solved the command problems. He was not a tactful person and was removed from his post in 1777. One of his supporters was Benjamin Rush, a physician who signed the Declaration of Independence and published a book on preventive medicine in the military. In his book, Rush stressed that physicians had to convince line officers to implement their medical advice for it to be effective.

Benjamin Rush wrote in 1778:

"Consider that the principle study of an officer in time of war should be to save the blood of his men. If it be criminal to sacrifice thousands by termidity in battle, why sacrifice twice the number in a hospital by negligence? An attention to the health of your soldiers is absolutely necessary to form a great military character."

c. William Shippen, who also helped found the Philadelphia medical school, became the third Director-General. Shippen, however, did not do much better at running the Hospital than had Morgan. He was accused of corruption and court-martialed. Although acquitted, he eventually resigned in early 1781.

d. The drug purchase and issue problems began to be addressed by Congress when it appointed Andrew Craigie to be the first Apothecary-General. He began to issue drug chests to both the regimental surgeons and the general hospitals. Regimental commanders complained that the chests were inadequate.

e. John Cochran became the fourth Director-General. He had been a regimental surgeon in the French and Indian War and was the first Director-General not to have a formal medical degree from Europe. Cochran remained Director-General for the remainder of the war.

2-5. THE BATTLE AGAINST SMALLPOX

Inoculation against smallpox was performed using live smallpox virus (Jenner had not yet developed his vaccination procedure using the cowpox virus). Inoculation could be dangerous. Since live viruses were used, the patient could contract smallpox and die. The patient could also infect others with smallpox.

- a. Inoculation had previously proven its effectiveness when it was used to control an outbreak of smallpox in Boston during the 1720s. At the beginning of the war, John Warren (brother to Joseph Warren) performed smallpox inoculations on new recruits when he served as a surgeon to a hospital in Boston.
- b. Director-General Morgan recommended to General Washington that troops be inoculated for smallpox. The Canadian campaign convinced Washington that inoculation was necessary and ordered that all Continental line troops be inoculated. This was the first time that an attempt had been made to inoculate an entire army. The results were successful. Inoculation reduced the death rate from smallpox from 160/1,000 to 3/1,000.

Washington wrote to Shippen from Valley Forge on 6 January 1777:

"Finding the smallpox to be spreading much and fearing that no precaution can prevent it from running through the whole of the Army, I have determined that the troops shall be inoculated. Should the disorder infect the Army in the natural way and rage with its usual virulence, we should have more to dread from it than from the sword of the enemy."

2-6. MILITARY MEDICINE DURING THE REVOLUTIONARY WAR

- a. Throughout the war, medical equipment, supplies, and drugs were in short supply. In addition, most regimental surgeons were not well trained, especially at the beginning of the war. Medical officers often set to work with only what they could carry in their pocket surgical kit and performed the only useful surgery they knew--amputation.
- b. Medical treatment facilities had to be moved as the Army was fighting and retreating. The field medical treatment facility was often in some local house to which the wounded were carried, dragged, or limped into on their own.
- c. Enlisted personnel were often assigned to help in the regimental hospitals. Rather than assigning personnel who could be trained to become efficient hospital personnel, commanders usually assigned enlisted personnel who were a burden to the unit and who were not suited for military life. (A hospital corps consisting of trained enlisted personnel would not be established until 1887.)
- d. The general hospitals became larger and better organized as the war went on. Dr. James Tilton, who eventually became Surgeon General during the War of 1812, believed that the large general hospital resulted in the spread of disease. He built smaller, well-ventilated hospitals ("Tilton's huts") which reduced the transmission of infection.
- e. Inspector General von Steuben published the first Army Regulations dealing with health care in 1778 and 1779. In them he stressed the duty of the regimental commander to preserve the health of his troops and the importance of cleanliness. He also gave the regimental surgeon authority to determine when a soldier had sufficiently recovered from his illness to resume his duties.

Excerpts from the first regulations published for an American force, written by von Steuben:

"Instructions for Commandant of a Regiment. The preservation of the soldier's health should be his first and greatest care; and as that depends in great measure on their cleanliness and manner of living, he must have a watchful eye over the officers of companies, that they pay the necessary attention to their men in those respects."

"There is nothing which gains an officer the love of his soldier's more than his care of them under the distress of sickness: it is then that he has the power of exerting his humanity in providing them every comfortable necessary and making their situation as agreeable as possible."

"When a soldier has been sick he must not be put on duty until he has recovered sufficient strength, of which the surgeon shall be the judge. The surgeons are to remain with their regiments, as well on a march as in camp, that in case of sudden accidents they may be at hand to apply the proper remedies." (Von Steuben, Regulation 5, 1778-1779)

f. Cinchona bark (from which quinine was later obtained) was used with some success in treating malaria.

g. No major advances in medicine or surgery came from the war, but smallpox control was a step forward. The war, which officially ended in September 1783 with the Treaty of Paris, still resulted in a considerable loss of life, mostly from disease.

Section II. NAPOLEONIC WARS

2-7. THE FRENCH REVOLUTION AND THE WAR OF THE FIRST COALITION

a. Under the rule of King Louis XVI of France, there was much corruption in government, unjust taxation, oppression, and poverty. The French people were encouraged by the success of the American Revolution. Increasing public discontent in France exploded in 1789 in a successful attack on the Bastille, a notorious fortress used to hold political prisoners. During the next few years, there were royal attempts to placate the rebels, establish a constitutional monarchy, and ease taxes, but the efforts were not successful.

b. The French turmoil was viewed as a threat to all of the monarchies in Europe. In 1792, Prussia, Austria, Great Britain, Spain, and Holland attacked France in the War of the First Coalition.

c. In August 1792, mobs in Paris attacked the royal palace, arrested the King, and declared France to be a republic. Soon, however, radical elements took over the government and executed King Louis XVI, Queen Marie Antoinette, and many aristocrats and political leaders in what became known as the "Reign of Terror." French citizens were conscripted and sent to defend the new republic from the invading forces. The new troops were undisciplined, but ferocious fighters. Soon the invading Coalition armies were pushed back.

2-8. FRENCH MILITARY MEDICAL SERVICE

The war with Coalition forces resulted in a tremendous slaughter rate. Tactics of the time were massed musket and case shot with cannon rounds at close range followed by a bayonet charge.

a. Much of the French military medical service had been destroyed during the revolution. The old regime had built a number of military hospitals on the northern frontier, but many were no longer usable. Those that were used were not sufficient for the large number of casualties that poured in, so nearby homes were used to billet the patients over the objections of the home owners.

b. The medical command was divided between a physician-in-chief and a surgeon-in-chief. This split reflected the disciplinary split in civilian life. In the northern battles, the physician-in-chief was Jean Francois Coste and the surgeon-in-chief was Pierre Francois Percy. Both were career medical officers.

Percy had a fine grasp of the situation and the proper mind-set of a military surgeon:

"The art of healing men is a little like that of destroying them; timid actions gain nothing, and if victory often follows the audacity of brave soldiers, success also crowns the efforts of enterprising surgeons."

(1) Physicians were still without a valid theory of disease, used polypharmacy prescriptions (many drugs in combination, often in excessive amounts), and used harmful procedures such as "bleed, purge, and sweat" to treat fevers.

(2) No surgery was done on the battlefield; patients were simply hauled to the rear. Surgeons treated wounds by incising the wounds and fishing around with their fingers for the musket ball or fragment.

c. As with other wars, it was disease, not wounds, that took the greatest toll on the military. Coste and his colleagues tried to follow the teaching of John Pringle and others on camp diseases and hospital sanitation, but without much success.

2-9. EVACUATION PROCEDURES

Sick and lightly-wounded soldiers were simply left on the battlefield to hide until the battle was over. The more seriously-wounded soldiers were evacuated by fellow soldiers to a collection point outside the battle area where the wounded soldiers stayed until they were loaded into an ambulance wagon and carried to a military hospital, usually located about three miles behind the army.

a. The evacuation process resulted in the loss of healthy manpower since it might require six to eight soldiers to carry one wounded soldier, his weapon, and his equipment from the battlefield. Wounded soldiers were carried on the arms of three or four soldiers; on an improvised litter made of guns, branches, or coats; or by farmer's carts pressed into service.

b. Large, cumbersome wagons were the only ambulances the French army had. The ambulances were of limited use since there was only one ambulance for every 20,000 soldiers and the ambulances stayed far from the battle.

c. Due to the cumbersome method of evacuation, it took 24 to 36 hours for the wounded soldiers to reach medical treatment. This resulted in many deaths. Many wounded stayed on the battlefield for three or four days after a battle until they could be collected and evacuated.

d. Percy, the French surgeon-in-chief, addressed the problem by organizing litter bearers to work on the battlefield to bring in the wounded. It was another French surgeon, Dominique Jean Larrey, who actually developed a system of rapid evacuation.

Percy was driven to try to develop a system of rapid evacuation because of what he observed:

"In retreat before the enemy there is no more frightful a spectacle than the evacuation of mutilated soldiers on big wagons; each jolt brings the most piercing cries. They have to suffer from rain, from suffocating heat or freezing cold and often do not have aid of food of any sort. Death would be a favor and we have often heard them begging it as a gift from heaven." 1792, Percy (in Vess)

2-10. LARREY'S CONTRIBUTIONS

a. **Evacuation.** In 1792, Larrey joined the French Army and served in northern France. Larrey, recognizing the need for rapid evacuation and for treatment on the battlefield, came up with a solution. He designed two types of "flying ambulances" to rapidly evacuate wounded soldiers from the battlefield to the hospital. The ambulances also carried first aid items which were used to treat casualties on the battlefield.

(1) One type of "flying ambulance" was a small two-wheeled carriage drawn by two horses. It could transport two litter casualties and had iron handles for securing the casualties to the floor.

(2) The second type was a four-wheeled carriage drawn by four horses. It had body springs for a more comfortable ride and could transport four casualties laid in a horizontal position.

Larrey, recognizing the need for forward evacuation and for immediate treatment, came up with a solution:

"This suggested to me the idea of constructing an ambulance in such a manner that it might afford a ready conveyance for the wounded during battle. My proposition was accepted and I was authorized to construct a carriage, which I called the 'flying ambulance.' I had made two kinds of carriages. The small, with two wheels, drawn by two horses... had a folding door. The floor was movable and on it was placed a hair mattress. The floor had four iron handles through which the sashes of the soldiers were passed. Two patients could lie full length in them; to the sides were attached several pockets to receive articles necessary for the care of the sick."

"The second kind had four wheels, the body hung on springs, and was drawn by four horses. The left side of the body opens almost its whole length, by means of two sliding doors, so as to permit the wounded to be laid in a horizontal position. Four men might lay with their legs slightly contracted."

b. **Surgery.** Delayed amputation was the rule based on civilian practice. Military surgeons, however, soon noted that wounded soldiers did not do well with delayed surgery. The casualties bled more and had more pain. The soldier's muscles became rigid, making the amputation more difficult. Gangrene, sepsis, and death were more common in patients who were evacuated to the rear with untreated wounds. Larrey noted that when a patient was in neurogenic shock, the bleeding was less, the muscles were relaxed, the limb was numb from bruised nerves, and the amputation pain was much less. He further noted that converting the injury to a clean, debrided, dressed surgical wound made evacuation more comfortable and made infection less likely.

(1) Based upon his observations, Larrey established new surgical guidelines. Immediate amputation was indicated if:

- (a) The limb was shattered or the joints smashed.
- (b) Small bones, joints, and nerves were all broken up.
- (c) Too much muscle tissue or major arteries were missing, even if the bone or joint was sound.

(2) Larrey stopped the use of salves and ointments, had wounds washed only with water, did inverted cone procedures so that the flaps fell together, and bandaged the stump with new adhesive bandages so the wound could drain.

(3) Larrey's surgical skill became so great that he could amputate a leg in one minute and an arm in 17 seconds. However, he gave much of the credit in saving lives to his flying ambulances which allowed wounds to be dressed on the battlefield and the casualties to be quickly evacuated. Without them, many soldiers would have died of hemorrhage.

2-11. NAPOLEON AND LARREY

a. In 1795, the Reign of Terror ended when a new government (with the help of a 26-year-old French army officer named Napoleon Bonaparte) was established. France had defeated the Coalition forces in the north. Only Great Britain and Austria continued to fight in Italy. Napoleon was given command of the French forces fighting the Austrians in Italy. Larrey was assigned to Napoleon's forces.

(1) With Napoleon's support, Larrey perfected the organization of his flying ambulances and outlined their missions and priorities. Their primary mission was to rescue casualties on the battlefield, administer first aid, and transport the casualties to the first line of hospitals. Their second mission was to remove the dead for burial.

(2) The priority for treatment was determined by the casualties' injuries, with the more seriously injured being treated and evacuated first without regard for rank or distinction. This was the beginning of modern triage (sorting).

b. After Napoleon defeated the Austrians in 1797, the French government sent Napoleon to Egypt to open a land route to challenge the British in India. While in Egypt, Larrey adapted to desert warfare by replacing his horse-drawn ambulances with camels which carried medical supplies and pannier litters for patient transport. Napoleon defeated the Egyptian forces, but was trapped by the English fleet. In August 1799, Napoleon left the Army in Egypt and returned secretly to France. Napoleon invited Larrey to go with him, but Larrey chose to stay with the army and his patients. During the campaign, many of the French troops died of bubonic plague, smallpox, and dysentery.

c. After Napoleon returned to France, he established a new government with himself as leader. A Second Coalition was soon formed by Great Britain, Austria, and Russia to fight France. Napoleon formed a new army, smashed the Second Coalition, and forced Austria, Russia, and Great Britain to sign a peace treaty. This permitted the army in Egypt, including Larrey, to return to France. When Larrey returned, he was appointed by Napoleon as surgeon to the elite Consular (later Imperial) Guard.

d. Great Britain, Austria, and Russia, again concerned with the growing power of France, formed a Third Coalition and again declared war on France. In 1804 Napoleon crowned himself Emperor Napoleon I and defeated the Third Coalition.

Larrey wrote:

"To prevent the evil consequences of leaving soldiers who are severely wounded without assistance, we placed the ambulances as near as possible to the line of battle, and establish headquarters to which all the wounded who require delicate operations are collected to be operated on by expert surgeons."

(1) Larrey placed the ambulances as near the line of battle as possible to make the time between injury and treatment as short as possible. Surgeon's mates and corporals evacuated the wounded to the forward ambulances. Larrey's objective was to treat the wounds, including performing amputations if needed, within 24 hours after the injury occurred.

(2) Larrey also established headquarters staffed by expert surgeons to treat soldiers requiring delicate operations.

e. In the Russian Campaign of 1809, Larrey's medical results were impressive with a high rate of soldiers being returned to duty and a significant reduction in the death rate. As a reward for his work, Napoleon made Larrey a baron of the Empire.

Napoleon understood Larrey and later commented:

"Larrey was the most honest man and best friend to the soldier that I ever knew. ... He tormented the generals and disturbed them out of their beds at night whenever he wanted accommodations or assistance for the sick or wounded. They were all afraid of him, as they knew he would instantly come and make a complaint to me."

f. When Russia again caused problems for France, Napoleon raised an army and invaded Russia. Larrey went with the army, treating wounds and directing junior surgeons. He was always at the battle's edge, once performing 200 amputations in 24 hours. The French troops captured Moscow but, the Russians burned Moscow and forced the French troops to retreat. The Russian winter of 1812-1813 was one of the worst in years. Starving and suffering from epidemic typhus, diarrhea, dysentery, and frostbite, the French army fought a rear guard action. The army was short of supplies and ammunition and was constantly harassed by Russian troops. Of the original 600,000 troops, over 500,000 were killed, died of illness or exposure, were captured, or deserted.

g. The English and allied armies crossed from Spain into France in 1814 and captured Paris. Napoleon abdicated his throne and went into exile on the isle of Elba. King Louis XVIII was placed on the throne of France and began to have the same problems as the old monarchy.

Note: Louis XVII, born in 1785, was the titular King of France in exile until his death in 1795.

h. In March 1815, Napoleon returned to France and the army came over to him. The King fled and Napoleon once again ruled France. Napoleon marched to face the reassembled Coalition armies, but was defeated at the Battle of Waterloo. Napoleon escaped, but was later captured and exiled to the island of St. Helena where he died in 1821.

In his will, Napoleon left Larrey 100,000 francs with this simple sentence:

"He was the most courageous and virtuous man that I have ever known."

(1) After the defeat at Waterloo, Larrey was captured by Prussian troops. Larrey's life was saved by a Prussian surgeon who recognized him and by the Prussian commander (Larrey had saved the life of the commander's son during a previous battle).

(2) Larrey returned to the military hospital to teach and write. Later he was appointed surgeon at the French veteran's hospital. He published books on surgery, took care of the veterans of the Guard, and completed his memoirs. Larrey died in 1842 at the age of 76, just after returning from an inspection tour of French military hospitals in northern Africa.

Larrey summed up his career and his life,

"To perform a task as difficult as that of a military surgeon, I am convinced One must sacrifice oneself, perhaps entirely, to others, must scorn fortune and must maintain an absolute integrity."

2-12. ADVANCES IN FOOD PRESERVATION

Armies had to spend much of their time in obtaining food to eat. Napoleon knew that if the army could carry sufficient food, it would be more efficient. Unfortunately, most fresh food would spoil during a campaign. Preservation methods such as drying and smoking helped, but Napoleon wanted a better method. In 1795, the French Government offered a prize for developing a method of food preservation.

a. After years of work, Nicholas Appert, a French chef and candy maker, developed a method of preserving soups, fruits, vegetables, and other food products by the process we now know as canning. His method involved packing the food into reinforced glass containers, heating the food by placing the containers into boiling water for various lengths of time, and immediately sealing the containers. In 1810, Appert claimed the prize.

b. Appert did not know why his process worked (Louis Pasteur eventually discovered that the heat killed the microorganisms which caused food to spoil), but he used the prize money to open the first commercial cannery. Later he developed the bouillon tablet and perfected an autoclave.

Section III. AMERICAN CIVIL WAR

2-13. AMERICAN MILITARY MEDICINE BETWEEN THE REVOLUTION AND THE CIVIL WAR

a. After the Treaty of Paris which officially ended the American Revolution, the United States reduced its military forces, including the medical portion of the army. Congress appointed physicians to the Army and Navy forces with a commission or warrant, but it was not the same as a line officer's commission. Physicians did not hold military rank, did not have the privileges that officers received, and were not permitted to give orders; however, they were subject to military discipline, including courts-martial. Edward Cutbush, who served aboard the frigate *United States* as a surgeon, convinced the captain to authorize vaccination against smallpox using Edward Jenner's method in 1799. Physicians served with distinction in military conflicts with the Barbary States in the first decade of the nineteenth century.

b. During the War of 1812 with Great Britain, there were problems with diseases, lack of hygiene in camps, inadequate supplies system, and lack of centralized control over military medical facilities. Navy and Army surgeons again proved their devotion to duty, such as Dr. Usher Parsons who served aboard the *Lawrence* during the Battle of Lake Erie.

c. In 1818, Secretary of War John C. Calhoun established a permanent medical department headed by Joseph Lovell, the first physician to be given the title of Surgeon General of the Army. Lovell introduced several reforms, established a mandatory examination for all military physicians, oversaw extensive research in disease prevention and other medical issues, and instituted efficient medical administration.

d. In 1822, post surgeon William Beaumont treated a civilian, Alexis St. Martin, for a gunshot wound of the abdomen. St. Martin recovered but Beaumont was unable to close a gastric fistula. With St. Martin's permission, Beaumont conducted experiments through the opening. Beaumont's work proved to be of great importance in the study of the human digestive system.

e. When Lovell died in office in 1836, Thomas Lawson became Surgeon General. During the Second Seminole War in Florida, seventy-five percent of the deaths in the war were the result of disease, usually malaria. The war resulted in the first large-scale trials of quinine obtained from cinchona bark. Results showed that quinine, when given in amounts far greater than previously considered to be safe, was effective in helping patients recover. This changed the treatment of malaria throughout the United States, saving many lives.

f. At the beginning of the Mexican-American War in 1846, the frigate *Raritan*, was ordered to Mexico. The crew's diet had consisted largely of salted meat and biscuits with occasional vegetables for the past two years. The crew was in poor health and the surgeon, Jonathan Foltz, urged its commander to take on citrus fruit to help prevent scurvy. (Although the cause of scurvy was not known and the effects of citrus fruit was not understood, the British Royal Navy instituted mandatory citrus issue shortly after the beginning of the century.) The captain ignored the suggestion and about 40 percent of its crew had to be replaced due to scurvy. Land forces suffered from malaria and other diseases. Of the approximately 100,000 soldiers engaged in the war, about 1,500 were killed by the enemy, but over 10,000 died from disease.

g. In 1847, Congress gave medical officers true commissions and real (not assimilated) rank.

2-14. BEGINNING OF THE CIVIL WAR

The American Civil War was the first modern war with the widespread use of railroads, telegraph, trench warfare, breech loading rifles, rifled cannons, and massive logistical support. It also introduced the modern military medical system.

a. **First Battle of Bull Run.** The first major battle of the Civil War following the secession and formation of the Confederate States of America was fought on 21 July 1861 near Manassas, Virginia, at a stream called Bull Run. Both forces were unprepared for a major battle and neither side had a functional medical service.

b. **King.** The medical director with the Union forces was William King. Establishment of regimental hospitals was not adequately planned and supplies were insufficient. Ambulances were too few and not properly organized. Combat soldiers left the line to evacuate their wounded friends. When the Union army fled back to Washington, most of the Union wounded were captured. Some of the wounded lay on the battlefield for several days before they were evacuated.

2-15. THE MEDICAL DEPARTMENT AT THE BEGINNING OF THE WAR

The Medical Department, like the Army itself, was not prepared for war.

a. **Finley.** Thomas Lawson, who had been Surgeon General for 25 years, died in 1861. His successor was Clement Finley, who was over 65 years old himself. Finley was bound by office routine and regulations and lacked experience in large scale medical operations.

b. **Tripler.** The medical disaster at Bull Run led to many changes, including the assignment of Charles Tripler as the new medical director of the Army of the Potomac. He concentrated on the organization of regimental hospitals, procuring ambulances and training ambulance attendants, vaccinating soldiers against smallpox, and improving sanitation. Lack of trained hospital personnel, however, complicated his problems.

c. **Sanitary Commission.** The United States Sanitary Commission, a private organization modeled after the English Sanitary Commission of the Crimean War, was formed with Doctor Henry Bellows as its president. The Commission provided food, medicine, and comfort to the troops; established convalescent and expedient field hospitals for soldiers; and provided nurses.

d. **Evacuation.** There was no system for planned evacuation. It was still improvised for the most part. The surgeons stayed with their regiments and did what they could with limited supplies. The wounded soldiers knew they faced a great likelihood of a hasty, painful field amputation (although ether and chloroform were in use). The survivors were sent to hastily created collecting points and field hospitals. After the Seven Days Battle (Peninsular Campaign of April-July 1862), the ambulance system broke down, civilian quartermaster drivers became disorganized, and the wounded stacked-up awaiting evacuation. The Sanitary Commission headquarters handled much of the evacuation of the wounded from The Seven Days Battle.

e. **Hammond.** After much political infighting, William Alexander Hammond was appointed Surgeon General in April 1862. Hammond was 34 years old and had been an army doctor for 10 years. When he was promoted to Surgeon General, he went from lieutenant colonel to brigadier general. Hammond brought a hard-driving vigor and faced many problems that prevented a coherent medical response. The Quartermaster Corps

Orders from Surgeon General Hammond:

*"(1) Satisfy yourself that medical supplies are in proper quantity. The time has passed when the excuse 'no supplies' will be accepted.
(2) You will require all medical officers to be faithful and attentive in the discharge of their duties.
(3) You will tell the Quartermaster your necessities in regard to transportation.
(4) You will arrange for the safe, effectual, comfortable and speedy transportation of the sick and wounded.
(5) You will hire such physicians, nurses, etc. as you require.
(6) You are authorized to call directly upon medical purveyors (supply officers), who will furnish everything you may ask for, regardless of supply tables or forms.
(7) And now I commit to you the health, the comfort and the lives of thousands of our fellow soldiers who are fighting for the maintenance of their liberties." (Surgeon General Hammond, 23 June 1862)*

built the hospitals and owned the ambulances, the Subsistence Corps had control of all rations, and procurement regulations made it difficult to purchase medical supplies. Hammond made many major reforms to the Medical Department. He also appointed Jonathan Letterman to be the new medical director for the Army of the Potomac.

2-16. LETTERMAN'S CONTRIBUTIONS

Letterman took over his new job in June 1862 and acted vigorously and quickly. Using the authority Hammond had given him, he got the sick and wounded from the Peninsular Campaign back to Washington. The Union forces were defeated at the Second Battle of Bull Run in August 1862 and Union medical support was again deficient. Thousands of wounded Union soldiers were left on the battlefield. The ambulance system did not work. Six days after the battle was over, some of the wounded still remained on the battlefield awaiting medical care and evacuation. Letterman realized the desperate need for reform of the medical system.

