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MORRISTOWN NATIONAL HISTORICAL PARK

1779-80 ENCAMPMENT

A STUDY OF MEDICAL SERVICES

APRIL 1971

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1779-80 ENCAMPMENT

A STUDY OF MEDICAL SERVICES

by

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**OFFICE OF HISTORY AND HISTORIC ARCHITECTURE
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**UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE**



Foreword

This report on the medical services at Morristown during the winter encampment of 1779-80 was undertaken to restudy and evaluate the subject in the light of the standard practices of the Continental Army Medical Department. One phase of the evaluation is to determine if the existence and location of the present replica of the so-called Tilton Hospital in the Jockey Hollow area can be justified historically. For interpretive purposes, the report reviews the organic structure of the medical or hospital department, identifies and describes health problems and diseases, and outlines the medical resources of the military surgeons to combat incident diseases and preserve the health of the soldiers.

Research on the subject was conducted at the Library of Congress, the National Archives, Pennsylvania Historical Society, American Philosophical Society, the Library Company of Philadelphia and the Morristown NHP library.

Several persons contributed to the completion of this study. As usual, Superintendent Stephen H. Lewis and Historians Bruce W. Steward and Diana F. Skiles provided splendid cooperation during my stay in the park; Leah S. Burt, Assistant Park Archivist, located Dr. Cochran's "LetterBook" in the Morristown Public Library. In the National Archives, the diligent efforts of Miss Marie Bouhnicht, Office of Old Military Records, resulted in locating much-needed hospital returns of Valley Forge, Middlebrook and Morristown. A special thank you goes to Historian Frank B. Sarles, Jr. and Barry Mackintosh for proofreading the draft of the report and to Miss Mary Shipman for typing it in final form.

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Introduction

During the American Revolution, New Jersey housed and sustained Washington's Continental Army during three long winters - one at Middlebrook (1778-79) and two at Morristown (1776-77 and 1779-80). Serious problems of medicine and health followed the patriot army from the battlefields to the encampments. It is a matter of record that the administration of the medical facilities had a direct effect on the efficiency and morale of the American army. Yet, while practically every feature of the war has been analyzed, the important subject of medicine and health has remained either neglected or ignored by military historians. As a medical historian wrote, to "Kill men is a picturesque affair, to cure them is not at all so." (1)

Chronic diseases accompanied the army everywhere. It was estimated that the average rate of sickness in the American army was 18 per cent. At various times sickness severely crippled the American war machine and in part accounted for enforced periods of inactivity and even several defeats. A noted Revolutionary physician determined roughly that from 10 to 20 men died of camp diseases for one by the weapons of the enemy. Such was the magnitude of the health problem in the Continental Army! (2)

Congress created a medical organization for the care of the sick and wounded which became an indispensable branch of the army. This was accomplished with the realization that the war would be long and drawn out and that the efficiency of the troops depended upon the quantity and quality of the medical services.

1. Louis C. Duncan, Medical Men in the American Revolution, 1775-1783 (Medical Field Service School, Pennsylvania, 1931), p. 3.

2. James Tilton, Economical Observations on Military Hospitals (Wilmington, Delaware, 1813), p. 34; Howard Lewis Applegate, "The Need for Further Study in the Medical History of the American Revolutionary Army," Military Medicine (Washington, D. C., Association of Military Surgeons of the United States, August 1961), vol. 126, No. 8, p. 617.

To understand the whole range of hospital and medical services provided during the winter encampment of 1779-80, it is necessary to have some general knowledge of the organic structure of the Revolutionary War Hospital Department. Thus the following introduction is intended to summarize some general features of the medical organization.

At its meeting of May 10, 1775, the Congress made no provision for a medical organization when it passed the act for the appointment of general officers and officers of the army general staff. Recognizing this oversight, Washington wrote Congress on July 21 urging that some provisions be made, "for the lives and health of both officers and men so much depend on a due regulation of this department." (3) Largely as a result of Washington's request, Congress adopted a "Hospital" plan on July 27. This act intended to provide centralized authority under a single administrative officer called Chief Physician and Director General of the Army Hospital. In theory he was in charge of all medical posts, but when the act was passed, there was only one, that of Cambridge. His staff would consist of four surgeons, twenty surgeon's mates, an apothecary, a clerk, two storekeepers, a matron, one nurse for every ten sick, and laborers as needed.

Dr. Benjamin Church, of Boston, and Dr. John Morgan, of Philadelphia, headed the Hospital Department successively between 1775-1777. Morgan was succeeded in 1777 by Dr. William Shippen, Jr., also of Philadelphia, who served until January 1781. (4)

3. Harvey E. Brown, The Medical Department of the United States Army from 1775 to 1873 (Washington, D. C., Surgeon General's Office, 1873), p. 4.

4. Worthington Chauncey Ford, ed., Journals of the Continental Congress, 1774-1789 (Washington, D. C., Government Printing Office, 1904-37, III, 294-95; Edward Warren, The Life of George Warren (Boston, 1874), pp. 53-59; Betsy Copping Corner, William Shippen, Jr., Pioneer in American Medical Education (American Philosophical Society: Philadelphia, 1951); Whitfield J. Bell, Jr., John Morgan, Continental Doctor (Philadelphia, University of Pennsylvania Press, 1965); Edgar Erskine Hume, Victories of Army Medicine-Scientific Accomplishments of the Medical Department of the United States Army (Philadelphia, J.E. Lippincott Company, 1943), pp. 2-3.

In all the legislative enactments of the Continental Congress and in the bulk of the official correspondence, the term "Hospital" was used to denote the whole medical management of the war and not merely a building or series of buildings for the treatment of the sick and wounded. In other words, the Hospital was the department or bureau of the army responsible for all matters pertaining to medical services. From 1775 to 1781 Congress supervised the Hospital through the Medical Committee created on September 14, 1775. The membership of this administrative agency varied during each session of Congress and only a minority of the members were professional medical men. This Committee centralized the distribution of medicines and supplies, nominated medical officers, and inspected the various hospitals.

In the campaign of 1776 the Continental Army went into the battles of New York with its medical services still disorganized; the men suffered greatly from the need of system, and perhaps knowledge, in the management of medical affairs. One problem was that the hospitals, as they were established, tended to remain independent of each other and prevented the coordination of Continental medical services.

To provide necessary coordination and centralization in the medical department, Dr. Shippen and Dr. John Cochran prepared a plan patterned after the medical organization of the British Army. This plan was approved by Washington and forwarded to Congress. By a resolution of Congress, Shippen and Cochran's plan was adopted on April 7, 1777, but in a revised form.

As approved, the plan called for the formation of a new Hospital, to be separated into four districts which corresponded to the military divisions: Eastern, east of the Hudson; Northern, region of Lake Champlain; Middle, from the Hudson to the Potomac; and Southern, south of the Potomac. To each of these districts was given a deputy director general, an assistant deputy director general, a physician general and a surgeon general, all responsible to the Director General. In each district one physician and one surgeon would superintend the practice of the hospitals; in each army one physician and surgeon general would superintend the regimental surgeons, whose position was otherwise undefined. Other hospital officers were commissioned senior surgeons, second surgeons, surgeon's mates, regimental surgeons, and regimental mates. For other than medical duties there were provided apothecaries, commissaries, clerks, paymasters, stewards, matrons, nurses, and stablers. (5) Further legislation by Congress in 1778, 1780 and 1782 made important changes, but the medical organization by districts remained until October 1780. (6)

5. Journ. Cont. Cong., VII, 110, 161-64, 197-200, 231-37, 244-45, 253-54, 289-90; IX, 941; XV, 1214, 1294-96; John C. Fitzpatrick, ed., The Writings of George Washington (39 vols., Washington, D. C., Government Printing Office, 1931-44, VII, 149-51.

6. Journ. Cont. Cong., February 6, 1778, X, 28-31; September 30, 1780, XVIII, 878-86; January 3, 1782, XXII, 4-7.

Two important Hospital officers were the Purveyor, who obtained and distributed supplies and provisions for the different hospitals, and the Apothecary, who prepared and issued capital medicines and drugs. The main warehouse of supplies was located at Reading, Pennsylvania, where Dr. Jonathan Potts, the Purveyor General, maintained his headquarters. Hospital drugs were prepared and compounded mostly at Apothecary General Dr. D. A. Craigie's shop at Carlisle, Pennsylvania.

There were three general types of supplies needed in the hospitals: special provisions for the sick; hospital furniture including bedding, clothing, eating utensils, cooking and washing equipment, candles, and the like; and medical necessities including bandages, instruments, herbs, paper, string, and all varieties of drugs. (7) The Apothecary, who received the drugs and medicines from the Purveyor, prepared those items for use and delivered them to the various hospitals where they were distributed by his assistants. The Apothecary also supplied each regimental surgeon with a chest of medicines and instruments, commonly called the "Apothecary Ration." (8)

At the beginning of the Revolution there were but very few hospitals in the colonies. Except in the larger towns - Philadelphia, New York and Boston - there were no general hospitals anywhere in the whole country. That of Philadelphia, established in 1755, was the first permanent hospital in America; it was used both by Americans and British during the war. Even the best hospitals which did exist provided unwholesome, deleterious accommodations for the sick. With ensuing hostilities and military campaigns, other hospitals had to be established.

7. Francis Allison to Jonathan Potts, April 27, 1778, James Fallon to James Craik, April 7, 1778, William Brown to Potts, March 11, 1778, and Manheim Hospital inventory, March 7, 1778, and Manheim Hospital inventory, March 7, 1778, quoted in James E. Gibson, Dr. Edo Otto (Wisconsin, George Banta Publishing Company, 1937), pp. 156-57, 162-65; Howard Lewis Applegate, "The American Revolutionary War Hospital Department," Military Medicine (Washington, D. C., Association of Military Surgeons, 1961), April, No. 4, p. 301.

8. Andrew Craigie to Potts, May 1, 1776, quoted in Gibson, op. cit., pp. 155-56; Journ. Cont. Cong., July 17, 1776, April 17, 1777, February 6, 1778, V, 568-69, VII, 232, X, 128-31.

At first a single institution, the Continental Army Hospital was necessarily divided and expanded as war progressed. During the earliest months of fighting, private houses were used as general hospitals, and later on the medical department followed the practice of requisitioning barns, churches, college halls, and public buildings, which unfortunately were not always suited for housing the sick and wounded. Some of these improvised hospitals had no heating facilities and the patients suffered untold hardships.

The first hospitals were established at Cambridge and they continued to find place in different locations: temporarily at the shifting front, more permanently in towns conveniently distant from active operations. Those near the seat of the war in New Jersey and Pennsylvania were the most frequented and notable hospitals - at Amboy, Philadelphia, Elizabethtown, Fort Lee, New Brunswick, Lititz, Lancaster, Trenton, Newark, Princeton, and Bethlehem. Perhaps the most notorious was that of Bethlehem, established in December 1776. (9)

It is estimated that at the time of the Revolution there were about 200 persons possessing medical degrees in the thirteen colonies and probably about 3,500 practitioners. Of these total numbers, about 1,200 served in the army and navy during the eight years of the war. Medical men played a large and active part in the war - in the practice of their profession, as prominent officers of the Line, and in the Halls of Congress. Many doctors with flintlock, sword and scalpel fought, suffered and died during the grim years of the conflict; everywhere medical men were found in the forefront of action. (10)

9. Duncan, op. cit., pp. 127-28; James Gregory Mumford, A Narrative of Medicine in America (Philadelphia, J. B. Lippincott Company, 1903), pp. 131-32. See also John W. Jordan, "The Military Hospitals at Bethlehem and Lititz during the Revolution," The Pennsylvania Magazine, XX, No. 2 (1896), pp. 137-57; Herbert Huebener Beck, "The Military hospital at Lititz, 1777-78," Lancaster County Historical Society Papers (Lancaster, Pennsylvania, 1919).

10. Hume, op. cit., pp. 2-6; Duncan, op. cit.; pp. 1-6. Von Herbert M. Morais, "Doctors and the American Revolution," NTM (Heft 6, 2 Jahrgang, 1965), pp. 99-120; J. M. Toner, The Medical Men of the Revolution (Philadelphia, 1876); Carl Binger, Revolutionary Doctor (New York, W. W. Norton and Company, 1966).

The great majority of the physicians of the period were self-taught or graduates of the apprenticeship system. Local practitioners took into their offices those seeking to become doctors, let them read books, taught them to prepare medicines and compound drugs, and gave them first hand observation of treatment. Yet, the men who were given positions of responsibility in the Continental Hospital were all university-trained men." (11)

At the outbreak of the war a number of unlettered and very incompetent medical officers found their way into the army. Many of those first commissioned were never educated to the profession, and were to the last degree ignorant, factious, and turbulent, averse to all subordination and order, and as stated by Washington, "a disgrace to the profession, the army, and the Society." The regimental surgeons and mates, many of whom were designated by Washington as "very great rascals," were dissatisfied at having the officers of the general hospital take equal rank with themselves. There was "a constant bickering among them, which tends greatly to the injury of the sick." (12) Some of the surgeons made a practice of selling recommendations for furloughs and discharges. "Some had never seen an operation of surgery, and were ignorant to a degree scarcely to be imagined." (13)

After the medical organization was established by Congress, the Director General was given power to appoint and examine candidates for the positions of hospital and regimental surgeons and mates. They were tested in the subjects of anatomy, surgery, physiology, and medicine; candidates for surgery had to demonstrate good eyesight and manual dexterity. Director Generals Church and Morgan found fierce opposition from locally appointed surgeons whose competence as civilian doctors had never been challenged. Some of them resigned rather than submit to what they claimed was an indignity, while others simply refused to comply with the orders. General Washington revoked all medical commissions in the summer of 1776 and required new examinations; all surgeon and mate commissions had to be certified by the Director General. Therefore, most of the military surgeons were examined by the Director General or his deputies. (14)

11. Duncan, op. cit., pp. 1-2; Dictionary of American Biography (New York, Charles Scribner's Sons, 1933).

12. Washington to the President of Congress, September 24, 1776, Jared Sparks, Writings of Washington (Boston, 1834), IV, 117; Fitzpatrick, op. cit., IV, 51, 107-08.

13. George W. Morris, The Early History of Medicine in Philadelphia (Collins Printing House, 1886), p. 196.

14. Applegate, Hospital Department, p. 300.

There is no account available of American medical service comparable to Hamilton's description of the British. In view of the older organization of the British Army, however, the difficulties Washington had with his army, and the general low state of medical education in the colonies at that time, it can be reasonably assumed that the American medical service rarely equaled and probably never excelled the British. In his account Hamilton laments that unqualified men were appointed surgeon's mates in the British service, some with no better training than was afforded by a few months of work in an apothecary's shop. Even a common soldier from the ranks, after assisting the surgeon of the regiment in spreading plasters for some time, and in the capacity of orderly man, was appointed mate when there was a vacancy. (15)

As a whole, the management of the medical matters during the Revolution was quite inexperienced, without precedent, always guided by principles of economy, and generally unsuccessful, as is indicated by the frequent legislation and directives. It appears that the main difficulties of the medical organization came about primarily because in the existing state of the colonies it was almost impossible to obtain subsistence, shelter, supplies, or transportation for the sick and wounded. These difficulties were compounded by a bureaucratic system of organization controlled by a medical Committee that was not always aware of the needs of the fighting men. All these factors explain why the hospitals were often destitute of many of the things needed to render the men comfortable and healthy. (16)

Hospitals were provided in the most scanty manner with the supplies necessary for the sick people. Sometimes the supplies were withheld from the hospitals by the officers whose business was to provide and administer them. (17)

15. P.M. Ashburn, A History of the Medical Department of the United States Army (New York, Houghton Mifflin Company, 1929), p. 9, citing R. Hamilton, The Duties of the Regimental Surgeon (London, 1787).

16. Ashburn, op. cit., pp. 22-23; Applegate, Hospital Department, pp. 303-04.

17. L. H. Butterfield, ed., Letters of Benjamin Rush (Princeton University Press, 1951), I, 180.

Medical practice advanced little during most of the colonial era. Theory, empiricism, and authority still ruled the medical world during the Revolutionary period. The vast majority of the practitioners either blindly followed authority of the past, and bled, and dosed by the book, or adapted some strange theory of planetary influence, signatures, animal spirits, or occult force, and treated disease in accordance with whatever theory they chanced to believe in. Quacks abounded like the locusts in Egypt. (18)

18. Edward H. Clarke, et al., A Century of American Medicine, 1776-1876), pp. 304; David L. Cowen, Medicine and Health in New Jersey: A History (The New Jersey Historical Series XVI, Princeton, 1964), pp. 3-4.

I. Hospital System at Morristown - 1779-80

1 - Flying and Regimental Hospitals

In the organization of hospital facilities, the Morristown encampment followed the general regular army medical structure that was practiced at Valley Forge and Middlebrook. There were three types of hospitals for the reception of the sick and wounded: (1) the general hospitals operated by the Continental medical establishment and located some distance away from camp; (2) the flying or field hospitals, which were temporary mobile medical posts operated also by the Continental medical men; (3) regimental hospitals managed by regimental surgeons and mates.

The flying and regimental hospitals were located right within the lines of encampments and occupied regular log huts. How many huts were used as hospitals depended on the number of sick.

At Valley Forge, where the pattern was set, the practice was to have one or two huts for flying hospitals for each brigade, located in the rear and as near the center as possible, about one to three hundred yards from it. These huts were 15 feet wide, 25 feet long, and 9 feet high, covered with boards, or shingles, but not with earth. Eleven of these flying hospitals were built at Valley Forge and served the purpose of supplying emergency care and of isolating a small proportion of the communicable diseases. In each regiment, one hut, or more if needed, was set aside as regimental hospital for the treatment of slight cases or the sick who could not be attended at the flying hospitals of the brigades. (1) At Middlebrook, the two churches of Millstone, the court house, and several barns were used as general hospitals, while in camp flying and regimental hospitals occupied regular line huts. (2)

1. Fitzpatrick, op. cit., X, 284, 300; William Shainline Middleton, "Medicine at Valley Forge," Annals of Medical History, Third Series, III, No. 6 (November 1941), 470.

2. Fitzpatrick, op. cit., XIV, 167, 223; XIII, 442; XIV, 2, 124-25; XV, 200; Peter Angelakos, "The Army at Middlebrook," Proceedings of the New Jersey Historical Society, LXX, No. 2 (April 1952), 79.

In reality a regimental hospital was not a hospital in any definite sense of the world, but merely a collection of the sick of a regiment. As Director Shippen explained in a hospital return of 1776, besides those who were sick in a general hospital, there were in "each regiment a number called sick, that are not proper subjects for the hospital, and under the care of regimental surgeons, though there are no regimental hospitals." (3)

When the medical department was established by Congress, the regimental hospitals were already attached to individual regiments or battalions, and cared for a great number of the sick. (4) In July 1776 Washington issued a general order setting forth the relationship that should exist between the regimental and the general hospitals:

The General finding the number of sick to increase, and being desirous to have them as well accommodated as possible, directs that the Barrack Master, under the direction of the Colonel, or commanding Officer of each Regiment, fix on some house convenient to the Regiment to be improved as a Hospital for the reception of Patients just taken down, or whose disorder does not require any special assistance beyond that of their own Regimental Surgeons. One of the Surgeons of the Hospital will occasionally visit these Hospitals and determine where the nature of the case requires the Patient to be removed to the General Hospital which will hereafter be kept in different Houses contiguous to each brigade. The Regimental Surgeons are to receive directions from, and be responsible to, the Director General, so far as respects the furnishing their Regimental Hospitals with conveniences for their sick. The Regimental Surgeons are also to keep a Register of

3. Hospital return from Amboy, November 1, 1776, in Stephen Wickes, History of Medicine in New Jersey and its Medicine Men (Newark, New Jersey, 1879), p. 65; Duncan, op. cit., p. 128.

4. Bell, op. cit., p. 184.

their sick, and make a weekly Return to the Director and Commissary General severally of the Sick in their respective regiments. (5)

Several days later, because the general order was misunderstood by some persons, a new directive made a clarification respecting the removal of the sick from the regimental to the general hospital:

The Regimental Surgeons are to send at any time, with the usual Ticket, any patient to the General Hospital whose case requires it (putrid, and infectious disorders always excepted). Whenever the Director General, or any Surgeon of the Hospital by his direction, visits the regimental Hospitals, they are to direct what patients are proper to be removed, but it is expected that when any Surgeon visits the Regimental Surgeon, and if they should differ in opinion, they will refer it to the Director General, who has by the Resolutions of Congress, a superintendency over the whole. The General most earnestly recommends to the Gentlemen in both departments, to cultivate harmony and good agreement with each other, as conducive to their own Honor, and the good of the service. (6)

Dr. Shippen and Dr. Cochran's original medical plan included a camp or flying hospital, which was partially included in the approved plan of 1777. In the medical plan Congress recognized the existence of the regimental hospitals only by acknowledging in general and vague terms the functions of the regimental surgeons. Presumably it intended that most of the sick and wounded should be cared for in the flying and general hospitals. In practice, however, the regimental hospitals took care of the greatest number of the sick. (7)

5. General Orders, Headquarters, New York, July 28, 1776, Fitzpatrick, op. cit., V, 345.

6. General Orders, Headquarters, New York, August 7, 1776, ibid., p. 377.

7. Jour. Cont. Cong. VII, 235-36.

Flying hospitals, as the term implies, were temporary and mobile camp hospitals; the term had been used since early 1777 to describe field hospitals. While such hospitals were necessarily mobile during a campaign, they were fixed, though of course temporarily, during the winter encampments.

Dr. James McHenry, surgeon from Pennsylvania, gave a clear and practical distinction between the functions of the three types of hospitals. According to him, the purpose of the general hospital was not to accommodate

the whole sick of the army, or to multiply offices by drawing, at all times as many as possible within its pails [sic]. But for the reception of that over proportion of sick that cannot be provided for in camp or at regimental hospitals, and on extraordinary occasions when the sick and wounded become so numerous that regimental doctors cannot attend or provide convenient places for the reception of their proportion. This is the first and we may say the only intention of a general hospital. (8)

2 - Hospital Huts

Early in November 1779 Washington's army was already moving into winter quarters. About November 25 the main body of the Continental Army had left the Highlands of the Hudson and reached the previously selected campground, three miles south of Morristown, on December 1. The camping site was a mountainous area known as Jockey Hollow, and included portions of the Peter Kemble, Joshua Guerin and Henry Wick farms. From 10,000 to 12,000 men pitched tents over a tract of frozen land of about 2,000 acres. Eight infantry brigades took up positions in Jockey Hollow proper at this time and soon undertook the difficult task of building log huts for winter quarters. On this site the army

8. Dr. McHenry to Dr. Benjamin Rush, 1776, Bell, op. cit., p. 283, n. 20.

was to spend six long winter months of unparalleled and continuous severity. (9)

In November Washington had directed that a general plan for the encampment of Morristown be prepared, using as a model or precedent the Pennsylvania huts built at Raritan and Middlebrook during the winter of 1778-79. Complete adherence to the plan was to be strictly followed, and any hut that was out of line was to be torn down. Because the plan has been lost, we do not have a complete picture of the physical appearance of the camp. Since the strength of the brigades and the topography of the camp varied, the encampments followed the basic scheme but departed in some details from the overall plan. A contemporary sketch of Stark's Brigade suggests that the general plan for the encampment provided for a layout of 24 huts for each regiment, 12 men per hut, the huts built in three rows of eight each. This arrangement followed the pattern established at Valley Forge and Middlebrook, the two earlier encampments in which huts, rather than tents, were used. (10)

9. For general information about this encampment see George J. Svejda, Quartering, Disciplining, and Supplying the Army at Morristown, 1779-80 (National Park Service, Division of History, February 23, 1970); Melvin J. Weig and Vera B. Craig, Morristown, a Military Capital of the Revolution. National Park Service Historical Handbook Series No. 7 (Washington, D.C., Government Printing Office, 1950); Emory McClintock, Topography of Washington's Camp of 1780 and its Neighborhood (Washington Association of New Jersey, Publications I, 1887-98).

10. Washington to General Nathanael Greene, West Point, November 17, 1779, Fitzpatrick, op. cit., XVII, 119; General Order, November 19, 1779, XVII, 137; John F. Luzader, New Jersey Brigade Encampment Site (National Park Service, Division of History, November 6, 1963), pp. 25-27.