Letterman had a clear view of army medicine:

"The leading idea, which should be kept constantly in view is to strengthen the hand of the Commanding General by keeping his army in the most vigorous health, thus rendering it, in the highest degree, efficient for enduring fatigue and privation, and for fighting."

a. **Ambulances.** Letterman revised the ambulance system using some of the techniques developed by Larrey. He established an ambulance corps trained in the most easy and expeditious method of putting men in and out of the ambulances and in placing and carrying casualties on stretchers. He ordered that the ambulances be provided with attendants at all times and be able to move at any moment. He used the light two-horse, two-wheel ambulances for bringing men from the field and the four-horse, four-wheel ambulances for carrying those already removed from the front lines farther to the rear. Letterman made it explicit that the use of ambulances was restricted to patient evacuation and to carrying medical supplies.

In Letterman's words:

"The subject of the ambulances became, after the health of the troops, a matter of importance. No system had anywhere been devised for their management They were under the control of the Quartermaster and, as a natural consequence, little care was exercised over them. They could not be depended upon for efficient service in time of action or upon a march, and were too often used as if they had been made for the convenience of commanding officers. The system I devised was based upon the idea that they should not be under the immediate control of medical officers, whose duties, especially on the day of battle, would prevent any proper supervision; but that other officers appointed for that special purpose should have direct charge of the horses, harnesses, ambulances, etc., and yet under such regulations as would enable medical officers at all times to procure them with facility when needed for their legitimate purpose."

Published in General Orders. Note the use of command authority.

"The Ambulance Corps will be organized with an officer in charge. He will inspect the ambulance. He will institute a drill in his Corps, instructing the men in the most easy and expeditious method of putting men in and out of the ambulances; placing them and carrying them on stretchers. He will be careful that the ambulances at all times are provided with attendants, that they may be able to move at any moment, using the light

2-horse (2-wheel) ambulances for bringing men from the field, and the 4-horse (4-wheel) ambulances for carrying those already offended further to the rear. The ambulance will be parked in the brigade, to be used on the requisition of the regimental medical officers for transporting the sick and procuring medical supplies, and for nothing else."

b. **Command.** Although the officers of the ambulance corps were usually Quarter-master officers and the enlisted soldiers were detailed from the line for duty as litter bearers, Letterman decided that they were to be under the direct control of the medical director. He further ordered that casualties were to be removed from the battlefield only by ambulance corps personnel who were to be identified by the special insignia they wore. The principles used by Letterman, with a few modifications, are the same as those in use today.

c. **Antietam.** The Battle of Antietam, fought in September 1862 near Sharpsburg, Maryland, was the first test of Letterman's new ambulance evacuation and treatment policies. The Union forces won the battle, but it was the bloodiest day of the Civil War with 25,000 Union and Confederate casualties.

(1) Initial collecting points were established for first aid and wound dressing. Regimental surgeons sent their patients by forward ambulance to forward surgical hospitals where hasty amputations were carried out using the Petit screw tourniquet. Amputations were performed to prevent death from infection due to the wounds. Most casualties with penetrating chest or penetrating abdominal wounds died. Almost all head-wound casualties with penetrating cranial traumas died.

(2) Field expedient hospitals were set-up in barns and other buildings. Letterman preferred the use of tent hospitals to keep the sick and wounded with the army. Also, the infection rate was lower in the open air tent hospitals than in the general hospitals.

(3) When the soldiers were ready for further evacuation, they were evacuated by rail. Letterman was the first to introduce the massive use of ambulance trains, later widely copied abroad. Patients were moved by rail to the general hospitals, facilities with hundreds of beds where civilian men and women came to nurse the sick and wounded.

d. **Fredericksburg.** At the Battle of Fredericksburg in December 1862, Letterman's evacuation system worked excellently. Twenty-four hours after the battle, all of the 9,000 wounded had been brought in, treated, and hospitalized.

e. **Supply Reform.** Under General Ambrose Burnside, Letterman reorganized medical supply procedures with automatic resupply from the rear based on a fixed table of allowances.

Letterman said:

"I desired to reduce the waste which took place when a 3-months supply was issued to regiments; to have a small amount given to them at one time and to have it replenished without difficulty, to avoid a multiplicity of accounts and yet preserve a proper degree of responsibility, and to have a fixed amount of transportation for carrying these supplies and used for no other purpose."

f. **Standardization of Care.** Letterman organized his surgeons, assigned them to treatment facilities by ability from initial dressing stations and collecting points to teams of the most experienced surgeons in the tent hospitals. He standardized surgical care using the principles of triage and echeloned surgical care on the battlefield. Letterman also established a corps of medical inspectors to help carry out his reforms.

Excerpt from Letterman's instructions to his corps of medical inspectors (a cross between a preventive medicine officer and an Inspector General):

"The duties of medical officers are not confined to prescribing drugs, it is also their duty, and of the highest importance, to preserve the health of those who are well."

g. **Data.** Letterman also established a standard system of reports and forms to track supplies and provide morbidity and mortality data. This project resulted in the classic, massive six-volume *Medical and Surgical History of the War of the Rebellion*.

2-17. NURSES IN MILITARY HOSPITALS

a. Congress passed an act providing for paid female nurses in August 1861. Dorthea Dix, a Boston school teacher known for her efforts to improve the care of the mentally ill, was appointed superintendent of the women nurses. She screened applicants at the Surgeon General's office much like Florence Nightingale during the Crimean War.

b. In contrast to earlier wars, Civil War nurses in the hospital service actually provided health care such as bathing wounded and sick soldiers, dressing wounds, and administering medications as ordered by the surgeons. One Civil War nurse was Clara Barton who later founded the American Red Cross. Walt Whitman, the poet, served as a male nurse in the hospital wards of Washington, D.C.

c. Confederate women started similar relief societies and staffed hospitals with female nurses.

2-18. DISEASE

The major problem to both armies was disease. More troops died from disease than died of wounds. Diarrhea and dysentery were common in the crowded, unsanitary camps. Too often camps were pitched in swamps and other sites with poor drainage and with overcrowded tents. Poor discipline and filthy camp sites helped to spread disease. Measles, mumps, pneumonia, and typhoid flourished in the overcrowded camps. Quinine, when available, was often administered in huge quantities as a remedy for just about every disease. In addition, large quantities of alcohol and opium-based medications were used.

2-19. LATTER STAGES OF THE WAR

a. **Hospital Ship.** The battles to control the Mississippi River resulted in much naval action. *Red Rover*, a captured river steamer that was refitted as a hospital ship by the Sanitary Commission, became the first American hospital ship to operate in support of fleet actions in hostile waters.

b. **Hammond.** Surgeon General Hammond received objections to Letterman's ambulance system in which line personnel reported to medical personnel. He had also upset physicians by eliminating calomel, a mercury compound used by many physicians, from the drug list since it was causing more harm than good. With support from Secretary of War Stanton, Hammond was court-martialed for failure to perform his duties and dismissed from the service. (Hammond was later exonerated after the war.)

(1) Colonel Joseph K. Barnes, a capable administrator, replaced Hammond and saw many of Hammond's ideas through to completion.

(2) During his service, Hammond organized the collection of pathological specimens from surgeons operating in the various theaters of the war. Hammond's research eventually became the foundation for the Armed Forces Institute of Pathology.

c. **Gettysburg.** In 1863, Confederate forces under General Robert E. Lee were defeated by Union forces under General George G. Meade in a series of battles near Gettysburg, Pennsylvania. Although Letterman was at Gettysburg, General Meade made his corps commanders leave their ambulance and supply trains behind. Due to Meade's failure to use Letterman's system, some of the wounded were on the battlefield for days before they were brought in.

d. **Letterman.** Letterman left the Army in 1864 due to illness. He returned to California where he wrote *Medical Recollections of the Army of the Potomac*, an important book on army field medical care. Letterman's evacuation system was used army-wide before the end of the war and was credited with saving the lives of many thousands of soldiers during the war.

e. **Appomattox.** In April 1865, Lee surrendered to Grant at Appomattox Court House, Virginia. The war officially came to a conclusion soon after.

Section IV. SPANISH-AMERICAN WAR

2-20. ADVANCES IN MILITARY MEDICINE

a. Research in pathology showed that diseases had specific causes which could be investigated using microbiology and physiological chemistry. Louis Pasteur provided evidence for the germ theory of disease which was empirically tested by Joseph Lister in the development of antiseptic surgery. Researchers such as the German Robert Koch did much to evolve germ theory into modern bacteriology. European scientists discovered the causative agents of an impressive list of diseases, among them amebic dysentery, typhoid fever, malaria, cholera, and tetanus, all of which were threats to military effectiveness.

b. Weaponry advanced with the development of high-velocity, small-bore carbines. At first, bullets from these new weapons were thought to contain explosives. Kocher, Longmore, and Otis believed that the force of the bullet striking a bone shattered the bone and produced bone and bullet fragments which caused extensive tissue damage. In the Chilean deployment (1891), Edward Rose Stitt became the first American military physician to actually treat a patient who had been injured by the new weapons and verified their theory.

c. American medical schools were still behind European schools in many areas. In 1893, Surgeon General George Sternberg formed the Army Medical School for graduate programs. In 1896, the War Department ordered that all enlisted men were to be trained to carry litters and administer first aid. Surgeons trained company officers in litter drill and emergency care of the wounded so they could in turn train their men. Military surgeons performed a wider range of operations than ever before, to include abdominal surgery.

Surgeon General Sternberg once stated:

"the principal reason for supporting an army in time of peace" was the maintenance of "an efficient organization... which will be ready for service in any emergency and serve as a nucleus for the larger army which will be required in case of war."

2-21. BEGINNING OF THE WAR

a. Spain's heavy-handed colonial policies in Cuba resulted in armed insurrection that lasted for ten years. To force submission, Spanish troops stripped whole sections of the countryside agricultural products and killed workers. Disease and starvation resulted. American citizens, enraged by Spanish cruelty and inflamed by the "yellow journalism" of sensation-seeking newspapers, assisted the rebel forces with funds, supplies, and volunteers.

b. In February 1898, the U.S. battleship *Maine* was destroyed by an explosion while anchored in Havana harbor with a loss of over 260 sailors. The 1898 investigation indicated that the Spanish government could have been responsible for the explosion. (In 1976, the Rickover board concluded that the explosion had resulted from a fire in the coal bunker which caused a detonation in the magazine.)

c. President William McKinley attempted to negotiate a peaceful settlement of the Cuban problem with Spain, but Spain refused to grant Cuba its independence. In April 1898, the United States and Spain went to war. Congress promised that the United States would not annex Cuba, but did not make this promise about other Spanish possessions.

d. The American military faced a Spanish army of over 175,000 regulars in Cuba, Puerto Rico, and the Philippines and another 150,000 in Spain. The greatest danger, however, proved to be disease within the United States.

2-22. MOBILIZATION

a. The United States Army in 1898 was small and widely scattered. The regular Army was well-trained, but numbered only about 26,000 troops scattered across the country. The National Guard numbered about 100,000, but was deficient in training, discipline, and equipment. The plan for invading Cuba and Puerto Rico called for using Regular troops, National Guard troops, and Volunteer troops. Problems soon developed between the Regular and National Guard forces in commanding units and obtaining supplies.

b. National Guard and Regular Army troops begin arriving at mobilization sites in New Orleans, Mobile, Tampa, and Chickamauga Park (Georgia) to prepare for the invasion of Cuba and Puerto Rico. Most National Guard troops were untrained, undisciplined groups of individuals, some still dressed in civilian clothes. Medical supplies and equipment were inadequate and were given low priority by the Quartermaster Corps who was responsible for shipment. Many regimental and division surgeons relied on relief agencies such as the Red Cross for resupply.

c. Although standards of proper hygiene and sanitation were established by medical officers, the standards were not enforced by the line officers. Latrines were hard to dig and frequently overflowed due to heavy rains. Diseases such as typhoid fever, measles, and mumps developed rapidly at the mobilization sites within the United States. Surgeons compounded the problem by sometimes misdiagnosed typhoid fever as malaria.

d. A shortage of qualified nursing personnel resulted in infantrymen being detailed to perform ward duty, usually the worst soldiers. Their lack of basic personal hygiene helped spread disease throughout the camps. To overcome these inadequacies, professionally qualified female nurses were employed in military hospitals.

e. Each volunteer regiment had its own hospital, usually lacking supplies and equipment. In May, Surgeon General Sternberg did away with such hospitals and replaced them with one 200-bed facility for each division. He also persuaded the Quartermaster Department to purchase and equip a hospital ship, the *Relief*.

2-23. MILITARY ACTIONS

a. **Philippines.** The Navy's Asiatic Squadron under command of Commodore George Dewey sailed into Manila Harbor in the Philippines on 1 May. Within a few hours, Dewey destroyed the Spanish fleet. Dewey's victory increased the pressure to immediately invade Cuba.

b. **Invasion of Cuba.** Toward the end of May, the Navy trapped the Spanish fleet in the Cuban harbor of Santiago. The Army was given the task of invading Cuba, but deployment was delayed due to lack of advance planning. Ships that could negotiate the Santiago coast were hard to find and many of the ships used were small, worn-out steamers. When the invasion force reached Cuba, there were not enough landing craft to off-load the ships. Horses and mules were thrown over the side and forced to swim to shore.

c. **End of the War.** In early July, the city of Santiago was surrounded and the avenues of escape for the Spanish army were closed. The Spanish fleet was defeated when it tried to flee. Soon the Spanish forces in Santiago and throughout Cuba surrendered. The war, which is sometimes referred to as the "splendid little war," officially ended in December 1898. Possessions such as Puerto Rico, Guam, and the Philippines gave the United States responsibilities in the Caribbean and the Pacific.

2-24. MEDICAL FORCES IN CUBA

The American military actions met with surprising success. The American medical actions met with far less success.

a. Since medical requirements had been given low priority in the invasion, much of the needed medical supplies and equipment had been left behind. Fortunately, early contacts with Spanish forces were relatively bloodless.

b. Letterman's system of evacuation was used as much as possible. Poor weather and inadequate roads hampered the use of wheeled vehicles and horse-drawn travois were common in front line evacuation. Wagons were commandeered to evacuate patients.

c. Aid stations and field hospitals had insufficient medical supplies on hand to adequately treat the wounded. Also, they were not prepared to provide medical treatment for the growing number of diseased patients that began to arrive. One of the primary diseases was yellow fever. The cause and transmittal vector of yellow fever were still unknown at this time.

d. One new development that proved effective was the first aid packet that had been issued to all soldiers. The first aid packet contained antiseptic dressings and sterile bandages. Soldiers were able to dress wounds before they were treated by a physician, thus reducing chance of infection.

e. Antiseptics prevented hospital gangrene and other hospital infections that caused so many deaths in previous wars. Amputations were rare.

f. Although adequate supplies and food began to flow again after the surrender of Spanish forces, most of the American soldiers became ill with malaria, typhoid, or dysentery.

g. Statistics showed that in the four months of combat operations, only 380 men were killed in action. Unfortunately, between 1 May 1898 and 30 April 1899, over 5,000 American soldiers died of disease, most without leaving the United States.

2-25. RESULTS OF THE WAR

The Spanish-American War had great effect upon military medicine. The alarming rate of death from disease during mobilization caused a reevaluation of the military medical situation.

a. Because of the high rate of typhoid fever incurred at the mobilization camps, The Surgeon General, in an unprecedented move, established the Typhoid Board to investigate the cause of the epidemic and make recommendations. This board, headed by Major Walter Reed with Major Victor Vaughan and Edwin Shakespeare, began in Aug 1898. This was the first of many in a series of medical boards that would be appointed in the decades to come to investigate the diseases that threaten the army. The Board found that more than 90 percent of the volunteer regiments developed typhoid fever within eight weeks after going into camp. The board members inspected all the major camp sites with regard to sanitation, tent placement, and conditions in general hospitals. They interviewed medical officers, verified camp records, and traced each soldier through every hospital, both military and civilian, that cared for him. The Board found poor sanitation practices in the ranks. It also found that medical officers failed to recognize typhoid fever. Many did not have the experience or knowledge to accurately diagnose the disease. Additionally, it was found that in some cases the disease was misdiagnosed as typho-malarial fever to avoid an admission of the existence of typhoid fever. The experience with the Seventh Army Corps, encamped in Florida, was illustrative of the diagnostic situation. Corps surgeons would not admit that there was an epidemic of typhoid fever among the troops. The diagnosis was important to the Army surgeons professionally because typhoid was a preventable disease and, if the camps had typhoid epidemics, the implication was that the medical officers were not doing their jobs.

b. In February 1899, President McKinley formed the Dodge Commission. The commission recommended improvements such as stockpiling medical supplies, giving medical personnel control over the transportation of medical supplies, having more trained doctors and a reserve of trained nurses, reducing "red tape" that hampered the medical forces, federal examinations of all medical officers, better field training for National Guard troops, and the enlargement and reorganization of the Quartermaster and Medical bureaus.

President McKinley, commenting on the establishment of the Dodge Commission, expressed the view that:

"The people of the country are entitled to know whether or not the citizens who so promptly responded to the call of duty have been neglected or maltreated by the Government to which they so willingly gave their services. If there have been wrongs committed, the wrongdoers must not escape conviction and punishment."

c. In 1899, Ronald Ross of the Indian Medical Service proved that the mosquito transmitted malaria to humans. This discovery would have a great impact on future military medicine.

EXERCISES: LESSON 2

INSTRUCTIONS. The following exercises are to be completed by writing the lettered response that best answers the question or best completes the incomplete statement or by writing the answer on paper that you provide. After you have completed all the exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers.

1. Patients in a regimental hospital who were too ill to deploy when the regiment left the garrison would be transferred to:
 - a. A civilian hospital.
 - b. A general hospital.
 - c. Another regimental hospital which was not being deployed.

2. Which of the following performed smallpox inoculations on new recruits in Boston during the beginning of the war?
 - a. Jonathan Potts
 - b. Benjamin Rush.
 - c. John Warren.
 - d. Joseph Warren.

3. Which of the following served as the third chief physician of the Hospital? Hint: He resigned after being acquitted at a court-martial.)
 - a. Benjamin Church.
 - b. John Cochran.
 - c. John Morgan.
 - d. William Shippen.

4. The attack on Quebec by Continental soldiers was defeated in part due to an outbreak of:
 - a. Malaria.
 - b. Smallpox.
 - c. Syphilis.
 - d. Typhus.

5. The first major use of vaccination against smallpox in the American military using Edward Jenner's procedure occurred:
 - a. During the American Revolution in 1779.
 - b. During the Whiskey Rebellion in 1794.
 - c. During the Mediterranean operations in 1799.
 - d. During the War of 1812.
 - e. Immediately after the Spanish-American War of 1898.

6. Congress passed legislation giving medical officers in the army true commissions and real rank as opposed to assimilated rank in:
- 1785.
 - 1798.
 - 1814.
 - 1847.
7. What medical information was obtained during the Second Seminole War in Florida?
- Large doses of quinine were needed to treat malaria.
 - The doses of quinine used by the military to treat malaria were too large, but quinine was effective if used in small amounts.
 - Quinine proved to be more effective against diarrhea than against malaria.
8. Who developed the "flying ambulances" used by the French military in the early nineteenth century?
_____.
9. Which of the following statements is/are true concerning Larrey?
- He favored delayed amputation rather than immediate amputation if the joint was smashed.
 - He stopped the use of salves and ointments in cleaning wounds.
 - He established treatment priorities based upon the casualty's rank.
 - Responses "a" and "b" above are true.
 - Responses "a," "b," and "c" above are true.
10. Which of the following describes a major contribution by Nicholas Appert?
- He developed a method of preserving food by canning using glass jars.
 - He developed a vaccine for smallpox.
 - He developed an improved method of evacuation used during the French invasion of Russia.
 - He developed the first practical French military uniform.
11. In the Mexican-American War (1846-1848), scurvy became a significant problem for the American Navy blockade off the coast of Mexico. Although the cause of scurvy was not understood, the British Navy had known for about a century that scurvy could be treated using:
- Cinchona bark.
 - Citrus fruits.
 - Heavily salted meat.
 - Penicillin.
12. Which one of the following was NOT a principle of the Letterman evacuation system?
- The command and control of the entire medical operation was performed by the tactical commander in the field.
 - The most qualified and carefully certified surgeons were assigned to medical treatment facilities in the division rear rather than to forward medical treatment facilities.
 - The transportation of patients was performed in vehicles dedicated to that purpose with trained personnel assigned to them.
 - Regimental surgeons provided only essential care before sending the patients to surgical hospitals farther to the rear.

13. During the Chilean deployment (1891), Edward Stitt became the first American military physician to study:
- Wounds caused by high-velocity, small-bore carbines.
 - Wounds caused by low-velocity, large-bore carbines.
 - The relationship between water consumption and cold injuries.
 - The relationship between water consumption and heat injuries.
14. A hospital corps consisting of trained enlisted personnel was established in:
- 1775.
 - 1812.
 - 1862.
 - 1887.
15. Which of the following statements is/are true concerning casualties during the American Civil War?
- Head wounds with penetrating cranial trauma were usually fatal.
 - Penetrating chest wounds caused by a minie ball were usually fatal.
 - Penetrating abdominal wounds caused by a minie ball were usually fatal.
 - All of the above are true.
16. During the Spanish-American War, Surgeon General Sternberg persuaded the Quartermaster Department to purchase and equip a hospital ship called the:
- Lawrence*.
 - Maine*.
 - Relief*.
 - Red Rover*.

SOLUTIONS TO EXERCISES: LESSON 2

1. b (para 2-2c)
2. c (para 2-5a)
3. d (para 2-4c)
4. b (para 2-3)
5. c (para 2-13a)
6. d (para 2-13g)
7. a (para 2-13e)
8. Dominique Jean Larrey (paras 2-9d,
2-10a)
9. b (paras 2-10b(1), (2), 2-11a(2))
10. a (para 2-12)
11. b (para 2-13f)
12. a (paras 2-16b, a, c(1))
13. a (para 2-20b)
14. d (para 2-6c)
15. d (2-16c(1))
16. c (para 2-22e)

LESSON ASSIGNMENT

LESSON 3	Military Medicine During the Twentieth Century.
LESSON ASSIGNMENT	Paragraphs 3-1 through 3-48; appendixes A, B, and C.
LESSON OBJECTIVES	After completing this lesson, you should be able to: 3-1. Identify major medical and military events associated with the twentieth century, including the time frame and people associated with the events. 3-2. Identify major medical and military events pertaining to the development of aeromedical evacuation during the twentieth century. 3-3. Identify medical and military events associated with operations other than war. 3-4. Identify the terms civil affairs and civil action and tactical, operational, and strategic medical missions. 3-5. Identify the major characteristics of a staff ride.
SUGGESTION	After studying the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

LESSON 3

MILITARY MEDICINE DURING THE TWENTIETH CENTURY

Section I. WORLD WAR I

3-1. MILITARY MEDICINE AT THE START OF THE TWENTIETH CENTURY

At the start of the twentieth century, there was a revolution in technology that affected all aspects of military medicine. Advances such as the telephone and telegraph, national and international medical journals, and travel to foreign hospitals gave the American medical community a new outlook on health care and research. For the first time, the United States competed with Britain, France, and Germany on an equal basis in science and medicine.

a. The advent of antiseptics, X-rays, vaccines against diseases, and major breakthroughs in surgery pioneered by scientists such as Lister and Pasteur occurred toward the end of the 1800's.

b. In the first decade of the 1900's, military medicine was also growing. Research in sanitation, nutrition, pathology, surgery, and chemistry promoted new treatments.

(1) In 1900, Karl Landsteiner of Vienna discovered the ABO antigens of blood and developed the method of typing and matching donor and recipient for safe transfusions.

(2) Continued research led to successes such as the discovery by Dr. Walter Reed and his associates that the mosquito was the carrier of yellow fever. William Gorgas, chief sanitary officer in Havana, immediately began to eliminate mosquito breeding places. In a matter of months, the pattern of yellow fever transmission in the city was broken.

(3) The 1902 Biologics Control Act authorized the New York Hygienic Laboratory to produce vaccines and serums for typhoid fever, diphtheria, yellow fever, and tetanus. It also performed other medical research on behalf of the government. In 1904, it moved to Washington, D.C., where it later became the United States Public Health Service.

(4) In 1904 William Gorgas was assigned to assist with the construction of the Panama Canal. He began applying mosquito-control efforts to control malaria and yellow fever. When he encountered objections to his efforts, he received the personal support of President Theodore Roosevelt. Although Gorgas never totally freed the Canal Zone from malaria and yellow fever, the morbidity rate of malaria in 1913 was only 10 percent of the 1906 rate.

(5) The U.S. War Department organized the Army Shoe Board in 1908 under Major Edward Munson. His team studied over 2000 soldiers' feet to determine the problems related to poor shoe fit and natural bone deformities, and developed the "Munson last" shoe frame to create better military boot designs. Dr. Munson also published many texts on field sanitation and preventive medicine.

(6) Around 1910, Dr. Leonard Rowntree of Johns Hopkins and his colleagues developed plasmapheresis--a discovery which led to separation of blood components (plasma, red cells, platelets, etc.) for specific transfusion uses.

(7) Purification of drinking water by the use of liquid chlorine was developed in 1910 by Major Carl Rogers Darnell, Professor of Chemistry at the Army Medical School. He later designed a purification filter for field use in World War I. Around the same period, Major William Lyster used a solution of calcium hypochlorite in a linen bag (Lyster bag) to treat water.

(8) George Crile conducted research on blood transfusions, treatment of traumatic shock, and thyroid operations.

(9) Harvey Cushing made neuro-surgery and brain operations a specialized field.

(10) Alexis Carrel was the first to operate extensively on the aorta and the heart and performed early work on organ and tissue transplants.

c. One of the most important military medical issues concerned the command of hospital ships. Medical and line officers both wanted command authority. The issue was settled by President Theodore Roosevelt when he named Navy surgeon Charles Stokes to be the commanding officer of the new hospital ship *Relief*, which joined the Great White Fleet as it sailed around the world 1907-1908.

d. The reconstituted American Medical Association (AMA), originally founded in 1847 in Philadelphia, worked vigorously to improve the social position of American physicians and to ensure that those practicing medicine in the United States would represent the highest achievable standard of professional expertise. The chief hallmark of this movement was the reform of medical education under the direction of the Council of Medical Education of the AMA and given popular credibility by Abraham Flexner's 1910 muckraking report on the state of medical education in the United States. The Flexner report spurred increasing concern with the quality of clinical instruction and awareness of the emerging importance of postgraduate medical education and subsequent specialized medical practice. The area where specialization was having its most dramatic impact was in the rapid emergence in urban centers of skilled general surgeons.

Simon Flexner's 1910 report on the status of America's medical schools presented a list of problems. These ranged from inadequate laboratory facilities and shortage of instructors in the "modern" sciences to low admissions standards and graduation without any competency exam in many cases.

e. Many new professional societies and boards were established, such as the American College of Surgeons in 1913. Various other specialty organizations also made strict standards for both education and medical practice and monitored the licensing of practitioners.

(1) In 1915, the American Medical Association (AMA) created the National Board of Medical Examiners to test new medical graduates. Internship programs were also started to give new doctors more practical experience in the hospital setting before allowing them to set up their own practices.

(2) The Army improved its screening of new medical officers by requiring graduation from a reputable medical school, at least one year of practice, and the successful passage of an examination.

f. Frederick Russell of the Army Medical School developed a safe and effective typhoid fever vaccine which was demonstrated in a large-scale test in San Antonio, Texas (only two out of 12,000 men inoculated contracted the disease). In 1911, the Army and Navy made Russell's new vaccine mandatory. With the discovery of the paratyphoid bacilli, the vaccine was expanded to include *paratyphoid A* and *B* (TAB). By late 1917, all U.S. soldiers were receiving the TAB vaccine.

3-2. START OF WORLD WAR I

a. On 28 June 1914, Archduke Ferdinand of Austria was assassinated by a Serbian nationalist in the city of Sarajevo. Austria soon declared war on Serbia. Russia mobilized to support Serbia. Germany, fearing a Russian invasion of its ally Austria, declared war on Russia. When France mobilized, Germany declared war on France and stated that Germany forces would march through Belgium to attack France. Great Britain, an ally of Belgium, declared war on Germany on 4 August 1914 to protect Belgium. Italy and other countries soon entered the conflict.

b. The United States attempted to remain neutral. However, public outrage at incidents such as the sinking of the *Lusitania* by a German submarine finally resulted in the United States entering the war on the side of the Allies late in 1917. The War Department began proceedings to draft civilians into military service early in 1918. Local examination boards had the power to either unconditionally accept or reject draftees and volunteers. Questionable cases were referred to Medical Advisory Boards.

3-3. CHANGES IN WARFARE

The advent of new ballistic weapons, airplane and submarine warfare, and gas warfare resulted in the worst battlefield wounds suffered up to that time.

a. Advances in weaponry included new rifle cartridges which traveled at higher velocities with even more force to shatter bone and destroy tissue. Older weapons such as machine guns were improved. Wounds produced by shrapnel, shell, and grenade fragments were destructive to large areas of the body and almost always infected by pieces of dirty clothing driven inside the tissues. Searches for shrapnel, shell, and grenade fragments were performed at rear area hospitals using X-ray and magnet applications.

b. Chlorine gas released from canisters set along the front was introduced by the Germans. The deadly gases sank down into the trenches causing initial symptoms of watery eyes and an irritated bronchial tract. Panic soon resulted. Protective masks and respirators containing filter pads soaked with hyposulfite and sodium bicarbonate were developed to protect troops against these gasses. Soon additional chemical agents, such as mustard gas, were used. Mustard gas was usually not noticed at first, but soon caused inflamed eyes, vomiting, and blisters on exposed skin similar to burns which became infected.

Approximately 97 percent of all gassed soldiers survived, but evacuation, decontamination, and treatment placed a severe strain on medical treatment facilities and evacuation resources.

3-4. PATIENT EVACUATION PROCESS

Fortunately, the Allies had a treatment and evacuation system in place that was far superior to any previous evacuation system.

- a. Buddy-aid treatment of injuries was performed at the injury site using individual first aid supplies.
- b. Field medics provided emergency care to stabilize the patient for evacuation.
- c. First aid stations were usually located about 500 to 1000 yards behind the regimental reserves in a sheltered spot outside, in a house cellar, or in the ruins of bombed buildings. They had a water supply, dressings, and surgical equipment for rapid initial treatment. Arriving patients were given a shot of anti-tetanus serum.
- d. Casualties were moved from aid stations to field hospitals by ambulance squads. Each ambulance squad had ten cars and a repair vehicle that carried two mechanics, extra tires, gasoline, and spare parts. Each ambulance could hold 4 to 6 litters or 10 to 12 ambulatory patients.
- e. Field hospitals, located in the rear of the divisional reserves, consisted of a combination of tents and local buildings such as churches, schools, and hotels. Field hospitals performed urgent surgery for hemorrhage, perforating head and abdominal wounds, immediate-need amputations, and bone splinting.
- f. Patients evacuated to treatment facilities in the rear traveled in hospital trains converted from civilian passenger railway cars. Each car held about 18 casualties and a hospital corpsman. There was one surgeon for the whole train. Small infirmaries were set up along the rail route for those casualties unable to continue the train trip. Upon arrival at the final depot, casualties were cared for by volunteer Red Cross nurses and assigned to hospitals based on reported bed space.

3-5. HOSPITAL CARE

- a. The prevention of shock was found to be directly related to the prevention of blood loss. Tourniquets and compression bandages were used as soon as possible after injury and loss blood volume was restored.
- b. Although Landsteiner had demonstrated the safety of blood transfusions if properly matched by antigen type, general public donation programs had not been established by the beginning of the war. Due to the shortage of available blood and problems with storage and preservation, transfusions were generally limited to direct (vein to vein) transfusion between donor and patient. Transfusions following surgery proved to be of great benefit in preventing and controlling shock.
- c. The general surgical treatment was conservative. Amputation was rarely used unless the body part was so mutilated that it was unsalvageable. Every effort was made to give the patient at least partial use of the limb.
- d. Fractured femurs were secured by the Blake splint, which elevated and extended the leg in a traction apparatus. After the original infection of the wound had subsided and the bone fragments had begun to regenerate and unite, plating and wiring and/or grooving a "V" and "point" out of facing bone ends aided complete and secure union.
- e. Most of the men wounded in the brain or spinal cord died on the battlefield or at first-aid stations. Those who survived to reach the rear base hospitals had 90 percent mortality from meningitis.

f. Dental surgery was a major activity due to the several facial disfigurement wounds suffered through grenades, shrapnel, and bullets. Facial/dental surgery was performed at the rear base hospital. Ragged tissue was carefully trimmed, leaving as much of the lip area as possible, and sutured. A metal bridge with artificial teeth was connected to the remaining good teeth and a portion of a rib or tibia was used to rebuild the jaw. Skin flaps were carefully sewn to avoid excessive scarring.

3-6. PREVENTIVE MEDICINE

Diseases such as typhoid, typhus, malaria, and tetanus spread through the troops due to the wet, cold environment of the trenches, insect vectors, and poor sanitation. However, efforts were made to help prevent a repeat of the medical disasters of previous wars.

a. Safe drinking water treated with sodium hypochlorite was supplied to the troops in mobile hundred gallon metal tanks. Also, local deep wells and springs were tested and labeled either fit to drink or of need of boiling before use.

b. The systematic collection and incineration of refuse, wastes, and other garbage, along with chemical treatment, did much to decrease the spread of disease.

c. In 1916, the Army Medical Department was formally organized by corps. A Veterinary Corps was added to the Medical Corps and the Dental Corps. In addition to caring for animals (essential when much of the army still moved by horse), the Veterinary Corps was given the task of ensuring that food supplies were safe for troop use, a mission that increased as time went on.

3-7. AVIATION MEDICINE

Theodore Lyster, chief surgeon of the Air Division Medical Section, developed and implemented new physical standards for pilots. He also established a medical research board to do research. Experiments established the need to supply oxygen to pilots at high altitudes. Lyster went to Europe to investigate why accident rates in the U.S. aviation services were so high (three times as many pilots were dying from accident than from enemy action). He found that pilots were flying to the point of exhaustion and the untrained medical officers did not recognize the nature of this stress. Lyster's response was the creation of a new type of medical officer, the flight surgeon. In addition to specialized education, the flight surgeons were required to learn to fly.

3-8. END OF THE WAR

The fighting in World War I ended on 11 November 1918. This was the first major American war where deaths from battle injuries outnumbered deaths from disease. Deaths from disease were decreased due to advances in the development of vaccines against disease, higher sanitation standards, and developments in shock therapy and surgical techniques. The increase in battle deaths was related to the use of new weapons and delivery systems.

Section II. WORLD WAR II AND KOREA

3-9. MEDICAL ADVANCES BETWEEN THE WARS

a. The Army, with the aid of the American Medical Association, created an internship program in 1920 offering continuing education to medical officers through Walter Reed Medical Center, the Mayo Clinic, the New York Neurologic Institute, and the Eye and Ear Infirmary in New York City. This program, while improving the skills of the students, also acted as both a recruitment and retention tool for the Army as it faced a major force reduction following the postwar draftee release.

b. The first use of refrigeration to preserve blood was in the 1920's. The first blood bank in the United States was established at Cook County Hospital, Chicago, in 1937.

c. The major breakthrough was the discovery of antibiotics.

(1) In 1928, Alexander Fleming accidentally discovered that a petri dish contaminated by penicillium mold caused the death of bacterial colonies around the mold. Additional research soon developed procedures to mass produce purified penicillin extract for Allied troops. Penicillin soon proved effective against a wide variety of bacterial infections and was also used prophylactically in orthopedic and thoracic surgeries.

(2) Other antibiotics, such as streptomycin, were discovered in the 1930's. Antibiotics proved useful against typhus, typhoid fever, spotted fever, atypical pneumonia, brucellosis, and gram-negative bacterial diseases.

d. Increases in aviation science resulted in increased medicine research. As aircraft were developed that could fly higher than twenty thousand feet, it became necessary to develop heating flying suits. A centrifuge was used to study the effects of acceleration on the human body. Captain Harry G. Armstrong studied the problems of air embolism in pilots, a condition similar to the "bends" suffered by naval divers. Armstrong determined that formation of nitrogen bubbles in the body at high altitudes could be controlled if the pressure could be controlled using a pressurized cabin or by the pilot wearing a pressure suit when flying above 63,000 feet of altitude.

3-10. START OF WORLD WAR II

A world-wide economic depression occurred in the late 1920's resulting in unemployment everywhere. Countries such as Germany, Italy, and Japan turned to military expansion to provide employment and to seize needed resources from neighboring countries. In the late 1930's, Hitler began to rearm Germany. In the Pacific, Japan invaded areas of China. In September 1939, German forces attacked Poland using their *blitzkrieg* (lightning war) tactics. German forces attacked and quickly defeated France. Great Britain was soon in danger of destruction from the air and invasion from across the Channel. When Germany attacked the Soviet Union, Russian troops retreated, trading territory for time until stands could be made at Stalingrad and other cities. Although the United States tried to stay out of the war, attacks by Japan on Pearl Harbor and other American Pacific bases in December 1941 brought it into the war.

3-11. MEDICAL PERSONNEL

At the beginning of the war, Army medical personnel strength was below authorized levels. When the draft was activated, the government began recruitment and draft programs for medical civilians. Selection of doctors, dentists, and nurses for military service was done by the Bureau of Procurement and Assignment. Civilian medical education programs were accelerated. By 1943, two-thirds of all physically fit American physicians under age 45 were in the Armed Forces and 80 percent of all enrolled medical students were bound for the military. This created a major shortages of physicians in the United States.

3-12. EVACUATION AND TREATMENT FACILITIES

Because combat operations were fought on a global scale, the various theaters of operation varied considerably. So did the medical support. In Europe, the medical evacuation through echelons was fairly simple due to the open land maneuver spaces, roads, and built-up settlement areas. However, the Pacific's jungles, swamps, and lack of roads forced location of medical aid to be near beaches.

a. **Combat Medics.** First aid care was given at the site of injury by company aidmen, usually within the first half-hour after wounding. Each soldier carried a packet of field dressings and sulfa tablets and powder for immediate antibiotic and sanitary care.

b. **Aid Stations.** First echelon medical support was conducted by medical detachments such as aid stations with attached aidmen and litter bearers. Battalion aid stations, usually located 300 to 500 yards behind the front lines, had two leaders--a medical officer and a medical administration corps officer in charge of evacuation organization.

(1) The "backbone" of the evacuation system was the litter bearer. Litter bearers often worked 72-hour shifts, with trips over wooded and rugged country from 1000 yards to four miles. In Sicily, evacuation over mountainous terrain was accomplished by relay teams of litter bearers which ran continuously for 12 to 15 hours just to cover a few miles. Many litter bearers were injured or killed by enemy mines and fire or suffered emotional breakdowns from stress and exhaustion. When needed, units employed cooks, musicians, and company clerks as replacements.

(2) Aid stations were often unable to obtain adequate medical supplies through normal channels. This resulted in medics being used to hand-carry drugs and other medical supplies forward to the aid stations. Evacuation from the aid stations was usually done using ground ambulances.

c. **Clearing Stations.** Second echelon medical support was provided by the medical battalion commanded by a lieutenant colonel who was also the division surgeon. A medical battalion usually consisted of three collecting companies and one clearing station.

(1) The collecting station personnel examined the field dressings, gave I.V. morphine and plasma transfusions to shock patients, and (near the end of the war) administered penicillin.

(2) At the clearing station, patient triage sent the less serious case to evacuation hospitals and the problem patients to field hospitals. The clearing station was also the forward supply point for whole blood shipments.

d. **Mobile Hospitals.** Third echelon medical support involved hospitals at greater than Corps level, such as field and evacuation hospitals.

(1) A field hospital's surgical team was made up of two surgeons, an anesthetist, a surgical nurse, and two enlisted technicians. It was highly mobile and did immediate/urgent surgical care on massive chest and abdominal wounds, severe compound fractures, and traumatic amputations. Because of such violent pre-operation trauma, the death rates were from 12 to 25 percent. Auxiliary surgical groups composed of specialized surgical teams (thoracic, orthopedic, neurological, maxillofacial/dental, and shock treatment) were attached to field hospitals to aid patients whom the general surgeons at the field hospitals could not adequately treat.

(2) Evacuation hospitals were located on rail and water transport lines approximately 15 to 30 miles behind the front and 3 to 15 miles behind the field hospital. Patient evacuation was done by ambulance, boat, or air to rear/CONUS facilities as soon as possible to conserve needed medical resources.

(3) In September 1942, the portable surgical hospital (PSH) was introduced in the Pacific Theater to provide prompt surgical care to battle casualties. A team consisted of three surgeons, one internist, and 25 enlisted men. Surgery was performed in the forward battle areas near the battalion aid station.

(a) The surgical teams were highly qualified and picked not only for their technical expertise but also for their stamina and physical condition. This was important because their equipment, about 40 pounds per person, was manually carried to the front. They worked quickly, used blood and plasma transfusions to prevent shock, and prepared casualties for evacuation.

(b) The litters on which the patients were brought served as operating tables. Water was provided by a Lyster bag over the scrub sink. Lighting was natural (sunlight) in the daytime and by hooded flashlight and kerosene lanterns at night.

(c) The only method of evacuation to the rear was by litter. This sometimes resulted in occupying most or all of the enlisted personnel in patient evacuation duties and created personnel shortages at the PSH.

e. **General Hospitals.** The next echelon of medical support involved fixed general hospitals providing complete medical care. They were usually located in Allied rear areas in the European and Pacific Theaters of Operation and were under the control of the communications zone (COMMZ) headquarters. Patients were held for a maximum of 90 days, then returned to their unit or sent to CONUS/Zone of Interior for care in Army or VA hospitals.

(1) Paris became the hub of the European continental evacuation system. Its main hospital train depot handled hospital trains and two airports handled the air evacuation cases.

(2) Hospital ships were also very active during the war. They were marked with Geneva Convention protective symbols and theoretically immune from enemy fire. In 1943, landing ship tanks (LSTs) used to haul assault troops were modified to evacuate and treat wounded personnel in the Pacific and beaches in Africa. Approximately 150 folding army cots were placed in each LST to establish a ward. Casualties were evacuated to the LST using smaller vessels called DUKWs. Casualties were later evacuated from the LST to a hospital ship. Despite early doubts, the system worked quite well. LSTs were controlled by the U.S. Navy. LSTs were not considered "immune" targets under the Geneva Convention and could be fired upon by the enemy.

3-13. PREVENTIVE MEDICINE

Twice as much time was lost to disease as was lost to nonbattle injuries and combat wounds combined. Most illnesses were preventable, but many unit commanders did not enforce the proper discipline.

a. The United States Typhus Commission was established in 1942 with the roles of research, preventive medicine, and care of the sick. Typhus, a louse-borne rickettsial disease, was epidemic throughout North Africa and Europe during the war due to poor sanitation and the decay of refuse and the dead. The Typhus Commission distributed three million individual doses of vaccine. Delousing (dusting with DDT) of civilian and military personnel and of the areas around military camps was also performed.

b. Quinacrine hydrochloride (Atabrine), used to fight malaria, was distributed with rations four times a week and intense indoctrination on sanitation was given, especially about food preparation, water purification, and waste disposal.

c. At the beginning of the war, it was believed that preinduction testing could eliminate the unfit and remove the possibility of psychological problems. Although the tests could identify obviously unfit personnel who exhibited frank behavior disorders, they could not predict the reaction of individuals to combat stress. American forces suffered large numbers of combat stress reaction (also called shell shock or battle fatigue) casualties in North Africa and the South Pacific. As the war progressed, the importance of friendships and rapid return to duty after rest treatment was recognized.

d. The winter of 1944-45 was the coldest and wettest that Europe had seen for many years. In the Third Army, there were six cases of cold injuries for every 10 battle casualties. In November and December of 1944, the equivalent of five and a half divisions were lost to cold injury. This quickly drew attention to the importance of measures to prevent cold injuries. Foot inspections were done by unit commanders and preventive medicine workers to ensure that proper foot self-care was being performed.

3-14. ADVANCES IN TREATING SHOCK

a. Colonel Edward Churchill studied the development of shock and resuscitative process following trauma. He discovered that shock was not only related to blood fluid loss but also to electrolyte loss. This led to improvements in intravenous solution preparation.

b. The Blood Donor Service of the American Red Cross was organized in 1941. Unlike World War I, new procedures made indirect transfusions practical. Human blood plasma could be dried to a powder, stored for an extended time, and later be reconstituted with distilled water. It was primarily used to stabilize shock cases at the front lines until evacuation could be made to rear hospitals.

3-15. END OF THE WAR

In May 1945, Germany surrendered. This was followed in August by the surrender of Japan and the dawning of the nuclear age. The Medical Department had proven itself to be an effective force multiplier.

3-16. POST WORLD WAR II DEVELOPMENTS

a. In 1947, the Medical Service Corps was created to care for various administrative, sanitary, and pharmacy units; the Women's Medical Specialist Corps was created for dietitians, physical therapists, and occupational therapists; and the Nurse Corps was created as a regular army establishment. At first, only females were allowed to serve in the Women's Medical Specialist Corps and the Nurse Corps. In 1955 they were opened to reserve male practitioners and, in 1966, both corps were open to regular commissioned male practitioners.

b. Efforts supported by General Dwight Eisenhower to unite all military medical services into one large medical service failed.

3-17. KOREA

The Korean War provided an opportunity to test new ideas and procedures.

a. Vascular reconstruction had been postulated since World War I as the appropriate therapy for vascular injuries. Traumatic aneurysms and arteriovenous fistulas were repaired by a vascular surgical team at Walter Reed Army Institute of Research in 1950. In 1951, Lieutenant Colonel Carl Hughes took a vascular repair team to Korea and taught the newer methods of repair for vascular injury. These procedures vastly reduced the amputation rates. The progress was dependent upon the availability of trained specialists and dedicated medical resources as well as rapid evacuation times and, in general, a lower volume of casualties.

b. Colonel Kenneth Orr led a research team studying cold injuries which resulted in a better understanding of the effects of cold (especially frostbite) on the human physiology. This led to the development of better protective clothing for cold climates and improved preventive medicine advice for cold-weather operations.

c. A renal insufficiency center was established by Captain Paul E. Teschan of the U.S. Army Medical Corps. The center used the new artificial kidney to perform dialysis on patients with Korean hemorrhagic fever and with renal insufficiency from septic shock.

d. Efforts led by Major James C. Beyer resulted in the development of lightweight body armor which reduced mortality and morbidity from wounds. The research eventually resulted in bullet-proof vests used by civilian police officers.

e. During the Korean War, the Mobile Army Surgical Hospital (MASH) which evolved out of the Portable Army Surgical Hospital and the forward surgical teams of World War II was used in combat for the first time. Helicopter air ambulances greatly decreased the amount of time it took to move casualties from the battlefield to a hospital.

3-18. POST KOREA

a. In the 1950s, Colonel John Paul Stapp used a high-speed rocket-powered sled to study the medical effects of abrupt acceleration/deceleration such as those effecting pilot ejecting from a jet aircraft. Colonel Stapp's experiments resulted in the development of new restraining gear which led to the use of seat belts in automobiles.

b. The study of virology at the Walter Reed Institute of Research and other institutions led to the isolation of the rubella (German measles) virus in 1962.

c. The success of helicopter evacuation in Vietnam resulted in civilian institutions to evacuate casualties to medical facilities by helicopter. In 1970, the Military Assistance to Safety and Traffic (MAST) program which provided military assistance in developing civilian evacuation systems was initiated.

d. In Operation Desert Shield/Desert Storm, the military alliance lead by the United States forced the invading Iraqi army from Kuwait.

(1) There was a good supply of drinking water and the modern water discipline of forced drinking was in place. Adequate personal hygiene and field sanitation services were provided, yet some units became ineffective due to dysentery during the early stages of deployment. The dysentery was caused by consumption of local foods grown under unsanitary conditions. Proper food inspection procedures were instituted and the problem was controlled.

(2) A new burden was the threat of chemical weapons and the need for mission-oriented protective posture (MOPP) gear. MOPP gear prevents sweat evaporation and hence makes heat injury far more likely. In closed MOPP gear, the predicted time to 50 percent unit heat casualties, the point at which units are considered combat ineffective, can be less than 60 minutes. Fortunately, the American forces quickly defeated the Iraqi forces and were not forced to fight in MOPP for extended periods of time.

Section III. AEROMEDICAL EVACUATION

3-19. BIRTH OF THE AEROMEDICAL EVACUATION CONCEPT

As warfare evolved, technology produced new weapons to inflict more death and destruction on the enemy. However, new technology also helped to save the lives of injured soldiers. One of the best examples is the development of aeromedical evacuation.

a. In 1903, Orville and Wilbur Wright demonstrated that a heavier-than-air machine could fly and carry human passengers. The military soon recognized that the airplane could be used to scout enemy positions and, later, as a platform from which bombs could be dropped on enemy positions.

b. A group of military officers, including Captain George Gosman (an Army physician), saw the possibility of using aircraft to save lives. They conceived and designed a method to employ aircraft to carry patients. In January 1910, they tested a plane capable of carrying a single patient. Although the aircraft crashed, they were encouraged by the test and went to Washington, D.C., to ask the War Department to finance the rebuilding of their aircraft.