There are two vivid accounts of hut construction. James Thacher, surgeon of a regiment attached to General Stark's brigade, and one of the foremost journalists of the Revolution, wrote as follows:

Log houses are constructed with the trunks of trees, cut into various lengths according to the size intended, and are firmly connected by notches cut at their extremities in the manner of dovetailing. The vacancies between the logs are filled in with plastering consisting of mud and clay. The roof is formed of similar pieces of timber, and covered with hewn slabs. The chimney situated at one end of the house, is made of similar but smaller timbers, and both the inner and the outer side are covered with clay plaster, to defend the wood against the fire. The door and windows are formed by sawing away a part of the logs of a proper size, and move on wooden hinges. In this manner have our soldiers, without nails, and almost without tools, except the axe and saw, provided for their officers and for themselves comfortable and convenient quarters, with little or no expense to the public. The huts are arranged in straight lines forming a regular uniform compact village. The officers' huts are situated in front of the line, according to their rank, the kitchens in the rear, and the whole is similar in form to a tent encampment. The ground for a considerable distance in front of the soldiers' line of huts is cleared of wood, stumps and rubbish, and is every morning swept clear for the purpose of a parade ground and roll call of the respective regiments. The officers' huts are in general divided into two apartments, and are occupied by three or four officers, who compose one mess. Those for the soldiers have but one room, and contain ten or twelve men, with their cabins placed one above another against the walls, and filled with straw, and one blanket for each man. I now occupy a hut with our field officers, Colonel Gibson, Lieutenant Colonel Brent, and Major Meriweather. (11)

11. James Thacher, A Military Journal (Boston, 1883), pp.155-56.

Joseph Martin, a Revolutionary soldier, left in his diary this fine picture of hut construction:

The next thing is the erecting of the huts; they were generally about twelve by fifteen or sixteen feet square (all uniformly of the same dimensions) the building of them was thus; after procuring the most suitable timber for the business, it was laid up by notching them in at the four corners. When arrived at the proper height, about seven feet, the two end sticks which held those that served for plates were made to jut out about a foot from the sides a straight pole made to rest on them, parallel to the plates; the gable ends were then formed by laying on pieces with straight poles on each which served for ribs to hold the coverings, drawing in gradually to the ridge pole. Now for the covering, this was done by sawing some of the larger trees into cuts about four feet in length, splitting them into bolts, and riving them into shingles, or rather staves; the covering then commenced by laying on those staves, resting the lower ends on the poles by the plates, they were laid on in two thicknesses, carefully breaking joints; they were then bound on by a straight pole with withes, then another double tier with the butts resting on this pole and bound on as before, and so on to the end of the chapter. A chimney was then built at the centre of the backside, composed of stone as high as the eaves and finished with sticks and clay, if clay was to be had, if not, with mud. The last thing was to hew stuff and build us up cabins or births to sleep in, and then the buildings were fitted up for the reception of gentlemen, soldiers, with all their rich and gay furniture.(12)

Soldiers huts were required to be about 14 feet wide and 15 or 16 feet long, and laid out in a straight line. Officers huts were generally larger in size, usually accommodated only two to four men, with two fireplaces and two chimneys, and besides a door, at least two windows.(13)

12. Joseph Martin, A Narrative of some of the Adventures, Dangers and Sufferings of a Revolutionary Soldier (Hallowell, Maine, 1830), p. 122.

13. Luzader, op. cit., pp. 29-30; Weig, op. cit., pp. 15-16.

There are no references about building huts for hospitals at Jockey Hollow because, as at Middlebrook, regular huts were used as flying and regimental hospitals. How many huts were used as hospitals and where they were located is impossible to determine. The location of the hospital huts within the encampment limits of the respective regiments and brigades was decided by the brigade and regimental commanders.

During the encampment the army's general hospitals were located at Sunburg, Yellow Springs, Philadelphia, Trenton, Pluckemin, Basking Ridge, Fishkill, and Albany. (14) Basking Ridge and Pluckemin hospitals were the nearest to Morristown. There are numerous references about these two hospitals in connection with details of men being sent from the Jockey Hollow area to cut wood, superintend the hospitals, and perform guard duties. (15)

When Washington's army marched from Jockey Hollow in June, 1780, the sick and wounded were left behind, as was customary after an encampment. As Washington said, "We must keep the Sick always in the Rear of the Army, or they will be subject to captivity." (16) However, instead of leaving them scattered in the different huts of the respective Lines, as they were during the encampment, the sick and wounded were gathered and accommodated in the huts of the Pennsylvania Line which were converted then into a general hospital. At this time Pluckemin, Basking Ridge, and the Pennsylvania Huts were the three general

14. Monthly hospital returns of the sick and wounded, February 1-May 1, 1780, National Archives, Record Group 93, Microfilm 246, Roll 135.

15. Almon W. Lauber, ed., Orderly Books of the Fourth New York Regiment, 1773-1780, the Second New York Regiment, 1780-83 (Albany, The University of the State of New York, 1932), pp. 211, 263, 293, 326; Order Book, Washington, February 15, 1780, New-York Historical Society; Fitzpatrick, op. cit., XVIII, 105, 401n., 486.

16. Washington to Dr. Shippen, Headquarters, White Marsh, December 12, 1777, Fitzpatrick, op. cit., X, 150.

hospitals as the army moved towards the east. Pluckemin and Basking Ridge had served as two of the most important general hospitals during the encampment. There were not too many hospital patients left behind; the rigors of winter had passed and with spring and summer came renewed spirits. As of July 1, the three general hospitals were taking care of 165 sick and wounded. Of this total number, 112 belonged to the Pennsylvania Line. It has to be assumed, however, that before the army departed from Jockey Hollow, some of the sick and wounded that belonged to the Line were already hospitalized at Basking Ridge which was the nearest general hospital for the treatment of certain noncontagious diseases. (17).

Late in September more sick were sent to the Pennsylvania Huts, as the following letter of Nathanael Greene implies:

The situation of Paramus, and the uncertainty of our armies continuing at this place, induces me to think it will be for the interest of the service to send the sick to the huts at Morris. You will therefore take measures for their immediate removal, having regard to the weather, so as not to expose the sick more than what is necessary, as we are not yet pressed in point of time. Application must be made to the magistrates for wagons, and for fear it should not be in their power to procure them agreeable to the forms of law, I have sent you a party of light-horse and a press warrant to impress such a number as shall be competent to the service. Such of the sick whose cases are very bad, and when there will be danger in moving them, may be left at Paramus, and a surgeon remain with them. All convalescents not fit to join the army and yet able to march, should travel on foot to Morris in order to ease the transportation. (18)

17. A Return of the General Hospital at Baskinridge, Pluckemin and the Pennsylvania Hutts from the first day of June, to the first day of July 1780; Dr. William Brown to Washington, July 3, 1780, Washington Papers, Library of Congress.

18. George Washington Greene, The Life of Nathanael Greene (New York, Houghton, Mifflin and Co., 1890), II, 229-30, extract of a letter from Greene to Dr. Tilton, September 27, 1780.

While most of Washington's army spent the winter of 1780-81 in New York, the Pennsylvania Line encamped in the Old Hand's and First Connecticut Brigades encampments in Jockey Hollow, under the command of General Anthony Wayne. Colonel Thomas Craig moved ahead with a detachment to inspect the Pennsylvania Line huts, and on November 20 informed Wayne that he had found them "nearly all demolished, except the officers houses which are occupied by the sick." Wayne saw the huts himself and found part of them "destroyed." (19)

On January 27, 1781, Washington received the following discouraging note from Morristown:

I take the liberty of informing your Excellency of the distressed situation of the general Hospital at the Pennsylvania Huts. These small buildings have been in a wretched ruinous state for some time, owing to the disorderly behavior of the patients and soldiery; what were left undestroyed the late snow storm has affected; there is not a single hut in the Captain's Line and these are the only ones left standing, except a few of the field officers, which is sufficiently close to keep out the snow and rain, and not one apartment is large as to contain more than three persons--most of them only two. (20)

The general hospital at the Pennsylvania Huts was active until June 1781, when the hospital "broke up." Dr. Cochran's Letter Book contains three hospital returns which are the only source of information about the hospital during the last six

19. Wayne to Col. Craig, November 15, 1780; Col. Craig to Wayne, November 20; Wayne to General Irvine, December 6; Wayne to Washington, December 10. Wayne Papers, Pennsylvania Historical Society. See also Carl Van Doren, Mutiny in January (New York, the Viking Press, 1943), p. 361.

20. Malachy Treat to Washington, Morristown, Washington Papers, Library of Congress.

months of operations. A breakdown of the three returns is as follows:

March

Admitted	0
Discharged	4
Dead	0
Deserted	1
Intermittent fever	1
Venereal	2
Rheumatic	2
Wounded	5
Convalescent	6
Total remaining	19

May

Admitted	0
Discharged	0
Dead	0
Deserted	0
Convalescent	2
Wounded	5
Inflammatory fever	1
Venereal	1
Rheumatic fever	1
Various chronic	3
Total remaining	13
Sick Officers	2
Soldiers wives	
and children	7
Total -	22

June

Admitted	0
Discharged	4
Dead	1
Deserted	0
Convalescent	2
Wounded	3
Venereal	1
Various chronic	2
Total remaining	8
Women and children	7
Sick Officers	2
Total -	17

An item of interest in the returns is the inclusion of women and children. (21)

21. Letter Book of Dr. John Cochran, Surgeon General of the Army, 1780-82. MNHP-Microfilm Collection.

II. Health state of Washington's Army

1 - Incident Diseases

Much of the time of military surgeons was spent in diagnosis and treatment of the various diseases that plagued and followed the army from the battlefields to the encampments. Identification and diagnosis were extremely difficult because each of the general categories of ailments had several variations with the same general symptoms and the same particular reactions. Early identification of diseases was based upon symptoms alone, and these, with their innumerable combinations, had led by the 1780s to lists of over 1500 so-called diseases.(1)

For the identification and number of diseases we have to depend on hospital returns prepared by the regimental, flying and general hospitals. These returns - weekly and monthly - provided the basic information for the chief hospital surgeon's report to the Director General, which was an inventory of medical officers, hospital expenses, medicines, supplies, and the sick and wounded. The regimental weekly returns were submitted to the flying hospitals of the brigades; they listed the names of the sick, the rank and regiment, and the type of ailment and its condition.(2)

Some of the returns break down diseases into three or four general categories only. Sometimes physicians filled out printed forms which listed a more extensive and meaningful classification

1. Richard H. Shryock, "Eighteenth Century Medicine in America," American Antiquarian Society (Worcester, Massachusetts, 1950), p. 18.

2. Journ. Cont. Cong., July 7, 1776, V, 569; and General Orders July 4, 24, 28, 1775, August 21, 1775, July 2, 1776, May 26, August 2, 20, December 20, 1778, April 8, 1779, December 17, 1779; Fitzpatrick, op. cit., III, 311, 363, 376, 439, VI, 8, XI, 545-55, XII, 259, 338, 442, XIV, 347, XVII, 281-82; Lauder, op. cit., p. 297.

of diseases. A fairly accurate list of diseases that afflicted the army included the following:

various kinds of fevers
diarrhea
dysentery
rheumatism
venereal complaints
jaundice
rash
itch
measles
mumps
scurvy
piles
scrofula
lumbago
fits
angina
asthma
paralysis
erysipelas
consumption
ague
cholera
cholera morbis
whooping cough
rupture
sore eyes
hip gout
abscess
smallpox (3)

3. Varicus returns of the Middle Department, 1778-79, National Archives, Record Group 93; Gibson, op. cit.; pp. 81-82; Eloise Engle, America's Medical Soldiers, Sailors and Airmen in Peace and War (The John Day Company, 1967), pp. 22-23; Joseph M. Toner, Contributions to the Annals of medical progress and medical education in the United States before and during the War of Independence (Washington, D.C., Government Printing Office, 1874), pp. 93-96. See also John Pringle, Observations on the Diseases of the army (1810).

For practically every physician, every disease had a different name and this is reflected in the returns. Some of them break down fevers into inflammatory, intermittent, bilious, putrid, nervous, and hectic; other returns included such other disorders as coughs, diabetes, hernia, hemorrhoid, nephritis, and many others with particular names. (4)

Malaria, endemic in the middle and southern colonies during the eighteenth century, was recognized as a clinical entity in the Continental Army, but there was no understanding of its mode of transmission.

What is called now dengue was described by Dr. Benjamin Rush in 1780 as bilious remittent fever, confused then with yellow fever and malaria. Breakbone fever and scarlatina rheumatica were also applied to dengue.

Diphtheria and scarlet fever were not separate and distinct diseases in the eighteenth century, probably due to lack of bacteriological knowledge. Contemporary observers gave diphtheria and scarlet fever many names: throat disease; throat distemper; throat ail; canker ail; malignant quinsies; putrid, malignant, or pestilential sore throat; malignant croup; cynanche trachealis; angina suffocativa; and malignant angina. Many of these terms were also applied to other diseases. (5)

Veneral disease was as old as armies. In the British army it was so common, according to Swieten, that no soldier was reproached about it. "While this is the case, all hopes of reformation are shut out." (6) In 1773 Congress passed an act, which in part, read as follows:

Resolved, that the sum of ten dollars shall be paid by every officer, and the sum of four dollars by

4. Monthly return of the general hospital at Danbury, October 20-November 7, 1778. National Archives, RG 93, Microfilm 246, Roll 135.

5. Hume, op. cit., pp. 160, 190.

6. Ashburn, op. cit., p. 11, Citing Baron van Swieten, The Diseases Incident to Armies (Boston, 1777).

every soldier, who shall enter, or be sent into any hospital to be cured of the venereal disease; which sums shall be deducted out of their pay, and an account thereof shall be transmitted by the physician or surgeon who shall attend them, to the regimental paymaster for that purpose. (7)

Continental troops also showed symptoms at time of another malady that an officer blamed on cheap rum: "They have chiefly got a disorder, which at camp is called the Barrel Fever, which differs in its effects from any other fever - its concomitants are black eyes, and bloody noses." (8)

Thacher mentions in his journal the malady of homesickness, in an entry of June, 1780:

Our troops in camp are in general healthy, but we are troubled with many perplexing instances of indisposition, occasioned by absence from home, called by Dr. Cullen nostalgia, or home sickness. This complaint is frequent among the militia, and recruits from New England. They become dull and melancholy, with loss of appetite, restless nights, and great weakness. In some instances they become so hypochondrical as to be proper subjects for the hospital. This disease is in many instances cured by the raillery of the old soldiers, but is generally suspended by a constant and active engagement of the mind, as by the drill exercise, camp discipline, and by uncommon anxiety, occasioned by the prospect of a battle. (9)

7. Colonel William O. Owen, ed., The Medical Department of the United States Army During the period of the Revolution (New York, Paul B. Haeger, 1920), pp. 91-92; Hume, op. cit., p. 120.

8. Lieutenant James McMichael, "Diary," Pennsylvania Archives, Second Series, XV, 139.

9. Thacher, op. cit., p. 198, ed. of 1827.

In the British army there was also the same confusion about classification and diagnosis of diseases. Swieten, the "Physician to their Imperial Majesties," classified the diseases of the British army as follows:

coughs
sore throats
pleuresy
peripneumony
rheumatism
intermittent fevers
spring intermittents
autumnal "
quartan fevers
jaundice
dropsy
vomiting
cholera morbus
diarrhoea
dysentery
inflammation of the intestines
phrenzy
haemorrhage of the nose
a continued fever
scurvy
lues venerea
itch
worms (10)

Of the numerous diseases affecting the armies during the Revolution, the three principal infectious afflictions were putrid fever, dysentery, and smallpox.

Fever was the great killer of the century. There were many kinds of fever and with many manifestations. Fever could attack the same person many times, and in one or another form caused about eight out of every ten deaths. It was caused by fatigue, overexposure to the elements, excessive drinking of alcoholic beverages, low morale, poor ventilation, and lack of proper sanitary facilities.

10. Swieten, op. cit., pp. 14-103.

Besides being the greatest scourge of the army, the fever known as putrid was one of the greatest causes of disability of soldiers, and the most feared of all diseases. Crowded conditions in the hospitals, combined with factors like inadequate ventilation and sanitary protection, made putrid fever fatal. The patient's own stinking clothes and foul linen suffocated the patients and attendants. This fever was recognized in the hospital as typhus, jail, intermittent, inflammatory, nervous, slow, bilious, hectic, remitting, jaundice, and phrenzy. Typhoid was not listed in the returns, but it no doubt existed under some one or the other classifications." (11)

Dr. Benjamin Rush, the outstanding medical man of the Revolution, observed that the principal diseases in the hospitals were the two types of typhus fevers which he called gravior and mitior. Men who came to the hospitals with "pleurisies and rheumatisms" soon lost their original diseases, and suffered, or died, by the above mentioned fevers. Typhus mitior always prevailed most, and with the worst symptoms, in the winter. A free air, which could be obtained in summer, always prevented or mitigated the fever. In all those cases where the contagion was received, cold weather seldom failed to render it active. Whenever a hospital was removed in winter, one half of the patients generally sickened on the way, or soon after they arrived at the place to which they were sent. There were many instances of patients with this fever who suddenly fell dead after being removed from a hospital. The contagion was frequently conveyed from the hospital to the camp by means of blankets and clothes. (12)

11. Lester King, The Medical World of the Eighteenth Century (The University of Chicago Press), pp. 123-54; Hume, op. cit.; pp. 99-100; Gibson, op. cit.; pp. 83-84.

12. Benjamin Rush, Medical Inquiries and Observations (Philadelphia, Thomas Dobson, 1794), I, 255-56.

Dr. James Tilton, another noted military physician, was an excellent witness of putrid fever. Not only did he see it in all its malignancy, but he was himself stricken by the fever in the hospital at Princeton. His description corresponds fairly well with the symptoms of typhoid.

Putrid fever - also called jail fever - he writes, generally gave some days of warning in the form of "a languor and listlessness of the whole body, and a peculiar sensation of the head as if it were tightened, or compressed in a hoop." But after some days, more or less in different patients, the pulse began to "sink; a dry tongue, delirium and the whole train of nervous and putrid symptoms supervene." In his own case, he adds,

besides an obstinate delirium, I had a crust on my tongue as thick as the blade of a knife, and black as scot. The skin was worn off my hips and dorsal vertebrae, so as to make it necessary to patch those parts with common plaster. At the acme of my disorder, eleven surgeons and mates all gave me over, and only disputed how many days I should live. (13)

Dysentery, or "putrid diarrhoea," was a widely spread disease very common in camps and hospitals. It killed many and disabled still more. Dysentery was common in both British and American armies, and was very common also in Europe. All American medical writers refer to it as one of the most serious diseases of the army. Dysentery and "camp disorders," thought to be severe varieties of diarrhea, were assumed to be caused by wet clothes, changing weather conditions, stagnant water, or tainted meat or moldy bread. Chills and fevers followed by pains in the head, back and limbs, were the first symptoms of camp disorders. There was a loss of appetite accompanied by nausea and diarrhea. Surgeons were so baffled by these cases that often they merely let nature take its course; some patients regained their health, but unfortunately, many others died. (14)

13. Tilton, op. cit., pp. 59-60.

14. Ibid., p. 61; Swieten, op. cit.; pp. 68-70; Thacher, Military Journal, pp. 33, 145, 208; Lewis Beebe, "Journal," Pennsylvania Magazine of History and Biography, LIX (1935), 343-50; Ebenezer Elmer, "Journal," New Jersey Historical Society Proceedings III (1848-49), 48.

Smallpox, the last of the three principal afflictions of the army, was one of the chief scourges of the seventeenth and early eighteenth centuries, and one of the earliest pestilential diseases in America of which we have any record. It caused great havoc in the Continental Army during the first two years of the war.

There were five major smallpox scares. In 1776 it nearly ruined the northern army, and during the siege of Boston the same year the Americans suspected the British of trying to infect them on purpose. Due to the alarming death toll by smallpox, Washington adopted inoculation as a preventive measure. Twice the main body of the army was inoculated en masse, at Morristown in 1777 and Valley Forge in 1778. Again at Yorktown in 1781, the British were accused of trying to spread infection among American troops. (15)

2 - Hospitals and Contagion

Military hospitals, designed to take care of the sick and wounded, became the graveyards of the Revolutionary soldiers. While a soldier had 98 chances out of a hundred of escaping death in battle, his odds of leaving a hospital alive were but 75 per cent. Serious afflictions that caused death were often contracted in the hospital where the soldiers may have gone for treatment of a simple malady. In part because of fear of hospitals, the vast majority of the men sent to general hospitals never came back to their respective regiments when they regained their health. (16)

15. Howard Lewis Applegate, "Remedial Medicine in the American Revolutionary Army," Military Medicine (Washington, D.C., Association of Military Surgeons of the United States, June 1961), Vol. 126, No. 8, p. 450; Wickes, op. cit., pp. 22-23.

16. Washington to the President of Congress, Morristown, January 19, 1780, Fitzpatrick, op. cit., VII, 30; Gibson, op. cit., p. 83.

According to Dr. Tilton, the Americans had outdone the English and the French in the pomp and extravagance of their hospital arrangements, and had surpassed all other nations in the "destruction and havoc thereby committed on their fellow citizens." It would be shocking to humanity, he writes,

to relate the history of our hospital, in the years 1777 and 1778, when it swallowed up at least one half of our army, owing to a fatal tendency in the system to throw all the sick of the army into the general hospital; whence crowds, infection and consequent mortality too affecting to mention. I doubt not but humanity at first dictated the ample provision made for the sick in general hospitals. (17)

Tilton, perhaps the foremost hospital planner of the period, was definitely against general hospitals. "Many a fine fellow," he writes, "have I seen brought into the hospital, for slight syphilitic affections and carried out dead of a hospital fever." Sir John Pringle, director-general of the British army hospital system, ranked the hospitals among the chief causes of sickness and death in the army. Frederick, King of Prussia, made very little use of general hospitals. Wounds and chronic diseases were the only cases referred to any place outside of camp; all acute diseases were treated by the regimental surgeons, or in what he called his field hospitals. (18)

Dr. John Jones, whose pioneer work in surgery will be discussed in a later chapter of this report, gave army medical officers some advice on the effects of overcrowding soldiers, but in those days fresh air was not an important subject. Overcrowding, he writes, had been the main cause of the great mortality in London and Paris hospitals. Typhus fever was directly traceable to this practice, as was also dysentery, he asserted. Though he never heard of living micro-organisms as the cause of diseases, Jones was right no doubt in his observation. He recalls also a number of European campaigns in which the sick and wounded were crowded together in one general hospital, with resulting high mortality. On the other hand, he observed that the sick and wounded left in camp, though naturally subjected to many discomforts, nevertheless generally recovered. He therefore advised medical officers to treat their patients in camp when

17. Tilton, op. cit., p. 13.

18. Ibid., pp. 14-15.

possible, and when this could not be done, to make use of churches, barns, and outhouses, open to the rafters, without any ceiling. Private houses and other places into which sick and wounded men could be crowded were to be avoided. Unfortunately, Jones' advice was not always followed, and the army suffered as a result.

Jones, who was one of the founders of the New York Hospital, had seen terrible conditions in the Hotel Dieu where he was a student. In this great Parisian hospital he saw beds placed in triple rows, with four to six patients in each bed, and where more than once in the morning rounds he saw the dead lying with the living.

Like Tilton, he favored the use of regimental hospitals only, but with large space for each patient and liberal ventilation, with fire-places and "the utmost possible cleanliness," an ideal regimental hospital rarely, if ever, seen.(19)

In the autumn and winter, writes Dr. Rush, the mortality among the soldiers revived in the hospitals from their lack of room and air, and of many other things necessary for sick people. Many hundreds of them were buried every week during the campaign of 1776 in different villages in Pennsylvania and New Jersey. "The scene was shocking to humanity and alarming to the friends of the Revolution," writes Rush.(20)

In 1777 there were more than 5,000 sick in the army hospitals and the great mortality was due to diseases caught in them. Too many sick were crowded together in one house, sometimes twenty men in one room large enough for only six or eight patients. During the winter of 1777-78 more than 700 sick and wounded were herded together in the barn-like structure of Bethlehem Hospital.

19. John Jones, Plain Concise Practical Remarks, on the Treatment of Wounds and Fractures (Philadelphia, 1776), pp. 11-12, 90, 102-03.

20. Benjamin Rush, A Memorial Containing Travels Through Life or Sundry Incidents in the Life of Dr. Benjamin Rush, written by Himself. (Lanoraie, Louis Alexander Biddle, 1905), p. 133.

The conditions were most conducive to the outbreak of the malignant putrid fever. Soldiers admitted for minor ailments succumbed victims of the fever. It was estimated that about 500 died of the feared pest of typhus. (21)

"I have made a discovery," wrote Rush to Nathanael Greene in 1778,

A sure and certain method of destroying Howe's whole army without powder or ball or without any of the common implements of death. Lead them through any of the villages in Lancaster country where we have a hospital, and I will ensure you that in 6 weeks there shall not be a man of them alive or fit for duty. (22)

He thought that hospitals were the "sinks of human life in the army" because they had killed more persons than the sword. As hospitals, he preferred the wholesome air of private houses, and hoped that the progress of science would abolish some day the hospitals for acute diseases.

Perhaps there are no cases of sickness, in which reason and religion do not forbid the seclusion of our fellow creatures from the offices of humanity in private families, except where they labour under the calamities of madness and the venereal disease, or where they are the subject of some of the operations of surgery. (23)

3 - Health During the 1779-80 Encampment

Valley Forge has always been remembered as a symbol of distress and privations. Hundreds of men perished there needlessly because of malnutrition, contagion, lack of clothing, inadequate shelter, and cold weather. "The Potters field of Philadelphia," writes Tilton, "bears melancholy testimony of the fatal effects of cold weather on the military hospitals in the fall of 76 and succeeding winter." So many were the dead that

21. Middleton, op. cit., p. 470; Morais, op. cit., p. 113; Butterfield, op. cit., I, 180-82.

22. Butterfield, op. cit., I, 195.

23. Rush, Medical Inquiries, I, 262.

instead of single graves, the soldiers were buried in large square pits, in which the coffins were placed in ranges, "cross and pile, until near full and then covered over." (24)

Perhaps still remembering the brutal inroads of death at Valley Forge, Washington sent to Congress the following note of warning on December 15, 1779:

Our prospects are infinitely worse than they have been at any period of the War, and unless some expedient can instantly be adopted a dissolution of the Army for want of subsistence is unavoidable. A part of it has been again several days without bread - and for the rest we have not either on the spot or within reach a supply sufficient for four days. (25)

To the early privations of the soldiers was added an unprecedented bitter cold that compounded the suffering of the campers. Although very cold, at Valley Forge the first light snowfall did not come until the middle of January, and the apple trees bloomed late in March. In **contrast**, the winter at Morristown seemed bent on breaking all records of severity. And such was the case.

On the 14th of December, according to Thacher, the snow was about two feet deep and.

the weather extremely cold; the soldiers are destitute of both tents and blankets, and some of them are actually barefooted and almost naked. Our only defence against the inclemency of the weather, consists of brush wood thrown together. Our lodging the last night was on the frozen ground. Those officers who have the privilege of a horse, can always have a blanket at hand. Having removed the snow, we wrapped ourselves in great coats, spread

24. Tilton, op. cit., p. 63.

25. Worthington Chauncey Ford, The Writings of George Washington (New York, 1890), VIII, 138. For the suffering and privations at Valley Forge see "Diary of Surgeon Albigenice Waldo, of the Connecticut Line, Valley Forge, 1777-78," The Pennsylvania Magazine (1897), XXI.

our blankets on the ground, and lay down by the side of each other five or six together, with large fires at our feet, leaving orders with the waiters to keep it well supplied with fuel during the night. We could procure neither shelter nor forage for our horses, and the poor animals were tied to trees in the woods, for twenty four hours without food, except the bark which they peeled from the trees. (26)

Eight days later an officer, who had experienced the winter of Valley Forge, wrote to his brother:

I think if you saw my Situation and way of living you would really Pity me, for colder weather I never saw in this time of year, and we are yet in our cold tents, we have just got the men in their Hutts, and it is so cold we can't get ours built, and what is worse than all we scarcely got anything to Eat. (27)

By the 27th of the month a snow-storm was raging, but the greatest one began on January 3, 1780. Thacher left the following minute description of that terrific storm:

The weather for several days has been remarkably cold and stormy. On the 3d instant, we experienced one of the most tremendous snow storms ever remembered; no man could endure its violence many minutes without danger of his life. Several marquees were torn asunder and blown down over the officers' heads in the night, and some of the soldiers were actually covered while in their tents, and buried like sheep under the snow. My comrades

26. Thacher, Journal, p. 216.

27. Lieutenant Erkuries Beatty to Reading Beatty, Camp near Morristown, December 22, Pennsylvania Magazine of History and Biography, XLIV (1920), 205.

and myself were roused from sleep by the calls of some officers for assistance; their marquee had blown down, and they were almost smothered in the storm, before they could reach our marquee, only a few yards, and their blankets and baggage were nearly buried in the snow. We are greatly favored in having a supply of straw for bedding, over this we spread all our blankets, and with our clothes and large fires at our feet, while four or five are crowded together, preserve ourselves from freezing. But the sufferings of the poor soldiers can scarcely be described, while on duty they are unavoidably exposed to all the inclemency of storms and severe cold; at night they now have a bed of straw on the ground, and a single blanket to each man; they are badly clad, and some are destitute of shoes. We have contrived a kind of stone chimney outside, and an opening at one end of our tents gives us the benefit of the fire within. The snow is now from four to six feet deep, which so obstructs the roads as to prevent our receiving a supply of provisions. For the last ten days we have received but two pounds of meat a man, and we are frequently for six or eight days entirely destitute of meat, and then as long without bread. The consequence is, the soldiers are so enfeebled from hunger and cold, as to be almost unable so perform their military duty, or labor in constructing their huts. It is well known that General Washington experiences the greatest solicitude for the sufferings of his army, and is sensible that they in general conduct with heroic patience and fortitude. (28)

This storm continued for several days and access to the camp, even from Mendham or Morristown, was next to impossible. On January 26 an officer camped at Basking Ridge wrote in his journal, in a merry style, as follows:

We have had a fast lately in camp, by general constraint, of the whole army, in which we fasted more sincerely and truly for three days than ever we did from all the resolutions of Congress put together. This was occasioned by the severity of the weather, and drifting of the snow, whereby the roads were rendered impassable, and all supplies of provisions cut off, until the officers were obliged

28. Ibid., pp. 220-21.

to release the soldiers from Command, and permit them to go in great numbers together into the country to get provision where they could find it. (29)

By March a great amount of snow still remained on the ground and the soldiers were in a wretched condition due to lack of clothes, blankets, shoes, and provisions. Several times the troops were reduced to one half or to one quarter allowance, and some days were passed without any bread or meat. To prevent their own deaths from starvation, the soldiers were forced to rob the inhabitants. (30)

Unfortunately for the sick and wounded, the hospitals were affected very hard for want of stores, particularly wine, spirits, tea, coffee, rice, molasses, milk, and vegetables.

In a letter to Jonathan Potts, Purveyor-General of the Hospitals, Dr. Cochran refers to the dismal inefficiency which characterized the management of the hospital department during the encampment:

Dear Sir: I received your favor by Dr. Bond, and am extremely sorry for the present situation of the hospital finances. Our stores have all been expended for two weeks past, and not less than 600 regimental sick and lame, most of whom require some assistance, which being withheld, are languishing and must suffer.

I flatter myself you have no blame in this matter, but curse on him or them by whom this evil is produced. The vengeance of an offended Deity must overtake the miscreants sooner or later. It grieves my soul to see the poor, worthy, brave fellows pine away for want of a few comforts, which they have dearly earned.

29. Frank Moore, Diary of the American Revolution, (New York, Charles Scribner, 1860), II, 406.

30. Thacher, Journal, p. 188.

I shall wait on his Excellency, the Commander-in-Chief, and represent our situation, but I am persuaded it can have little effect, for what can he do? He may refer the matter to Congress, they to the Medical Committee, who will probably pow-wow over it awhile, and no more be heard of it. The few stores sent on by Dr. Bond in your absence are not yet arrived, I suppose owing to the badness of the roads. If they come they will give us some relief for a few weeks. (31)

Thus all the conditions and circumstances of the winter encampment were most propitious for the outbreak of infectious diseases and a high toll of death caused by malnutrition, shortage of medical supplies, and inadequate shelter and clothing. Yet the general state of health in the army was surprisingly good through the winter in spite of all privations and sufferings. Very few of the hospital returns have been located, but in many respects they speak for themselves. Because they give so much light on the nature and extent of incident army diseases, we reproduce them in the following pages.

The first return is of the number of men sick in hospitals of the ten brigades near Morristown, February 1780. In other words, the return pertains to the flying hospitals, and perhaps the regimental also. (32)

31. Dr. Thomas Bond, Jr., To Dr. Potts, Morristown, March 18, 1780; Dr. Cochran to Dr. Potts, Morristown, same date, Papers of the Pennsylvania Historical Society; also Walter L.C. Biddle, "Dr. John Cochran, Director-General of the Hospitals of the United States, 1781," The Pennsylvania Magazine, III (1879), No. 3, 244.

32. National Archives, RG 93. For the fact that the army was healthy, see also P. Turner, Danbury to Washington, February 3, 1780, Washington Papers, Library of Congress; Thacher, op. cit., 198, 1827 edition.

Brigades	Regi- ments	Sergeants	Drums and Fifes	Rank and File	Total of each Regi- ment	Total of each Brigade
1st Maryland	1st			11	11	
	5th	2		19	21	
	7th			6	6	
	3rd		1	13	14	52
2nd Maryland	2nd			10	10	
	6th			9	9	
	4th			8	8	
	Delaware			10	10	37
1st Penn.	1st	1		4	5	
	7th		1	2	3	
	10th			5	5	
	2nd			9	9	22
2nd Penn.	3rd	1		7	8	
	6th			2	2	
	9th			7	7	
	5th			9	9	26
New Jersey	1st			12	12	
	3rd					
	4th			11	11	
	2nd			9	9	32
New York	2nd			2	2	
	4th			8	8	
	5th			7	7	
	3d			7	7	24
Starks	Webbs			9	9	
	Jacksons	4	2	13	19	
	2 R. Island			5	5	
	Sherborns	1		12	13	46
Hands	4th Penn.	2		7	9	
	11th Penn.	1	1	7	9	
	Hazens	1		16	17	
	Livingston	1		5	6	41
1st. Conn.	3rd			3	3	
	4th			13	13	
	6th			25	25	
	8th			7	7	48
2nd Conn.	1st			14	14	
	2nd	1	1	22	24	
	5th			15	15	
	7th	3	2	30	35	88
Total men sick		18	8	390		416

During the same month of February the strength of the ten brigades was 11,361 men, broken down as follows: (33)

<u>Brigade:</u>	<u>Officers Present</u> <u>Fit for Duty</u>	<u>Noncommissioned</u> <u>Officers</u>	<u>Rank and File Total</u>
1st Maryland	32	88	994
2nd Maryland	34	101	1,055
1st Connecticut	40	140	2,209
2nd Connecticut	36	92	884
Hand's	42	137	908
New York	39	87	883
1st Pennsylvania	43	121	1,048
2nd Pennsylvania	40	101	893
Stark's	41	129	982
New Jersey	45	102	1,015
	-----	-----	-----
	392	1,098	9,871

The two above returns show that of 11,361 officers and men, only 416 were reported sick, that is, 3.7%.

Three general hospital returns prepared by Dr. William Brown, Physician General of the Middle Department, covering February 1 to May 1, provide more specific information about the health state of Washington's army. (34)

33. Monthly return of the Continental Army for February 1780, The William L. Clements Library, University of Michigan.

34. General Return of the Sick and Wounded in the Military Hospitals belonging to the Army, Commanded by his Excellency General Washington, from February 1 to March 1, 1780. NH-RC 93.

places where military hospitals are open	Admitted during the month	Discharged during the month	Deserted during the month	Dead during the month	Remaining in Hospital					Total
					Convalescent	Wounded	Sick of acute diseases	Sick of chronic diseases	Venereals	
Yellow Springs	21	10		1	5	4		45	1	55
Philadelphia	12	69			8			1		9
Sunbury					17	6	3	4		30
Brenton	1	2			3	1	6	1	1	12
Pluckemin	32	33	3	2	12	1	8	40	29	90
Maskenridge	15	10		3	5	2	14	10	2	33
Fish-Kill					30	2	6	47	10	95
Albany	4	3	3	1	6	8	13	44	15	86
										410
Camp, under care of Regimental surgeons through- out the Line, by Dr. Cochran's return					128	9	123	246	57	563
	85	127	6	7	214	33	172	439	115	973

General return for March 1 to April 1:

Places where military hospitals are open	Admitted during the month	Discharged during the month	Deserted during the month	Dead during the month	Remaining in Hospital					Total
					Convalescent	Wounded	Sick of acute diseases	Sick of chronic diseases	Venereals	
Sunbury	1	19	1			5	1	5		11
Yellow Springs					5	4		45	1	55
Philadelphia	3	6			4			1	1	6
Brenton		2			2	1	2	4	1	10
Cluckemin	38	37	5	1	10		6	39	29	84
Maskenridge	1	3		2	5	4	11	8	2	30
Fish-Kill					30	2	6	47	10	95
Albany	3	18	2	1	5	6	10	32	9	62
										<u>353</u>
Camp, under care of Regimental Surgeons throughout the Line, by Dr. Cochrain's return						210	151	277	32	670
	46	85	8	4	271	22	187	458	85	1,023

General return of April 1 to May 1: 36

Places where military hospitals are open	Admitted during the month	Discharged during the month	Deserted during the month	Dead during the month	Remaining in Hospital					Total
					Convalescent	Wounded	Sick of acute diseases	Sick of chronic diseases	Venereals	
Sunbury	1	14	1			5	1	5		11
Yellow Springs	25	26		1	6	3		41	3	53
Philadelphia	9	10			1	1		2		4
Trenton					1	1	3	4		9
Pluckemin	46	29	6	3	14		3	49	26	92
Baskenridge	12	14		3	3	4	13	10	1	31
Fish-Kill	7	67		2	26	3	3	27	3	62
	100	165	7	9	51	17	23	138	33	262

This last return does not include the sick and wounded "taken care of by the Regimental and Flying hospital surgeons (of which there is always a great number of slight cases)."

Dr. Cochran, mentioned in the first two returns, was Physician and Surgeon General of the Middle Department. During the Jockey Hollow encampment he established his headquarters in the residence of "Dr. Canfield," Morristown, where the hospital stores were kept. (35)

During the period covered by the three general hospital returns - February 1 to May 1 - there was no general hospital at Morristown, but Basking Ridge and Pluckemin were relatively nearby. The "remaining" in the general hospitals were afflicted mainly by chronic diseases, followed by convalescents, acute diseases, venereals, and wounded. Only 231 men were hospitalized during the three months. Perhaps what is more significant is that in the first two returns, 61% of all the sick and wounded reported, were taken care of by the regimental and flying hospitals; most of these patients were slight cases of disease, followed by contagious cases like putrid fevers.

Another kind of weekly and monthly returns, shown below, provide more useful information besides the number of sick, like the number of dead and of surgeons and mates. The figures below include the troops quartered in Jockey Hollow and those stationed in different outposts outside of Morristown. (36) (See p. 30a).

Compared with Middlebrook and Valley Forge, the number of dead during the Morristown encampment was exceedingly low. From December 18, 1779, to June 3, 1780, only 86 persons died during the winter encampment; the highest number of dead occurred in the week of March 4, when 12 men died. Middlebrook had 101 dead between February 20 and May 29, 1779, with 13 dying during the first week. At Valley Forge the death toll was grim. From January 12 to May 30, 1778, a total of 2,094 men died. In one week alone - May 2 - 403 persons died; in the last week of May - 393. (37)

35. Fitzpatrick, op. cit., XVII, 282. Dr. Canfield's house is still standing and used as headquarters of the DAR.

36. National Archives, RG 93.

37. For the Middlebrook and Valley Forge weekly returns, see National Archives, RG 93.

Weekly Returns

Date	Present fit for duty	Sick Present	Sick Absent	Total Rank and File	Dead	No. of Surgeons	No. of Mates
Dec. 18/79	8,433	656	677	11,574	7	13	16
" 25/79	8,169	759	627	11,538	6	12	7
" 2/79	10,925	664	739	14,135		34	27
Jan 1/80	7,506	723	642	11,403	1	26	20
" 8/80	7,474	839	625	11,242	4	29	21
" 15/80	4,910	677	611	10,815	4	26	19
" 22/80	5,563	969	580	10,536	4	24	19
" 29/80	4,701	837	538	10,464	4	21	19
Feb. 5/80	3,825	621	328	8,145	2	18	16
Feb. 14/80	5,983	701	696	10,049	3	24	59
March 4/80	6,316	627	465	9,774	12	23	23
" 11/80	6,357	624	438	9,654	1	24	24
" 18/80	6,442	596	434	9,590	2	23	22
" 25/80	6,383	569	427	9,495	3	23	20
April 1/80	6,069	613	425	9,447	2	22	22
" 8/80	6,311	615	412	9,239	2	26	25
April 15/80	6,356	681	389	9,130	1	29	25
" 22/80	4,460	496	320	7,054	4	19	16
" 29/80	4,367	491	292	6,629	11	18	16
May 6/80	4,494	419	294	6,436	2	19	18
" 13/80	4,403	419	288	6,329	3	19	18
" 20/80	4,434	388	308	6,464	2	19	19
" 27/80	4,571	443	291	6,385	2	20	21
June 3/80	3,760	363	253	5,558	4	16	18

Total Dead 86

Monthly Returns

Date	Present fit for Duty	Sick Present	Sick Absent	Total Rank and File	Dead	No. of Surgeons	No. of Mates
Jan. 1780	8,589	1,193	727	17,058	24	34	27
March "	8,601	804	564	13,851	22	29	28
April "	6,634	657	424	10,683	25	29	25
May "	6,490	575	390	9,645	12	29	34
June "	5,843	333	552	8,455	6	33	32

In the following monthly return prepared by Dr. Brown for the general hospitals of Basking Ridge, Pluckemin, and the Pennsylvania Huts - June 1 to July 1780 - a more detailed breakdown of diseases is given. (See p. 31a).

This return covers only the sick and wounded who were hospitalized in the three hospitals and does not include the patients who remained in the regimental and flying hospitals. (38) Although there was very little fighting during the winter, most of the hospital patients were wounded (76), followed by

chronic diseases	- 39	
convalescent	- 34	
rheumatism	- 32	
venereals	- 23	
intermittent fevers	- 13	
ulcers	- 12	
dysentery	- 8	
pulmonic affections	- 7	
inflammatory fever	- 6	
bilious remittent fever	- 5	
Smallpox and measles	- 5	
diarrhea	- 3	
nervous malignant fever	- 1	
jaundice	- 1	- Total - 189

Compared with other ailments, the cases of venereals were exceedingly high, and so were those of rheumatism; wounded were, probably, surgical cases.

Several factors, no doubt, contributed to the healthy state of the army during the long and cold winter encampment. Many of the army soldiers and officers were veterans who had learned to struggle with the hardship of war. In spite of an inefficient medical organization, three years of war must have brought some important improvements in remedial and preventive medicine, and in the quality of the medical personnel.

Regiments	Admitted	Discharged	Deserted	Dead	Remaining													TOTAL			
					Convalescent	Wounded	Inflammatory Fever	Nervous Malignant Fever	Bilious Remittent Fever	Intermittent Fever	Dysentery	Diarrhoea	Rheumatism	Pulmonic Affections	Dropsy	Jaundice	Lues Venerea		Small-Pox and Measles	Ulcers	Various Chronic Diseases
8th Virginia					1																1
16th "			1																		
1st Maryland	3									1								1			2
2nd "	2																				
3rd "	8																	1			1
4th "	5																				
5th "	4					1												1			2
7th "	7																				
Delaware	3																				1
1st Pennsylvania	3	1		1		1										1	1		1		4
2nd "	12				7								1	2			1		4		15
3rd "	17				2					1			6	1		1		2	4		17
4th "	8				2					1			2			2			1		8
5th "	16				5	2	1		1	3			5			1	1	1	3		23
6th "	7	1				2				2			2				1		2		9
7th "	4			1						1						2			3		6
9th "	13		1		3	1	1			1			2	2		2		2	3		17
10th "	2	1								1									1		2
11th "	9				1		2				2		5						1		11
1st New Jersey	2					3													1		4
2nd "	30				4	9				2		1	6	2			1		8		33
3rd "	9					9															10
4th "	14				1	13												1			14
Connecticut Regts.	10	1			3	2	1			3	1		1			1			2		14
New York Regts.	3	2			3	1					1			1			2				7
Artillery Regts.	1	4															1		3		4
Col. Angel's Regt.	23	2				23	1			1			2			2			1		30
Col. Jackson's		1			1	1										5			1		8
Col. Hazen's						2						2						3			9
1st New Hampshire	1					1															1
His Excellence's																					
Guard	2					2															2
Capt. Bedham [?] Corps	1					1															1
French Seamen	4	15						1	4									2			7
Artificers		1																			
British Prisoners	3	1		1		2															2
	194	52	2	33	4	76	6	1	5	13	8	33	2	7	-	1	23	5	12	39	265

III. Army Remedial Medicine

Remedial medicine was dominated by tradition and superstition. It was a combination of folk medicine and authoritative or presumed authoritative sources. In the most trifling cases of disease, physicians followed a general routine of practice--bleeding, vomiting, blistering, purging, anodynes, and the like. Physicians were necessarily apothecaries, for they prepared their own remedies. Large quantities of unpleasant-tasting and ill-smelling concoctions were the rule. "Salmon's Herbal," the great pharmacopeia then in use, was a tome of 1,300 pages which ascribed miraculous powers to all known herbs. (1)

Ignorance of the cause of diseases was a fundamental factor in epidemics and deaths. Although a number of distinct diseases were recognized by their obviously peculiar symptoms--skin infections, consumption, gout, and so on--most forms of illness were not recognized as specific and were treated as involving a state of the body "system." To find the cures of these generalized conditions was the chief concern of the physician. One theory of diseases--humoral theory--held that diseases were manifestations of gross or violent humors within the body, and that to effect a cure those humors must be expelled. To accomplish this end, patients had to be bled, blistered, purged, vomited, and sweated. They also used two common specifics--opiates and the bark. Those who followed the theory of tensions recommended stimulants and narcotics. Both schools of thought were reinforced by the use of the traditional pharmacology which was "an accumulation in which a little sense was imbedded in a great mass of nonsense." (2)

1. Richard Lee McClenahan, "The New Jersey Medical History in the Colonial Period," Proceedings of the New Jersey Historical Society, New Series, X, No. 4 (October 1925), 363; Gibson, op. cit., p. 48.

2. Charles C. Wall, "Dr. His Exclty, Geo. Washington to James Craik," Virginia Historical Magazine (October 1947), p. 319; Shryock, op. cit., pp. 11-12.

Writing about the origin of diseases, Tilton wrote that all physicians agreed

that the ordinary endemics of our country proceed from vicious qualities in the air we breathe. Some have expressed an opinion that this vice of our atmosphere producing intermitting and remitting fevers, is a mere negative quality, proceeding from a defect of oxygen or vital air. Others are of opinion that this noxious quality is positive and proceeds from chemical combinations in the atmosphere that are poisonous to the human body. (3)

1. Bleeding

Bleeding is the best example of the power of tradition and superstition in remedial medicine. Bleeding was the universal cure for many ailments; the motto might well have been, "When in doubt, bleed." Sometimes doctors prescribed that the patients be bled to unconsciousness. This common procedure was usually performed with the spring lancet, a smoothly working contrivance which cut so quickly that the patient was not aware that anything had happened until the blood started to flow. Washington himself had great faith in the efficacy of bleeding as panacea. (4)

In the first bleeding of pleurisy patients, twelve ounces of blood were removed and while the vein was open, the patient was forced to breathe deeply and cough. If the pain did not diminish within twenty-four hours, a second bleeding was prescribed. Rheumatic patients had ten ounces of blood taken from the afflicted areas. Men affected by phrenzy were bled in the foot and jugular vein, and if fevers remained, further bleeding was advised. (5)

3. Tilton, op. cit., pp. 52-53.

4. John Duffy, Epidemics in Colonial America (Louisiana State University Press, 1953), p. 9; Wall, op. cit., pp. 323-24; Fitzpatrick, op. cit., I, 163; Louis J. Livingood, "The Pioneer Doctor," Historical Review of Berks County (April 1936), p. 74.

5. Swieten, op. cit., 14-21, 28-29, 41, 52, 57, 59, 67-68, 74, 77-79, 83, 91.

Dr. Rush thought that the majority of diseases required depletion, and that bleeding was the easiest, safest and shortest means of accomplishing it. He carried bleeding and the depleting system farther than ever had been done before by any of his contemporary physicians; and in like manner he urged the use of calomel-mercurus chloride. He applied his principles of medicine successfully to the cure of consumptions, dropsies, hydrocephalus internus, apoplexy, gout, and other diseases of the mind. A free use of the lancet, in almost every case, and particularly in some in which it had rarely or never before been used, was one of his first and most common prescriptions. His defense of bleeding was founded in his theory of fever. He advocated that all

diseases are preceded by debility. There is but one exciting cause of fever, and that is stimulus; and that consists in a preternatural and convulsive action of the blood vessels. All the supposed variety of fevers have but one proximate cause, and that is morbid excitement. All ordinary fevers being seated in the blood vessels, it follows, of course, that all those local affections, we call pleurisy, angina, phrenitis, internal dropsy of the brain, pulmonary consumption, and inflammation of the liver, stomach, bowels, and limbs, are symptoms only of an original and primary disease in the sanguiferous system. (6)

Bleeding was practiced even by midwives, gardeners, and blacksmiths, but it was not generally understood and very few knew when it was necessary. Even physicians themselves had been much the dupes of fashion in this respect, "as to render it the subject of satire and ridicule." Buchan, a contemporary English physician, thought that no practice of medicine was so frequently necessary as bleeding.