In his attempts to persuade the War Department, Gosman stated:

"I clearly see that thousands of hours and ultimately thousands of patients would be saved through the use of airplanes in Air Evacuation".

c. Although the concept was supported by Army Surgeon General George Torney and others, the project was turned down. The decision was due both to the danger in transporting patients by air and to financial problems.

3-20. WORLD WAR I

a. In World War I, trench warfare taxed the medical support and evacuation systems of the United States and its allies. Some countries experimented with air evacuation, but the American military decided that all American airplanes were needed for combat duty.

b. Although air evacuation was not used in combat by the United States, it did prove its usefulness in the training environment within the United States. Training military pilots resulted in many crashes. In 1918, a biplane at an Army training site in Louisiana was converted into an air ambulance capable of carrying a physician to the crash site and evacuating the injured pilot to a hospital. The success of this operation prompted a directive to convert selected aircraft for crash rescue purposes.

3-21. BETWEEN THE WORLD WARS

In May 1921, the War Department stated:

"...the use of airplanes for the transportation of sick and wounded soldiers, when other safer means of transportation is available, could not be justified."

a. During the 1920s, air ambulances were developed that carried one to two litters but no medical attendants. During 1927 and 1928, the U.S. Marines fighting against guerrillas in Nicaragua successfully used aircraft to evacuate casualties from remote locations.

b. Another attempt at designing an evacuation vehicle was the autogiro, a machine that contained a rotor similar to that of a helicopter and the wings of an airplane. It was hoped that this design would allow the craft to land and take off in shorter distances at a lower speed. Field testing was conducted during Marine operations in Nicaragua in 1932, but the craft was hampered by an underpowered engine.

c. Proponents of air evacuation developed the principles needed for air evacuation. The Army Air Corps concluded that air evacuation required two types of aircraft--a heavy transport-type for long-range flights and a lighter craft for unimproved forward locations. Efforts concentrated on developing heavy transport aircraft for long evacuation flights. Due to a lack of funding, obsolete military aircraft were converted for use as air ambulances for long evacuation flights. Light aircraft that could use short, unimproved landing strips were not developed at this time.

d. Other countries, especially Germany, continued to develop aeromedical evacuation. Strategic evacuation on a large scale proved successful during the Spanish Civil War of 1936--38.

3-22. WORLD WAR II

a. As the war began in Europe, money for procurement became available. By late 1940, General Arnold, Chief of the Army Air Corps, directed the Air Corps Medical Division to plan for conversion of transport planes for evacuation missions. Recommendations included installation of litter brackets on cargo planes for long evacuation flights, the use of single-engine liaison airplanes for short forward evacuation, and the organization of an air ambulance battalion.

b. Because of resource constraints, the cargo and light aircraft could not be used exclusively for evacuation. However, the conversion of these aircraft to perform both cargo and evacuation missions did occur. Cargo aircraft fitted with litter supports allowed them to "backhaul" casualties to rear bases after delivery of supplies forward.

c. Evacuation during the war was divided into light (tactical) and heavy (strategic) evacuation. By the beginning of the war, strategic evacuation by transport plane had become an accepted and safe mode of evacuation. Evacuation by the "heavy lift" aircraft that cruised at greater heights for longer durations had

several medical restrictions placed upon them. Consequently the training of flight surgeons, flight nurses, and enlisted technicians was considered necessary. Included in this training was responsibilities for classification of patients, loading and unloading procedures, and en route care. This en route care varied from feeding patients to changing dressings to administering medication, fluids, and oxygen.

(1) Strategic evacuation generally consisted of movement from the various theaters to and within the United States. Evacuation within the combat zone was difficult, but was accomplished by the larger transports. Aeromedical evacuation was credited with saving thousands of lives during the war.

(2) Although strategic aeromedical evacuation was officially accepted, the use of light aircraft for forward air evacuation was performed on an "informal" basis. As the use of light aircraft for artillery observation, courier service, and personnel transportation spread, the improvised use as air ambulances also increased. Casualties were moved by whatever means were available to a location where light aircraft could land. Casualties were staged, triaged, treated, and evacuated by air.

d. The first use of helicopters in forward air evacuation occurred in 1944 when four soldiers were rescued from deep in the Burma jungles. Although the early Sikorsky R-4 helicopters were limited in their capacity (only one patient could travel inside the craft), development of better helicopters soon followed. In 1945, the Sikorsky R-6 had two covered external litter "capsules" attached to it.

e. By the end of the war, thousands of casualties had been moved rapidly and effectively by air.

3-23. POST-WORLD WAR II

Even though a significant number of casualties had been successfully transported by aircraft during World War II, the early postwar years did not see large changes in aeromedical evacuation. There was no new doctrine for dedicated tactical air evacuation aircraft. Also complicating the situation was the creation of the U.S. Air Force. In September 1949, the Department of Defense directed that air evacuation was the responsibility of the Air Force. The Air Force focused its resources on building strategic bombing forces and paid only small attention to air rescue. The Army, even though it was limited in the size of aircraft it could maintain and utilize, still had the requirement to collect casualties from forward locations.

3-30. KOREA

In June 1950, hostilities broke out in Korea. The invasion of South Korea by North Korean troops caught the United States off guard and the issue of battlefield evacuation took on immediate importance.

In 1950, Richard Meiling, the chairman of the Armed Forces Medical Policy Council, observed:

"As a peacetime operation, the air transportation of patients is steadily improving in efficiency. As a military operation under combat conditions, a lot of improvement is still required. There still... is the small minority which is unable or unwilling to recognize the inherent soundness of air evacuation."

a. It soon became apparent that North Korea would not abide by the Geneva Conventions pertaining to medical vehicles. In addition, the rugged terrain and long evacuation routes made ground evacuation difficult. The solution was air evacuation.

b. Early in the conflict, forward evacuation was provided by an Air Force fixed-wing aircraft based in Japan. However, the aircraft was hampered by the terrain and lack of adequate airstrips. By the end of July, Air Force H-5 helicopters equipped with external litter pods were deployed to Korea where they successfully served as air ambulances.

c. The Army also used helicopters for medical evacuation. In January 1951, a newly formed helicopter detachment was activated and attached to a 60-bed Mobile Army Surgical Hospital (MASH), another new innovation of the conflict. Later, two more detachments were attached to other MASH units.

d. Some problems resulted from the perception that the helicopter could fly and land anywhere, anytime. A lack of armor and inability to fly at increased heights left the craft highly vulnerable to ground fire. Helicopter evacuations were restricted to daylight hours, although a few nighttime missions were conducted using flashlights. Some casualties were evacuated directly to awaiting hospital ships. Since medical care could not be provided during air evacuation, as much medical treatment as could be given without delaying evacuation was administered to the patient prior to movement.

e. As the war continued in Korea, problems over air evacuation continued between the Army and Air Force. In October 1951, the Air Force turned over responsibility for forward (tactical) air evacuation to the Army. The Air Force retained responsibility for strategic evacuation.

f. A new detachment, the Helicopter Ambulance Unit, was soon developed. It consisted of five helicopters and was attached directly to forward medical or line units for support just as the early attachment to the MASH units had been done. The major difference was that this new evacuation unit was under administrative and operational control of the Army Medical Service for the first time ever. In February 1953, a Helicopter Ambulance Company was formed to provide command and control for these units.

g. During the Korean War, more than seventeen thousand casualties were evacuated by helicopter.

3-25. POST-KOREA

Post-Korea after action reports praised the air ambulance helicopter as a success. Medical planners stressed the idea of a more powerful helicopter that could carry patients inside the fuselage for protection and allow en route care. In 1957, the UH-1 Iroquois (more popularly known as "Huey") was developed. It could evacuate up to six litter patients at a time and was soon recognized as one of the most useful aerial platforms ever produced.

3-26. VIETNAM

a. As the Vietnam conflict escalated, the number of American troops and aeromedical evacuation assets increased. Using the Medical Detachment (Helicopter Ambulance) as the base unit, the first elements were sent to Vietnam in 1962. These detachments were authorized five UH-1 A or B model helicopters. Transition to the more powerful UH-1D model as well as development of a new six-ship detachment followed. A new 25-ship Medical Company (Air Ambulance) soon came on line as the buildup of combat troops increased. At the peak of combat operations in 1968, there were 116 air ambulances operating throughout the country.

b. The peculiarities of combat in Vietnam required adaptation of doctrine to fit the combat situation.

(1) Air superiority early in the conflict allowed helicopter transport without significant interference from enemy air activity. This combined with more powerful engines gave the helicopter the ability to fly higher where it was out of range of most small arms fire.

(2) Operating in remote, rugged conditions called for the development of additional methods of extraction. In addition to the already available Stokes litter, the jungle penetrator litter (a cable with an attached seat designed to be lowered through the thick jungle) was developed. The seat was lowered and raised using a winch in the helicopter. Winch extraction missions were decidedly dangerous and resulted in losses of both personnel and aircraft.

(3) The nature of combat operations without an established "front" also changed the employment of medical evacuation units as well. Most evacuation missions could overfly organic medical

units such as the battalion aid and division clearing stations. Flying directly to hospitals required the establishment of effective command and control as well as a responsive medical regulating system. Beginning in 1966, medical regulating of all in-country patients was performed by the 44th Medical Brigade.

(4) In-country evacuation was provided by U.S. Air Force assets such as the C-141. Patients requiring further treatment or hospitalization were entered into the Military Airlift Command (MAC) aeromedical evacuation system. This system moved patients throughout the Pacific and on to CONUS.

c. The use of short range radios early in the conflict caused many problems. With the installation of long-range radios, response time was drastically reduced allowing more direct communication between requesting units, en route aircraft, and the receiving hospital. Effective radio communication allowed the air crew to notify the receiving hospital with pertinent patient information or special needs while en route.

d. It took an average of 9 minutes to launch an aircraft after receipt of the request. Many times an aircraft was diverted from one mission to another because of higher priority and the patient's condition. Most aircraft spent no more than a minute on the ground as the casualties were loaded and on-board emergency treatment was begun. Medical regulating of patients while airborne was based upon the extent of injuries and the assessment done by the flight medic. This information combined with the surgical backlog and capabilities of the closest facilities determined which facility would be the receiving hospital.

e. As the number of hospitals increased, the average time of 1 to 2 hours from wounding to treatment decreased to about 35 to 40 minutes. This is significant when compared to Korea where the average evacuation time was 4 to 6 hours. During 1969 (the peak year for air evacuation), over 200,000 casualties were transported by air.

f. Quick response and a willingness to attempt evacuation under almost any condition became the hallmarks of forward air evacuation in Vietnam. Early medical evacuation support soon provided a doctrine and legacy that has come to epitomize tactical evacuation. "Dust Off," a radio call sign chosen at random, soon became the popular term for air evacuation --not only in Vietnam but throughout the world.

Excerpt from "When I have your wounded" by Patrick H. Brady, Army Magazine, June 1989:

"He had gone into a supposedly secure area for some urgent wounded--one of them a U.S. soldier. Once on the ground, they began drawing fire. The ground forces screamed at Kelly to get out. He replied...'When I have your wounded.' His next words were 'My God,' and he curled up from a single bullet shot right through his heart. The ship curled with him, and the rotors beat it to pieces. There was a U.S. physician on board, and he declared Kelly dead on the spot. Then they were rescued....We cranked up and went back for Kelly's patients. That area is so clear in my mind. Kelly's ship was still burning, the area still called secure and the patients still classified urgent. We were landing beside the burning Dust Off when our ship took several rounds, probably the same folks who shot Kelly. . . . we made a tactical approach, found some cover and retrieved the patients. The U.S. patient walked to the aircraft carrying a bag. All the patients were ambulatory. None were urgent. I was told that one was coming out of the field to go on R&R."

3-27. POST-VIETNAM

Doctrine formed during the Vietnam conflict and tested in combat remained essentially unchanged following the end of hostilities in 1973. In 1976, the UH-60 Blackhawk became the newest member of the Army helicopter family. It was designed as an all-purpose utility helicopter with medical evacuation in mind.

3-28. GRENADA

In Grenada (Operation Urgent Fury) in 1983, difficulties arose from the lack of coordination and training of Army helicopter crews in shipboard landing. This resulted in several cases where casualties had to be returned to Army divisional medical elements rather than treated aboard ship.

3-29. PANAMA

In Panama (Operation Just Cause) in 1989, casualties were airlifted out of Panama directly to San Antonio, Texas, by U.S. Air Force aircraft. This situation resulted in the over-evacuation of injured soldiers who could have been treated in-country.

3-30. PERSIAN GULF

a. The war in the Persian Gulf (Operation Desert Shield/Desert Storm) saw the most rapid and largest deployment of medical assets since World War II, all within a 6-month period. This rapid and successful mobilization is highlighted by the longest self-deployment of a helicopter unit in U.S. Army history from Germany to Saudi Arabia.

b. In Desert Storm, the need for forward evacuation was combined with the challenges associated with the terrain. Lessons learned from the Grenada conflict were incorporated into new doctrine. Fortunately, the need for medical evacuation was not as great as had been anticipated.

Section IV. OPERATIONS OTHER THAN WAR

3-31. DEFINITIONS

Operations other than war might be new to formal operations doctrine, but it is not new for the Army or for the Army Medical Department (AMEDD). The AMEDD has a long history of helping civilians, first within the Continental United States and then later outside our shores. FM 100-5, Operations, gives 13 activities that are U.S. Army other than war missions. Three that pertain to the AMEDD are nation assistance, humanitarian assistance and disaster relief, and support to insurgencies and counterinsurgencies.

a. AMEDD actions fall into two general arenas--civil affairs and civic action. These two terms are often used interchangeably, but they are different. The following definitions will be used for the purposes of this lesson.

(1) Civil affairs. Civil affairs refers to a situation in which the U.S. Army is in control of civil operations either under martial law or as an army of occupation.

(2) Civil action. Civil action refers to a situation in which the U.S. Army assists an existing government in conducting civil operations.

b. The remaining paragraphs in this section gives examples of civil affairs and civil actions during the twentieth century.

3-32. PUERTO RICO

After the end of the Spanish-American War, President William McKinley placed Puerto Rico under military rule. During the time that Spain controlled Puerto Rico, it did not immunize the population against smallpox. Lieutenant Colonel John van Rensselaer Hoff, the Force Surgeon of the American army of occupation, was faced with a smallpox epidemic. At that time, smallpox vaccine was produced directly from calves. Hoff established a vaccine farm and used military law and authority to set up immunization sites

throughout the island. He also imposed quarantine and isolation on patients and ultimately eradicated smallpox from Puerto Rico. This was an example of civil affairs--medical management of a civilian population under military control.

3-33. POLAND

At the end of World War I, typhus was raging in Poland. President Wilson's humanitarian beliefs led the United States into civic action activities following the Versailles peace conferences. The President asked Herbert Hoover, Director General of Relief and Rehabilitation for the Supreme Economic Council of the Allies, for advice in managing the epidemic. Hoover concluded that he lacked the necessary resources, but that the American army under General John J. Pershing had the needed resources. President Wilson then ordered Pershing to solve the problem using a civil action approach.

a. Typhus (epidemic louse-borne typhus fever) is a rickettsial disease which has a mortality rate of 10 to 40 percent in the absence of specific therapy with the fatality rate increasing with age. In 1909, Charles Nicolle discovered that the disease was transmitted by body lice. The significance of the discovery was that the disease could be controlled by killing the vector (lice).

b. Colonel Harry L. Gilchrist was chosen as the commander of the American Polish Typhus Relief Expedition. During World War I, he had developed a unit for decontaminating soldiers exposed to mustard gas.

c. Gilchrist acted quickly since the American troops would soon leave for home. He organized his new unit into field teams and set up mobile bath units to reach the Poles living in small towns and villages. He realized that many people believed that lice were not harmful so he established an education program and got local officials involved. The local officials were useful in persuading fellow citizens to bathe and be deloused. His problem, however, was further complicated by the 1920 Russo-Polish War which resulted in additional refugees and prisoners of war with typhus. Controlling the spread of typhus was made more difficult by a lack of fuel during winter. People huddling together for warmth made the spread of lice easier.

d. Gilchrist never fully accomplished his mission since the American forces left before the task was completed. The Polish government continued the battle against typhus utilizing Gilchrist's techniques. The disease was finally brought under control in 1923.

e. Gilchrist saw both the humanitarian and the political effects of his efforts. He felt that the association of American soldiers with the medical efforts made to help the inhabitants was of inestimable value in leading the Poles to adopt American ways.

3-34. NORTH AFRICA

After the United States entered World War II, Colonel James Stevens of the Office of the Surgeon General requested the establishment of a special organization to address the problem of typhus in the theaters of operation. Simmons knew the problems that typhus epidemics caused troops in World War I and knew that American troops would face similar problems in future combat actions. President Roosevelt was persuaded that the historically proven power of typhus to delay, disrupt, and disorganize military campaigns and its current prevalence in potential areas of operations required the formation of a special organization. As a result, the United States of America Typhus Commission was established.

a. In November 1942, U.S. Army troops faced their first major action in North Africa. In February 1943, General Leon Fox, Director of the USA Typhus Commission, began aggressive studies of vaccines and lousicides in Cairo, Egypt. Efforts were made to control typhus in Egyptian port workers since a typhus epidemic among these workers could close the port and cripple the military campaign. These efforts were aided by a new powder (DDT) which proved to be very effective in killing lice.

b. Due to the modesty of Arab women, the normal procedure of disrobing and dusting the inside of the clothing would not work. This problem was overcome by blowing the powder up the sleeves, down the front and back, and on the head while the clothing was still on the person. This method produced

outstanding success and was quickly adopted as standard practice. With the ease of this new procedure, medical teams began to dust workers and the general population.

3-35. NAPLES

a. U.S. Army troops entered a Naples that had been destroyed by bombs, shells, and the retreating German army. Citizens were crowded in caves or bomb shelters without heat and light and having little water, food, clothing, or soap. U.S. Army medical personnel were suddenly confronted with an outbreak of typhus in the civilian population. Naples became an excellent example of civil affairs in its earliest stage in conquered enemy territory.

b. Typhus control teams followed sound practices of contact dusting, targeting all individuals known to have been associated with typhus victims, and setting up mass delousing stations throughout the city. Teams dusted as many as 50,000 civilians per day and contained the epidemic by dusting all individuals entering or leaving the city.

3-36. GERMANY

Near the end of World War II, typhus was present throughout Germany. The greatest challenges were displaced persons, released prisoners of war, conscript workers, and the holocaust victims liberated from Nazi concentration camps. In response to the threat, medical personnel re-immunized American troops and conducted dusting with DDT among the afflicted civilian populations. Efforts were aided by the introduction of a new power duster. Typhus was successfully contained and the experience gained in these civil affairs activities helped to prepare for the role as military governor of Germany.

3-37. KOREA

a. Before the start of the Korean conflict, South Korea contained around 2.8 million refugees. The United States agreed to provide assistance to South Korea in dealing with this problem. This was the first time active duty military personnel in peacetime were assigned to civilian governments in advisory positions. Once again, U.S. military medical forces provided medical services, inoculated civilians against smallpox, and dusted civilians with DDT to eradicate typhus.

b. When the North Korean army invaded South Korea, American medical personnel became part of the United Nations police action. Medical personnel faced waves of refugees and displaced persons numbering over four million. Now the operations fell under civil affairs. The programs remain the same, but a new organization was formed when Eighth Army Civil Assistance Division combined with a multinational team sent by the United Nations. The new organization became the United Nations Civilian Assistance Command, Korea.

c. The new command placed greater emphasis on education and training. Teams were sent out to the provinces to set up and train local (Korean) sanitation teams. Other teams trained Korean health professionals and helped establish a system of mobile clinics to reach outlying areas.

3-38. VIETNAM

a. The United States began by providing assistance to the South Vietnamese government to help it put down rebel forces supported by North Vietnam. When North Vietnam declared war on South Vietnam, President Kennedy issued instructions to strengthen South Vietnam using Special Forces teams as military trainers and advisors.

b. The Military Assistance Advisory Group becomes Military Assistance Command with instructions to win the "hearts and minds" of the people, thus strengthening the resolve of South Vietnamese to resist Communism. Medical personnel were crucial to this program by providing projects with immediate, short-term, and long-term benefits. This was the first Medical Civic Action Program (MEDCAP).

c. Medical personnel dedicated to MEDCAP began to arrive in Vietnam in January 1963. They formed teams that were dispersed to South Vietnamese army units, displaced persons encampments, and strategic hamlets. They performed direct patient care done in tail-gate medicine fashion over periodic visits. The program resulted in over 914,000 treatments that year and in over 3 million treatments the following year.

d. In 1965, President Johnson authorized air strikes against North Vietnamese military targets and then committed ground troops. The MEDCAP program became MEDCAP II. MEDCAP II had the same objectives, but it was run directly out of the maneuver units.

e. Efforts were joined by the United States Agency for International Development (USAID) in the Provincial Health Assistance Program (PHAP). The United States military portion was known as MILPHAP. By September 1965, the military teams (Army, Air Force, and Navy) began arriving. The primary goal was to improve the medical skills of the Vietnamese while carefully coordinating all activities with local hospital chiefs in support of their programs. This program closely resembled what had been done in Korea.

f. In 1967, the U.S. Army established the Civilian War Casualty Program (CWCP). Three separate field hospitals provided hospital care for civilians. In previous wars, the AMEDD has taken care of civilian casualties; but this was the first time the policy was formalized and directed by Congress.

g. At the same time, MEDCAP II medical personnel were seeing over 188,000 Vietnamese per month and establishing dental and veterinary programs. Dental Civic Action Programs (DENTCAP) resulted in 15,000 dental treatments per month and Veterinary Civic Action Programs (VETCAP) treated over 2,000 animals each month.

h. Following the North Vietnamese Tet Offensive in 1968, the system of separate hospitals for the South Vietnamese civilians began to collapse. U.S. medical personnel started to treat civilians at all U.S. health care facilities. The South Vietnamese civilian and military hospital system followed suit and integrated their patient populations, which greatly increased the quality of care available to civilians in South Vietnam.

i. In 1969, President Nixon announced troop withdrawals and the scaling back of assistance programs. Census levels show that U.S. field hospitals were caring for about 600 South Vietnamese each day and that MEDCAP II was treating over 1.3 million civilians per year.

j. In May 1972, U.S. hospitals withdrew ending the Civilian War Casualty Program. In June, the MEDCAP II and MILPHAP programs were terminated. These programs undoubtedly assisted many individuals whose medical conditions might have worsened without intervention and resulted in the training of many South Vietnamese health care workers.

3-39. KURDS

Shortly after Operation Desert Storm ended in February 1991, the United States found itself engaged in civil affairs activities under Operation Provide Comfort. The Kurds living in northern Iraq rebelled against Saddam Hussein's authority, but the Iraqi army suppressed the uprising. Approximately 500,000 Kurds fled toward Turkey. The majority were stranded in several remote mountain passes between the two countries where they experienced hostile environmental conditions without adequate food, water, or shelter.

a. A United Nations Security Council Resolution authorized U.N. military forces to conduct operations on humanitarian grounds in the territory of another state which it was not formally occupying and without an invitation from that government. U.S. forces made up part of a joint task force augmented by civil affairs and other support teams which established and executed a resettlement plan. The military was particularly well suited to this operation which required well defined command and control, massive logistics requirements to be delivered to remote areas, and adequate security to ensure the proper distribution of the supplies and the safety of the population from Iraqi and Turkish military forces. The AMEDD played a

relatively minor role in the hands-on civilian/refugee medical care; this care was primarily provided by military units of other nations and by numerous private volunteer organizations (PVOs).

b. U.S. Army preventive medicine personnel, however, played a key advisory role in fighting diarrhea, dehydration, and malnutrition which were the main causes of death among the refugees. The primary difficulty was the lack of a safe water supply. The few small streams available were used for drinking, washing, and sewage simultaneously. Alternate water supply systems were established and sanitation projects were implemented. These programs along with aggressive rehydration and other preventive and primary care programs provided by the PVOs and other military units resulted in the successful drop in mortality and morbidity rates among the refugees. By the end of June 1991, the Kurds were successfully resettled.

Section V. SUMMARY

3-40. MILITARY MEDICAL STANDARDS

Military medicine differs from civilian medicine in that it must uphold two separate standards. It must meet the standards of civilian health professions and, at the same time, meet the standards of military readiness. Military medicine must function as a large health-care organization during peacetime (including licensing and hospital accreditation) and, at the same time, plan and train for war.