6. James Thacher, American Medical Biographies (2 vols., New York, 1967), pp. 34-36. This is a facsimile copy of a book published in Boston in 1828.

Bleeding is proper at the beginning of all inflammatory fevers, as pleurisies, peripneumonies, etc. It is likewise proper in all topical inflammations as those of the intestines, womb, bladder, stomach, kidneys, throat, eyes, etc. as also in asthma, sciatic pains, coughs, head-achs, rheumatisms, the apoplexy, epilepsy and bloody flux. After falls, blows, bruises, or any violent hurt received either externally or internally, bleeding is necessary. It is likewise necessary for persons who have the misfortune to be strangled, drowned, suffocated with foul air, the fumes of metals, or the like. In a word, whenever the vital motions have been suddenly stopt, from any cause whatever, except in swoonings occasioned by mere weakness or hysteric affections, it is proper to open a vein: But in all disorders proceeding from a relaxation of the solids, and an impoverished state of the blood, as dropses, cacochymies, etc. bleeding is improper. (7)

2. Medicine, Drugs, Instruments

In the process of diagnosis and treatment, drugs were administered, as all other medicines, in unbelievable quantities. Prescriptions were prepared in a haphazard fashion, and no one thought of measuring the amount of drugs with any degree of accuracy. One writer expressed that "the asbestos stomachs and colossal minds of our forefathers were much above such petty minuteness." Hence one finds such phrases as "enough to lie on a pen-knife's point," the "bighth of a walnut," or "a pretty drought." Prescriptions containing nauseating ingredients were given for many diseases. (8)

7. William Buchan, Domestic Medicine, or the Family Physician (Boston, 1778), pp. 401-02.

8. Duffy, op. cit., p. 8.

It is readily apparent that the type of medical service that a regiment received depended upon the physician's training, ability, and devotion to duty. To simplify the traditional pharmacopoeia, Dr. William Brown, physician-general of the Middle Department, prepared in 1778 the first pharmacopoeia published in America, while stationed at the hospital of Lititz, Lancaster County, Pennsylvania. It was a 32-page book written for the use of the army hospitals and supposedly was used extensively during the Revolution. This little book was a collection of prescriptions designed especially for less experienced regimental mates and detached troops unaccompanied by medical officers. After enumerating various symptoms, it prescribed by numbers the medicines which were supposed to be available in the regimental medical chests. In format, Brown's book is similar to that of Swieten, but far less comprehensive in content. Part I contains 84 prescriptions for internal medicine, and Part II, 16 for external medicine and surgery. Some of the health precautions suggested and treatments recommended are unique. For instance, in cases of rheumatism in the arm, it directs to take ten ounces of blood from the affected side; for contaminated water, six ounces of vinegar is prescribed to be mixed with every three quarts.(9)

One of the crucial problems of army medicine was the inadequate supplies of drugs, medicines and instruments, especially after importation was cut off from England. France did not directly export any quantity of medical supplies at least until 1778. American privateers provided the most important relief. Drug cargoes from British ships served as a most important source of supply, particularly in 1777 and 1778.

9. William Brown, Pharmacopoeia (Philadelphia, 1778); Hume, op. cit., p. 128; Duncan, op. cit., pp. 224-25.

A listing of the different medical supplies commonly in use is provided by the contents of medical chests ordered by the Continental Congress in 1776 and 1778 for the Pennsylvania 4th Regiment and the Northern Department's Medical Store. The medical supplies were provided by Marshall's, the great prescription store of Philadelphia which seems to have had a good portion of the medicines and instruments to supply the Continental Army during the war. This store kept a blotter, or "waste book," of all transactions with the Congress.

In contemporary English, the names of medicines, drugs, and the like are as follows:

Botanicals

Peruvian bark; Jesuits' bark; or bark
Powdered Peruvian bark
" jalap
" ipecac
" Rhubarb
Rhubarb root
Sennae or sena
Gentian root
Senega; rattlesnake root; or snake root
Squill; or sea-onion
Cinnamon
Orange peel
Camomile flower
Balm
Camphor; or camphire
Opium
Gum Arabic
Alce; or aloes
Gum ammoniac
" quaiac
Myrrh
Balsam of copaiba
" of Peru
" of tolu
olive oil
Castor oil

Drugs of animal origin

Spanish flies; or flies
Yellow beeswax
Honey
Powdered crabs' eyes
Spermaceti

Chemicals

Alum or rock alum
Chalk
Cream of tartar
Tartar emetic
Nitre or salpetre
Salt of wormwood
Epsom salts; bitter purging salts; or bitter cathartic salts
Glauber's salts; Glauber's purging salts; or Glauber's wonderful salts
Salt of tartar
Sal ammoniac
Corrosive sublimate of mercury
Red precipitate of mercury
Calomel
Flowers of sulphur
Oil of vitriol
" of turpentine
White vitriol
Elixir of vitriol
Roman vitriol
Sugar of lead
Cerated glass of antimony
litharge of lead; litharge vinegar; or extract of Saturn

Tinctures

Tincture of opium; thebaic tincture; liquid laudanum; and Sydenham's laudanum

Tincture of myrrh and alces
" of cinnamon

Spirits

Spirit of sal ammoniac
Sweet spirit of nitre
Compound spirit of lavender
Rectified spirit of wine

Miscellaneous preparations

Conserves of red roses
Cordial confection
Asthmatic electuary
Paregoric elixir
Purgative pills
Compound powder of bole with opium
Soap liniment
Venetian soap

Ointments

Ointment from calamine stone
Yellow basilicon ointment
Strong mercurial ointment
Ointment of gum elemi
Camphorated white ointment

Plasters

Adhesive plaster
Simple diachylon plaster
Diachylon plaster with gum
Blistering plaster; vesicatory plaster
Stomach plaster

Surgical dressings, etc.

Lint	needles
Tow	Pins
Sponge	Compresses
Twine	Bandages
Tape	Flannel
Fracture pillows	Shears
Splints	Rags
Thread	

Surgical instruments

Director
Probe, silver
Forceps
Catheters
Amputating instruments
Trepanning instruments
Lancets
Tourniquets
Syringe, pewter
" , ivory
Glyster pipe arm'd
Tooth-drawing instrument

Pharmaceutical equipment

Scales and weights
Mortar and pestle
Tyles (pill tiles)
Spatulas
Bolus knife
Plaster Knife (plaster spatula)
Leather skins

Miscellaneous supplies

Bottles
Gallypcts
Vials
Corks
Pillboxes
Wrapp[ing] paper
Writing paper
Ink powder
Quiles (quills) (10)

10. George B. Griffenhagen, Drug Supplies in the American Revolution. United States National Museum (Bulletin 225, Smithsonian Institution, 1961), pp. 130-33; Dr. Jonathan Potts' Papers, Pennsylvania Historical Society.

Although the number of individual drugs in the above listing is considerable, only about a dozen constituted the really critical shortages. Heading the list of the most wanted articles was Peruvian or Jesuits' bark, from which quinine was later discovered. During the Revolutionary War tons of bark were used in the hospitals. Bark was an indispensable specific, as commonly used then as are aspirin tablets in the modern household. Bark, tartar emetic and glaubers' salts were the best means of combating the endemic diseases like fevers and ague.

Cathartics and purgatives were the most prominent group of drugs on the list of capital articles. Jalap, ipecac, and rhubarb were the botanical favorites; bitter purging salts--Epsom salts--and Glauber's purging salts were the chemical choices for purging. Tartar emetic--antimony and potassium tartrate--was the favorite for a vomit, and cantharides--Spanish flies--was the most important ingredient of blistering plasters. Gum opium was administered for its narcotic effects, while gum camphor, nitre--saltpetre or potassium nitrate,--and mercury--pure metal as well as certain salts--were employed for a variety of purposes. (11)

Besides in cases of syphilis, itch and other diseases without fever, wrote Tilton, mercury was regarded as specific remedy in smallpox, measles, scarlatina, influenza, yellow fever, and the like; it was not less successful in the early stages of jail fever. In yellow fever, remitting or any other fever, if the patient's mouth could only be touched with mercury, he was regarded as safe.

Calomel was given in the hospitals in various forms, and according to circumstances, said Tilton: sometimes alone, or mixed with opium, tartar emetic, neutral salts, and the like. The following prescription was of extensive use and considered by him as official: two drams of calomel, one dram of opium, fifteen grains of tartar emetic, and enough syrup for making 60 pills. One of these pills could be taken every night, or night and morning, according to the conditions of the patients. This form of medicine could be used, not only in all contagious and infectious diseases, but in all fevers "whatscever, where the inflammatory diathesis

11. Ibid., p. 129.

prevails; and may be regarded as the most powerful of all antiphlogistic remedies." He prescribed it for inflammations of the lungs and liver to the greatest advantage. "I do not recollect to have seen it tried in inflammations of the stomach and bowels; but in ordinary colics it may be regarded as specific." Opium he considered the first of stimulants, and was particularly useful in case of a lax state of the bowels.(12)

Rush wrote that he carried with him into private practice a good deal of knowledge acquired in the military hospitals. It was there "I learned the safety and advantages of giving opium in low fevers, and of adding other stimulants to opium in the treatment of the locked jaw.(13)

Lint, a form of absorbent material made by scraping or picking apart old woven material, also often was short in supply.

Equipment shortages included surgical instruments and mortar and pestles for pulverizing the crude drugs. Glass vials for holding compounded medicines were also a supply problem, especially after essential drugs were again available.

Some of the shortages, like lint, glass vials, purging salts, and nitre were eased by local manufacture, and "at the same time initiated the first large-scale pharmaceutical manufacturing in America." Numerous botanicals indigenous to the colonies were widely used in medicine of the period. Attempts to substitute indigenous plants for scarce drugs like Peruvian bark were largely unsuccessful. Peruvian bark, jalap, ipecac, camphor, opium, cantharides--these were the drugs with the greatest demand among American army physicians.(14)

12. Tilton, op. cit., pp. 57-60.

13. Rush, A Memorial, p. 60.

14. Griffenhagen, op. cit., pp. 132-33; David Ramsay, A Review of the Improvements, Progress and State of Medicine in the XVIII Century (Charleston, 1801), pp. 8-19.

3. Typhus and Dysentery

Dr. Rush claimed that the remedies which appeared to be most effective against typhus fever were vomits of tartar emetic, gentle doses of laxative salts, bark, wine, volatile salts, opium and blisters. An emetic seldom failed to check the fever while it was in a formative state and before a patient was confined to bed. (15)

Tilton left an excellent description of remedial treatment for typhus.

Although often compelled to let blood in the commencement of this fever, we were cautious of repeating this operation; and were disposed to avoid it altogether, when not demanded by a full pulse and other pressing circumstance. After bleeding, if that operation should be thought necessary, a vomit was deemed of excellent use, by opening and squeezing all the glands of the body, and thus shaking from the nervous system, the contaminating poison, before its impressions are fixed. With this view the earlier the vomit is administered the better. During the prelude or those marks of approaching danger above described, a vomit may prevent the fever altogether.

Once the patient acquired the fever, the use of mercury was essential as long as any signs of inflammatory diathesis remained. This remedy had the power of subduing all kinds of contagion or infection that surgeons were familiar with in those days. Wine was deemed a capital remedy in every stage of typhus. In his own case, he writes, when everybody was just waiting for him to die, providence

ordered otherwise. My friend, Dr. Rush, paid kind attention to me, and a benevolent lady of the neighborhood sent me several gallons of excellent wine. I drank freely of the liquid, and took, at the same time, liberally of Huxham's tincture. My tongue soon after began to moisten on the edges; and

15. Rush, Medical Inquiries, pp. 255-56.

in the course of some days the whole crust fell off and left it so raw and initalable that I was obliged to hold skinned almonds in my mouth to abate the irritation . . . All the cuticle scaled off from my skin; and all my hair gradually combed off from my head; so that instead of my former straight hair I had an entire new suit, that curled beautifully.

Being reduced to skin and bones I had a voracious appetite, and in a moderate space of time recovered a more than ordinary plump habit; but it was not less than nine months before I gained the usual elasticity of my muscles. (16)

Dysentery, or putrid diarrhoea, wrote Tilton, was generally the result or dregs of other camps and hospital diseases, and was the most intractable disorder of all those the physicians had to deal with. The patient would often be able to move around, with little or no fever, his skin remarkably dry and husky, and constant drain from his bowels. Various attempts were made to force the skin by

warm bathing, Ipecacuanha mixed with opium and by that means, to divert the current of humours from the bowels; but all to no purpose. The only restraining I recollect to have been of any use, was recommended to us by Doctor Craik, one of our physicians, general, noted for his great range in the materia medica.

It consisted of Tinct. Huxham. and Tinct. Japon. equal parts. Of this mixture one or two spoonfuls were given every morning before breakfast, and again before dinner. But while the patients remained about the hospital, nothing appeared to have more than a palliative effect. Multitudes melted away, as it were, of this miserable complaint and died. The only expedient I ever found effectual for their relief was to billet them in the ccuntry, where they could enjoy pure air and a milk diet; or to furlough them to their own homes, if within their reach.

16. Tilton, op. cit., pp. 59-60.

He also mentions that dysentery, besides bleeding, frequently required vomit in the first instance, but afterwards the practice was to keep the bowels freely open with small drops of calmel given at bedtime and repeated doses of "Sal. Cath. Amarum," during the day until the griping abated. Then the cure was completed with gentle astringents and anodynes. No disease required a more perfectly low diet than dysentery. Frequently it was complicated with the putrid fever and required a treatment conformable with that disease. (17)

4. Other Diseases

Venereal disease was a constant menace in both the British and the American armies. As with so many other diseases, physicians could do very little to combat the pain of the afflicted patient because of their complete ignorance of the malady. Infected men were given a special diet of broth, barley, rice, oats, greens, fresh meat, milk, and ripe fruit; special ointments were applied to the diseased area. As a fine had to be paid by those who had the disease, many men chose to suffer in silence. (18)

Soldiers had traditional remedies. One cure for venereal disease was an elixir of spring water, sumac and mullin roots, and gun powder, taken three or four times a day. If there was no immediate relief, a mixture of salts and spirits of turpentine was taken. (19)

17. Ibid., pp. 60-61.

18. Jour. Cont. Cong., X, January 6, 1778, p. 24; Lauber, op. cit., pp. 381, 384, 393; John Nice, "Extracts from Diary," Pennsylvania Magazine of History and Biography, XVI (1892), 360; Swieten, op. cit., 94-101; Fitzpatrick, op. cit.; VIII, 121; IX, 130; XII, 54.

19. Lauber, op. cit., p. 803.

A cure for kidney ailments was a glass of horseradish roots mixed with mustard seed and gin; a remedy for snake bites was internal dosing of olive oil and external application of mercurial ointment.(20)

An intense irritation of the skin known as the itch was very common and highly contagious. In the hospitals it was treated with ointments of sulphur. A soldier's remedy for the itch is described by Private Martin, as the army moved out of Morristown in 1777:

When I was inoculated with the smallpox I took that delectable disease, the itch; it was given us, we supposed, in the infection. We had no opportunity, or, at least, we had nothing to cure ourselves with during the whole season. All who had the smallpox at Peekskill had it. We often applied to our officers for assistance to clear ourselves from it, but all we could get was, "Bear it as patiently as you can, when we get into winter quarters you will have leisure and means to rid yourselves of it." I had it to such a degree that by the time I got into winter quarters I could scarcely lift my hands to my head. Some of our foraging party had acquaintances in the artillery and by their means we procured sulphur enough to cure all that belonged to our detachment. Accordingly, we made preparations for a general attack upon it.

The first night one half of the party commenced the action by mixing a sufficient quantity of brimstone and tallow, which was the only grease we could get, at the same time not forgetting to mix a plenty of hot whiskey toddy, making up a hot blazing fire and laying down an oxhide upon the hearth. Thus prepared with arms and ammunition, we began the operation by plying each other's outsides with brimstone and tallow and the inside with hot whiskey sling. Had the animalcule of the itch been endowed with reason they would have quit their entrench-

20. Thacher, Military Journal, pp. 52-53; Henry Dearbon, Revolutionary War Journals (Chicago, 1939), pp. 234-35.

ments and taken care of themselves when we had made such a formidable attack upon them, but as it was we had to engage, arms in hand, and we obtained a complete victory, though it had like to have cost some of us our lives. Two of the assailants were so overcome, not by the enemy, but by their too great exertions in the action, that they lay all night naked upon the field. The rest of us got to our berths somehow, as well as we could; but we killed the itch and we were satisfied, for it had almost killed us. This was a decisive victory, the only one we had achieved lately. The next night the other half of our men took their turn, but, taking warning by our mishaps, they conducted their part of the battle with comparatively little trouble or danger to what we had experienced on our part.(21)

Self-medication seems to have been a general practice even among officers. Col. Francis Johnson, sick with bilious fever, treated himself with buttermilk and a series of medicines which had the "brake jaw" names of "Absorbents, Alkalines, Neutrals, Soap, Astringents, Means, Tonics, Antizymics, Emetics and Devilectics."(22) General Anthony Wayne, afflicted with "feaver and shake," prescribed himself a strong emetic, "and when I have got it at a little distance, I shall so fortifie myself with the Bark."(23)

Physicians obviously attributed unwarranted therapeutic virtue to alcoholic beverages. Many of the requisitions for drugs and supplies from the line as well as the hospitals contained vinous and spiritous items- madeira and port wine, rum, whiskey, and the like. Wine was used for patients with putrid fevers; cider and strong beers were acceptable when wine was not available.(24)

21. Martin, op. cit., pp. 110-11.

22. Johnson to General Anthony Wayne, Bristol, May 31, 1777, Pennsylvania Magazine, XXX (1906), Vol. I, 504.

23. Anthony Wayne MSS, September 7, 1779, Pennsylvania Historical Society.

24. For list of articles ordered to be purchased for the hospitals of the Middle Department, see Dr. Potts' Papers, Library of Congress, 1778 or 1779.

Perhaps the prevailing opinion about spiritous beverages was expressed by Surgeon Waldo at Valley Forge:

The poor sick suffer much in tents this cold weather. But we now treat them differently from what they used to be at home under the inspection of Old Women and Doct. Bolus Linctus. We give them Mutton and Grogg and a Capital Medicine once in a while, to start the Disease from its foundation at once. We avoid Pidling Pills, Powders, Boluss' Linctu's Cordials and all such insignificant matters whose powers are only render'd important by causing the Patient to vomit up his money instead of his disease. But very few of the sick Men Die. (25)

25. Surgeon Waldo, Diary, p. 312.

IV. Preventive Practices

Although military surgeons were mainly concerned with preventive medicine, and much of their time was spent in diagnosis and treatment of the various army diseases, they also tried to find the causes of ailments in order to institute preventive methods and provide remedies. Preventive medical practices, therefore, developed with the realization that the army could be kept healthy by the maintenance of certain living conditions. By experience, military surgeons learned that many diseases that afflicted the army could be decreased by control of certain fundamental factors, like physical fitness, shelter, clothing, exercise, weather, diet, water, alcoholic beverages, and rules of personal hygiene and camp sanitation. Washington's personal interest in preventive medicine is reflected in many general orders and directives that tended to promote the health and healthful conditions.

Rush, Jones and Tilton were the three leading exponents of preventive medicine. Rush advocated that the health of a soldier was preserved by paying careful attention to particulars like dress, diet, cleanliness, encampment, and exercise. Jones and Tilton's ideas were more or less similar to those of Rush. (1)

Rush's observations were first published in the Pennsylvania Packet, April 22, 1777, under the title of "Directions for preserving the health of soldiers." His observations were so well received that they were published in 1778 and distributed throughout the army. Based on the novel premise "that the

1. Benjamin Rush, Directions for Preserving the Health of Soldiers (Lancaster, 1778), 8 page booklet; Tilton, op. cit., pp. 34-36; Jones, op. cit., pp. 105-14; Thacher, Medical Biographies, p. 50; Howard Lewis Applegate, "Preventive Medicine in the Revolutionary Army," Military Medicine (Washington, D.C., Association of Military Surgeons of the United States, 1961), Vol. 126, no. 5 (May), 379-82, is an excellent summary.

mortality from sickness in camps is not necessarily connected with a soldier's life," Rush Directions formed a brief but pioneering contribution to American military hygiene and proved to be one of his most influential writings. (2)

1. Smallpox

Inoculation against smallpox is the best example of preventive medicine. It consisted of transplanting pus from the pustules of a smallpox victim into an incision or puncture in the skin of a healthy person. This treatment was first used about 1720. It was estimated that the casualty record for victims of the natural smallpox was 16 per cent, while death through inoculation averaged one in 300 patients. This was one of the few diseases which was successfully combated, and constantly during the war whole army corps submitted to this operation. Before the mass inoculation at Morristown in 1777, a test in New York had shown that only four men out of 400 died of inoculation. (3)

Before inoculation, patients were prepared for the ordeal by a special diet and systematic dosings of medicines.

According to Ashbel Green, for example, the inoculation treatment used at Morristown in 1777

consisted of a regimen of vegetable diet - animal food and all salt and spice of every kind were strictly prohibited. As to medicine, it consisted of five or six powders, composed of a small quantity of calomel, mingled, if I mistake not, with nitre [nitre] - a powder to be taken every other day; and two cathartics, one about a week after inoculation, and the other at the period when the eruption of the pock was to be expected. We were enjoined to keep cool, and to avoid violent exercise. This was the amount of the prescriptions of our medical advisers;

2. Rush's pamphlet was reissued twice during the Civil War. Butterfield, I, 145-146.

3. Gibson, op. cit., p. 84; Lynn Montross, The Story of the Continental Army, 1775-1783 (New York, Baines and Noble, Inc., 1952), pp. 184-85; Mumford, op. cit., pp. 132-33.

and I believe we were nearly all of the opinion I certainly was - that our regimen was, by far, the most objectionable part of the whole concern . . .

The most troublesome symptom we experienced was the sore which was formed on the arm at the place where the virus had been introduced by the puncture of a lancet. Many of these sores continued to discharge pus for two or three months, and in some instances were large and in a degree painful. Yet none of them proved dangerous. (4)

4. Ashbel Green, The Life of Ashbel Green (New York, Robert Carter, and Brothers, 1849), pp. 90-91. For more information about this inoculation see "Extracts from American Newspapers, relating to New Jersey," Documents Relating to the Colonial History of New Jersey (Paterson, 1898), IV, 444-46; John Morgan, A Recommendation of Inoculation, according to Baron Dimsdale's Method (Boston, 1776); Gibson, op. cit., p. 84; Leonard Lundin, Cockpit of the Revolution: The War for Independence in New Jersey (Princeton University Press, 1940), pp. 233-35; Fred B. Rogers, The Healing Art: A History of the Medical Society of New Jersey (Trenton, 1966), p. 41; Francis F. Packard, History of Medicine in the United States (2 vols., New York, Paul B. Hoeber, Inc., 1931), I, 577; Philip H. Hoffman, History of the Arnold Tavern, Morristown, N. J. (Chronicle Press, Morristown, 1903), p. 13; Reverend Joseph F. Tuttle, "Washington at Morristown, 1777-1780," Harper's New Magazine, XVIII, No. CV, (February 1859), 293-95; History of Morris County, New Jersey (New York, W.W. Munsell and Co., 1882), pp. 115-16; Bill of Mortality, Presbyterian and Baptist Congregations of Morristown (Morristown, Jacob Mann, 1806); Fitzpatrick, op. cit., III, 408-09, VI, 473, VII, 129-32, 230, 288, VIII, 156-57.

2. Diet

Proper food was one of the most important factors in preserving the health of the army. According to Washington, in 1777 there were 3,745 soldiers in the hospitals and army, the number of which had been greatly increased by the use of "bad bread, and the want of vinegar, vegetables, and soap." (5) Lack of food, poor rations, and badly prepared provisions caused malnutrition and often weakened the soldier to such an extent that he became the victim of different ailments.

A soldier's ration consisted of fresh beef, pork, or salt fish; bread and flour; peas, beans, or other vegetables; rice or cornmeal; milk, rum, spruce beer, or molasses; and salt and butter. Vegetables, well cooked, were one of the most important items since they prevented the scurvy and all putrid disorders. To supply the army with fruits and vegetables, general orders encouraged the planting of military vegetable gardens near hospitals and establishment of farmer's markets in the camping areas. (6)

Milk, wrote Tilton, "is the grand restorative for convalescents, and vegetables generally are useful, in combating that putrid tendency to which all hospital patients are so liable." (7)

5. Owen, op. cit., p. 82.

6. Rush, Directions, pp. 4-5; Swieten, op. cit., 7; Journ. Cont. Cong., IV, November 29, 1776, p. 991; Fitzpatrick, op. cit., General Orders, August 8, December 24, 1775, to Horatio Gates, September 1, 1777, to George Clinton, March 12, 1775, and to Philip Livingston, Elbridge Gerry and George Clymer, July 19, 1777, III, 409, IV, 180, IX, 154, XI, 68, VIII, 441; Duncan, op. cit., p. 212. Lauber, op. cit., p. 634; Owen, op. cit., p. 53; Applegate, Preventive Medicine, pp. 379-80.

7. Tilton, op. cit., p. 55.

"Beef and bread are by no means suitable diet for men in fever," wrote Rush in 1777. To stop in part the ravages the hospitals were making upon the army, he suggested to billet in farmhouses such of the sick as were able to help themselves. The air and diet of a farmer's kitchen, he said, were the best "physic" in the world for a soldier worn down with the fatigues of a campaign. "I have prescribed them with great success in this neighborhood, but my influence is not great enough to make the practice universal through the department." (8)

Pork was sometimes forbidden in camps, being regarded as unwholesome. It was believed to retard perspiration, and as it spoiled sooner than beef or mutton, was supposed to afford less proper nourishment. Pork, however, certainly constituted more than one half of the animal food consumed by the American peasantry, and when mixed with vegetables, was found to be a very nourishing and wholesome diet. (9)

When camp fever broke out among the troops who camped in Middlebrook in 1778-79, General Greene, believing that the heavy diet of fresh meat was one of the main causes of the disease, took measures to provide every man with a pint of vinegar with his daily rations. "Nothing will correct this evil like the free use of vinegar," he told Washington. To provide an adequate supply of cider vinegar, he had it made from molasses, flour, and water which would be ready for use in a fortnight. (10)

8. Rush to Washington, Princeton, December 6, 1777, Butterfield, op. cit., I, 180-82.

9. Jones, op. cit., p. 112.

10. Theodore Thayer, Nathanael Green, Strategist of the American Revolution (New York, Twayne Publishers, 1960), p. 171.

As far as the sick were concerned, a regimental officer of the day, appointed by rotation, visited the sick every day to see that they were provided for and taken care of; they inspected the food, both as to the quality and manner of preparing it, "obliging the men to accustom themselves more to boiled soups, and less to broiled and roasted, which as to their constant diet is destructive to their health." (11)

Wheat was preferable to flour since the latter, often spoiled or not properly used for preparing bread, was responsible for many diseases. Flour was most nutritious when made into well-baked bread of biscuit; flour could be ruined if improperly prepared. Most companies had ovens and bakers to prepare baked goods and prevent the men from eating poorly made flour cakes. Those who ate hard bread were more healthy than those who rationed daily on "fire cakes and water." (12)

11. General John Peter Gabriel Muhlenberg, "Orderly Book," Pennsylvania Magazine, XXXIII (1909), No. 3, 271-72, General Order of June 2, 1777, Camp Middlebrook.

12. Rush, Directions, pp. 4-5; Jones, op. cit., p. 112; Journ. Cont. Cong., May 2, 1777, VII, 323; Lauber, p. 465; Ralph Cross, "Journal," Historical Magazine (2nd Series, 1870), VII, 9; William Rogers, "Journal," Journals of the Sullivan Expedition (1887), p. 248; Swieten, pp. 7, 10-11; Tilton, op. cit., p. 39; Waldo, Diary, p. 310; General Orders, July 7, 1775, September 2, 1776, July 5, August 2, September 4, 10, 1777, to Gates, September 1, 1777, to Clinton, March 12, 1778, Fitzpatrick, op. cit., III, 315, VI, 7, VIII, 350-51, IX, 139, 154, 177, 200, XI, 68; Muhlenberg, Orderly Book (1910, no. 1), p. 39, General Order of July 5, 1777.

During the hard winter months of 1780 the campers of Jockey Hollow suffered from lack of meat and bread, and the soldiers were forced to go into the farms to get provisions. In the hospitals there was shortage of wine, spirits, tea, coffee, molasses, rice, milk and vegetables.(13)

Washington was alarmed at the high rate of consumption of alcoholic beverages in the army. Most regiments received liquor rations, and soldiers could buy more from farmers. Liquor sale was strictly regulated after several deaths attributed to local liquor concoctions. Unrestrained use of alcohol caused the men to neglect their duties. Rush was against the excessive use of rum because it left the body in a weakened condition and more liable to be affected by the weather; rum was suspected of laying the foundation for fevers, fluxes, jaundices, and most diseases which occurred in military hospitals.

Though the excess of spiritous liquors was undoubtedly pernicious, yet something stronger than water and light beer was necessary for men who were exposed to all extremes of heat and cold, to long marches and wet clothes. For these reasons, a moderate amount of spirits was necessary; during the heat of summer, rum mixed with vinegar made a good antiseptic drink.(14)

13. Thacher, Military Journal, pp. 220-21; Dr. Bond, Jr., to Dr. Potts, March 18, 1780, Pennsylvania Historical Society.

14. Jones, op. cit., p. 112-13; Rush, Directions, pp. 4-5; Swieten, op. cit., p. 112; McMichael, op. cit., p. 139; Elmer, op. cit., p. 84; General Orders, August 28, September 6, 1775, Fitzpatrick, op. cit., III, 449-56, 474.

3. Clothing, Shelter, Exercise

Clothing and shelter were other factors that affected the soldier's health. As the extremes of heat and cold in the northern colonies were severely felt, and the transitions from one to the other remarkably sudden, they caused a great proportion of the army disorders. Rain caused colds, fevers, ague, and jaundice; cold weather prompted fevers and pneumonia. In hot weather, men became fatigued because of sun strokes, marching and exercising, lack of fresh water or drinking of cold water; the transition between hot air in the daytime and cold at night also caused sickness. (15)

Army medical theorists suggested that the men wear woollen or flannel suits in the winter and cotton suits in the summer, but this was never adopted because each soldier would need at least two uniforms and that required money which was not available. Consequently, soldiers suffered greatly due to lack of proper clothing. During the winter encampment thousands of men were unfit for duty because of shortage of winter clothing and shoes. Rush asserted that men who wore flannels contracted fevers less frequently than those who wore linen. He preferred the use of flannel shirts next to the skin, like the Roman soldiers. Linen shirts, he said, accumulated and concealed filth, and prevented "a due regard being paid to cleanliness." (16)

15. Jones, op. cit., p. 105; Waldo, op. cit., p. 273; Cross, op. cit., p. 10; John Davis, "Journal," Pennsylvania Magazine, V (1881), 294; Abraham Dodge, "Orderly Book," Essex Institute Historical Collections, LXXXI (1945), 154; Silvanus Reed, "Orderly Book," New Hampshire Historical Society Collections, IX (1889), 413.

16. Rush, Directions, p. 3-4; Jones, op. cit., pp. 105-07; General Orders, July 24, 1776, Fitzpatrick, op. cit., V, 333; Tilton, op. cit., p. 37; W.C. Ford, "Defenses of Philadelphia," Pennsylvania Magazine, XX (1896), 230-34, 238-39, 521-25, 523, 544.

Since Valley Forge the practice was to quarter the troops during winter in wooden huts, with fireplaces, instead of tents. Sometimes the building efforts of the troops resulted in poorly built huts which were leaky, drafty and cold, and caused pneumonia, colds, and fevers, and more often when there was shortage of winter clothing. In general, a good hut, proper clothing, bedding, fireplaces, and physical activities were the best preservatives against cold.

In summer a tent was used for every six to ten men; when men slept on the ground, in woods, fields, or trenches without any protective shelter, the rate of camp diseases increased. (17)

"Idleness is the bane of a soldier," wrote Rush. He favored regular exercise even in winter as being essential for a healthy army. Jones advocated a balanced program of physical activities, but without any excesses, which included sports. Troops without any physical or exercise periods were plagued with ailments. (18)

17. Jones, op. cit., pp. 106-08; Rush, Directions, pp. 3-4; James Chambers, "Orderly Book," Pennsylvania Archives (2nd Series, 1880), XI, 474; Dearbon, op. cit., p. 120; Lauber, op. cit., pp. 120, 341, 536; McMichael, op. cit., pp. 138-40; Richard Butler, "Journal," Historical Magazine, VIII (1864), 105; Swieten, op. cit., pp. 9-10; Waldo, op. cit., pp. 305, 312; General Orders, October 9, 1776, December 14, 1778, to Nathanael Greene, June 6, 1778, Fitzpatrick, op. cit., VI, 191, XII, 34, XIII, 395; Applegate, Preventive Medicine, pp. 379-80.

18. Rush, Directions, pp. 7-8; Jones, op. cit., pp. 106, 113-14; Swieten, op. cit., p. 106; Tilton, op. cit., p. 34; Waldo, op. cit., p. 272.

4. Personal Hygiene and Sanitation

"Cleanliness," wrote Tilton,

is essential in all conditions of life, but especially to soldiers. Without the necessary cautions on this score, an army is literally poisoned, and dwindles into insignificance. Officers, therefore, should be very solicitous to protect their men, as well as themselves from the dreadful effects of filth and nastiness.(19)

Great emphasis was placed on personal cleanliness, and it was part of the duties of regimental officers to enforce the different regulations that covered many aspects of personal hygiene and cleanliness of camp environs. These regulations were sometimes difficult to enforce and officers were compelled to impose penalties on those who disobeyed them.(20) Frequent bathing in warm running water was advised, especially during summers; and also frequent changes of linen. Soldiers were encouraged to wash their uniforms as often as possible, and sometimes regular washing days were established. Daily washing of hands and facial shaving were also advised. Frequent hair cuts or daily greasing and combing of the hair was also recommended. Long and uncombed hair, wrote Rush in 1777,

is apt to accumulate the perspiration of the head, which by becoming putrid sometimes produces diseases. There are two methods of guarding against this evil: the first is by combing and dressing the hair every day; the second is by wearing it thin and short in the neck. The former is attended with

19. Tilton, op. cit., p. 35.

20. Fitzpatrick, op. cit., X, 241, "General instructions for the Colonels and Commanding Officers of Regiments in the Continental Service," 1777., General Orders, November 22, 1775, and July 11, 1776, IV, 109, V, 263; Applegate, Preventive Medicine, p. 380; Chambers, op. cit., p. 458; Lauber, op. cit., pp. 95, 261; Muhlenberg, op. cit., XXXV (1911), No. 4, 482.

delays often incompatible with the duty of a soldier, and therefore the latter is to be preferred to it. (21)

Washington's inflexible feeling about the subject of personal cleanliness is expressed in an order issued by General Wayne on March 29, 1778:

As there is no Greater or surer mark of discipline than cleanliness, so there is nothing more conducive to health and spirit; it introduces a laudable pride which is substitute for almost every virtue; the Genl. therefore, in the most pointed terms, desires the officers to oblige their men to appear clean and decent at all times and upon all occasions: Even punishing the Soldier that appears dirty whether on duty or not. (22)

Great emphasis was also placed on the cleanliness and sanitation of the camp environs. Camping sites were carefully selected, and when possible, camping near swamps, marshes, ponds, forests, or cross-winds was avoided to prevent the spread of fevers. Frequently changing the spot of an encampment was found to contribute greatly to the health of the army. (23) Numerous regulations and general

21. Butterfield, op. cit., I, 141; Rush, Directions, pp. 5-6; Swieten, op. cit., p. 10; Tilton, op. cit., pp. 35, 37; Cross, op. cit., pp. 9-11; Davis, op. cit., p. 291; Edward Hand, "Orderly Book," Pennsylvania Magazine, XLI (1917), 206; Lauber, op. cit., pp. 313, 445, 453, 556, 610, 677; Simeon Lyman, "Journal," Collectionsof the Connecticut Historical Society, VII (1889), 113, 117, 127-28; Applegate, Preventive Medicine, pp. 380-81; Fitzpatrick, op. cit., XI, 387.

22. Orderly Book of the Second Pennsylvania Line, Middleton, op. cit., p. 480.

23. Applegate, Preventive Medicine, p. 380; Rush, Directions, pp. 6-7.

orders covered sanitary precautions to prevent the spread of disease, like cleaning of streets and camp parades; burying of dead carcasses; slaughtering done at least a mile from camp; building necessities at convenient distances from tents or huts to prevent obnoxious and unwholesome smells; collection of filth and garbage about tents and huts; cleaning and enlargement of springs and rimming them with boards or a barrel to keep the water from being muddy; building arbors over the springs to keep water cool. Impure water was made wholesome by mixing with vinegar when available; putrid drinking water caused colds or the flux. (24)

24. Thayer, op. cit., p. 171; Tilton, op. cit., pp. 35-36; Dodge, op. cit., p. 172; Adam Hubley, "Journal," Pennsylvania Magazine, XXXIII (1909), 298; Rush, Directions, pp. 5-6; Swieten, op. cit., pp. 7-8; Fitzpatrick, op. cit., IV, 214, V 11-12, 34, 353, VIII, 171, XI, 107; Jones, op. cit., p. 109; Dodge, op. cit., p. 226; Sharp Delaney, "Orderbook," Pennsylvania Magazine, XXXII (1908), 303-04, 307; John O'Neill, "Orderly Book," Pennsylvania Archives, XI, 2nd Series (1880), 405; Check also Fitzpatrick, op. cit., index of volumes III-XIV under headings of cleanliness and sanitation for additional details; Muhlenberg, op. cit., XXXIII (1909), No. 3, 273, XXXIV (1910), No. 1, 39; Brigade Order of March 9, 1780, Hawkin's Orderly Book, No. 1, Historical Society of Pennsylvania; Applegate, Preventive Medicine, pp. 380-81; Philip Fithian, Journal, 1775-1776 (Princeton University Press, 1934), pp. 190-92.

Huts had to be kept always clean, and aired in summer and winter by leaving windows and doors open occasionally; bedding, straw and blankets were also aired frequently. To prevent the ill effects of moisture, trenches were made around the huts to carry off the water or snow; the huts were roofed with boards, slabs, or large shingles instead of being covered with earth. When huts were sunk into the ground and roofed with earth, humidity and lack of air caused many ailments. (25)

5. Care of the sick

Although not always followed, there were many suggestions, practices, and general orders that tended to decrease the spread of disease and accelerate the chances of recovery. By the time of the 1779-80 winter encampment at Morristown, the evils of general hospitals had been clearly demonstrated. Valley Forge was a lesson to remember. Without foresight and provision the sick and disabled soldiers from New Jersey were evacuated to Bethlehem during the terrible winter of 1777-78. Bethlehem became a feared plague spot where hundreds succumbed like flies to typhus fever. As the hospital returns show, during the Morristown encampment of 1779-80 most of the sick and wounded were kept in the regimental and flying hospitals. Here the patients, though lacking many of the conveniences and necessities found in large general hospitals, suffered only the original diseases, and generally recovered with a wholesome diet, more fresh air and healthier environs. (26)

25. Jones, op. cit., pp. 107-08; Lauber, op. cit., pp. 264, 341, 344; Fitzpatrick, op. cit., XIII, 395, XIV, 367-68, XVIII, 337; Washington, Order Book, Morristown, Order of February 16, 1780, New-York Historical Society; Captain Parker, Orderly Book, Massachusetts Historical Society, March 8, 1780; Order Book, 4th Pennsylvania Regiment, Library of Congress, May 6, 1780; Col. Israel Angell's Regiment, Orderly Book, May 6, 1780, Rhode Island Historical Society.

26. Middleton, op. cit., p. 470; see hospital returns cited in this report; Jones, op. cit., pp. 110-11.

Contagion in the hospitals was decreased with the practice of separating the sick from the wounded and the isolation of patients with contagious diseases -- like the itch, smallpox, and putrid disorders -- in field hospitals. Because of their small size, field hospitals were easier to keep clean in both the persons and bedding of the sick; the floors, often being properly cleaned, could be sprinkled with vinegar, of which a large quantity was supposed to be allowed to every hospital unit. (27)

In connection with removing the sick to general hospitals, Washington wrote to Congress in 1779:

As far as I can judge much expense has been incurred, many lives have been lost, and many desertions have been occasioned by removing men from Camp which the means of taking care of them in their Regiments might have been prevented. It often happens that the seeds of dangerous disorders are sown by removing the sick at improper times and in unfavourable weather, which might be avoided by keeping them in Camp, if they could have the necessary assistance there, but which under the present arrangement are unavoidable. (28)

Military surgeons had only the most primitive means at hand to transport patients from place to place, the same being true in the towns and cities of the colonies. Sick and wounded men were carried in wagons, hand-barrows, and in chariot-like vehicles referred sometimes as flying ambulances, or they simply walked behind the marching armies. It certainly must have been a grim picture to see patients bounced and jolted in farm wagons over rutted frozen roads in mid-winter. (29)

27. Jones, op. cit., p. 111.

28. Washington to the Committee of Conference, January 8, 1779, Fitzpatrick, XIII, 490.

29. Hume, op. cit., pp. 90, 149; General Order, March 4, 1776, Fitzpatrick, op. cit., IV, 369.

Due to the many disorders and irregularities taking place at the hospitals, and the fact that in some of them the sick were not tended with care, it was directed that a field officer "visit each hospital to maintain order and supervise hospital care." When necessary, armed guards were to

prevent and Quell all disorders and Riots at the Hospitals, by confining the offenders; to suffer no patient to go beyond the limits of the Hospital without a written license from the chief surgeon attending; and to enforce obedience to such regulations as the directors or chief surgeons of the Hospital shall judge necessary for the Health and best good of the patients and the service. (30)

In 1779 the first army regulations were issued, written by Baron Steuben, the Inspector General. One chapter related to "Treatment of the Sick." Though the regulations were approved and issued by Congress in 1779 or 1780, no doubt they were enforced by Steuben much earlier. Most of the regulations pertaining to the sick were embodied in existing general orders and directives issued by Washington and the medical officials. As these regulations were the first issued, we quote them in full below:

There is nothing which gains an officer the love of his soldiers, more than his care of them, under the distress of sickness; it is then he has the power of exerting his humanity, in providing them every comfortable necessity, and making their situation as agreeable as possible. Two or three tents should be set apart in every regiment, for the reception of the sick, as cannot be sent to the general hospital, or whose cases may not require it; and every company shall be constantly furnished with two sacks, to be occasionally filled with straw, and serve as beds for the sick. These sacks to be provided in the same manner as clothing for the troops, and finally issued by the regimental clothier, to the captain of each company, who shall be answerable for the same.

30. Washington to the officers visiting the hospitals, Valley Forge, January [30], 1778, Fitzpatrick, op. cit., X, 405-08.

When a soldier dies, or is dismissed from the hospital, the straw he lay on is to be burnt, and the bedding well washed and aired before another is permitted to use it. The sergeants and corporals shall every morning at roll call, give a return of the sick of their respective squads, to the first sergeant, who must make out one for the company, and lose no time in delivering it to the surgeon, who will immediately visit them, and order such as he thinks proper, to the regimental hospital; such whose cases require their being sent to the general hospital, he is to report immediately to the Surgeon General, or principal surgeon attending the army.

Once every week, and oftener when required, the surgeon will deliver the commanding officer of the regiment, a return of the sick of the regiment, with their disorders, distinguishing those in the regimental hospital from those out of it.

When a soldier is sent to the hospital, the non-commissioned officer of his squad, shall deliver up his arms and accoutrements to the commanding officer of the company, that they may be deposited in the regimental arm chest.

When a soldier has been sick, he must not be put on duty, till he has recovered sufficient strength, of which the surgeon should be 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.

Each regiment will furnish a non-commissioned officer, to conduct the sick and lame, who are not able to march with their regiments. These men are to repair at the beating of the general, to the rendezvous appointed, where a sufficient number of empty wagons will be ordered to attend, for the reception of their knapsacks; and their arms if necessary.

A surgeon of each brigade, is to attend the sick belonging to it.

The commanding officer of each battalion, will inspect the sick before they are sent out from the battalion, in order that none may be sent but those who are really incapable of marching with their regiments. (31)

Of all the regulations, the third one, requiring burning of bed straw and washing of clothing, was the most significant. If this regulation "had gone a step further and recognized the responsibility of the body louse for the spread of typhus fever," wrote Middleton, "the pages of medical advance would have been turned forward more than a century." (32)

31. Friedrich Wilhelm von Steuben, Regulations for the Order and Discipline of the Troops of the United States (Philadelphia, Styner and Cist, 1779), Part I, pp. 121-33.

32. Middleton, op. cit., p. 480.

V. Surgery

1. General State of Surgery

Surgery, one of the most important phases of remedial medicine, remained until the early part of the nineteenth century a matter of superficial emergency measures, such as amputations and treatment of fractures. This was so because the speculative pathology that had confused ordinary therapy also blocked any development in surgery. As somebody wrote, if "illness was located in impure body fluids, there was little that surgery could do in the nature of the case. After all, one cannot operate on the blood." During the Revolution, military experience and contacts with French and British medical officers made for some skill in relation to wound surgery among American practitioners, but generally speaking, little attention was given to surgery as such. (1)

Dr. Thacher, who observed British and Hessian surgeons operating in the hospital of Albany, wrote as follows:

I have been present at some of their capital operations, and remarked, that the English surgeons perform with skill and dexterity, but the Germans, with a few exceptions, do no credit to their profession; some of them are the most uncouth and clumsy operators I ever witnessed, and appear to be destitute of all sympathy and tenderness towards the suffering patient Here is a fine field for professional improvement. Amputating limbs, trepanning fractured skulls, and dressing the most formidable wounds, have familiarized my mind to scenes of woe. (2)

Many surgeons broadened and deepened their knowledge of operative techniques not only by learning from others, but also by doing. Dr. David Ramsay, who studied medicine under Dr. Rush, put it this way:

1. Shryock, op. cit., pp. 12, 19.
2. Thacher, Journal, pp. 134-35.

The melancholy events of battles gave the American students [surgeons] an opportunity of seeing and learning more in one day than they could have acquired in years of peace."

Such practice paved the way for surgeons after the war to attempt bold and daring operations in new and unexplored fields.(3)

How neglected was the field of surgery during the first years of the war may be judged by the following experience of Dr. Morgan, when he was director-general of the medical organization. In 1776 a general order was issued to regimental surgeons to report the number of instruments, bandages, and the like, that they had on hand in order to lay them before the Medical Committee of Congress. Reports were received from fifteen regiments, by which it appeared that for 15 regimental surgeons and as many mates, all the instruments--and they were private property--were six sets for amputations, two for trepanning, 15 cases for the pocket, 75 crooked and six straight needles. Among the whole 15 surgeons there were only four scalpels, three pair of bullet forceps, half a wrapping paper and 70 pins, but few bandages, ligatures, or tourniquets, and only two ounces of sponge. Morgan, in his report to the Medical Committee, observed that he supposed "the reporting regiments to be at least as well provided as any others that have neglected to pay due attention to the order."(4)

Surgeons had two guides: their medical education and experience, and the manuals of surgery edited by Dr. Jones, of King's College, New York, and the Englishman John Ramby. Both books gave theoretical principles on the treatment of wounds and fractures. On the battlefields, of course, these theories were often abandoned.(5)

3. David Ramsay, The History of the American Revolution. American Issues Series, ed. by W. Thorp, M. Curti, and C. Baker (New York, 1941), I, 112.

4. John Morgan, A Vindication of his public character in the station of Director-General of the Military Hospitals (Boston, 1777), pp. 64-66; Morris, op. cit., 195-96.

5. Jones, op. cit., John Ramby, The Nature and Treatment of Gunshot Wounds (Philadelphia, 1776).

Jones' book, published in 1776, was designed chiefly for the use of young military and naval surgeons and was one of the very few such books available to them. Though almost entirely a compilation from the work of English writers, Jones' book reflected his experience in the Seven Years' War and proved to be a useful manual which went through new editions in 1776 and 1777. His book was also the first American textbook on surgery published in the United States at a time when almost no books on medicine were accessible. Jones' work was useful in laying down the accepted principles of surgery and giving some wise counsel on military hygiene. (6)

2. Amputations

Jones covers quite in detail the subjects of wounds, fractures, inflammation, amputation, blows on the head, injuries arising from commotion and fracture of the skull, gunshot wounds, and hints concerning military hospitals. Amputations, wounds, and fractures were the surgeon's main challenges.

On the battlefield, the usual procedure was to have the wounded man lie on the ground or on a folding seat and with little other preparation, the surgeon began his task. He probed for fragments of cannon ball, musket shot, and amputated shattered or diseased limbs. Immediate amputation was routine in most cases, but on some occasions it was delayed for several days in the hopes that medication might heal the wounds or reduce the

6. Jones had been a surgeon of colonial troops during the Seven Years' War, and joined the American military service as surgeon's mate of the Tenth Massachusetts Regiment, Continental Line, on September 1, 1777; on September 24 he became a surgeon serving as such until May 14, 1781. The book was written while he was Professor of Surgery at King's College. Hume, op. cit., p. 77; Duncan, op. cit., p. 23.

infection. In the majority of such cases, however, amputation was the gruesome eventuality.(7)

Amputation was perhaps the most serious problem encountered by a surgeon. In general, all serious compound fractures, especially those involving joints, called for amputation; frostbite cases were frequent. Jones explains the necessary steps for performing the cminous and cold-blooded operation, when done in a hospital. Although lengthy, his description is worthwhile quoting:

When the amputation of a limb is determined on, the following apparatus should be prepared in a different room. A large dish, with a compress to be placed over the vessels made in the form of a roller, flattened and sewed to the middle of a slip of linen, between two and three inches wide, and of sufficient length, to pass two or three times round the limb. The tourniquet or leather with a fillet and stick, a yard of tape rolled up, the amputating knife, catlen, saw, tenaculum, crooked needles armed, and ligatures of waxed thread, loose, a pair of strait scissars, and sponges.