3-41. THREE LEVELS OF WAR

The medical wartime mission can be defined in the same way that other military activities are defined--tactical, operational, and strategic.

a. The tactical level is the hands-on application of medicine including direct patient care and evacuation of patients from the battlefield. The command and control of medical elements by medical personnel is included in this level.

b. The operational level includes the functions in which medical department personnel offer specialized advice to the line command who is responsible for implementing the advice. Examples include planning preventive medicine activities, planning medical logistics, and planning the placement of hospitals based on battle plans and casualty estimates.

c. The strategic level is concerned with predictions about disease threats, medical research, and projections of medical needs for possible mobilization.

3-42. APPENDIXES

Three appendixes are found following this lesson. Appendix A contains an article by Jay Luvaas (reprinted with permission from *Parameters*) which discusses the importance of the study of military history. Appendix B discusses how to plan and conduct a staff ride, an excellent method for instructing other officers in military history. Appendix C contains a reading list developed for the AMEDD officer.

EXERCISES: LESSON 3

INSTRUCTIONS. The following exercises are to be completed by writing the lettered response that best answers the question or best completes the incomplete statement or by writing the answer on paper that you provide. After you have completed all the exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers.

1. William Gorgas was supported by President Theodore Roosevelt when he reduced disease by controlling mosquito population in:
 - a. Florida.
 - b. Mexico.
 - c. Panama.
 - d. Spain

2. In 1916, the medical department was formally organized by corps and a veterinary corps was added. The Veterinary Corps was concerned with:
 - a. Inspecting food supplies.
 - b. Providing an insect-free environment.
 - c. The health of military horses.
 - d. Responses a and c.
 - e. Responses a, b, and c.

3. Which of the following was NOT a major NEW weapon introduced during World War I?
 - a. Aircraft.
 - b. Gas warfare.
 - c. Machine guns.
 - d. Submarines.

4. During World War I, a gas that was not very noticeable at first but which soon resulted in inflamed eyes, vomiting, and blisters was:
 - a. Chlorine gas.
 - b. Mustard gas.
 - c. Nerve gas.
 - d. White phosphorus.

5. In the 1930's, Captain Harry Armstrong showed that pilots who flew at high altitudes developed problems very similar to the decompression sickness suffered by naval divers. This resulted in the use of _____ by airplane pilots.
 - a. Compression vaccine.
 - b. Liquid nitrogen.
 - c. Liquid oxygen.
 - d. Pressurized suits.

6. Research on the effects of cold on human physiology by Colonel Kenneth Orr is associated with:

- a. First World War.
- b. Korean War.
- c. Second World War.
- d. Vietnam War.

7. Which one of the following is least concerned with civilian standards and expectations?

- a. Medical care given to a soldier during combat.
- b. Medical care given an active duty member during peacetime.
- c. Medical care given to the dependent of an active duty military member.
- d. Medical care given to a retiree.

8. What two officers made possible the purification of drinking water during the latter part of the 1910s?

9. According to William Robertson, Karl von Clausewitz defines critical analysis as having three stages. What are they?

10. According to Robertson, which of the following is more valuable for studying military history?

- a. Good maps.
- b. First-hand knowledge of the terrain.

11. A hypothetical military scenario played out on actual terrain, usually employing current doctrinal concepts is a description of a:

- a. Historical battlefield tour.
- b. Staff ride.
- c. Tactical exercise without troops.

12. A visit to the actual site of a military campaign with very little systematic preliminary study is a description of a:
- Historical battlefield tour.
 - Staff ride.
 - Tactical exercise without troops.
13. The optimum preliminary study phase for a staff ride should contain:
- Group discussion guided by knowledgeable instructors.
 - Individual research.
 - Lectures by knowledgeable instructors.
 - All of the above.
14. Which of the following statements is true?
- Military medical personnel must plan and train for war.
 - Military medical personnel are exempt from the need to plan and train for war.
15. Which of the following is/are good suggestion(s) when planning a staff ride?
- Plan for medical support.
 - The logistical coordinator should also be the primary instructor on the staff ride.
 - Plan the most scenic route, making stops at random to allow students to reflect.
 - All of the above are proper.
16. Which of the following describes the term civil affairs?
- AMEDD actions taken while the U.S. Army is assisting the existing government in conducting civil operations.
 - AMEDD actions taken while the U.S. Army is in control of civil operations as an army of occupation.
 - AMEDD actions taken while the U.S. Army is in control of civil operations while the country is under martial law.
 - Responses "b" and "c" above
 - Responses "a," "b," and "c" above.

SOLUTIONS TO EXERCISES: LESSON 3

1. c (para 3-1b(4))
2. d (para 3-6c)
3. c (para 3-3a)
4. b (para 3-3b)
5. d (para 3-9d)
6. b (para 3-17e)
7. a (para 3-40)
8. Major Carl Rogers Darnell
Major William Lyster (para 3-1b(7))
9. Determine the facts.
Establish cause and effects.
Analyze the results. (Appendix B, p. B-1)
10. b (Appendix B, p. B-2)
11. c (Appendix B, p. B-2)
12. a (Appendix B, p. B-2)
13. d (Appendix B, p. B-6)
14. a (para 3-40)
15. a (Appendix B, pp. B-8, B-13)
16. d (para 3-31a(1))

APPENDIX A

MILITARY HISTORY: IS IT STILL PRACTICABLE?

by JAY LUVAAS©

There was a day, before the advent of the A-bomb and its more destructive offspring, before smart bombs and nerve gas, before computer technology and war games, when professional soldiers regarded reading history as a useful pastime. Many who have scaled the peaks of the military profession have testified to the utility of studying military history.

Most of these, however, seem to be commanding voices out of the past. MacArthur, steeped in family tradition and familiar with many of the 4000 volumes inherited from his father, was never at a loss for a historical example to underscore his point of view; Krueger, as a young officer, translated books and articles from the German military literature; Eisenhower spent countless hours listening to the erudite Fox Conner on what could be learned from military history; Marshall and his contemporaries at the Army Staff College at Leavenworth reconstructed Civil War campaigns from the after-action reports; Patton took the time in 1943 to read a book on the Norman conquest of Sicily nearly nine centuries earlier and to ponder "the many points in common with our operations";¹ and Eichelberger summoned from memory a passage he had read ten years before in Grant's *Memoirs* (which ought to be required reading for all officers) and thereby stiffened his resolve to press home the attack at Buna. These Army commanders were all remarkably well versed in history.

So were many of their civilian superiors. President Franklin D. Roosevelt was an avid reader of naval history, and Harry Truman frequently acknowledged the pertinent lessons that he had gleaned from a lifetime of exposure to history:

Reading history, to me, was far more than a romantic adventure. It was solid instruction and wise teaching which I somehow felt that I...needed....It seemed to me that if I could understand the true facts about the...development of the United States Government and could know the details of the lives of...its political leaders, I would be getting for myself a valuable...education.... I know of no surer way to get a solid foundation in political science and public administration than to study the histories of past administrations of the world's most successful system of government.²

Because the military is a "practical" profession geared much of the time to problem-solving, soldiers--like engineers and scientists--tend to be pragmatic about what is meant by the word "practicable." History is "practicable" if it yields lessons, especially exemplary lessons in tactics and strategy that can be directly applied to some current situation. History is "useful" in illustrating points of doctrine, in instilling in the young officer the proper military values or an appreciation for our military heritage. The "practical" man often scans the past for some magical formula that may ensure success in war, like Field Marshall von Schlieffen's theory of envelopment, or Captain B. H. Liddell Hart's strategy of indirect approach.

Such assumptions inevitably determine the way military history is taught. Because an important duty of the officer in peacetime is to teach, and because in the Army *teaching* usually involves *explaining*, it is often assumed that history, to be taught, must be explained. The emphasis therefore is on organizing and presenting information in a lucid, often lavishly illustrated lecture, in which tidy answers outrank nagging questions in the minds of everyone involved. The inference on the part of most students, if not the instructor, is that a person who remembers the lecture will somehow have learned history. It's a mistaken assumption we all make.

It is also true that no other field of history is under as much pressure as military history to provide

¹Luvaas, Jay. "Military History: Is It Still Practicable?" *Parameters: Journal of the US Army War College*, March 1982 (volume XII, number 1), U.S. Army War College: Carlisle Barracks, Pennsylvania, pages 2-14. Reprinted with permission.

"practical" answers to some current problem. If military history cannot provide such answers, why study it? The specialist in Renaissance diplomacy is rarely solicited for his views on foreign policy but, rather, is left alone to concentrate his thoughts on the cold war with the Turks in the 15th century. Nor is the scholar who has spent a lifetime studying the ramifications of the French Revolution apt to be consulted when news breaks of still another palace coup in some Latin-American banana republic. But let a historian or journalist prowl around in some remote corner in the field of military history and often he will be expected, even tempted, to function as a current-affairs military analyst.

Perhaps we think this way because, as a society, we are largely ignorant about both the facts and the nature of history. In high school, European History no longer is required, having been replaced by something called "Western Civilization." We know astonishingly little about the history of other societies, and most of us, unfortunately, care even less. Students voting with their feet in colleges and universities across the nation have caused enrollments in history courses to plummet as they turn to "more practical" subjects such as economics, psychology, biology, engineering, and business administration. In the Army's schools, history has become a casualty of the Vietnam War; clearly the emphasis now is upon training. Even at the Military Academy, the required course in the military art was severely curtailed several years ago and only recently has been restored to its logical place in the curriculum. For that matter, how many officers who have invested off-duty hours to work toward an advanced degree have taken it in history? In the officer corps of today, the subject is rarely considered "practicable."

More to the point, is the Army as an institution as historical-minded as it was in the past? For without even a rudimentary understanding of history and its processes, there is no way that the past can be made to offer object lessons for the future. Professor Pieter Geyl, a distinguished Dutch historian, reminds us that it is useless to talk about "the lessons of history" when the historian "is after all only a man sitting at his desk."³ The lessons that we would learn are his--the fruits of *his* labors, the creation of *his* imagination, perhaps the idea that *he* is to sell to the reader. For, as a German general asserted a hundred years ago, "it is well known that military history, when superficially studied, will furnish arguments in support of any theory or opinion."⁴

COMMON FALLACIES

Perhaps the most frequent error in the abuse of history is to take historical examples out of context. Once removed from its historical context, which is always unique, a battle or a campaign ceases to offer meaningful lessons from history. According to Napoleon, "old Frederick laughed in his sleeve at the parades of Potsdam when he perceived young officers, French, English, and Austrian so infatuated with the manoeuvre of the oblique order, which (in itself) was fit for nothing but to gain a few adjutant-majors a reputation." Napoleon appreciated that the secret of Frederick's successes was not the oblique order, but Frederick. "Genius acts through inspiration," Napoleon concluded. "What is good in one case is bad in another."⁵

One of Frederick's own soldiers demonstrated that in another environment even Frederick's maneuvers might fail. When Baron von Steuben, who had served in the Prussian Army throughout the Seven Years' War, was trying to make soldiers out of Washington's shivering, half-starved volunteers at Valley Forge, he knew better than to waste precious time teaching those complex maneuvers he had mastered under Frederick. Instead he selected only those that were essential to meet the unique conditions that prevailed in America, where volunteers had only a few months instead of years to master the intricacies of Frederick's drill, and where officers had to learn to lead by example instead of relying upon the severity of the Prussian system. Soldiers, Frederick repeatedly had warned, "can be held in check only through fear" and should therefore be made to "fear their officers more than all the dangers to which they are exposed.... Good will can never induce the common soldier to stand up to such dangers; he will only do so through fear."⁶ Whatever may have motivated Washington's amateur soldiers at Valley Forge, most certainly it was not fear.

If there is a lesson here for us, it is simply that solutions to problems are not to be viewed as interchangeable parts. Even the Germans in World War II apparently failed to heed this lesson in drawing conclusions from their own war experiences. In addition to displaying a tendency to generalize from personal or limited experience, they often indiscriminately applied the experiences of one situation to

entirely different circumstances. Thus the German Supreme Command "applied the experiences acquired on the Western Front in 1940, unchanged, to the war against Russia" despite the "greater tenacity" of the Russian soldier, his "insensibility against threatening the flanks," the scarcity of roads, and the vast space involved "giving...the opponent the possibility of avoiding decision." In the words of one German general, not only did this misapplication of experience influence the operational plan against Russia, it also "contributed to the final disappointment."⁷

It is also a distortion to compress the past into distinctive patterns, for it is as true of history as it is of nature that "each man reads his own peculiar lesson according to his own peculiar mind and mood."⁸ History responds generously to the adage "seek and ye shall find." At the turn of the century the Chief of the German General Staff, Count Alfred von Schlieffen, was faced with the need to plan for a war on two fronts. His solution was to point toward a quick victory on one front in order to avoid ultimate defeat on both, and his inspiration for the battle of annihilation essential to a quick victory came, at least in part, from reading the first volume of Hans Delbruck's *Geschichte der Kriegskunst*, which was published in 1900. Delbruck's treatment of the battle of Cannae in 216 B.C. convinced Schlieffen that Hannibal had won his lopsided victory by deliberately weakening his center and attacking with full force from both flanks. The much publicized Schlieffen Plan was an adaptation of this idea. Having thus discovered the "key," Schlieffen turned in his writings to the idea of envelopment to unlock the secrets of Frederick the Great and Napoleon, both of whom, he claimed, had always attempted to envelop the enemy. Similarly, Captain B. H. Liddell Hart was to discover from his research for a biography of Sherman that the key to Sherman's success lay in a strategy of indirect approach. When he turned to history at large for confirmation, of course he "discovered" that nearly all successful generals, whether they had been aware of it or not, had employed something akin to the strategy of indirect approach. The future British field marshal Sir Archibald Wavell, who always found Liddell Hart's ideas stimulating whether he agreed with them or not, once slyly suggested to the captain: "With your knowledge and brains and command of the pen, you could have written just as convincing a book called the 'Strategy of the Direct Approach.'"⁹ Wavell appreciated that it was Liddell Hart and not the muse of history who preached this attractive doctrine.

Moreover, nothing is necessarily proven by citing examples from history. There are many works on military theory that provide examples of bad argument from analogy or authority; such faulty use of historical examples, according to Karl von Clausewitz, "not only leaves the reader dissatisfied but even irritates his intelligence." The mere citation of historical examples provides only the *semblance* of proof, although the reader who understands little about the nature of history may set aside his book convinced of the essential truth of some new theory, and the audience exposed to a well-organized and seemingly cogent lecture sprinkled with examples from history is equally vulnerable. "There are occasions," Clausewitz noted,

where nothing will be proven by a dozen examples....If anyone lists a dozen defeats in which the losing side attacked with divided columns, I can list a dozen victories in which that very tactic was employed. Obviously this is no way to reach a conclusion.

And if the author or lecturer has never mastered the events he describes, "such superficial, irresponsible handling of history leads to hundreds of wrong ideas and bogus theorizing."¹⁰

Perhaps the greatest disservice to history and its lessons comes from its frequent association with a given set of military principles or doctrine, and here the celebrated Swiss theorist Baron de Jomini may have had an unfortunate influence. Drawing upon an exhaustive examination of 30 campaigns of Frederick and Napoleon, Jomini deduced certain fixed maxims and principles which he claimed were both eternal and universal in their application. If such maxims would not produce great generals they would "at least make generals sufficiently skillful to hold the second rank among the great captains" and would thus serve as "the true school for generals."¹¹

To future generations of young officers, Jomini said, in effect: "Gentlemen, I have not found a single instance where my principles, correctly applied, did not lead to success. They are based upon my unrivaled knowledge of the campaigns of Napoleon, much of it acquired at first hand, and of the basic works of Thiers, Napier, Lloyd, Tempelhof, Foy, and the Archduke Charles. Thanks to my labors you need not invest years of your own time in scrutinizing these voluminous histories. Did not Napoleon himself confess:

'I have studied history a great deal, and often, for want of a guide, have been forced to lose considerable time in useless reading'? You have only to study my principles and apply them faithfully, for 'there exists a fundamental principle of all the operations of war' which you neglect at your peril."¹²

Jomini had many prominent disciples, and their books were nearly all written on the assumption that battles and campaigns, ancient as well as modern, have succeeded or failed to the degree that they adhered to the principles of war as explained by Jomini and could be confirmed by the "constant teachings of history." But where Jomini read history, many of his followers read primarily Jomini and thus were one step removed from history and its processes.

The emergence of doctrine (as late as the American Civil War there were only drill manuals) and the introduction of historical sections on most European general staffs after the Prussian victories in 1866 and 1870 meant that increasingly, in the eyes of professional soldiers at least, military history was linked to doctrine and more specifically, to the principles of war as these principles were rediscovered and refined. Since World War I it has become fashionable to use history to illustrate the official principles of war as they are variously defined.

There are three dangers inherent in this approach. In the first place, pressed into service in this way history can only *illustrate* something already perceived as being true; it cannot prove its validity or lead to new discoveries. This is probably the terrain on which most soldiers first encounter the subject, and they would do well to heed the warning of Clausewitz that if "some historical event is being presented in order to demonstrate a general truth, care must be taken that every aspect bearing on the truth at issue is fully and circumstantially developed--carefully assembled ...before the reader's eyes." In other words, the theorist ought to be a pretty good historian. Clausewitz goes so far as to suggest that, even though historical examples have the advantage of "being more realistic and of bringing the idea they are illustrating to life," if the purpose of history is really to explain doctrine, "an imaginary case would do as well."¹³ Moreover, to use history primarily to illustrate accepted principles is really to put the cart before the horse. If one starts with what is perceived as truth and searches history for confirmation or illustrations, there can be no "lessons learned." How can there be?

A second weakness in linking history to doctrine is the natural tendency to let doctrine sit in judgment of historical events. Sir William Napier, who had a healthy respect for Jomini's theories, used his maxims as a basis for rendering historical judgment on the generalship of French and British leaders in his classic *History of the War in the Peninsula*. Similarly, Major General Sir Patrick MacDougall "discovered" that these maxims could also serve as criteria for judging the generalship of Hannibal, and Matthew F. Steele's *American Campaigns*, which was published in 1909 and endured as a text at the Military Academy and other Army schools even beyond World War II, used the maxims of Jomini, von der Goltz, and other late-19th-century theorists to form the basis for historical commentary on the generalship of individual American commanders.

Most serious of all is the ease and frequency with which faith in doctrine has actually distorted history. This was happening frequently by the end of the 19th century as each army in Europe developed and became committed to its own doctrine. It is the primary reason why the tactical and strategical lessons of the Civil War, which in many respects was the first modern war, went unheeded.¹⁴ Even the elaborate German General Staff histories on the wars of Frederick the Great and the wars of liberation against Napoleon never failed to drive home the soundness of current German doctrine,¹⁵ and the German official histories of the Boer War and the Russo-Japanese War similarly serve to demonstrate above all else the continuing validity of German doctrine. The Boers had applied that doctrine and *therefore* usually won, at least in the earlier battles before the weight of numbers alone could determine the outcome. British doctrine was faulty, if indeed the British yet had a doctrine, and *therefore* the British suffered repeated defeats. The Germans had trained the Japanese Army and the Japanese had won in 1904-05, "proving" again the superiority of German doctrine. Had a trained historian instead of an officer serving a tour with the Military History Section analyzed the same campaigns, surely he would have asked some searching questions about the differences in the discipline, morale, and leadership of the two armies. Did the Japanese cavalry win, for example, because of superior doctrine based on shock tactics or because it was better disciplined and led? To the officer corps of the day, the results demonstrated the weakness of the Russian Army's mounted infantry concepts in the face of shock tactics, whereas 10 years later, in a war

that, at the outset, was strikingly similar in the conditions prevailing on the battlefield, shock tactics did not prevail anywhere for long.

Thus military history distilled by Jomini and his disciples ultimately found itself shaped by a commitment to doctrine, and the instinct of most professional soldiers before World War I was to explain away exceptions to the official rules rather than to use history as a means of testing and refining them.

FACTS IN HISTORY

Although it is not always evident in a lecture or a textbook, we can never be completely certain--and therefore in agreement--about what actually happened in history. Frederick and Napoleon knew this well. Skeptical both of the historian's motives and of the reliability of his facts, they evinced a healthy skepticism about the ability of the human mind ever to recreate an event as it actually had happened.

"The *true truths* are very difficult to ascertain," Napoleon complained. "There are so many truths!"¹⁶

Historical fact...is often a mere word; it cannot be ascertained when events actually occur, in the heat of contrary passions; and if, later on, there is a consensus, this is only because there is no one left to contradict....What is...historical truth?....An agreed upon fiction.... There are facts that remain in eternal litigation.¹⁷

A Union staff officer whose corps bore the brunt of Pickett's charge at Gettysburg put it a different way:

A full account *of the battle as it was* will never, can never, be made. Who could sketch the charges, the constant fighting of the bloody panorama! It is not possible. The official reports may give results as to losses, with statements of attacks and repulses; they may also note the means by which results were attained...but the connection between means and results, the mode, the battle proper, these reports touch lightly. Two prominent reasons...account for the general inadequacy of these official reports...the literary infirmity of the reporters, and their not seeing themselves and their commands as others would have seen them. And factions, and parties, and politics... are already putting in their unreasonable demands....Of this battle greater than Waterloo, a history, just, comprehensive, complete, will never be written. By-and-by, out of the chaos of trash and falsehood that newspapers hold, out of the disjointed mass of reports, out of the traditions and tales that come down from the field, some eye that never saw the battle will select, and some pen will write what will be named *the* history. With that the world will be, and if we are alive we must be, content.¹⁸

This writer intuitively understood that as soon as the historian begins to impose order on something as chaotic as a battle, he distorts. If his narrative is to mean anything at all to the reader he must simplify and organize the "disjointed mass of reports." He must, for lack of space, omit incidents that did not contribute to the final result. He must resolve controversies, not merely report them, and he must recognize that not every general is candid, every report complete, every description accurate. Orders are not always executed; not every order is even relevant to the situation. At Gettysburg, the watches in the two armies were set 20 minutes apart, and after the battle Lee had some of his subordinates rewrite their after-action reports to avoid unnecessary dissension. Well may it be said that "on the actual day of battle naked truths may be picked up for the asking; by the following morning they have already begun to get into their uniforms."¹⁹

During World War I, German General Max Hoffman confided to his diary: "For the first time in my life I have...seen 'History' at close quarters, and I know that its actual process is very different from what is presented to posterity."²⁰ *Plutarch Lied* is the descriptive title of an impassioned indictment of the French military leadership on the other side of no-man's land:

Men who yesterday seemed destined to oblivion have, today, acquired immortality. Has some new virtue been instilled in them, has some magician touched them with his wand?....Civilian historians have studied historical events from a point of view which is exclusively military. Far from trusting to their own judgment, they have not considered it respectful to exercise their critical faculties on the

facts as guaranteed by a body of specialists. An idolatrous admiration for everything which concerns the army has conferred upon them the favour of having eyes which do not see and memories which are oblivious of their own experiences....An incredible conspiracy exists in France at this very moment. No one dares to write the truth.²¹

Even with the best of intentions and an impartial mind, it is difficult to reconstruct what actually happened in history. This truth was given eloquent expression by a French pilot on a reconnaissance flight to Arras in May 1940 as he reflected on the chaos engulfing a dying society 30,000 feet below.

Ah, the blueprint that historians will draft of all this! The angles they will plot to lend shape to this mess! They will take the word of a cabinet minister, the decision of a general, the discussion of a committee, and out of that parade of ghosts they will build historic conversations in which they will discern farsighted views and weighty responsibilities. They will invent agreements, resistances, attitudinous pleas, cowardices....Historians will forget reality. They will invent thinking men, joined by mysterious fibers to an intelligible universe, possessed of sound far-sighted views and pondering grave decisions according to the purest laws of Cartesian logic.²²

Even where there can be agreement on facts, there will be disagreements among historians. "To expect from history those final conclusions which may perhaps be obtained in other disciplines is...to misunderstand its nature." Something akin to the scientific method helps to establish facts, but the function of the historian is also to explain, to interpret, and to discriminate, and here "the personal element can no longer be ruled out.... Truth, though for God it may be One, assumes many shapes to men."²³

This explains the oft-quoted statement of Henry Adams, the famous American historian: "I have written too much history to believe in it. So if anyone wants to differ from me, I am prepared to agree with him."²⁴ No one who does not understand something about history could possibly know what Adams meant by this apparently cynical statement. Certainly he did not intend to imply that history, because it lacked unerring objectivity and precision, is of no practicable use to us. Quite the contrary. To recognize the frail structure of history is the first essential step toward *understanding*, which is far more important in putting history to work than blind faith in the validity of isolated facts. History tends to inspire more questions than answers, and the questions one asks of it determine the extent to which the subject may be considered practicable.

MAKING HISTORY INSTRUCTIVE

What, then, can the professional soldier expect to learn from history? If it can offer no abstract lessons to be applied indiscriminately or universally, if it cannot substantiate some cherished principles or official doctrine, if the subject itself is liable to endless bickering and interpretation, what is the point of looking at history at all?