In another dish should be placed a sufficient quantity of lint, some long pledgets of the same, spread with simple cerate or soft digestive. A large pledget or two, or tow armed with the same cerate, and a few soft compresses of tow unarmed. Slips of linen about three inches wide, to cross the stump, and retain the pledgets, &c. two rollers of different lengths, and a loose, knit woolen cap, to draw over the whole.

7. Thacher, Military Journal, pp. 112-13; Benjamin Boardman, "Diary," Massachusetts Historical Society Proceedings (2nd series, 1891-92), VII, 404; Elisha Bostick, "Memoirs of the First Year of the Revolution," William and Mary Quarterly (3rd series, 1949), VI, 100; Fithian, op. cit., p. 217.

If the leg is to be removed, the most convenient posture for the patient, is lying on a firm table of convenient height, covered with blankets sufficiently doubled, and pillows to support the head. The operator, standing on the inside of the leg, held in a steady horizontal line by the assistants, first fixes his compress longitudinally, over the course of the artery in the ham; then bringing the two ends of the bandage to which it is fixed, towards each other, and passing one of them through a slit made in the opposite extremity, as in the uniting bandage, he makes two or three turns round the limb, with the longest end, and drawing it pretty tight, fastens it with a pin; over this is fixed the tourniquet, or leather, with the fillet and stick, which ever of them are used, and having given it the necessary degree of tightness, he delivers it into the hands of his assistant; then fixing upon that part where the first incision is to be made, which is about four fingers breadth below the patella, he passes the tape about half an inch below this part, and making a turn or two, pretty close, fastens it with a pin. He then beginning the first incision on the outside of the leg, as high as he can carry the knife without constraint, divides the skin, and membrana adiposa down to the muscles; and bringing his knife forwards, terminates his first stroke far enough on the inside, to make one half of the circumference of the circle, which is finished by another stroke carried from the place of beginning, to meet the opposite point. It is to be observed that this incision is to be made above the tape, which then falls below the wound, without embarrassing the operator.

The first incision being completed, so as even to mark the muscles, rather than suffer any adhesion of the adipose membrane, the assistants are to draw up the integuments as high as possible, when the muscles are to be divided by two semi-circular incisions, quite down to the bones.

The interosseous ligament must then be separated by the Catlen or point of the amputating knife, pushed between the bones, which are next to be carefully sawed through.

The assistants observing to hold the limb in the most exact horizontal line, leaft by raising the leg in the beginning or middle of the operation, the saw should be compressed by the extremities of the bones, or towards the latter end of it, by letting the limb fall from the direct line, the tibia should break off and form a sharp point or splinter. (8)

Chewed bullets have been dug up at places where the colonial armies camped during the Revolution. In those days, tradition says, a wounded soldier who had to undergo a major operation, such as having one leg or arm cut off, was given a bullet to chew on. It lessened his screams. Many of those bullets show that they were chewed flat by human teeth. But it is more than a tradition that bullets were given to culprits in the army so they could chew them and ease their agony while being flogged. According to a Revolutionary soldier, he saw near West Point a sergeant, a corporal, and two privates stripped and flogged one cold morning, each receiving one hundred lashes upon his bare back. They did not utter one word of complaint, but each one, taking a leaden bullet in his mouth, bit upon it as the punishment was inflicted. (9)

Dr. Charles Gilman, of Woodbridge, New Jersey, serving as a major with the Continental Army, entered in his diary the following observation about amputation and pain:

a good dose of tincture of opium followed by ample rum, together with a very sharp knife and sharp saw and ears covered with lamb's wool, and then the head bound over (the ears) results in little discomfort to the man.

He suggested searing the stump with a hot iron and then using pressure bandages rather than suture. (10)

8. Jones, op. cit., pp. 58-60.

9. Jeptha Root Simms, "Joseph Moors, Recollections of a Revolutionary Soldier," The Frontiersmen of New York (Albany, 1882-83), I, 588-90.

10. C. Malcolm B. Gilman, "Military Surgery in the American Revolution," The Journal of the Medical Society of New Jersey, LVII, no. 3 (August 1960), 493-94.

Tilton, who many years after the Revolution suffered the amputation of a leg, observed that the longer the surgeons continued in the service, "amputation and cutting became less fashionable." He noted that on many occasions limbs might have been saved, but were cut off due to the "obstinacy in the patients," and because "the best authorities directed to be cut off." It therefore became a maxim with the surgeons to save a limb if it could be cured without having to amputate. (11)

3. Wounds

Most of the wounds were caused principally by musket balls about three-fourths of an inch in diameter. Within an effective range of one hundred yards or a little more, the balls did considerable damage. The bayonet was actually used only rarely. There were few wounds caused by small guns, of short range, which fired solid shot and grape. A considerable number of wounds were caused by knives, clubs and hatchets, due to the Indian contingent of the British forces. (12)

In gunshot wounds, advised Jones, the first object was to remove the ball; next, to restrain the hemorrhage by using a ligature, as no styptic was to be relied on. The first dressing should be light, easy and superficial, with a "retentive bandage of soft flannel"; it was well to first dip the lint in oil. At the second dressing some mild digestive might be used, with a bread and milk poultice over all. General treatment was then given as in other wounds.

Incised wounds were to be brought together with sticking plaster and bandages. The use of a suture was unnecessary in longitudinal wounds, but transverse wounds required it; in sutures the needle was dipped in oil; a plaster was applied over the sutures, which might usually be removed in two or three days.

Punctured wounds required no special treatment, unless deep and winding, when they must be enlarged.

11. Tilton, op. cit., p. 62.

12. Duncan, op. cit., p. 12.

Surgeons were not entirely in agreement about the method of treating lacerated wounds. A general rule was to preserve as much skin as possible.

Wounds of the tendons, caused by a cutting instrument, were treated like other simple incised wounds, provided the surgeon could bring the extremities of the divided tendon in contact, and preserve them by means of a proper bandage. No suture was ever used.

Wounds made by a bayonet or small sword were to be enlarged in order to give free discharge of the blood lodged in the cavity.

Jones covers in his book the nature and treatment of many other kinds of wounds, especially penetrating ones. (13)

In connection with wounds, Dr. Gilman relates in his diary an interesting discovery concerning the use of alcohol as a disinfectant:

At the battle of Haarlam's Heights, I received a crease wound to the back of the hand. Painful, it would not heal and exuded laudable pus. In camp at Newburgh, I spilled--quite accidentally--for I had too much rum, some upon the member [wounded hand]. I covered it, and in two days I noticed no odor. I removed the cover and the wound was healing. Thereafter, all wounds were soaked in rum clothes [sic] before covering. (14)

Tight compression, wrote Gilman, was the treatment for bayonet wounds and to staunch the flow of blood. He mentions that when Woodbridge Sergeant Charles Gamberton was shot in the face at the Battle of Monmouth, his teeth stopped the ball and he spat it out. Gilman wrapped Gamberton's face tightly with a compression bandage, and the cheek wound healed quickly. (15)

13. Jones, op. cit., pp. 13-19, 21-31, 90-100.

14. Gilman, op. cit., p. 492.

15. Ibid. For more information about the treatment of wounds, see Swieten, op. cit., pp. 117-28.

4. Fractures

Broken bones were serious challenges to the army surgeon. When minor bones were broken, he did his best, using bandages and crude splints, and as a result many soldiers had crooked arms or legs. When most limb bones were broken or shattered, amputation was the safest way out. (16)

Treatment of simple fractures of the limbs was a branch of surgery that was practiced by everybody, writes Jones. A great majority of practitioners in Europe, as well as in America, followed the old general practice which he describes as follows:

In the first place, an extension and countere extension, as it is called, was made by two assistants, with more or less violence, according to the nature of the case, until the extremities of the broken bone were brought opposite to each other, when the Surgeon with his fingers finishes the coaptation or setting, after which a long roller, making many turns both upon, as well as above and below the fractured part, was applied; upon this roller, splints of different kinds, armed with tow or linen compresses, to fill up the inequalities, were placed longitudinally, and secured with tapes of some kind of ligature, drawn pretty close, to preserve the fractured bones from slipping out of their place, and for greater security, the limb was fixed in a strait direction fully extended, and resting upon the calf and heel, in a fracture box, defended by a pillow or some soft substances. (17)

Another way of doing it was to extend the broken leg or arm, then exert traction against the lower posts of a four-posted bed. (18)

16. Boardman, op. cit., p. 407; Ezra Green, "Diary," New England Historical and Genealogical Register XXIX (1875), 21; William Beatty, "Journal," Historical Magazine (2nd Series, 1867), p. 81.

17. Jones, op. cit., p. 32.

18. Gilman, op. cit., p. 494.

During his army career, Jones performed many cures of simple fractures by using the old general practice but this was difficult, painful to the patient, and was responsible for many deformities. He and other surgeons favored a new method advocated by an English medical writer named Pott, which was the opposite of the old violent method.

Instead of extending the leg in a right line, and attempting to replace the broken bones while the muscles are in a state of tension and contraction; the patient is to be placed on his side, with his knee half bent, one assistant taking hold of the lower extremity of the leg, just above the ankle, while the other embraces the superior end just below the knee; both making at the same time such gentle extension, and no more, as is necessary to bring the bones opposite to each other; when the Surgeon, with his own hands reduces them to the most exact apposition in his power.

The relaxation of the muscles of the thigh must be made by drawing it gently towards the body, and whoever examines with the least attention, the structure of this bone and its articulation with the hip, will readily discern how admirably this side position of the limb and body, is calculated to promote the patient's ease as well as happy union of the bone.

Extension and apposition of the fractured limb, having been made under the foregoing circumstances, the next consideration will be the application of proper medicaments to the part affected; a variety of compositions, consisting of adhaesive plasters, cerecloths, the white of an egg with vinegar, or thin compresses dipped in Spirit Vin Camphor, have been used for this purpose, many of them well enough adapted to answer the intention, while others, particularly the adhaesive plaster, by irritating and inflaming the skin, and exciting a tettersous eruption, becomes exceedingly troublesome and injurious; --the only rational view in any external application, is to keep the skin lax, moist and perspirable, and by such means to repress or abate inflammation, disperse extravasation, while very gentle compression serves to restrain the bones in some measure to their proper places; and these desirable purposes are most effectually answered by a cerate with a solution of litharge in vinegar, to which such a proportion of soap, oil, and wax is added, as will give a consistence, that admits of being spread without warning. (19)

19. Jones, op. cit., pp. 36-37.

There was no agreement in connection with treatment for compound fractures. Several English surgeons of the most distinguished reputation advised immediate amputation in almost every bad compound fracture with small splinterings of the bones; others contended that in 19 cases out of 20, amputations were unnecessary and improper. In a great measure, the conflict of opinions seemed to have been due to the difference of situation and circumstances in the patient, than any real disparity in the surgeon's ideas about the disease. Jones observed that compound fractures of the limbs were attended with much more danger in a large hospital than in a private hospital or in the country where there was fresh air. Due to the danger of infection, "a surgeon might with equal propriety attempt to save a limb in the latter situation, or amputate it in the former." Thus contagion was a determining factor.

In general, all fractures about the joints where ligaments were torn, and the heads of bones were injured, required amputation. Sometimes the problem was to decide when or when not to amputate. To young practitioners, Jones' advice was to be guided in such difficult cases by the particular situation of their patient: "if placed in a large or crowded Hospital, speedy amputation should take place, but in private practice, and in a pure and healthy air, every effort should be exerted to save the limb." (20)

Generally speaking, how effective was army remedial medicine during the Revolution? When we study eighteenth century medicine we must not judge physicians too harshly. We need only remember our present-day confusion regarding some diseases like cancer. We simply do not know enough about them. Quite similar was the Revolutionary physician's struggle against diseases. Then, as now, the physician could not sit idly by; he had to treat the patients who suffered from one or another disease. At worst, he could slavishly follow traditional remedies; at best he could discover new and more effective treatment. In either case he developed theories to justify his practice. He classified and analyzed and prescribed as best he could, and proceeded largely by trial and error.

20. Ibid., pp. 45-46, 54.

While advances in remedial medicine, writes Applegate,

represent the best of American military medicine during the Revolution, it may also be said that remedial medicine symbolized the utter incapacity of Eighteenth century military medicine. The ability to accurately diagnose naturally varied in relation to the competency of individual doctors. However, generally speaking American medical diagnosing should probably be rated fair at best. Army surgeons relied on manuals of medical practice which described remedial techniques, and yet they usually prescribed only three basic remedies: bleeding, purgatives, and waiting for nature to take its course. Many doctors were virtually helpless in surgery and bonesetting, although some became quite skillful as the war progressed. There is little evidence to show that remedial medicine effectively reduced the death rate--in fact the testimony leads one to believe the opposite conclusion, that improper and outdated remedies caused the deaths of many unfortunate soldiers. (21)

21. Applegate, Remedial Medicine, p. 452.

VI. Park Replica of Tilton's Hospital

As stated before in the first chapter of this report, an indefinite number of log huts at the campsite of the Pennsylvania Line were adapted and converted into a general hospital in June 1780, after the main body of Washington's army marched from the Jockey Hollow area. This hospital arrangement lasted until June 1781 and was referred to as the general hospital of the Pennsylvania Huts.

There is no information about the location of the different hospital huts. The general hospital site, however, has been a matter of local tradition that has tied in the hospital with the existence of a graveyard.

According to tradition, a section of the Pennsylvania encampment, about a mile north from the Wick House, was known as hospital field, and on slightly rising ground nearby was the burial ground. This burying ground had been marked early in the nineteenth century by John B. Wick, a descendant of Henry Wick, by planting a grove of locust trees to protect the graves from obliteration. As late as the 1850s Joseph Tuttle, a local historian, reported that two rows of graves, in the form of furrows, were still visible there; in the graves were buried those who had died in the 1779-80 winter. By the 1790s there were no traces of the graves, but the outline of the ground was well marked by the locust grove. (1)

During 1933-36, following the tradition of the hospital and burying ground, the National Park Service undertook the construction of a hospital hut which purported to be a replica of the hospital originally built in Jockey Hollow. Its location was determined roughly by that suggested in local tradition. The idea of building the hospital was excellent from the interpretive point of view.

1. Joseph F. Tuttle, Annals of Morris County (1859), p. 61; Edmund D. Halsey, History of Morris County (New York, 1882), p. 122; Emory McClintock, op. cit., p. 11; Andrew M. Sherman, Historic Morristown (Morristown, 1905), pp. 289-91.

A real problem, however, was to determine what kind of hut to build. Historians working in the Park at that time found the answer in Dr. Tilton, the Revolutionary physician who wrote a book about hospitals in 1813. In 1778 and 1779, Tilton was in charge of hospitals at Trenton and New Windsor, and in the winter of 1779-80 had also charge of some hospitals.(2)

As Surgeon General of the Army during the War of 1812, he wrote his book on hospitals, citing his many experiences during the Revolution. This included a sketch, and description of a hospital modeled after an Indian hut and designed especially for cold weather.

About this hospital, he wrote: "This was the expedient I employed in the hard winter of 79, 80, when the army was hutted near Morris Town, and I was well satisfied with the experiment." (3) In other words, he built an experimental hospital, but did not specify where, nor how many huts.

Lacking positive evidence or any other justification to question the assumption that Tilton's hut was identical with the Camp hospital of the Pennsylvania Huts, the Park went ahead and built a replica of Tilton's experimental hospital following his specifications. Before building the hut-replica, an archeological investigation of the area was carried out in search of physical remains of the hospital. In one place was found a musket ball which was identified as having human teeth marks on it. A detail worked on the Pennsylvania Line encampment site, covering the whole area extensively. While many artifacts were found, including a pair of surgical forceps, no evidence was discovered of a structure as large as the hospital hut.(4)

2. Duncan, p. 239. For information on building the hospital replica, see the Park File on Hospitals, Morristown.

3. Tilton, op. cit., p. 50.

4. Alonso W. Pond, "Report of Archeological Survey," Morristown NHP, June 3, 1935, Park Files; Russell Baker, "Report on Work Accomplished in Archaeology During Fifth Enrollment Period," Morristown NHP, September 13, 1935, Park Files.

As reconstructed, the hospital is an impressive building compared with regular soldier and officer huts associated with the encampment. As specified in Tilton's book, a fireplace was built in each of the three rooms, with holes in the roof for the smoke to circulate just over the heads of patients. It was designed to accommodate 28 patients, and the smoke was supposed to act as a disinfectant.

Unfortunately, the reconstruction of Tilton's hospital hut cannot be justified historically on two counts at least: (1) it is built in the wrong location; (2) it is not a typical Revolutionary hospital.

While Dr. Cochran was in charge of the flying and regimental hospitals during the 1779-80 encampment, and his headquarters were in Morristown, Dr. Tilton was stationed at Basking Ridge, about seven miles south of Jockey Hollow. It was at Basking Ridge where Tilton built his experimental hospital. Early in February 1780 there was a detail of two artificers and an officer-foreman building the hospital "for Doc. Tilton." (5)

In 1821 Mrs. Eliza Susan Quincy wrote her recollection of events in the Revolution when she was a girl. Her father had a house and farm at Basking Ridge, fifteen or twenty miles from Elizabethtown. In the following passage of her recollections, she refers to Dr. Tilton and his hospital:

Basking Ridge was in a retired, pleasant situation, enclosed by some high land called "the Long Hills." It was a secure place from the British, and at times in the centre of the American Army. The headquarters of Washington were at Morristown, only seven miles distant. A hospital was located on Mr. Morton's estate. It was a long, low, log building, situated on a rising ground in a meadow; a brook ran in front of it, and supplied

5. J. Baldwin, Commander of Artificers, Morristown, February 5, to General Greene, Dreer Collection, Park Files; also Tilton to Green, Basking Ridge, February 15, 1780, Green Papers, American Philosophical Society.

the inmates with water for cooking, and washing. Dr. Tilton, the director of the medical department, with Dr. Stevenson, Dr. Coventry, and other physicians, had rooms in my father's house; and a small school house was converted into an apothecary's shop. This arrangement continued more than two years, and the society of these gentlemen was agreeable. (6)

There is no evidence that Tilton's hospital was built outside of Basking Ridge during the encampment. His experimental hospital was a success in the sense that it prevented overcrowding and decreased typhus fever. Furthermore, it proved that sick men recovered health sooner and better in huts, sheds, and barns, exposed occasionally to wind, and sometimes to rain, than in the large and crowded hospitals. In 1781 he presented his observations about hospitals to the Medical Committee of Congress, pointing out the leading principles to be observed in forming a plan for the administration of military hospitals. He sent his plan to the President of Congress, but unfortunately it has been lost. Although Congress did not take immediate action, his principles were accepted and put into practice, but after the Revolution. (7)

On the basis of what has been discussed above, it is suggested that the existing replica of Tilton's hospital be dismantled as being an intrusion on the historic scene, and that the interpretation of the hospital and medical story be moved to the campsite of the Pennsylvania Line where it belongs. Here the story can be told through the medium of one or two reconstructed soldier and officer's huts similar to the existing ones. From the point of view of interpretation, the Jockey Hollow area is unique in the sense that it is perhaps the only Revolutionary encampment area where the three types of military hospitals are represented. But it is at the campsite of the Pennsylvania Line where this story should be told. To complement the hospital story, perhaps it would be advisable to open test trenches in the burial ground site in order to confirm or deny the historical background of the tradition.

6. Eliza Susan Quincy, Basking Ridge in Revolutionary Days. Reprinted from her Memoirs (The Somerset County Historical Quarterly, I and III, 1960), p. 1.

7. Thacher, Medical Biographies, II, 132-33; Hume, op. cit., pp. 127-28, 144.

Appendix

Reorganization of the Medical Department, April 1777.

Congress resumed the consideration of the report on the hospital; Whereupon,

Resolved, That there be one director general of all the military hospitals which shall be erected for the continental army in the United States, who shall particularly superintend all the hospitals between Hudson and Potowmack rivers:

That there be one deputy director general, who, in the absence of the director general, shall superintend the hospitals to the eastward of Hudson's river:

That there be one deputy director general, who, in the absence of the director general, shall superintend the hospitals in the northern department:

That when the circumstances of the war shall require it, there be one deputy director general, who in the absence of the director general, shall superintend the hospitals in the southern department:

That the director general, or, in his absence, the deputy director general in each respective department, be empowered and required, with the advice and consent of the commander in chief therein, to establish and regulate a sufficient number of hospitals, at proper places, for the reception of the sick and wounded of the army, to provide medicines, instruments, dressings, bedding, and other necessary furniture, proper diet, and every thing requisite for the sick and wounded soldiers, and the officers of the hospitals; to pay the salaries and all other expences of the same:

That there be assistant deputy directors, to superintend the hospitals committed to their care, and assist in providing the articles before specified, under the orders and controul of the director or deputy director general of the respective districts:

That there be one apothecary general for each district, whose duty it shall be, to receive, prepare, and deliver medicines, and other articles of his department to the hospitals and army, as shall be ordered by the director general, or deputy directors general, respectively:

That the apothecaries [general] be allowed as many mates as the director general, or respective deputy director generals, shall think necessary:

That there be a commissary of the hospitals in each of the aforesaid districts, whose duty it shall be, to procure, store, and deliver provisions, forage, and such other articles as the director or deputy director general shall judge necessary for the use of the hospitals; in the purchase of which, he shall frequently consult with the commissary and quarter master general, and be regulated by the prices which they give:

That the commissary be allowed such assistants and store keepers, as the director general or deputy director general of the district, shall judge necessary:

That a steward be allowed for every hundred sick or wounded, who shall receive provisions from the commissary, and distribute them agreeable to the orders of the director general, or, in his absence, of the deputy director general, or physician, or surgeon general, and be accountable to the commissary for the same:

That a matron be allowed to every hundred sick or wounded, who shall take care that the provisions are properly prepared; that the wards, beds, and utensils be kept in neat order, and that the most exact oeconomy be observed in her department:

That a nurse be allowed for every ten sick or wounded, who shall be under the direction of the matron:

That an hostler or stabler be allowed to each hospital, to receive the horses from the commissary, and to take care of the waggon, and other horses belonging to the hospital, pursuant to orders from the director general, or, in his absence, the deputy director general, or such other officer as he shall appoint:

That there be a clerk in each district, whose business it shall be, to keep the accounts of the hospitals, and to receive and deliver the monies agreeable to the orders of the director or deputy director general:

That a sufficient number of assistant clerks be allowed: That such officers and soldiers as the general shall order to guard the hospitals and to conduct such as shall be weekly discharged the hospitals, to their respective regiments, shall, while on this duty, obey the director or deputy director general, or the physicians and surgeons general:

That the director and deputy directors general be respectively empowered to appoint and discharge their assistant deputy directors, and other said officers and attendants to the hospitals, in such numbers as the necessities of the army may require, and the commander in chief of the department shall, in writing, approve; report of which to be immediately made to Congress, as hereafter directed:

That there be also one physician and one surgeon general in each district, to be appointed by Congress, whose duty it shall be, respectively, to superintend the practice of physic and surgery in all the hospitals of the district to which they shall be appointed, and, in the absence of the director or deputy director general, they shall have power to order the physicians, surgeons, and other officers of the several hospitals, to such duty as they shall think proper, and shall report weekly to the director general, or, in his absence, to the deputy director general, or, in his absence to the assistant deputy director the state and number of the sick and wounded in the hospitals, and the delinquent officers of the same, and see that such, as may be fit, shall be delivered every week to the officer of the guard, to be conducted to the army:

That there be allowed, also senior physicians and surgeons, who shall attend, prescribe for, and operate upon, and see

properly treated, such sick and wounded, as shall be allotted them by the director general, deputy director general, or assistant director, or physician, or surgeon general; the number for the district to be determined by the director or deputy director general, and appointed by the surgeon and physician general:

That there be also such a number of second surgeons as the director or deputy director general for the district shall judge necessary, to assist the senior surgeons, and be under the same direction, and to be appointed by the physician and surgeon general as aforesaid:

That there be also such a number of mates as the director general or deputy director general of the district shall direct, who shall assist the surgeons in the care of the wounded, and see that the medicines are properly and regularly administered, and appointed in the manner before directed for senior and second surgeons:

That a suitable number of covered and other waggons, litters and other necessities for removing the sick and wounded, shall be supplied by the quarter master or deputy quarter master general, and in cases of their deficiency, by the director or deputy director general.