Here Napoleon, whose writings and campaigns formed the basis of study for every principal military theorist for a hundred years after his death,²⁵ provides a useful answer in his first major campaign. When he assumed command of the French army in Italy in 1796, he took with him a history of a campaign conducted in the same theater by Marshal Maillebois half a century before, and more than one authority has noted the similarity in the two campaigns. "In both cases the object was to separate the allies and beat them in detail; in both cases the same passes through the maritime Alps were utilized, and in both cases the first objectives were the same."²⁶ In 1806, when he sent his cavalry commander, Murat, to reconnoiter the Bohemian frontier, he recommended that Murat take with him a history of the campaign that the French had waged there in 1741, and three years later Napoleon approved the location of pontoon bridges at Linz because Marshal Saxe had successfully constructed two bridges there in 1740. In 1813 he sent one of his marshals "an account of the battle fought by Gustavus Adolphus in positions similar to those which you occupy."²⁷

Obviously history served Napoleon not so much because it provided a model to be slavishly followed, but because it offered ways to capitalize on what others before him had experienced. History, Liddell Hart reminds us,

is universal experience--infinitely longer, wider, and more varied than any individual's experience. How often do we hear people claim knowledge of the world and of life because they are sixty or seventy years old?...There is no excuse for any literate person if he is less than three thousand years old in mind.²⁸

By this standard Patton was at least 900 years old after studying the Norman conquest of Sicily.

Napoleon also proposed, in 1807, the establishment of a special school of history at the College of France that would have practical application for officers. Trained historians would teach the military student how to make sound historical judgments, for Napoleon understood that "the correct way to read history is a real science in itself." He regarded the wars of the French Revolution as "fertile in useful lessons," yet apparently there had been no systematic effort to retrieve them. This too "would be an important function of the professors in the special school of history." For similar reasons Napoleon ordered his War Minister in 1811 to have the Depot of War prepare comprehensive records of the sieges and attacks of the fortified towns captured by the French armies in Germany, not for publication but for ready reference. And he did not discourage the printing of a similar volume on the sieges in Spain.²⁹

Napoleon thus conceived of history as serving a purpose similar to that of the publications of the Old Historical Division and its ultimate successor, the Center of Military History. He would have applauded the appearance of the *Guide to the Study and Use of Military History*,³⁰ for some way had to be found to steer the military student through the "veritable labyrinth" of campaign studies, technical treatises, and memoirs. Like Frederick, who viewed history as "a magazine of military ideas,"³¹ Napoleon would have been delighted with the official histories of the campaigns of World War II, Korea, and Vietnam, and with the extensive monographs on specialized subjects such as mobilization, logistics, and medical services.

On St. Helena Napoleon spoke of the need to publish manuscripts in the Imperial Library as a way of establishing a solid foundation for historical studies. Probably one of the first proposals of its kind, it anticipated by half a century the decision of the US War Department to publish in 128 meaty volumes *The Official Records of the Union and Confederate Armies*, a unique compilation of the after-action reports and official correspondence of Union and Confederate leaders. Napoleon also gave the first impetus to official military history when he created a historical section of the General Staff and named Baron Jomini to head it.³²

His most enduring suggestion, however, was the deathbed advice he offered to his son: "Let him read and meditate upon the wars of the great captains; it is the only way to learn the art of war."³³

Because Napoleon occasionally mentioned certain "principles of the art of war," he is often thought to have meant that the study of the Great Captains is valuable because it leads to the discovery of enduring principles or illustrates their successful application in the hands of genius. While acknowledging that these Great Captains had "succeeded only by conforming to the principles" and thus had made war "a true science," Napoleon offered more compelling reasons for studying the campaigns of Alexander, Hannibal, Caesar, Gustavus Adolphus, Turenne, and Frederick:

Tactics, the evolutions, the science of the engineer and the artillerist can be learned in treatises much like geometry, but the knowledge of the higher spheres of war is only acquired through the study of the wars and battles of the Great Captains and by experience. It had no precise, fixed rules. Everything depends on the character that nature has given to the general, on his qualities, on his faults, on the nature of the troops, on the range of weapons, on the season and on a thousand circumstances which are never the same.

The Great Captains must therefore serve as "our great models." Only by imitating them, by understanding the bases for their decisions, and by studying the reasons for their success could modern officers "hope to approach them."³⁴

Napoleon agreed with Frederick, who considered history "the school of princes"--princes, that is, who are destined to command armies--and who wrote his own candid memoirs in order that his successors might know "the true situation of affairs...the reasons that impelled me to act; what were my means, what

the snares of our enemies" so that they might benefit from his own mistakes "in order to shun them." And both would have endorsed Liddell Hart's observation that "history is a catalogue of mistakes. It is our duty to profit by them."³⁵

Whereas Jomini concentrated upon *maxims*, Frederick and Napoleon focused their attention on *men*. They stressed the need for a commander to view a military situation from the vantage point of his opponent, and for the military student to become privy to the thinking process of successful commanders. This was the advice Prince Eugene, Marlborough's sidekick and the greatest commander who ever served the Hapsburgs, gave to young Frederick when, as the heir to the Prussian throne, Frederick accompanied the Prussian contingent serving with the Imperial Army along the Rhine in 1734. After he had become the foremost general of his day, Frederick urged his own officers, when studying the campaigns of Prince Eugene, not to be content merely to memorize the details of his exploits but "to examine thoroughly his overall views and particularly *to learn how to think in the same way*."³⁶

This is still the best way to make military history practicable. "The purpose of history," Patton wrote shortly before his death,

is to learn how human beings react when exposed to the danger of wounds or death, and how high ranking individuals react when submitted to the onerous responsibility of conducting war or the preparations for war. The acquisition of knowledge concerning the dates or places on which certain events transpired is immaterial....³⁷

The future field marshal Earl Wavell gave similar advice to a class at the British Staff College shortly before World War II:

The real way to get value out of the study of military history is to take particular situations, and as far as possible get inside the skin of the man who made a decision and then see in what way you could have improved upon it.

"For heaven's sake," Wavell warned,

Don't treat the so-called principles of war as holy writ, like the Ten Commandments, to be learned by heart, and as having by their repetition some magic, like the incantations of savage priests. They are merely a set of common sense maxims, like 'cut your coat according to your cloth,' 'a rolling stone gathers no moss,' 'honesty is the best policy,' and so forth.³⁷

Merely to memorize the maxim "cut your coat according to your cloth" does not instruct one how to be a tailor, and Wavell reminded his listeners that no two theorists espoused exactly the same set of principles, which, he contended, "are all simply common sense and ...instinctive to the properly trained soldier."

To learn that Napoleon in 1796 with 20,000 men beat combined forces of 30,000 by something called 'economy of force' or 'operating on interior lines' is a mere waste of time. If you can understand how a young, unknown man inspired a half-starved, ragged, rather Bolshie crowd; how he filled their bellies, how he out-marched, out-witted, out-bluffed, and defeated men who had studied war all their lives and waged it according to the text books of the time, you will have learnt something worth knowing.

But the soldier will not learn it from military texts.³⁸

Sometimes military history is treated, in books and lectures alike, as though it exists primarily for the future field commander. Frederick might have assumed something of the sort in his own writings, but he wrote more about such practical subjects as feeding and drilling an army, the gathering and evaluation of intelligence, and how to treat friendly and hostile populations than he did about strategy. Likewise, Napoleon was concerned about military education at every level, and his advice to his son on studying the decisions of the Great Captains should not obscure the fact that he believed strongly in military history in his officers' schools and also as a practical subject for research.

History can be made practicable at any level. The future field marshal Erwin Rommel did not have future corps commanders necessarily in mind when he wrote *Infantry Attacks* in 1937. His lessons, deduced from the experiences of his battalion in World War I, could indeed have been of value to any company or field grade officer. For example, describing the events he witnessed in September 1914, Rommel concluded:

War makes extremely heavy demands on the soldier's strength and nerves. For this reason make heavy demands on your men in peacetime exercises.

It is difficult to maintain contact in fog....Advances through fog by means of a compass must be practiced, since smoke will frequently be employed. In a meeting engagement in the fog, the side capable of developing a maximum fire power on contact will get the upper hand; therefore, keep the machine guns ready for action at all times during the advance.

All units of the group must provide for their own security. This is especially true in close terrain and when faced with a highly mobile enemy.

Too much spade work is better than too little. Sweat saves blood.

Command posts must be dispersed....Do not choose a conspicuous hill for their location.

In forest fighting, the personal example of the commander is effective only on those troops in his immediate vicinity.

The rain favored the attack.³⁹

Rommel drew his own conclusions from his experiences, but a discriminating reader could probably have extracted them for himself.

These observations were not lost on Patton, who probably shared similar experiences and had been involved in training troops. During the Saar campaign in early 1945, Patton confided to his diary:

Woke up at 0300 and it was raining like hell. I actually got nervous and got up and read Rommel's book, *Infantry Attacks*. It was most helpful, as he described all the rains he had in September 1914 and *also the fact that, in spite of the heavy rains, the Germans got along*.⁴⁰

And so, shortly, did the Third Army.

Another book of this genre is *Infantry in Battle*, which was prepared at the Infantry School in 1934 under the direction of then Colonel George C. Marshall and revised four years later. Written on the assumption that "combat situations cannot be solved by rule," contributors to this book fell back upon numerous examples from World War I to introduce the reader to "the realities of war and the extremely difficult and highly disconcerting conditions under which tactical problems must be solved in the face of the enemy."⁴¹

Military history has also been used to test the ability of military students. In 1831 a British colonel published a tactical study of the battle of Spicheren, fought 20 years earlier. In the introduction he explained:

To gain from a relation of events the same abiding impressions as were stamped on the minds of those who played a part in them--and it is such impressions that create instinct--it is necessary to examine the situations developed during the operations so closely as to have a clear picture of the whole scene in our mind's eye; to assume, in imagination, the responsibilities of the leaders who were called upon to meet those situations; to come to a definite decision and to test the soundness of that decision by the actual event.⁴²

LEARNING FROM HISTORY

What Frederick, Napoleon, Rommel, Patton, Wavell, and many others referred to here have shared in common can be summed in one word: *reading*. An English general in the 18th century urged young officers to devote every spare minute to reading military history, "the most instructive of all reading"⁴³

"Books!" an anonymous old soldier during the Napoleonic wars pretended to snort. "And what are they but the dreams of peasants? They may make a Mack, but have they ever made a Xenophon, a Caesar, a Saxe, a Frederick, or a Bonaparte? Who would not laugh to hear the cobbler of Athens lecturing Hannibal on the art of war?"

"True," is his own rejoinder, "but as you are not Hannibal, listen to the cobbler."⁴⁴

Since the great majority of today's officers are college graduates, with a healthy percentage of them having studied for advanced degrees, they have probably long since passed the stage at which they can actually benefit from a conventional lecture on history, with the emphasis on factual content and the expectation of a clear conclusion. The leading question therefore becomes: How do we teach them to learn from history? J. F. C. Fuller, coauthor of the concept that later became known as *blitzkrieg*, had this problem in mind when he addressed a class at the British Staff College a few years after World War I. "Until you learn how to teach yourselves," he told the students, "you will never be taught by others."⁴⁵

Fuller did not specify how this was to be accomplished, but he probably would insist that to teach the officer how to teach himself should be the avowed objective of every course in military history. Certainly he would agree that no course in military history can really do much good if the officer is exposed every half dozen years throughout his career to no more than a structured course of only a few months' duration, especially if in the process he has gained little understanding of history as a discipline or a scant appreciation for how it can be used and abused. Assuredly such a voracious reader as Fuller--who at age 83 confessed to having recently sold off all of the books in his library that he could not read within the next 10 years--would argue that there would be no point to any history course whatever if the student is not stimulated to spend some time afterwards poking around the field a bit on his own. "Books," Fuller once wrote, "have always been my truest companions."⁴⁶

Any student of history must learn to identify with the men and events he reads about, seeking above all to understand their problems and to accept the past on its own terms. The student must also learn to ask questions, not of the instructor necessarily, but of his material and especially of himself. Historians usually worry more about asking the right questions than finding definitive answers, for they know from experience that no document or book can answer a question that is never asked. Had Patton read Rommel's book when the sun was shining, for example, and all was going well, chances are he would never have paid any attention to the casual observation that rain seemed to favor the attack. Cannae was an important battle to Schlieffen because the double envelopment achieved by Hannibal suggested a method by which a battle of annihilation might be fought in a war against France and Russia. But to Colonel Ardant du Picq, the foremost French military theorist of the 1860s, Hannibal was a great general for a quite different reason--"his admirable comprehension of the morale of combat, of the morale of the soldier."⁴⁷ The two men were searching for solutions to different kinds of problems, and in reading about Cannae each responded to his individual interests.

In the old Army, when there was enough leisure time for reading, riding, or a regular game of golf, it was probably understood that the burden of learning from military history must rest primarily upon the individual officer. The annual historical ride to the Civil War battlefields--which had been preserved by Act of Congress "for historical and professional military study"⁴⁸--directly involved students from the Army War College in the unending dialogue between past and present. Students were frequently asked on location how they would have handled some problem in tactics or command and control that had confronted a commander during battle. "It is not desirable to have the question answered," the instructions specified. "Some will know the answer, but all who do not will ask themselves the question."⁴⁹

This is the only way to learn from history. The textbook or the instructor can organize information, but only the student can put it to work. "Mere swallowing of either food or opinions," Fuller reminds us, "does not of necessity carry with it digestion, and without digestion swallowing is but labour lost and food wasted."⁵⁰

Today there is a shortage of both "labour and food," as other budgetary priorities and manpower shortages have forced severe cutbacks in history courses throughout the Army.

But in a sense this blinds us to the real problem, for it does not necessarily follow that more money and instructors must be the solution. A formal course in military history, however desirable, is not the only way and may, in fact, not be the best way to teach students how to teach themselves history, which is the goal. George C. Marshall, as future Chief of Staff, regarded his two years at the Army Staff College in 1906-08 as having been "immensely instructive," but not because of the quality of the courses there. "The association with the officers, the reading we did and the discussion...had a tremendous effect....I learned little I could use," Marshall wrote, but "I learned how to learn....My habits of thought were being trained."⁵¹

Marshall's words touch upon the essence of practicability. Military history may be of indeterminate value for the immediate future (if World War III were to be fought next week, for example), but among the captains in the career courses today are the Army's top administrators and leaders of tomorrow, and not all graduates of the war colleges in June will retire in the next six or eight years. Those that remain are bound to benefit from anything that can heighten their understanding of society, of other armies, of the political process, of leadership, of the nature of war, of the evolution of doctrine, and of a dozen similar areas of human activity in which history, pursued by an intelligent and inquisitive reader, can still be strikingly practicable to the modern soldier.

To any set of military maxims, whatever their origin, perhaps the following literary maxims should be added:⁵²

The history that lies inert in unread books does no work in the world.

If you want a new idea, read an old book.

'Tis the good reader that makes the good book.

A book is like a mirror. If an ass looks in, no prophet can peer out.

Dr. Jay Luvaas is Professor of History at Allegheny College, Meadville, Pennsylvania. He received his Ph.D. from Duke University in 1956. Among his major works are: *The Military Legacy of the Civil War* (1959), *The Education of an Army* (1964), *Frederick the Great on the Art of War* (1966), and *Dear Miss Em: General Eichelberger's War in the Pacific* (1972). During 1972-73, Professor Luvaas was the Visiting Professor of Military History at the U.S. Military Academy.

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APPENDIX B

EXCERPT FROM *THE STAFF RIDE* BY WILLIAM G. ROBERTSON¹

I. Introduction

By its very nature, war is a highly complex affair with a virtually infinite number of variables. Conducted in a dynamic environment by human beings, themselves infinitely variable in personality and intellect, war is played out on the three-dimensional chessboard of terrain. That war is also highly emotional makes it especially difficult to replicate through theoretical formulations because the human variables are impossible to isolate and quantify exactly. Yet soldiers who are charged with the conduct of war must continually strive in peacetime to prepare themselves to wage it successfully. Direct personal experience is one guide, but this knowledge usually is limited in scope and is often in short supply. Theory provides one substitute for experience but alone is far from satisfactory. Not nearly so neat and clear-cut as theory, but far more illustrative of the complexity engendered by human factors in war, is military history. Carefully integrated into training, military history can go far to provide the vicarious experience of war needed to further the professional education of soldiers.

One of the most effective ways to enlist military history in the cause of professional military education is to study the operations of opposing forces in actual campaigns. Campaigns of any historical period are replete with valuable lessons for the professional soldier. Changes in technology and corresponding changes in doctrine render some of the lessons obsolete, especially those linked to minor tactics. But other lessons are timeless because they spring either from universal operational principles or from universal human characteristics. It is these universal lessons that are most important for officers who aspire to higher command and a true mastery of the art of war. During their careers most officers are exposed to these lessons in some way, often through a sterile list of maxims or principles to be committed to memory but neither fully analyzed nor understood. Such a method is inadequate to the ultimate purpose, that of so fixing in an officer's mind both the principles and their circumstances that they will become second nature in time of crisis.

Just as the study of military history provides universal lessons or principles, so too can it provide the means to best inculcate them in the minds of officers. One way is to relate the lessons or principles to specific historical case studies of particular campaigns or battles. For the best results, these case studies should not be superficial but should be as detailed as the circumstances of study permit. Only by studying a campaign or battle in detail is it possible to discover why events unfolded as they did. Further, if at all possible the campaign or battle should be studied through primary sources which provide both the required degree of detail and the serious intellectual challenge to fully involve the mind of the student. (See Section X.)

What the student--the professional soldier--must achieve is what German military theorist Karl von Clausewitz in *On War* defined as *critical analysis*: determine the facts, establish cause and effect, and analyze the results. In simpler terms, the soldier must find out what happened, establish why and how events occurred as they did, and decide what these cause and effect relationships mean now. It is the immediacy of this last element--the answer to the question, "So what?"--that makes this approach to battle analysis a peculiarly military endeavor. The effect of such analysis is synergistic in fostering not just lessons but a deeper understanding of the realities of war.

A significant component of the detailed study of a campaign or battle is an analysis of the terrain over which the action took place and the effect of that terrain upon the campaign or battle. Good maps are essential for such analysis, but the best maps are poor substitutes for firsthand knowledge of the terrain. Thus a visit to the actual sites associated with a campaign, if they are not too changed, is the ultimate step

¹Robertson, William G. *The Staff Ride*. Washington D.C.: United States Army Center of Military History, 1987, pages 3-30.

in analysis of the terrain's effects on the action studied. If detailed historical case study encourages the identification of universal military lessons, then a visit to the actual site is the ultimate means of reinforcing these lessons in the minds of students. The combination of systematic historical study of a campaign with a visit to the site of operations for the purpose of professional military education is a staff ride.

II. Definitions

A. General

Armies of various nations have conducted staff rides since at least the mid-nineteenth century. As might be expected from their diverse origins, staff rides have varied widely in concept and execution. In some instances the operational situations employed as teaching vehicles have been hypothetical, in others they have been historical. The goals of staff rides have varied from the specific testing of operational concepts to the general enhancement of professional and analytical skills. All staff rides, however, have one idea in common--to place students on an actual piece of terrain, confront them with an operational situation, and stimulate them to reach conclusions or derive lessons from the experience.

B. Specific

Staff rides have often been confused with other types of exercises that employ terrain. The following definitions clarify terms:

1. A tactical exercise without troops (TEWT) involves a hypothetical scenario played out on actual terrain, usually employing current doctrinal concepts. Although the exercise may take place on an actual battle site, any relationship to historical events is usually coincidental. A tactical exercise without troops uses terrain, but not history, as a teaching vehicle.

2. A historical battlefield tour is a visit to the site of an actual campaign but with little or no preliminary systematic study. If led by an expert, the historical battlefield tour can stimulate thought and encourage student discussion but within limits set by the lack of systematic preparation and involvement. A historical battlefield tour uses both terrain and a historical situation but does not have a preliminary study phase.

3. A staff ride consists of systematic preliminary study of a selected campaign, an extensive visit to the actual sites associated with that campaign, and an opportunity to integrate the lessons derived from each. It envisions maximum student involvement before arrival at the site to guarantee thought, analysis, and discussion. A staff ride thus links a historical event, systematic preliminary study, and actual terrain to produce battle analysis in three dimensions. It consists of three distinct phases: preliminary study, field study, and integration.

III. Purposes and Objectives

The staff ride is a versatile educational tool. In a general sense, its sole purpose is to further the professional development of U.S. Army leaders. Specifically, it may be designed to achieve one or many objectives, depending upon the needs of the student clientele and the circumstances under which the staff ride is conducted. Some of these specific objectives may be

- A. To expose students to the dynamics of battle, especially those factors which interact to produce victory and defeat.
- B. To expose students to the "face of battle," the timeless human dimensions of warfare.
- C. To provide case studies in the application of the principles of war.
- D. To provide case studies in the operational art.

- E. To provide case studies in combined arms operations or in the operations of a single arm or branch.
- F. To provide case studies in the relationship between technology and doctrine.
- G. To provide case studies in leadership, at any level desired.
- H. To provide case studies in unit cohesion.
- I. To provide case studies in how logistical considerations affect operations.
- J. To show the effects of terrain upon plans and their implementation.
- K. To provide an analytical framework for the systematic study of campaigns and battles.
- L. To encourage officers to study their profession through the use of military history.
- M. To kindle or reinforce an interest in the heritage of the U.S. Army.

In fact, a carefully designed and implemented staff ride can attain simultaneously all of these objectives and more. Depending upon the campaign selected, the staff ride can illuminate any principle or lesson at any chosen level. Because its mixture of classroom and field study facilitates student involvement, it ensures that any educational benefits are more likely to be retained.

The commander should view the staff ride as a part of his training program to develop his subordinates. Like the Army Test and Evaluation Program, the staff ride should be exercised, critiqued, and improved upon. Its focus may vary according to the level of command to be exercised, the lessons to be emphasized, or the type of operation to be studied. Whatever form it takes, the staff ride is a continuing professional development exercise which will outlive any commander's tour. Like all major recurring training exercises, the staff ride should pass from project officer to project officer, each of whom becomes expert in its conduct. The staff ride file--all supporting documents, student packets, logistical support data--is part of the unit file and does not leave with a commander or project officer.

IV. Foundation of Staff Riding

A. Instructor knowledge

The primary instructor and his associates should have maximum knowledge of the selected campaign to the degree permitted by circumstances. In other words, staff ride instructors must be true subject-matter experts. They should ultimately be able to identify all important facets of an extremely complex human event and understand how these facets relate to each other. Having mastered their subject, the instructors should impart this knowledge to students by using current military concepts and terminology wherever possible. This subject-matter expertise will seldom be immediately available but will come incrementally with every iteration of the staff ride.

B. Student knowledge and involvement

Students must have maximum knowledge of and involvement in the staff ride to the degree permitted by circumstances. Students must not be permitted to visit the campaign site without a working knowledge of the basic framework of events, nor should they be passive spectators at any stage in the exercise. Gained through both individual study and collective discussion, this knowledge and involvement will reap large benefits during the field study portion of the course. The key is that students are active participants in the educational process: in the exchange of information, in the stimulation of thought, and in the collective analysis of the military operation.

C. Complete integration of the preliminary study and field study portions of the course

Staff ride instructors must be aware that the preliminary study and field study phases are individual parts of a larger whole. Standing alone, they cannot drive home the desired lessons with the same force as a truly integrated presentation. Without the field study phase, the preliminary study phase is an incomplete form of battle analysis, taught in a classroom environment. Without the systematic analysis of the preliminary study phase, the field study phase is simply a battlefield tour. Carefully integrated, the two activities generate optimal understanding and analytical thought.

V. The Instructor Team

A. General principles

The primary instructor and his associates are the central figures in the design and conduct of a successful staff ride. Although National Park Service rangers, licensed guides, and local historians may assist materially, they cannot be expected either to understand the particular educational focus of the exercise or to design a program with the U.S. Army's needs in mind. To the degree that the instructor team not only designs the staff ride but conducts all aspects of it as well, the goals dictated by the particular situation are best achieved and the U.S. Army's needs best served.

B. Specific requirements

To the degree that circumstances permit, the instructor team should

1. Be thoroughly conversant with the sources, both primary and secondary, relevant to the campaign selected.
2. Understand the organizational, doctrinal, and technological context in which the campaign took place.
3. Understand the operational context in which the campaign took place.
4. Be thoroughly conversant with the biographical data available on the opposing commanders and their principal subordinates and be able to characterize those individuals succinctly.
5. Know the orders of battle of the opposing forces and be able to characterize significant units in terms of size, armament, and quality.
6. Be thoroughly conversant with the movements and operations of all significant units in the campaign and be able to distinguish those events chronologically.
7. Be able to analyze the campaign and determine, to the degree possible, the factors significant to the historical outcome, including terrain not visited.
8. Know the ground associated with all aspects of the campaign, to be able to guide students easily to all relevant locations.
9. Understand current U.S. Army doctrine and terminology.
10. Be able to interpret the significant events of the campaign in terms of current U.S. Army doctrine and terminology wherever possible and assist students to derive usable lessons from the comparison.
11. Be able to assess carefully and monitor continually students' knowledge and interest levels to generate and retain their involvement throughout the exercise and keep them from becoming passive spectators.
12. Continually work to refine and improve the staff ride by developing new sources, new field study routes, more effective training aids, and greater subject-matter expertise.