That there be one physician and surgeon general for each separate army, who shall be subject to the orders and controul of the director general and deputy director general of the district wherein he acts: That his duty shall be, to superintend the regimental surgeons and their mates, and to see that they do their duty, to hear all complaints against the said regimental surgeons and mates, and make report of them to the director general, or, in his absence, to the deputy director, or, in their absence, from the said army, to the commanding officer thereof, that they may be brought to trial by court martial for misbehavior; to receive from the director general or deputy director general, a suitable number of large strong tents, beds, bedding, medicines, and hospital stores, for such sick and wounded persons as cannot be removed to the general hospital with safety, or may be rendered for for duty in a few days; and shall also see that the sick and wounded, while under his care, are properly attended, and dressed and conveyed, when able, to the general hospital, for which last purpose he shall be supplied by the director general, or deputy director, with a proper number of convenient waggons and drivers.

That each physician and surgeon general of the armies, shall appoint such a number of surgeons, nurses, and orderly men, as the director general or deputy director general shall judge necessary for the more effectual care and relief of the sick and wounded, under the care of such physician and surgeon general as provided in the last foregoing section; and the said physicians and surgeons general shall have under them, in each army, a steward to receive, and properly dispense such articles of diet as the director general, or deputy director general shall give,

or order to be given him by the commissary of the army or hospital:

That whenever any regimental surgeon or mate shall be absent from his regiment without leave from the said surgeon general, or the commander in chief of the army where his duty lies, the said surgeon general shall have power to remove such surgeon or mate, and forthwith to appoint another in his stead:

That the director, deputy directors, physicians, and surgeons general, and all other officers before enumerated, shall be tried by a court martial for any misbehaviour, or neglect of duty, as the commander in chief of the several armies shall direct:

That the physician and surgeon general of each army, shall cause daily returns to be made to him, of all the sick and wounded which have been removed to the hospitals, all that remain in the hospital tents, all that are become fit for duty, all that are convalescent, and all who may have died, specifying the particular maladies under which the sick and wounded labour.

That the said physicians and surgeons general shall cause weekly returns of the same to be made to the director or deputy director general respectively:

That the physicians and surgeons general of the hospitals, cause like daily returns to be made in every hospital, and the like weekly returns to their respective directors, mutatis mutandis:

That the deputy directors general cause the like returns to be made, once every month, to the director general, together with the names and denominations of all the officers in the respective hospitals:

And that the director general shall make a like return for all the hospitals and armies of these United States, once every month, to the Medical Committee:

That the Medical Committee have power to appoint any of their members to visit and inspect all or any of the medical departments, as often as they shall think proper, to enquire into the conduct of such general officers of the hospital as shall be delinquent in this or any parts of their duty, and to report their names to Congress, with the evidence of the charges, which shall be brought against them.

Resolved, That in time of action and on any other emergency, when the regimental surgeons are not sufficient in number to attend properly to the sick and wounded, that cannot be removed to the hospitals, the director, or deputy director general of the district, be empowered and required, upon the request of the physician and surgeon general of the army, to send, from the hospitals under his care, to the assistance of such sick and wounded, as many physicians and surgeons as can possibly be spared from the necessary business of the hospitals.

That the director, deputy directors general, assistant deputy directors, physicians and surgeons general, be, and they are hereby required and directed to employ such parts of their time, as may conveniently be spared from the duties before pointed out to them, in visiting and prescribing for the sick and wounded of

the hospitals under their care.

That the establishment of the medical department be as follows:

1 director general,	6 dollars a day and 9 rations,	
3 deputy directors general,	5 do.	6 do.
Indeterminate assistant deputy director,	3 do.	6 do.
4 physicians general and		
4 surgeons general each,	5 do.	6 do.
1 to each army, physician and surgeon general of the army	5 do.	6 do.
Senior Surgeons,	4 do.	6 do.
Second Surgeons,	2 do.	4 do.
Surgeons' mates,	1 1/3 do.	2 do.
Apothecaries general,	3 do.	6 do.
Mates,	1 1/3 do.	2 do.
Commissary,	2 do.	4 do.
Clerk, who is to be pay master,	2 do.	4 do.
Assistant clerks,	2/3 do.	1 do.
Stewards,	1 do.	2 do.
Matron,	1/2 do.	1 do.
Nurses,	24-90	1 do.
Stabler,	1 do.	1 do.
Regimental surgeons,	2 do.	4 do.
Ditto, mates,	1 1/3 do.	2 do.

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ILLUSTRATIONS

Plate 1

Field case of surgical instruments, American Revolution (Army
Medical Museum, Washington, D.C., MNHP File).

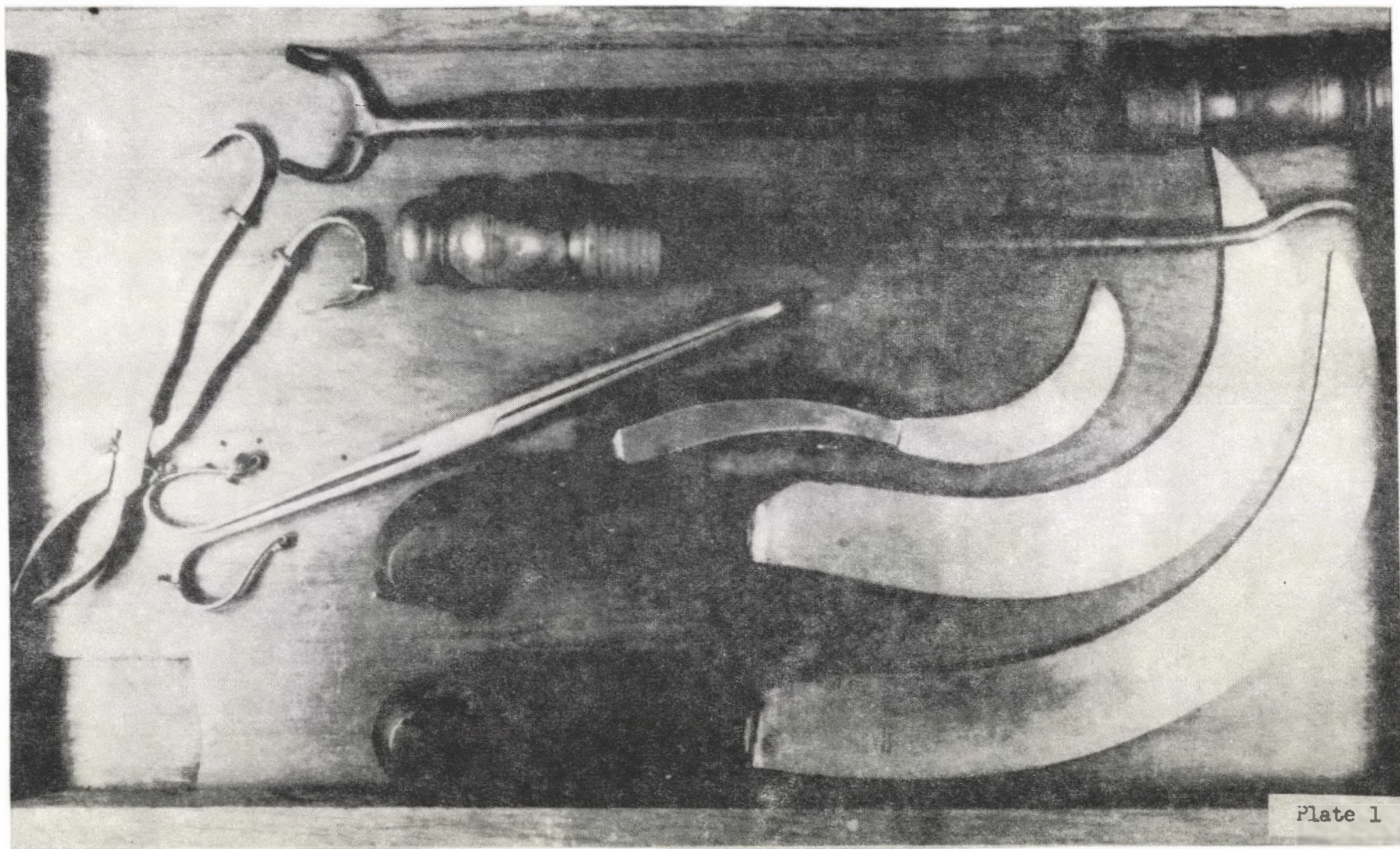


Plate 1

Plate 2

Trepanning instruments once owned by Dr. Charles McKnight,
Revolutionary Surgeon (Photo by M. Weig, 9/28/38, MNHP File).

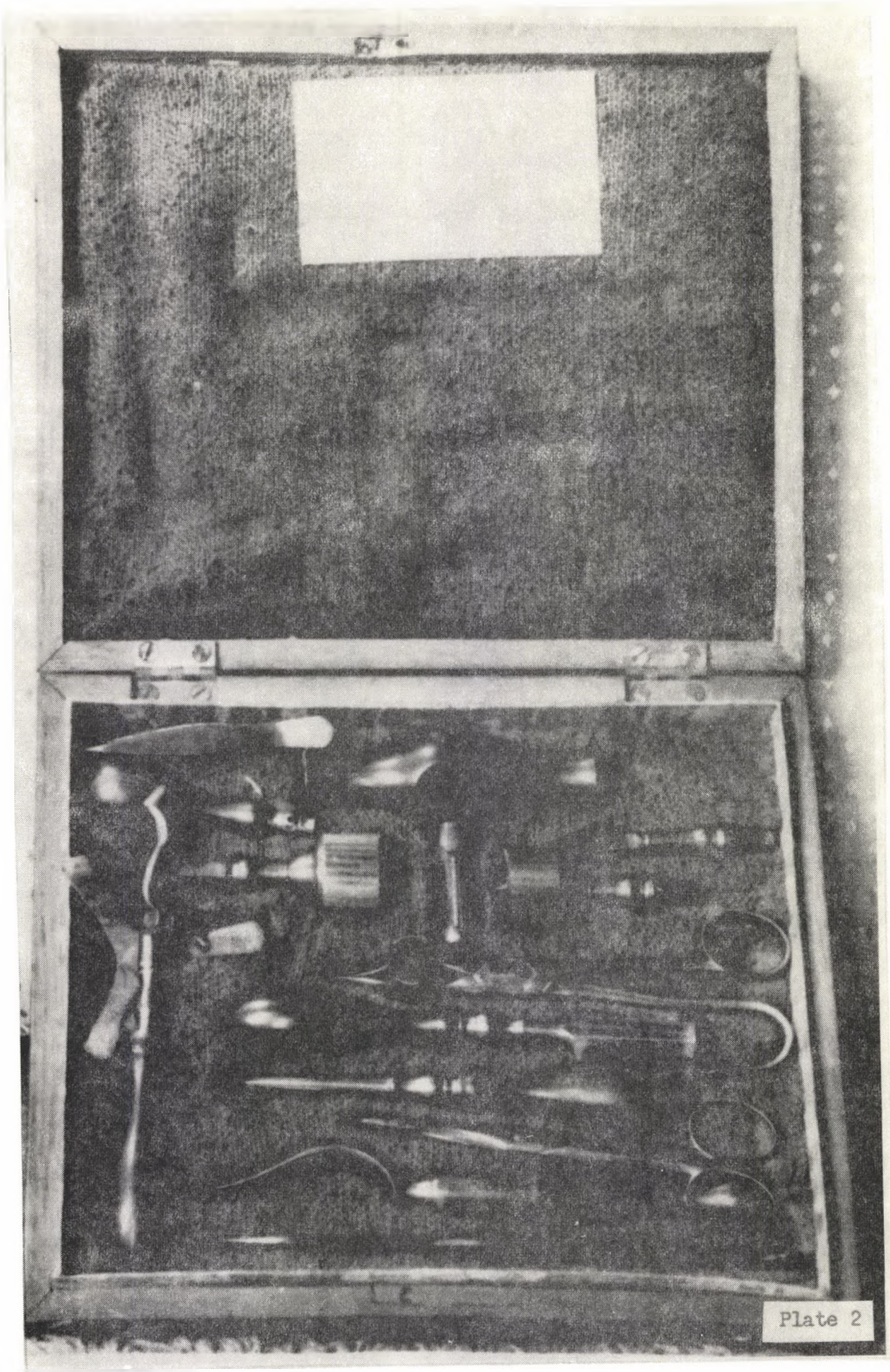


Plate 3

Surgical instruments once owned by Dr. Charles McKnight,
Revolutionary Surgeon (photo by M. Weig, 9/28/38, MNHP
File).

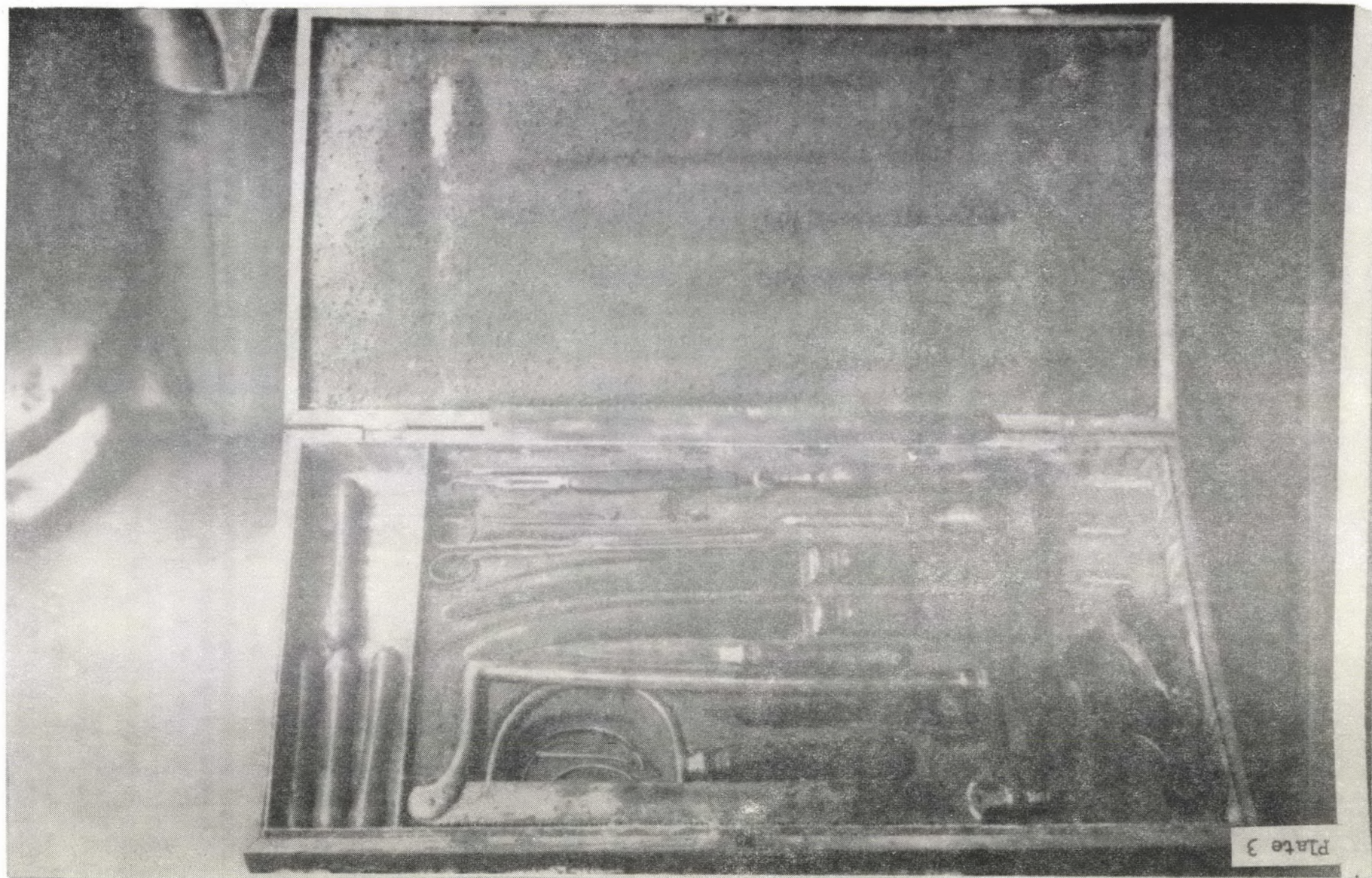


Plate 4

On the left, a cutting devise with multiple knives, used in wet cupping; the blades are controlled with a spring and trigger. On the right, a large size spring lancet, used for bleeding, with a blade controller (Livingood, The Pioneer Doctor).

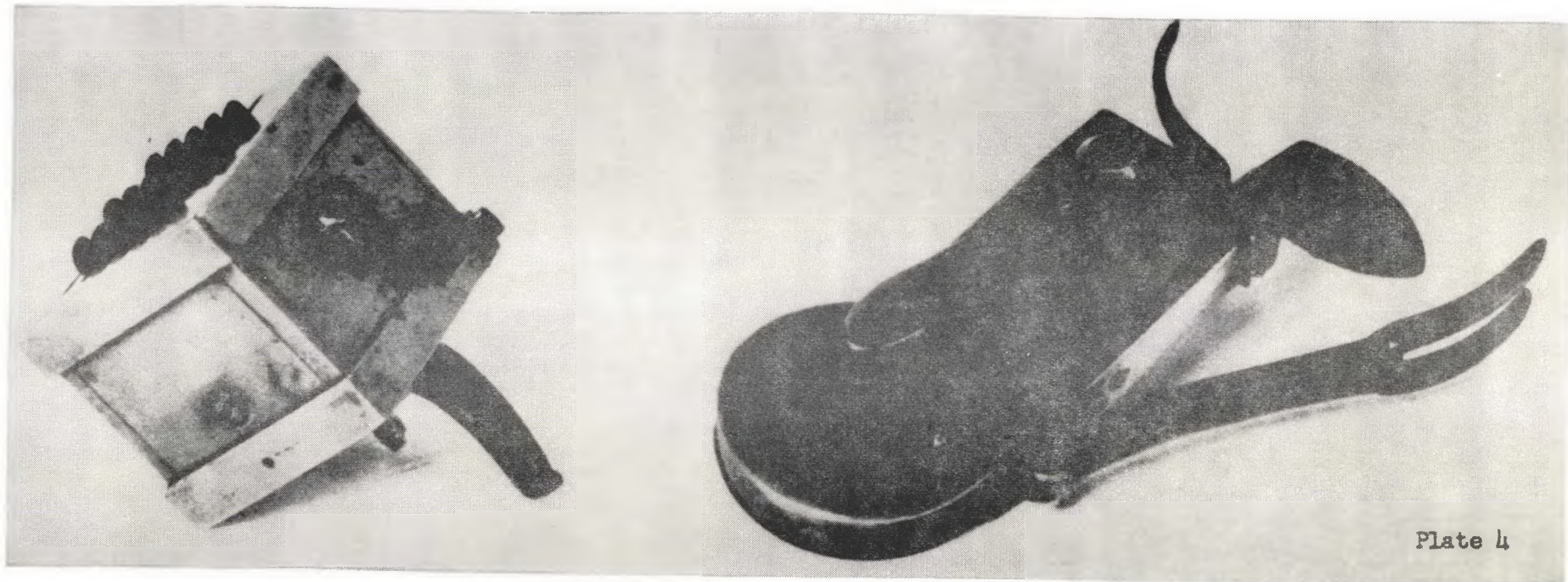


Plate 4

Plate 5

A cutter for pill-making, and a wooden stethoscope (Livingood,
The Pioneer Doctor).

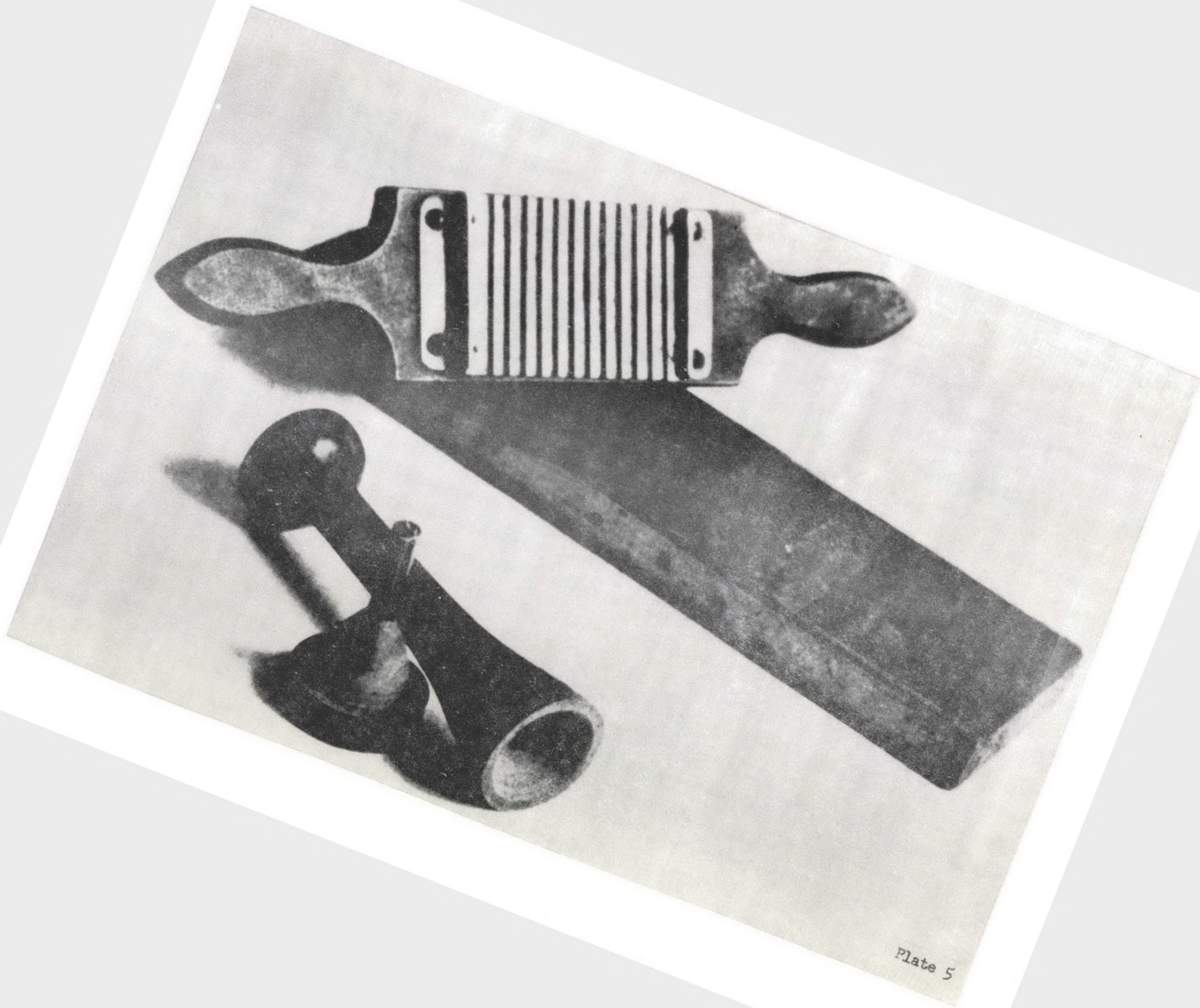


Plate 5

Plate 6

Amputation case, British Army, 1775.

- A- Sharp's bow saw
- B- Spanner with smooth cylindrical handle
- C- Spare blade
- D- Benjamin Bell's bow metacarpal saw
- E- Cheselden's-Sharp's large curved amputation knife
- F- Catlin
- G- Tenaculum
- H- Bullet forceps

(Museum of the Royal College of Surgeons, British Army,
MNHP File).