VI. Site Selection

The selection of a campaign to be the subject of the staff ride is one of the most important decisions the primary instructor makes. Staff rides can be conducted wherever a historical campaign occurred, but some campaigns make far better teaching vehicles than others. Among the major considerations in selecting a site are

A. Experience level of the opposing forces

No matter how well trained in peacetime, units behave differently in their first engagements than in subsequent contests. If "first battle" lessons are important, engagements such as First Bull Run or Kasserine Pass should be chosen. Otherwise, operations involving veteran units will provide a far richer variety of lessons.

B. Echelon of command

Certain sites are well suited to illuminate lessons at the small-unit level but offer little from the operational perspective of war. Other campaigns are rich in operations that illuminate timeless staff problems. A staff ride class consisting of officers at battalion and company level should select a campaign most useful in providing lessons for that particular echelon of command. Similarly, a staff ride class consisting of general officers will profit more from studying a campaign chosen for its operational situations than one chosen for its minor tactics. Many campaigns (Napoleonic, American Civil War, the world wars, and the Korean War, for example) are complex enough to serve as excellent teaching vehicles at any echelon of command.

C. Type of terrain

Campaign sites can be found which encompass virtually any type of terrain desired--mountains, plains, heavy vegetation, desert, large or small streams.

D. Type of unit

The staff ride methodology can accommodate virtually all significant types of units. Most campaigns provide opportunities for studying the operations of infantry, artillery, and cavalry units, either singly or as combined arms. Similarly, logistical and support functions can usually be addressed in any campaign. Some campaigns, however, are not particularly useful in illuminating the role of specialized units such as engineers. Twentieth-century innovations such as armor and aviation are most easily studied on modern battlefields, although open-minded students guided by imaginative instructors can study these branches by analogy and on premechanized battlefields.

E. Integrity of historical setting

Some campaign sites remain relatively unchanged from their original historical settings, either because of conscious preservation or because of unsuitability for development. Other sites have been altered to one degree or another but are still recognizable and thus usable. Still others have been virtually obliterated, leaving little or nothing of the historical scene intact. Staff rides can be conducted at any of these sites, but as the degree of historical integrity declines, the task of the primary instructor and his associates becomes more difficult. Students have enough difficulty in mastering the details of past organizations and events; their task is made all the more difficult if they are required to block out many modern intrusions as well.

F. Availability of sources

A staff ride requires the support of as many sources of information as can be obtained. Even the simplest campaign entails an enormous number of facts, and the more of these instructors and students

can gather and assimilate, the better they can interpret the campaign. If both primary and secondary accounts exist, both should be utilized.

G. Availability of logistical support

No matter how excellent the chosen campaign may be as a teaching vehicle, it is not a good candidate for a successful staff ride if the instructor-student party cannot be supported logistically. Transportation, messing, and billeting facilities, as needed, must be reasonably close at hand. The student's attention should be completely focused on the intellectual aspects of the exercise and not distracted by inadequate logistical support.

H. Nearness to home station

Given the fiscal and time constraints imposed by a school's or unit's particular circumstances, the optimum site for a staff ride teaching specific lessons may be beyond the reach of that school or unit. Nevertheless, every effort should be made to seek a site that meets as many of the previous criteria as possible.

VII. The Preliminary Study Phase

In a staff ride, the purpose of the preliminary study phase is to prepare the student for the visit to the site of the selected campaign. If the student has not been well prepared as to the purpose of the exercise, the organizational and operational setting of the campaign, and the significant events of the action, and if the student has not become intellectually involved in the process of study, then the exercise becomes more a historical battlefield tour. The preliminary study phase is critical to the success of the field study phase and therefore equally critical to the success of the staff ride as a whole.

Since staff ride participants will usually be busy U.S. Army professionals who may have had little interest in history, the primary instructor and his associates must take student knowledge and interest levels into account when designing the preliminary study phase. The object is not to produce professional scholars but to use historical case study to enhance the professional military education of U.S. Army officers.

A. Form

The preliminary study phase may take various forms, depending upon the time available for study and the needs of the participants: formal classroom instruction, individual study, or a combination. Circumstances will dictate which form must be adopted, but it should be clearly recognized that some forms represent far more effective teaching techniques than others.

1. A preliminary study phase consisting solely of a lecture or lectures by the instructor team should be adopted only when extreme circumstances preclude the use of other methods. Lectures, providing little or no opportunity for student involvement, are most likely to produce passive students. In this form, almost all student-instructor and student-student interaction will take place in the field study phase.

2. At the opposite extreme from pure lecture is individual study. This form consists of providing students with packets of instructor-collected source materials to study individually before the field study phase of the staff ride. While requiring greater participation by the student than does the pure lecture, this form also forgoes the benefits derived from instructor guidance and group discussion and tends to encourage student passivity.

3. The optimum preliminary study phase combines lecture, individual study, and group discussion moderated by the instructor team. To get students actively involved, instructors may assign them specific subjects to investigate more intensively than the general background material and then brief to the group, either in a formal classroom setting or during the field study phase. Useful subjects in this regard are specific leaders, specific units, critical events, or specific functional areas such as logistics or communications. By creating mini-experts on particular subtopics, this method virtually guarantees lively

discussion and divergent viewpoints among participants. Once created in the preliminary study phase, this involvement carries over into the field study phase with decidedly positive results.

4. Few Army organizations will be able to devote to staff rides the time that is available at the highest levels of the Army educational system. This does not mean that staff rides are beyond their reach or that the preliminary study phase should be abandoned. Instead, innovative approaches to the preliminary study phase should be adopted. If formal classroom time is severely limited, it should simply address the purpose and objectives of the exercise as well as the historical, technological, and doctrinal context of the chosen campaign. Carefully selected reading packets geared to individual study then can illuminate critical aspects of the campaign in more detail. If the packets are designed to offer divergent viewpoints and generate discussion, so much the better. This discussion can take place on the battlefield itself.

5. No matter what form is adopted for the preliminary study phase, the instructor team must make every effort to ensure that the purposes of that phase are met. The more limited the time available for group discussion, the more the instructor team must compensate by carefully choosing sources, providing individual study packets, and being available to answer questions and stimulate thought.

B. Content

1. The preliminary study phase in any form must accomplish certain tasks:
 - a. Students must be informed of, and clearly understand, the purpose of the exercise.
 - b. Students must become actively involved in the exercise. They must not lapse into passive spectators.
 - c. Students must acquire the basic knowledge necessary to a general understanding of the selected campaign. Generally, this basic knowledge should consist of
 - (1) Organization, strength, armament, and doctrine of the opposing forces.
 - (2) Biographical and personality data on significant leaders.
 - (3) Relevant weapons characteristics.
 - (4) Relevant terrain and climatic considerations.
 - (5) General outline and chronology of significant events.
 - d. Students must develop an intellectual perception of the campaign that will be either reinforced or modified during the field study phase.
2. If possible, students should use the preliminary study phase to advance beyond general knowledge in their analysis and understanding. One way to this advancement is to have individual students focus their additional study on particular leaders, units, functional areas, or phases of the campaign.
3. During the preliminary study phase, students must be given access to the best sources that can be provided for them. As a minimum, a modern account (analytical, if possible) and a modern topographical map of the selected campaign should be made available to all participants. Beyond these general materials, relevant primary sources (such as after-action reports, official messages, personal accounts, contemporary maps) should be provided.

VIII. The Field Study Phase

The field study phase most readily distinguishes the staff ride from other forms of systematic historical study. It culminates all previous efforts by instructors and students to understand selected historical events, to analyze the significance of those events, and to derive relevant lessons for professional development. Because field study builds so heavily upon preliminary study, each phase must be designed to produce a coherent, integrated learning experience. If the preliminary phase has been systematic and thorough, the field phase reinforces ideas already generated. This is not to say that a systematic and thorough preliminary study phase permits a vestigial or hurried field study phase. Instead, the visual images and spatial relationships created by carefully designed field study reinforce any analytical conclusions acquired earlier. If, on the other hand, preliminary study has been hurried or incomplete, field study may raise entirely new issues or lines of analysis. In either case, the field study phase is the most effective way to stimulate the student's intellectual involvement and to ensure that he or she retains any analytical conclusions reached at any point in the staff ride process.

A. Design

1. The field study phase should be designed to visit all significant sites associated either with the selected campaign or with the portion emphasized in preliminary study. If only a portion of the field can be visited, the instructor team must summarize what occurred elsewhere so that students comprehend the campaign as a whole.
2. The route should be designed to visit sites in chronological order to avoid confusion and unnecessary complexity.
3. The route should avoid both backtracking and long barren segments to maintain involvement.
4. Planned stops or stands along the route may be selected for historical significance, visual impact, vignette suitability, or logistical necessity. No stops should be made simply in the hope that something may turn up.
5. The route schedule should be flexible enough to permit brief unplanned stops to address issues that students raise spontaneously.
6. If students have investigated certain topics beyond the level of general background knowledge, both planned and spontaneous stops provide opportunities for them to share their findings and stimulate discussion.
7. If available primary sources, such as vivid personal accounts or period photographs, can be linked to specific sites, those sites should be included in the route.
8. As much of the route as possible should be traversed on foot. Many terrain features which seem insignificant or are even invisible from a motor vehicle suddenly become prominent when viewed from the foot soldier's perspective. This perspective is critical to understanding all premechanized campaigns and most modern ones as well. Widely scattered sites will require motor transport between them, but, even so, students should dismount as frequently as possible to experience the effects of terrain firsthand.
9. Ease of access should be considered during the design of the field study route but should not necessarily override other considerations such as chronological development, site significance, or visual impact.
10. If significant sites lie on private land, easements granting temporary access must be obtained from property owners. No entry should be attempted otherwise.
11. If possible, alternate routes should be devised for segments of the primary route in case unforeseen circumstances or time constraints require a modification of the original program.
12. The instructor team should traverse the primary route and all alternate segments to discover any timing or other problems that might interfere with the successful completion of the field study phase.

Instructors should make additional spot checks just before the exercise to ensure that weather, accidents, or road repairs have not made the chosen route impassable.

B. Conduct

1. Throughout the field study phase, the instructor team should make every effort to maintain intense student involvement by removing distractions and keeping attention focused on the exercise.

2. The instructor team should ensure that students are correctly oriented both chronologically and spatially throughout the exercise. This orientation must be a continuous process. No matter how thorough the preliminary study phase has been, most students will tend to become disoriented at some point along the field study route, particularly in either close terrain or a highly complex historical situation. A partial solution is to have all students carry compasses, maps, and notes on relevant documentary material such as orders of battle. Nevertheless, only the instructor team, with its greater knowledge of both the historical events and the terrain, can ensure proper student orientation throughout the field study phase.

3. A simple technique to enhance both student involvement and orientation is the use of first person accounts, or vignettes, at specific stops along the field study route. These personal accounts are essential to any battle analysis, since they provide important information on the attitudes, perspectives, and mental state of the participants--the vital human dimension of battle. There are two methods of providing such vignettes:

a. The reading of vignettes drawn from primary sources. Ideally, such vignettes are brief and colorful. The instructor team should select them beforehand and arrange for easy access in the field. Carefully devised and correctly executed, vignettes will contribute significantly to re-creating the sense of time, place, and mood which every staff ride must achieve to be truly successful.

b. The use of veterans. For relatively recent campaigns, veterans of the operation who can supply truly living vignettes are unmatched for encouraging and retaining interest and involvement by participating in discussions with students and instructors. Veterans must be used carefully for best effect; if possible, they should be chosen because of particular roles they played in the selected campaign. Further, the instructor team should screen veterans for articulateness and accurate recollection. In some cases, screening may expose personal biases or personality traits that would make a veteran ineffective. If such difficulties can be overcome, a staff ride which includes veterans of the selected campaign will be extremely rewarding.

4. At every opportunity during the field study phase, the instructor team should stimulate student discussion and relate it to similar discussions held during preliminary study.

5. Any bus used on the field study route should be equipped with a public address system by which the instruction team provides commentary, previews stops, or reads vignettes to break the tedium.

6. Training aids can orient students, clarify complex maneuvers, and create immediacy. Such aids may include enlargements of contemporary photographs, situation maps, sketch maps, diagrams, and tape recordings of weapons sounds and period music.

7. The size of the student party and the instructor-to-student ratio will help determine the quality of the field study phase. In general, as the instructor-to-student ratio declines, so does student involvement and discussion. In most cases, thirty-five to forty students are the most a single instructor can lead and retain any degree of personal interchange. A much more effective ratio is one instructor for every fifteen to twenty students. Members of the instructor team should be spaced throughout a large party to answer questions, focus interest, and stimulate discussion.

8. During the dismounted portion of the field study phase, the instructor team should maintain a steady pace, neither rushing nor dawdling but progressing purposefully from point to point. The column should be kept compact, with file-closers if necessary, to prevent straggling. Left to their own devices, relatively large groups moving in column tend to disperse and have to be gathered at each stop.

9. Given the inflexibility of travel dates for most staff rides, both instructors and students should be prepared for bad weather. All members of the group should have seasonal protective clothing, and the instructor team should have route modifications and other contingency plans. Normally, these simple precautions will allow a successful field study even if weather is less than ideal.

IX. The Integration Phase

No matter how detailed the preliminary study or how carefully crafted the field study, a truly successful staff ride requires a third and final phase. This integration phase is a formal or informal opportunity for students and instructors to reflect jointly upon their experience.

Several positive effects stem from the integration phase. First, it requires students to analyze the previous phases and integrate what they learned in each into a coherent overall view. Second, it provides a mechanism through which students may organize and articulate their impressions of both the selected campaign and the lessons derived from its study. Third, students may gain additional insights from sharing these impressions with their peers. Finally, the instructor team may use the integration phase to solicit student comments on its performance and suggestions for improvement.

The integration phase may be conducted on the battlefield immediately following the field study phase, at a nearby location following the field study phase, or upon the return of the students to their home station. In general, however, the integration phase is most successful when it follows field study as closely as circumstances permit.

An instructor should moderate discussion during the integration phase and focus on the exercise just completed. He or she should allot enough time for all who wish to speak and for a complete discussion of any issues raised. The instructor should encourage candor among all participants.

X. Sources

A. Both primary and secondary sources are useful in a staff ride.

1. Primary sources are documents produced by participants or eyewitnesses, either contemporaneous with the events described or at some point thereafter. Included among primary sources are official documents such as after-action reports, orders, messages, strength reports, telephone logs, unit journals, maps, and map overlays. Also included are personal accounts such as letters, diaries, and reminiscences. For the most recent conflicts, the oral recollections of a participant are a primary source. Although they, like all sources, must be analyzed critically, primary sources are the raw material from which historical events are reconstructed.

2. Secondary sources are accounts of events produced by nonparticipants who received their information secondhand from primary sources or other secondary accounts. Secondary sources are most often narrative in form; many are analytical in nature. Their authors range from enthusiastic amateurs to professional historians.

3. Examples

a. For the period of the American Civil War, a primary source is any of the 128 volumes of the U.S. War Department's *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies* (Washington: Government Printing Office, 1880-1901); a secondary source is Bruce Catton's *A Stillness at Appomattox* (Garden City, N.Y.: Doubleday, 1953).

b. For the period of World War II, a primary source is a unit journal held in the National Archives; a secondary source is any volume in the official series *United States Army in World War II*, published by the U.S. Army Center of Military History.

4. The function and placement of primary and secondary sources in the course structure differ significantly.

B. Secondary sources are most valuable in the initial stages of study when the immediate need is for general background information and a simple chronological outline of events. Secondary sources can also bring order to what initially seems a confusing jumble of facts and conflicting testimony. Secondary sources

thus represent both an introduction to the subject and a convenient framework on which to attach relevant primary materials as they are digested. Analytical secondary sources may also stimulate student analysis by providing a frame of reference for initial discussion.

C. Valuable as they are, secondary sources should not be the sole materials furnished to staff ride students. Because they represent a highly selective winnowing of a much larger mass of primary materials, secondary sources tend to omit many details that may be critical to an analysis of events by professional soldiers. Also, by selecting only certain facts for presentation, the author of a secondary source tends to focus the student's attention in particular directions at the expense of others, thereby losing profitable avenues of inquiry to all but the most diligent. Finally, no matter how colorfully written, secondary sources lack the immediacy and the impact of an account by a participant or an eyewitness.

D. Inevitably, certain units may be forced to rely exclusively upon secondary sources such as the United States Army in World War II series. Units which have conducted successful staff rides by relying solely on secondary sources state that a good rule of thumb is "the more, the better." Instructors should make every effort to collect as many of the most pertinent secondary works as are available. The officers of the unit should be canvassed for relevant works in their own professional libraries and for friends in other units or on other posts who would be willing to help build a temporary library. At the same time, the instructor team should enlist the aid of post librarians, whose collections often are part of much larger information and book-lending networks. The objective should be to assemble the best available operational picture of the action and arrange it to give the students a thorough foundation for the preliminary study phase. As a further inducement to participate in both the preliminary study and field study phases, students might well be required to prepare their own operational schematics and maps, especially if the secondary sources fail to provide the kinds of details needed for the purpose of the exercise. All such measures, however, are compromises. Efforts made by units even in the most adverse circumstances to go beyond secondary sources will be rewarded by a more stimulating and professionally useful experience.

E. Primary sources are most successfully introduced in the preliminary study phase after staff ride students have already learned general background and basic chronology, through either lectures or secondary sources. The value of primary sources is threefold:

1. Primary sources provide a large quantity of raw material for student analysis. Their richness of detail gives students the opportunity to understand exactly how the opposing forces conducted their operational and administrative affairs and permits comparison between earlier and current practice. Reading original orders and message traffic instead of summaries and paraphrases allows students to draw their own conclusions about commanders' and staffs' mindsets at particular times. Similarly, student analysis of original after-action reports may generate insight into how the authors perceived certain events and why they emphasized or omitted those events. Examination of contemporary maps with all their imperfections may clarify otherwise inexplicable operational decisions.

2. Primary sources allow students to relate more closely to a past situation. By the very nature of the exercise, staff ride students must attempt to place themselves figuratively in another time and context. This sense of "how things were" is difficult to attain but, to the degree it can be achieved, contributes signally to the success of the exercise. Primary sources, judiciously used in both the preliminary study phase and the field study phase, are the most important resource available to propel the student to an earlier time.

3. Because of their detail and complexity, primary sources are an intellectual challenge to the staff ride student. They require the student to study them, analyze them, and reach conclusions about them to a far higher degree than do most secondary sources. The process through which the student assimilates primary sources strengthens his or her commitment to the exercise and involvement in a learning experience. An added training benefit accrues to military leaders who use these contemporaneous records; the staff estimates, orders, overlays, and after-action reports are the same, or similar, kinds of staff actions they encounter day to day with the U.S. Army in the field.

F. The use of primary sources is not without pitfalls. For instance, primary does not always equate to *correct*. Because staff ride students are professional soldiers rather than professional scholars, they often need assistance in threading their way through the primary materials provided for their use. As their own

knowledge increases over time, instructors should be able to provide this guidance. While important, such assistance should in no way relieve students of their responsibility to involve themselves deeply in the analytical process. Used intelligently, primary sources contribute greatly to the success of a staff ride; used ignorantly, they contribute equally to its failure.

XI. Training Aids

Imaginative training aids will improve both the preliminary and field study phases. Availability and suitability of these aids will vary with the historical period selected, the amount of time available, and the amount of resources committed to the project. The following types of training aids are a sample of what an instructor team may use:

A. Maps

Each student should have access to topographical maps of appropriate scale as well as copies of maps contemporary to the historical period under study. Maps of either type in 35-mm. slide, viewgraph, or panel chart format may be used by both instructors and students in the preliminary study phase. During the field study phase the instructor team may use appropriately marked maps to illuminate specific points, while students may use maps to orient themselves.

B. Photographs

Large numbers of photographs exist from all of America's wars beginning with the Civil War. These may be used by instructors and students during the preliminary study phase to illustrate any number of points. Photographs of uniforms, equipment, and commanders are readily available and may enliven lectures and briefings. Action shots from twentieth-century conflicts serve a similar function. An especially effective technique during the field study phase is to match a historical photograph to its actual site for a then-and-now comparison.

C. Paintings, drawings, and diagrams

When photographs are not available, these illustrations may serve the same educational purpose. Diagrams created especially for the staff ride by the instructor team may be used to good effect in both the preliminary study phase and the field study phase.

D. Films and videotapes

Although these items may be costly and may not fit into the time constraints of the preliminary study phase, they should not be overlooked as an educational resource. Film footage of twentieth-century conflicts is especially powerful. Other film or television tape series showing the employment of weapons of an earlier era can provide a visual dimension to battle analysis not attainable by any other means.

E. Tape recordings

In some circumstances tape recordings may be useful either in illustrating a point or in setting a mood. Recordings of nineteenth-century weapons firing may help to re-create nineteenth-century campaigns. Recorded music from any period may provide a useful link to the past. Veterans may record their recollections if they are unable to join the field study phase in person.

F. Artifacts

Uniforms, personal effects, weapons, and inert ammunition may be used in the preliminary study phase to illustrate a wide variety of points. Their utility increases if students can examine them directly.

G. Terrain boards

Although often difficult to research accurately, terrain boards may have some utility during the preliminary study phase to illustrate the general nature of the terrain on which the selected campaign was conducted. In no sense, however, should they be considered a substitute for the field study phase of a staff ride.

XII. Logistical Support

Depending upon such variables as the site selected for study, the size of the group, and the amount of time available, logistical support of the field study phase of a staff ride can be a complex operation that requires considerable prior planning and coordination. Although often unnoticed by participants, particularly if competently executed, this logistical support is a major factor in the success or failure of the exercise. Specific details will vary with individual staff rides, but certain general principles remain valid.

The logistical support of the field study phase should be so designed that transportation, messing, and billeting will not detract from the educational aspects of the exercise. This does not mean that the instructor team must cater to every whim of the participants. It does recognize, however, that poorly designed travel schedules, inadequate messing arrangements, and uncomfortable billeting may distract students from their primary purpose.

Logistical support is an integral part of field study and must be taken into account during the design of that phase. For example, travel schedules may define the amount of time available at the site and thereby limit what can be done educationally. Messing sites may be limited to certain locations by regulation or availability and therefore require adjustment of the proposed field study route. Parking for motor vehicles or landing zones for helicopters may be similarly limited and require adjustments. Safety considerations may also force deviation from preferred educational routes. These and other logistical considerations must be identified early in the planning process and integrated into the design of the field study phase. If identified soon enough, potential educational-logistical conflicts can usually be resolved satisfactorily.

Because of the detail and coordination involved, responsibility for logistical support of the field study phase should be formally assigned to a member of the instructor team at the earliest possible moment. This logistical coordinator should consult regularly with the primary instructor to integrate education and logistics. When the student party is especially large, additional members of the instructor team will need to assist the logistical coordinator.

Those assigned to logistical duties must be made aware of the importance of their work to the success of the exercise and should take pride in their tasks. Those items arranged by the logistical coordinator and his assistants--timely and dependable transportation, timely and nourishing meals or refreshments, cost-effective but comfortable billets--all contribute to the quality of the staff ride.

The logistical coordinator should also provide for medical support. A field environment raises the possibility of accidental injury or exposure to health hazards. Infrequent medical emergencies do occur, and contingency plans should be devised. Standard precautions should include first aid kits, evacuation plans, and identification of nearby sources of medical assistance.

XIII. Secondary Benefits

Although professional military education is sufficient reason for devoting time and resources to a staff ride, certain secondary benefits may accrue as well. These benefits spring from the fact that, for many participants, a visit to a great battlefield is an emotional experience that may reinforce their feelings for their profession, their units, and one another. If participants belong to the same unit, their shared experiences during the exercise may strengthen the camaraderie and esprit so necessary for unit cohesion. If promotions or individual achievement awards are due to be conferred at the time of the staff ride, there can be no better setting for the ceremony than a site hallowed by earlier deeds of sacrifice and valor. Significant in themselves, such experiences become even more meaningful in the context of a staff ride to the site of a great campaign of the past. An example of an exercise designed principally to achieve these secondary ends is described by Lt. Col. Richard M. Swain in "Terrain Walk" (*Field Artillery Journal* 52 [July-August 1984]:46-47).

XIV. Concluding Remarks

The design and conduct of a staff ride is not a simple task to be taken lightly or done on the cheap. By its very nature, a staff ride is both time and resource intensive. A staff ride requires subject-matter expertise, intelligently applied in a systematic way, to guide professional soldiers through the most complex of intellectual exercises--the analysis of battle in all its dimensions. If a terrain exercise is all that is required, a TEWT can be constructed on any convenient piece of ground. Such terrain exercises are useful, but they are not staff rides. If soldiers are to be taken to a battlefield of the past but there is little or no time for systematic preliminary study, a historical battlefield tour is all that is required. Such tours also have their place, but they are not staff rides. A staff ride yields far broader results than a TEWT or a tour but is far more difficult to devise. Those who want to create a staff ride must be aware of these difficulties. Carefully designed and intelligently executed, a staff ride is one of the most powerful instruments available for the professional development of U.S. Army leaders.

APPENDIX C

PROFESSIONAL READING PROGRAM

All officers should be engaged in a professional reading program. This program should include history. The following reading list includes military medical history, which is usually absent from most other military reading lists. This reading list is a consolidation of selected titles from the MQS II reading list and the AMEDD MQS II reading list for lieutenants and captains. It also contains recommendations of books which may be of particular interest to officers in the various corps of the AMEDD.

- * Indicates a book on the MQS II reading list for lieutenants
- ** Indicates a book on the MQS II reading list for list for lieutenants and captains
- *** Indicates a book on the MQS II reading list for captains
- **** Indicates a book on the AMEDD MQS II reading list for lieutenants and captains

Ackerknecht, Erwin H.

A Short History of Medicine, Baltimore: The Johns Hopkins University Press, 1982

Adams, George Washington

Doctors in Blue, New York: Collier, 1961***

Aker, Frank

October 1973: The Arab Israeli War, Hamden, CT: Shoe String Press, 1985*

Ambrose, Stephen E.

Eisenhower: The President, New York: Simon and Schuster, 1984*

Appleman, Roy E.

East of Chosin: Entrapment and Breakout in Korea, 1950, College Station, TX: Texas A&M University Press, 1987***

Barnett, Corelli

The Swordbearers: Supreme Command in the First World War, Bloomington, IN: Indiana University Press, 1975*

Bayne-Jones, Stanhope

The Evolution of Preventive Medicine in the United States Army, 1606-1939, Washington, D.C.: U.S. Government Printing Office, 1968****

Beebe, Gilbert W., and Michael E. DeBakey

Battle Casualties: Incidence, Mortality, and Logistic Considerations, Springfield, IL: Charles C. Thomas Publisher, 1952****

Blair, Clay

Korea: The Forgotten War, New York: Times Books, 1987*

Blanco, Richard L.

Wellington's Surgeon General: Sir James McGregor, Durham, NC: Duke University Press, 1974****

Blumenson, Martin

The Patton Papers, Houghton and Mifflin Company, Vol. 1, 1972, Vol 2, 1974

Braestrup, Peter

Big Story: How the American Press and Television Reported and Interpreted the Crisis of Tet 1968 in Vietnam and Washington, Westview Press, 1983**

Brodie, Bernard and Fawn M.

From Crossbow to H-Bomb, Bloomington, IN: Indiana University Press, 1973**

Caputo, Philip

A Rumor of War, New York: Ballantine Books, 1978**

Catton, Bruce

A Stillness at Appomattox, Garden City, NY: Doubleday and Company, 1953*

Clayton, James D.

A Time for Giants: The Politics of High Command in WWII, Franklin Waits, 1987***

Clayton, James D.

The Years of MacArthur: Triumph and Disaster 1945-1964 (volume 3), Houghton Mifflin Company, 1985*

Collins, Arthur S. Jr.

Common Sense Training: A Working Philosophy for Leaders, Novato, CA: Presido Press, 1979**

Cook, John L.

Dust Off, New York: Bantam Books, 1988

Cosmos, Graham

An Army for Empire, The United States Army in the Spanish-American War, University of Missouri Press, 1971*

Cowdery, Albert E.

The Medics' War, Washington, D.C.: U.S. Government Printing Office, 1987

Creveld, Martin Van

Command in War, Harvard University Press, 1985**

Creveld, Martin Van

Supplying War: Logistics from Wellington to Patton, New York: Cambridge University Press, 1979**

Creveld, Martin Van

Technology in War: From 2000 B.C. to the Present, New York: Free Press, 1988**

Cunningham, Horace H.

Doctors in Grey: The Confederate Medical Service, Magnolia, MA: Peter Smith Publisher, 1958****

DeMillie, Nelson

Word of Honor, New York: Warner Books, 1985***

Dorland, Peter, and James Nanny

Dustoff: Army Aeromedical Evacuation in Vietnam, Washington, D.C.: U.S. Government Printing Office, 1982

Doughty, Robert

Seeds of Disaster: Development of French Doctrine 1919-1939, Archer Books, 1985**

Downs, Frederick

The Killing Zone: My Life in the Vietnam War, New York: Berkley Publishing Group, 1987**

Duffy, John

From Humors to Medical Science, 2d edition, Urbana, IL: University of Illinois Press, 1993

Duncan, Louis C.

The Medical Department of the United States Army in the Civil War (reprint), Gaithersburg, MD: Butternut Press, 1985

Depuy, R. E., and Trevor Dupuy

Brave Men and Great Captains, Hero Books, 1984*

Fall , Bernard

Hell in a Very Small Place, New York: J.B. Lippencott Company, 1963*

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Street Without Joy, New York: Schocken Books, 1972**

Fehrenback, T. R.

This Kind of War: A Study in Unpreparedness, New York: MacMillian Company, 1963

Fishbein, Morris (editor)

Doctors at War (reproduction of 1945 edition), New York: Arno Press.****

Flanagan, E. M. Jr.

The Los Banos Raid: The 11th Airborne Jumps at Dawn, Novato, CA: Presidio Press, 1986***

Forester, C. S.

The General (1936 reprint), Nautical and Aviation Books, 1982*

Foster, Gaines M.

The Demands of Humanity: Army Medical Disaster Relief, Washington, D.C.: U.S. Government Printing Office, 1983

Freedman, Dan, and Jacqueline Rhoads

Nurses in Vietnam: The Forgotten Veterans, Austin, TX: Texas Monthly Press, 1987

Fuller, J. F. C.

Generalship -- Its Diseases and Their Cure: A Study of the Personal Factor in Command (reprint of 1936 edition), Ft. Leavenworth, KS: U.S. Army Command and General Staff College, 1987***

Gabriel, Richard A., and Paul L. Savage

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Gilett, Mary C.

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Gilett, Mary C.

The Army Medical Department 1818-1865, Washington, D.C.: U.S. Government Printing Office, 1987

Gilett, Mary C.

The Army Medical Department 1865-1917, Washington, D.C.: U.S. Government Printing Office, 1994

Glasser, Ronald J.

365 Days, New York: George Braziller, 1980

Goulden, Joseph C.

Korea: The Untold Story of the War, New York: Times Books, 1982*

Grant, Ulysses S.

Personal Memoirs (2 volumes, 1894; reprinted 2-volumes-in-1), New York: AMS Press, 1978*

Griffith, Paddy

Battle Tactics of the Civil War, New Haven, CT: Yale University Press, 1989

Halberstram, David

One Very Hot Day, New York: Warner Books, 1984*

Hapgood, David, and David Richardson

Monte Cassino, St. Martins Press, 1984*

Hardaway, Robert M.

Care of the Wounded in Vietnam, Manhattan, KS: Sunflower University Press, 1988

Harvard Nuclear Study Group

Living With Nuclear Weapons, Harvard University Press, 1983*

Heller, Charles E., and William A. Strofft (editors)

America's First Battles 1776-1965, Lawrence, KS: University Press of Kansas, 1986**

Hemingway, Ernest

For Whom the Bell Tolls, New York: Scribner, 1940*

Horne, Alistair

A Savage War of Peace: Algeria 1954-1962, New York: Viking, 1977***

Hume, Edgar Erskine

Victories of Army Medicine, Philadelphia: J. B. Lippincott Company, 1943****

Huston, James A.

The Sinews of War: Army Logistics 1775-1953, Army Historical Series, Washington, D.C.: Office of the Chief of Military History, U.S. Army, 1966. CMH Pub 30-4*

Jeffcott, George F. (editor)

Dental Services in World War II, Washington, D.C.: U.S. Government Printing Office, 1955

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Warrior in White, San Antonio, TX: The Watercress Press, 1990

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Law, Soldiers, and Combat, Westport, CT: Greenwood Press, 1978

Keegan, John

The Face of Battle, New York: Penguin Books, 1983**

Keegan, John

The Mask of Command, New York: Viking, 1987***

Kendrick, Douglas B. (editor)

Blood Program in World War II, Washington, D.C.: U.S. Government Printing Office, 1964

Kerpinevich, Andrew F.

The Army and Vietnam, Baltimore: The Johns Hopkins University Press, 1986***

Lang, Daniel

Casualties of War, New York: McGraw Hill, 1968***

Larteguy, Jean

The Centurians, E. P. Dutton and Company, 1962*

Lee, Harriet S., and Myra L. McDaniel (editors)

Army Medical Specialists Corps, Washington, D.C.: U.S. Government Printing Office, 1968

Lewis, Lloyd

Sherman: Fighting Prophet, New York: Harcourt Brace and Company, 1982*

Linderman, Gerald F.

Embattled Courage: The Experience of Combat in the American Civil War, New York: Free Press, 1988**

Luvaas, Jay

The Military Legacy of the Civil War (reprint, paperback edition), Lawrence, KS: University Press of Kansas, 1988

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Company Commander, New York: Bantam Books, 1984**

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A Time For Trumpets: The Untold Story of the Battle of the Bulge, New York: Bantam Books, 1985*

MacDonald, Charles B., and Sidney T. Mathews

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Integration of the Armed Forces 1940-1965, Washington, D.C.: U.S. Government Printing Office, 1981

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The Pursuit of Power: Technology, Armed Force and Society Since 1000 A.D., Chicago: University of Chicago Press, 1982****

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Fatal Partners: War and Disease, New York: Doubleday, 1941****

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Ambush: The Battle of Dau Tieng, Nashville, TN: Battery Press, 1983****

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The Road Past Mandalay: A Personal Narrative, New York: Harper and Brothers, 1961***

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Battle Cry of Freedom, New York: Oxford University Press, 1988

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The Conduct of a Just and Limited War, New York: Praeger, 1983**

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The 25 Year War: America's Military Role in Vietnam, University Press Kentucky, 1984**

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12, 20, & 5: A Doctor's Year in Vietnam, New York: Bantam Books, 1986

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Perrett, Bryan

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Pogue, Forrest C.

George Marshall: Education of a General 1880-1939 (edited by Gordon Harrison), New York: Viking Press, 1963***

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Larrey: Surgeon to Napoleon's Imperial Guard, New York: Transatlantic, 1975****

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Attack, Vienna, VA: Athena Press, 1979**

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The Forgotten Soldier, Elmsford, NY: Pergamon Press, 1976**

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The Arnhietter Affair, New York: Random House, 1972***

Slim, Field Marshall Sir William

Defeat Into Victory, New York: MacKay, 1961; London, Pupaermac, 1986***

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On Strategy: The Vietnam War in Context, Washington, D.C.: U.S. Government Printing Office, 1983**

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A Midwife's Tale, New York: Vintage Books, 1990

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Surgeon on Iwo--Up Front With the 27th Marines, Navato, CA; Presidio Press, 1984

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**CORRESPONDENCE COURSE OF THE
U.S. ARMY MEDICAL DEPARTMENT
CENTER AND SCHOOL**

EXAMINATION

SUBCOURSE MD0405	Military Medical History.
CREDIT HOURS	5 hours.
LESSON ASSIGNMENT	Lessons 1 through 3 and appendixes A and B.
MATERIALS REQUIRED	No. 2 lead pencil.
SUGGESTIONS	<p>Check to see that your computerized answer sheet is for edition 5 of Subcourse MD0405. Inform Nonresident Instruction Branch, U.S. Army Medical Department Center and School, of any mismatch so that you will receive the correct grade.</p> <p>You may use the subcourse text in accomplishing this examination.</p>
INSTRUCTIONS	<p>Each of the following questions or incomplete statements is followed by a group of lettered responses. Select the ONE response that BEST answers the question or completes the statement. On the answer sheet, blacken the space corresponding to the letter of your choice.</p>

THIS EXAMINATION CONSISTS OF 50 ITEMS.

1. Military medicine is held to the standards of:
 - a. Civilian health professions.
 - b. Military readiness.
 - c. Both civilian health professions and military readiness.

2. Medical research, predictions about disease threats, and medical projections for mobilization requirements are part of which level of military medicine?
 - a. Operational.
 - b. Strategic.
 - c. Tactical.

3. Direct patient care and the evacuation of patients from the battlefield is part of which level of military medicine?
 - a. Operational.
 - b. Strategic.
 - c. Tactical.

4. The planning of preventive medicine activities, medical logistics, and the placement of hospitals are part of which level of military medicine?
 - a. Operational.
 - b. Strategic.
 - c. Tactical.

5. Which of the following ancient civilizations developed the highest level of military medicine?
 - a. Egypt.
 - b. Greece.
 - c. Mesopotamia.
 - d. Rome.

6. What new development in warfare occurred around the sixteenth century that produced a great challenge to military medicine?
 - a. Antipersonnel cannons and muskets powered by gunpowder.
 - b. High-velocity, small-caliber weapons.
 - c. Siege cannons that could breach walls.
 - d. Spanish long bow.

7. Jean Louis Petit is known for:
 - a. Developing a screw tourniquet which made thigh amputation possible.
 - b. Developing blood transfusion techniques.
 - c. Developing specialized surgical instrument used to remove musket balls.
 - d. Identifying the cause of epidemic typhus.

8. During Operation Desert Shield, soldiers became sick in the early weeks of deployment. What was the cause of this problem?
- Biological warfare.
 - Lack of immunizations.
 - Lack of proper food inspection.
 - Lack of purified drinking water.

SPECIAL INSTRUCTIONS: Examination items 9 through 18 pertain to the American Revolutionary War.

9. During the American Revolutionary war, the enlisted men assigned to hospitals were usually:
- Assigned by drawing straws.
 - Health care professionals in civilian life.
 - Not suited for military life and which the line commander could best do without.
 - Trained by physicians prior to being accepted for medical duty.
10. Which of the following was used to treat malaria with some success?
- Arsenic.
 - Cinchona bark.
 - Mercury.
 - Opium
11. The "Hospital" was established by Congress in:
- 1775.
 - 1776.
 - 1777.
 - 1778.

12. Which of the following served as the second chief physician of the Hospital and was later removed from his post.

- a. Andrew Craigie.
- b. Benjamin Church.
- c. Joseph Lovell.
- d. John Morgan.

13. Which of the following was the chief physician of the Hospital who was later court-martialed for being an informant for the British.

- a. Andrew Craigie.
- b. Benjamin Church.
- c. Joseph Lovell.
- d. John Morgan.

14. Which of the following served as the fourth chief physician of the Hospital and served until the end of the war.

- a. John Cochran.
- b. Andrew Craigie.
- c. John Morgan.
- d. William Shippen.

15. Which of the following was a physician killed during the Battle of Breed's Hill while serving as a line officer?

- a. Jonathan Potts.
- b. Benjamin Rush.
- c. John Warren.
- d. Joseph Warren.

16. Which of the following was a physician who signed the Declaration of Independence and wrote a book in which he stressed that line officers needed to implement medical advice?
- a. Usher Parsons.
 - b. Jonathan Potts
 - c. Benjamin Rush.
 - d. John Warren.
17. Which of the following is/are true concerning inoculation for smallpox at the beginning of the Revolutionary War?
- a. Inoculation was a benign procedure which was used almost universally in the civilian population.
 - b. Inoculation could result in the person contracting the disease and dying.
 - c. People who were inoculated could not transmit the disease to others.
 - d. Responses "b" and "c" are both true.
18. What decision did General Washington make on whether or not to inoculate soldiers for smallpox?
- a. He decided to inoculate the entire Continental line.
 - b. He decided to inoculate all of the officers since they were most at risk, but not to inoculate the enlisted personnel.
 - c. He decided to inoculate all of the enlisted personnel since they were most at risk, but not to inoculate the officers..
 - d. He decided to forbid inoculation for all members of the Continental line.
19. Which of the following statements is/are true concerning the status of medical officers in the military between the Revolution and the War of 1812?
- a. They could give orders to nonmedical personnel.
 - b. They were subject to courts-martial.
 - c. They held military rank like line officers.
 - d. They were entitled to the privileges and courtesies due line officers.
 - e. All of the above statements are true.

20. Who became the first Surgeon General of the permanent medical department in 1818?
- a. Benjamin Church.
 - b. Edward Cutbush.
 - c. Stephen Decatur.
 - d. Joseph Lovell.

21. William Beaumont was a military surgeon who is best known for his experiments on:
- a. Animal disease vectors.
 - b. Animal reproductive systems.
 - c. The human central nervous system.
 - d. The human digestive system.
22. What physician developed an effective method of evacuation under Napoleon?
- a. Appert.
 - b. Coste.
 - c. Larrey.
 - d. Letterman.
 - e. Von Steuben.
23. French "flying ambulances" were used to:
- a. Carry medical supplies used to treat casualties on the battlefield.
 - b. Evacuate casualties rapidly to a medical treatment facility.
 - c. Remove the dead from the battlefield.
 - d. Responses "a" and "b" above.
 - e. Responses "a," "b," and "c" above.
24. The major danger faced by American ground troops during the Mexican-American War (1846-1848) was:
- a. Enemy fire from the Mexican navy.
 - b. Mosquito-borne diseases.
 - c. Scurvy.

25. Jonathan Letterman's main contribution to the U.S. Army Medical Department was:
- Devising an improved evacuation system.
 - Draining the swamp land in Florida.
 - Ordering the best surgeons of the division take over administrative and other medical services and leave the actual surgery to the more junior surgeons.
 - Requiring inoculation for malaria in Panama.
26. The germ theory of infection was tested by _____ who developed antiseptic surgery.
- Robert Koch.
 - Joseph Lister.
 - Louis Pasteur.
 - George Woods.
27. Which of the following was the greater cause of death to American soldiers in the Spanish-American War between mobilization and the official end of the war?
- Disease in the Philippines.
 - Disease within the United States.
 - Enemy action in Cuba and Puerto Rico.
 - Enemy naval action in the Philippines.
28. The development of high-velocity, small-bore caliber rifles near the end of the nineteenth century resulted in:
- Decreased damage to tissue due to the smaller size of the bullet.
 - Decreased infection and bleeding due to the increased heat of the bullet which cauterized blood vessels.
 - Increased damage to tissue due to explosive charges in the bullet.
 - Increased damage to tissue due to the bullet shattering bone with bone fragments acting as secondary missiles.

29. *Red Rover*, the first hospital ship to be operated by American troops in support of fleet actions in hostile waters, served in the:

- a. War of 1812.
- b. Mexican-American War.
- c. American Civil War.
- d. Spanish-American War.
- e. First World War.

30. Army physician Walter Reed became known for his discovery that mosquitoes transmitted:

- a. Malaria.
- b. Typhoid.
- c. Typhus.
- d. Yellow fever.

31. One of the major debates at the beginning of the twentieth century was whether hospital ships should be under the command of a medical officer or a line officer. The issue was settled when Stokes, a _____ officer, was named commanding officer of the hospital ship *Relief*.

- a. Medical.
- b. Line.

32. In World War I, Major Theodore Lyster determined which one of the following to be the major cause of death among Army airplane pilots?

- a. Accidents resulting from inadequate rest.
- b. Enemy fire from antiaircraft guns.
- c. Enemy fire from opposing aircraft.
- d. Fire from "friendly" forces.

33. In World War I, Major Theodore Lyster greatly improved medical service provided to airplane pilots. One of his innovations was requiring flight surgeons to:

- a. Conduct research in high altitude stress.
- b. Have medical degrees.
- c. Learn how to fly aircraft.
- d. Take classes in engineering.

34. The Allied death rate from the use of poison gas in World War I was:
- Over 60 percent of gassed soldiers.
 - Slightly under 50 percent of gassed soldiers.
 - Between 20 and 25 percent of gassed soldiers.
 - Less than 5 percent of gassed soldiers.
35. American soldiers in World War I were administered the TAB vaccine to combat:
- Malaria.
 - Poisonous gas.
 - Typhoid fever.
 - Typhus.
36. A major improvement for wounded soldiers requiring surgery in World War I was the use of _____ to control shock following surgery.
- Antibiotics.
 - Blood transfusions.
 - Cold therapy.
 - Heat therapy.
37. In World War II, medical personnel tried to use testing to eliminate the incidence of combat stress reaction. Which of the following statements best summarizes the results?
- Psychiatric testing proved to be of no value to the military.
 - Psychiatric testing could identify the obviously unfit, but could not predict the reaction of individuals to combat stress.
 - Psychiatric testing resulted in eliminating almost all soldiers subject to combat stress reaction from serving in combat areas.
 - Psychiatric testing resulted in identifying almost all soldiers subject to combat stress reaction and curing them of this behavior before sending them to combat areas.

38. In 1943, some LST (landing ship, tank) vessels were used as a "ward" by augmenting its medical personnel and using folding cots for beds. Approximately how many cots would an LST have?
- a. 20.
 - b. 40.
 - c. 100.
 - d. 150.
39. A chemical which proved to be very useful in controlling insects which transmitted typhus during World War II was:
- a. Atabrine.
 - b. DDT.
 - c. Penicillin.
 - d. Sodium phenobarbital.
40. In 1947, the Nurse Corps and the Women's Medical Specialist Corps were added to the Army Medical Department. Which of the following is true about these corps when they were created?
- a. Males could serve in the Nurse Corps, but not in the Women's Medical Specialist Corps.
 - b. Males could serve in the Women's Medical Specialist Corps, but not in the Nurse Corps.
 - c. Males could serve in neither the Women's Medical Specialist Corps or the Nurse Corps.
 - d. Males could serve in both the Women's Medical Specialist Corps and the Nurse Corps.
41. The Mobile Army Surgical Hospital (MASH) with helicopters serving as air ambulances was first used during the:
- a. Korean War.
 - b. Persian Gulf War.
 - c. Second World War.
 - d. Vietnam War.

42. The term "dust-off" is associated with:
- a. Converting to jet-powered aircraft.
 - b. Decontamination of soldiers exposed to chemical agents and/or nuclear fallout.
 - c. Dusting of civilian populations with insecticide.
 - d. Helicopter air ambulances.
43. A systematic study of a military campaign, followed by an extensive visit to the actual site of the campaign, followed by an opportunity to analyze and integrate the results of the visit is a description of a:
- a. Historical battlefield tour.
 - b. Staff ride.
 - c. Tactical exercise without troops.
44. Which of the following describes the term civil action?
- a. AMEDD actions taken while the U.S. Army is in control of civil operations as an army of occupation.
 - b. AMEDD actions taken while the U.S. Army is in control of civil operations while the country is under martial law.
 - c. AMEDD actions taken while the U.S. Army is assisting the existing government in conducting civil operations.
 - d. Responses "a," "b," and "c" above.
45. The first major war in which fewer American soldiers died from disease than from battle injuries was the:
- a. Mexican-American War.
 - b. American Civil War.
 - c. First World War.
 - d. Second World War.

46. Probably the most important medical event between the world wars was the:
- Discovery of penicillin.
 - Invention of the Blake splint.
 - Invention of the x-ray machine.
 - Use of chlorine to purify water.
47. The Medical Civil Action Program was first used in:
- Grenada.
 - Korea.
 - Puerto Rico.
 - Vietnam.
48. Which of the following, if any, is/are correct concerning the U.S. Army medical system during World War II?
- Hospital ships were protected from attack under the Geneva Conventions, but LSTs used as floating wards were not.
 - Portable surgical hospitals were usually collocated with the general hospitals.
 - The division surgeon usually commanded the battalion aid station.
 - None of the above are true.
 - Statements "a," "b," and "c" above are true.
49. Based upon his article, with which of the following would Jay Luvaas agree?
- The military historian cannot know with completely certain what actually happened during a campaign.
 - The study of military history will lead to the discovery of fixed maxims and principles which are both eternal and universal in their application.
 - The historian's personal belief in the current military doctrine does not effect the why in which he interprets military history.
 - Military history can prove the validity of a tactic since tactics that have proven successful on the battlefield in the past will be equally successful on future battles.

50. Which of the following is a good suggestion when planning a staff ride?
- a. Ease of access is more important on a staff ride than chronological development.
 - b. Maintain a rigid schedule while visiting the site.
 - c. Obtain permission from property owners before visiting sites on private property.
 - d. Traverse as much of the site as possible in a car or other motorized vehicle.

END OF EXAMINATION