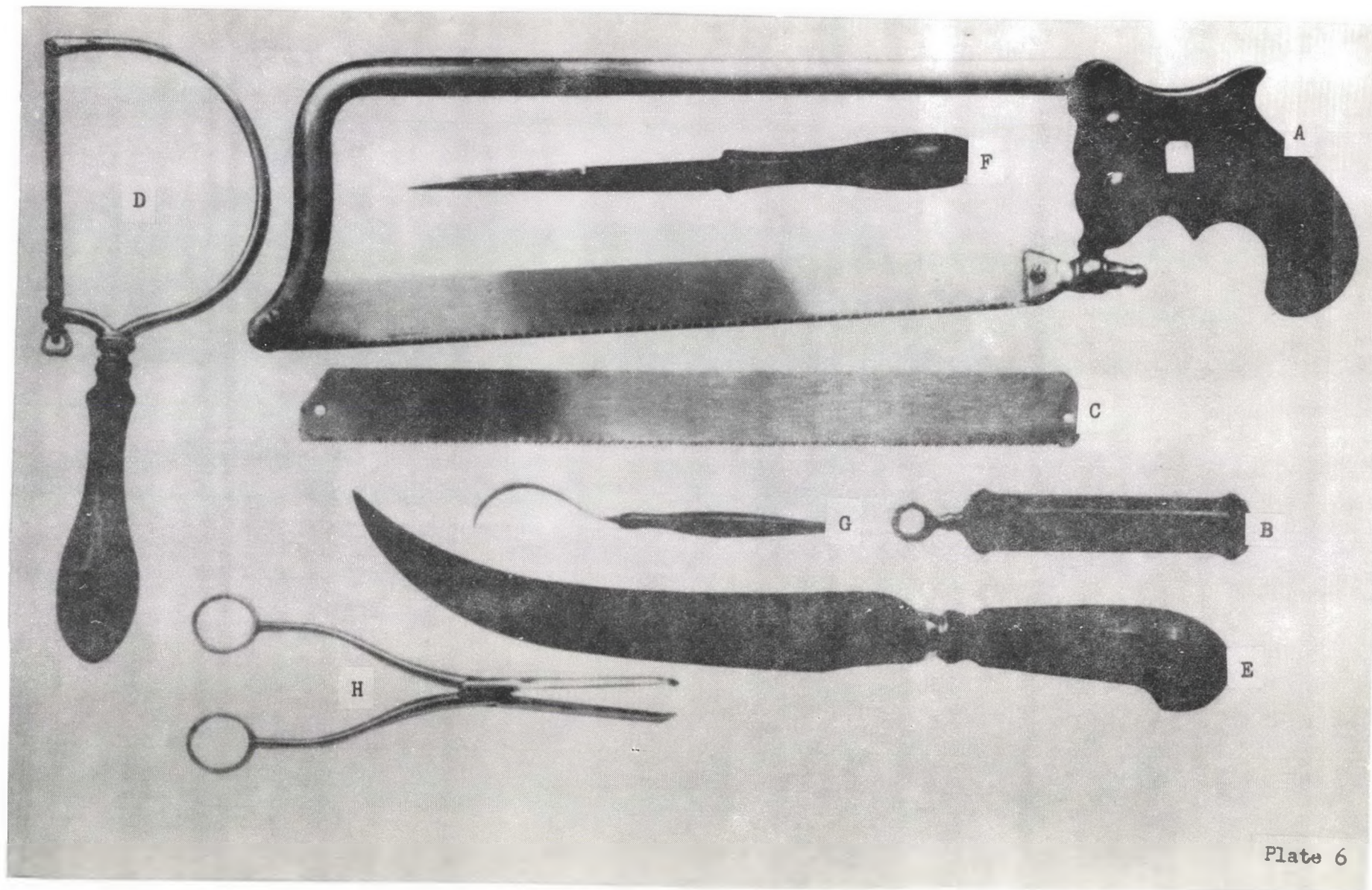


Plate 6

Plate 7

Above, Perret's amputation knife with periosteal elevator, 1772, called medium curved knife. Below, a semi-curved amputation knife, 1775 (Museum of the Royal College of Surgeons, British Army, MNHP File).

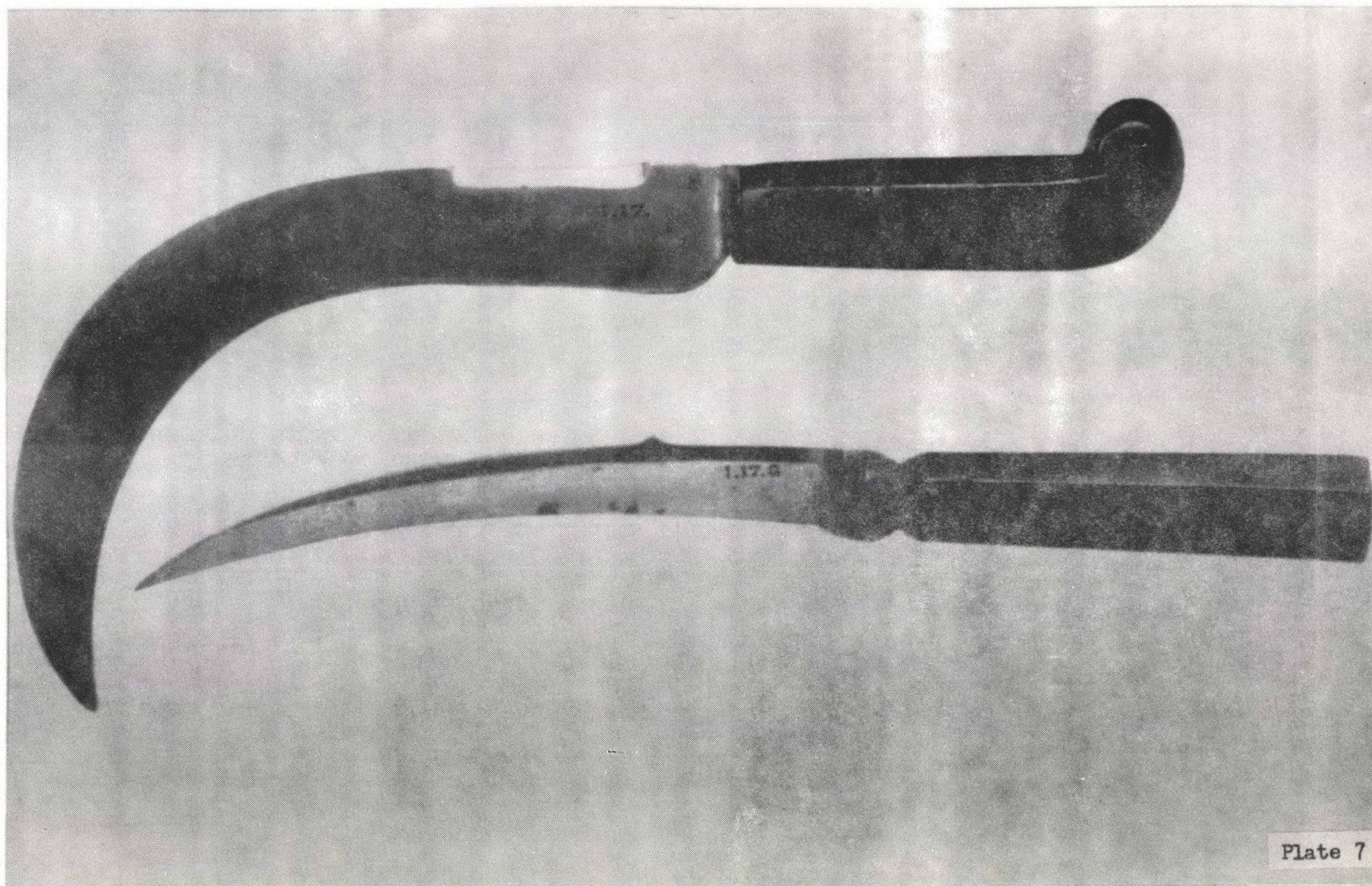


Plate 8

Above, curved amputation knife, c. 1765. Below, Loder's amputation knife, 1784. About 1780, the straight bladed knife was replacing the strongly curved knives employed in previous years (Museum of the Royal College of Surgeons, British Army, MNHP File).

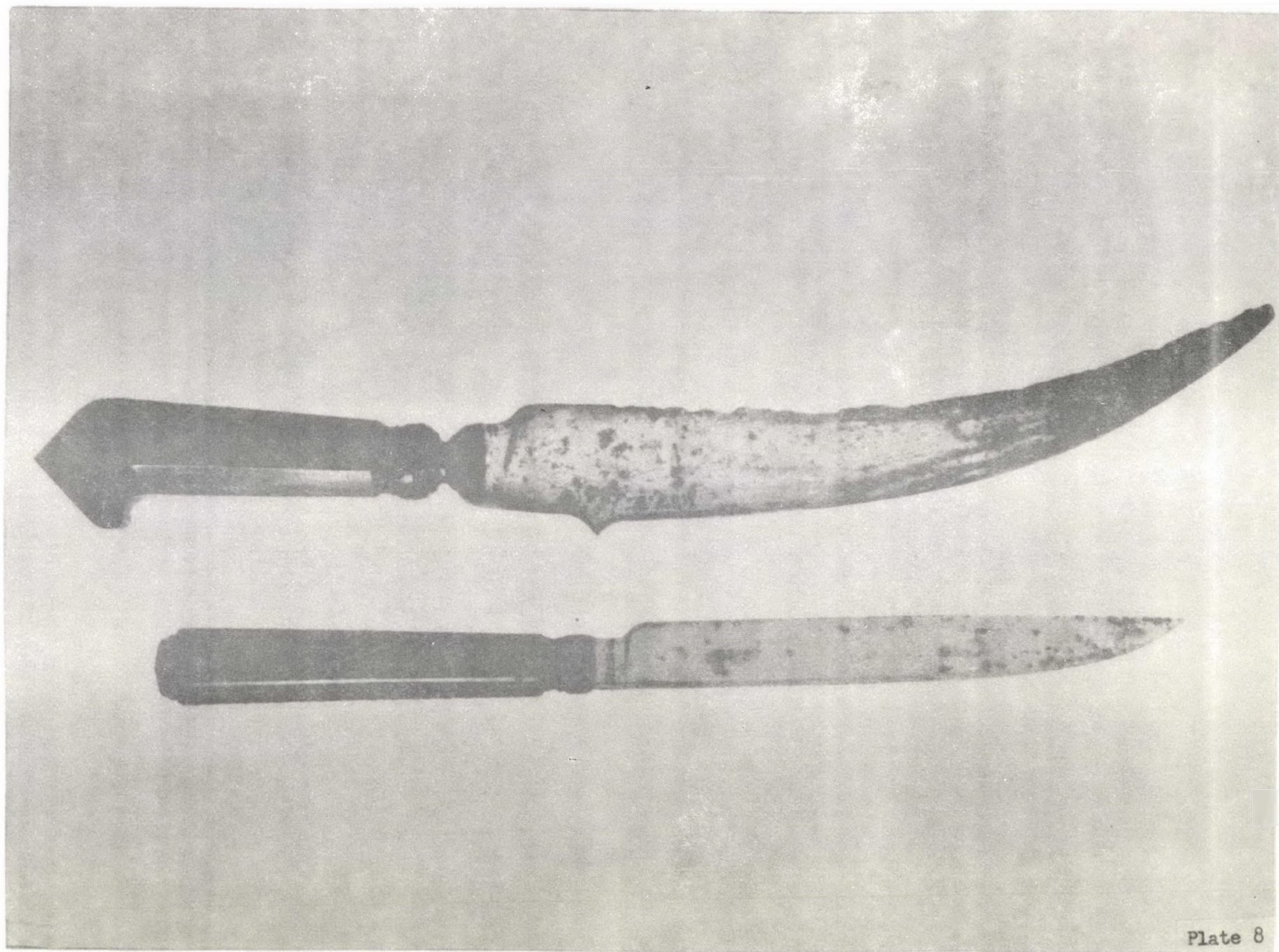


Plate 8

Plate 9

Bullet forceps--1770, 1798, 1775--from top to bottom
(Museum of the Royal College of Surgeons, British
Army, MNHP File).

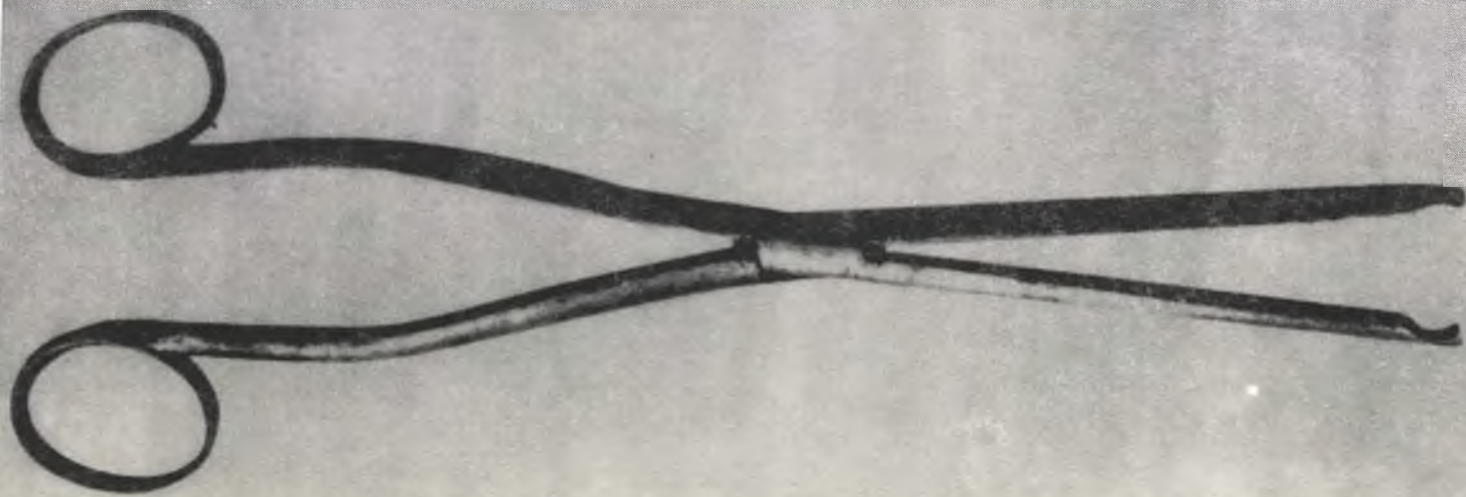
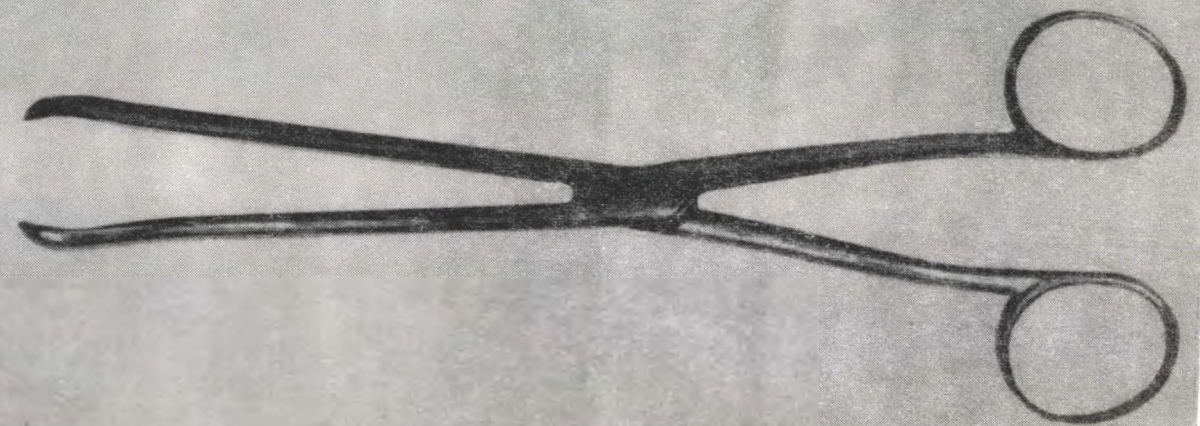
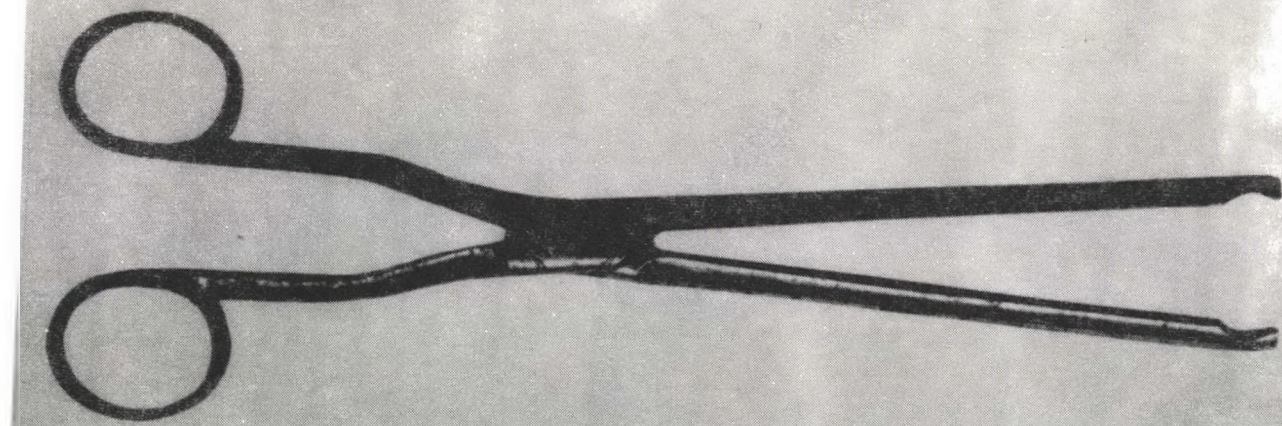


Plate 10

Military surgeon's trepanning case, containing 16 instruments, made by Grangeret, Paris (Harmonic Collection, Wellcome Historical Museum, MNHP File).

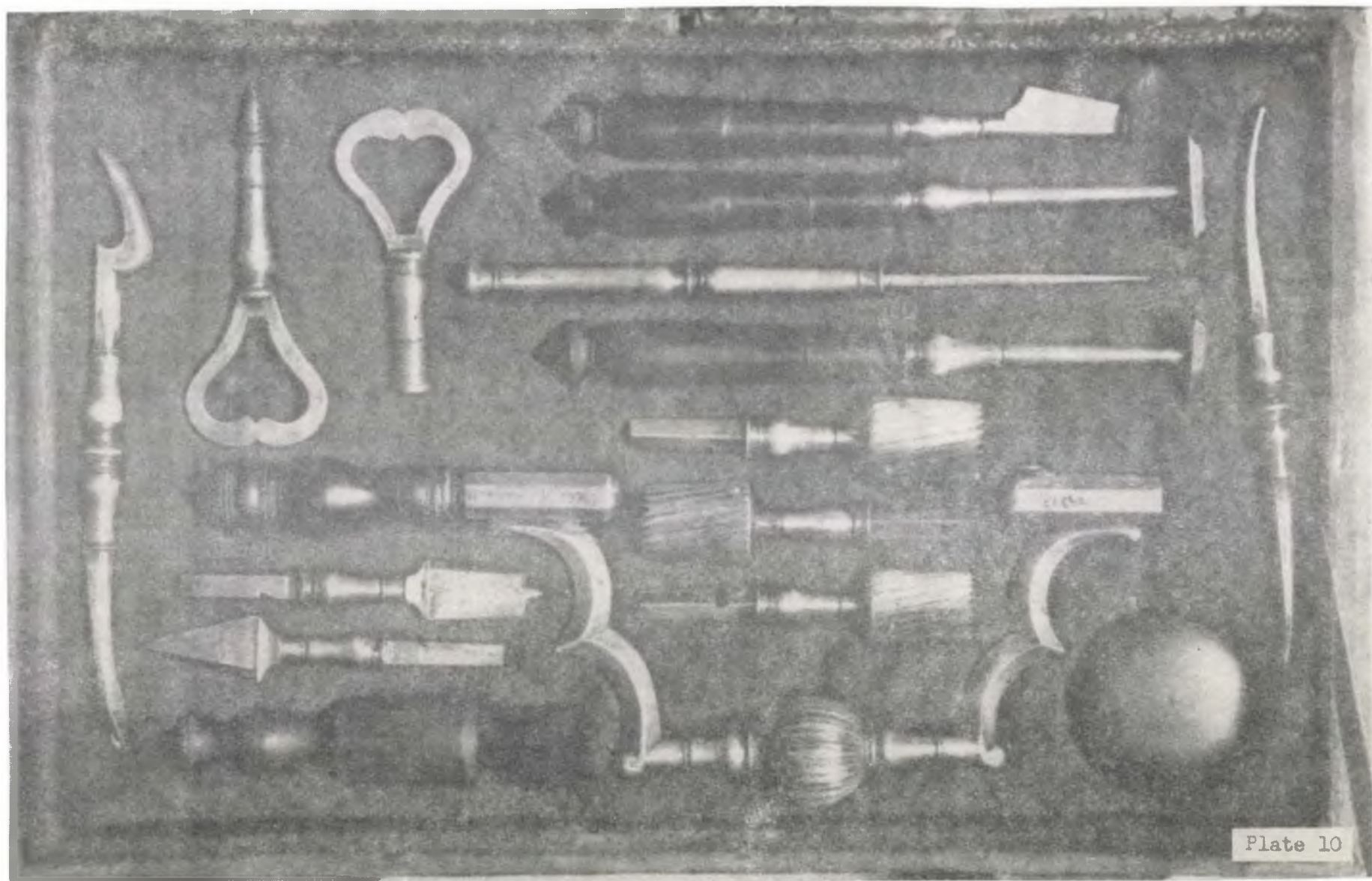


Plate 10

Plate 11

Top, ental instruments with cases. Center, lancets and knives with cases. Below, ophthalmic instruments, XVII-XVIII centuries (Harmonic Collection, Wellcome Historical Medical Museum, MNHP File.

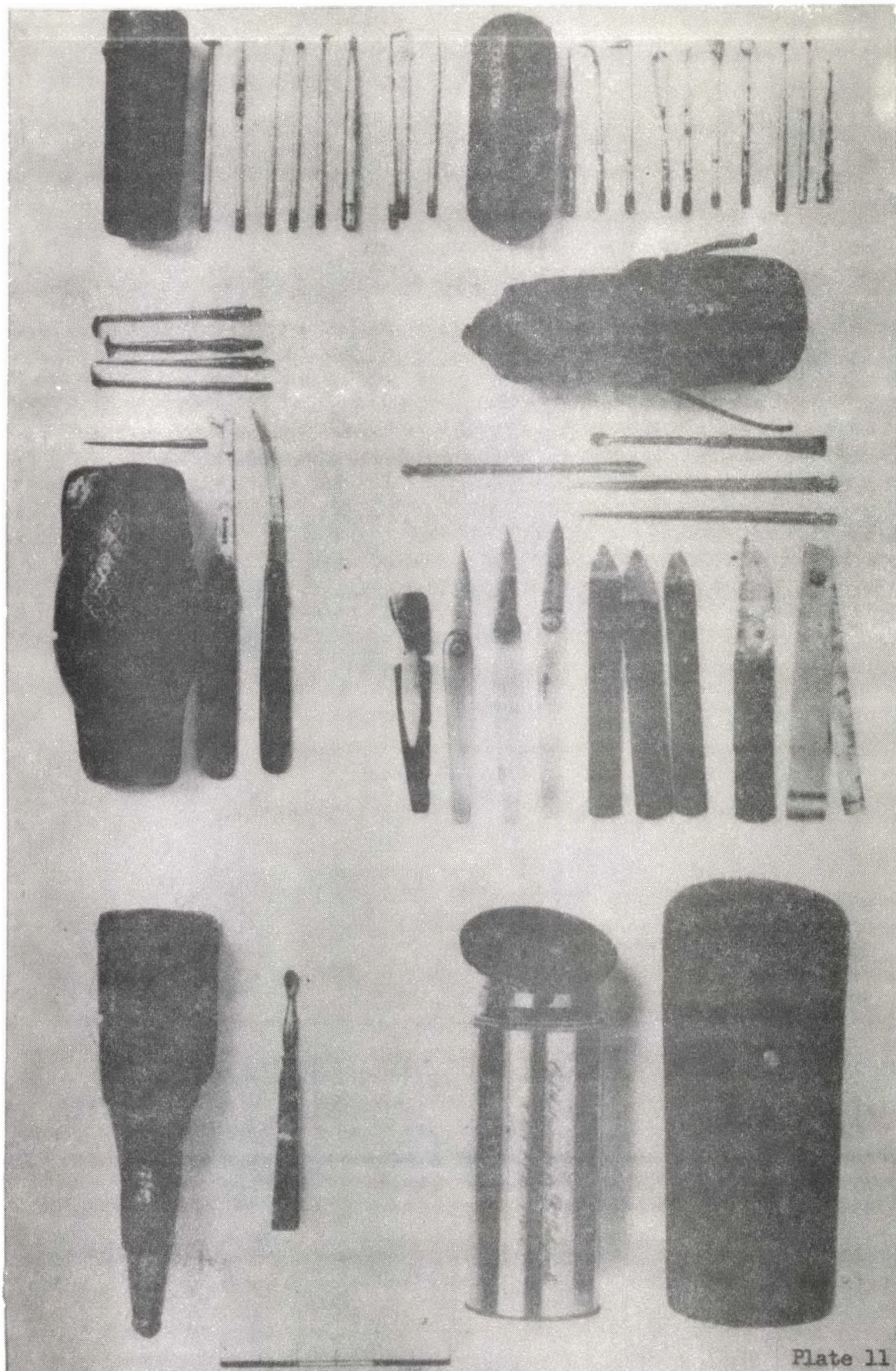


Plate 11

Plate 12

Bleeding cup, brass (Harmonic Collection, Wellcome Historical Medical Museum, MNHP File).

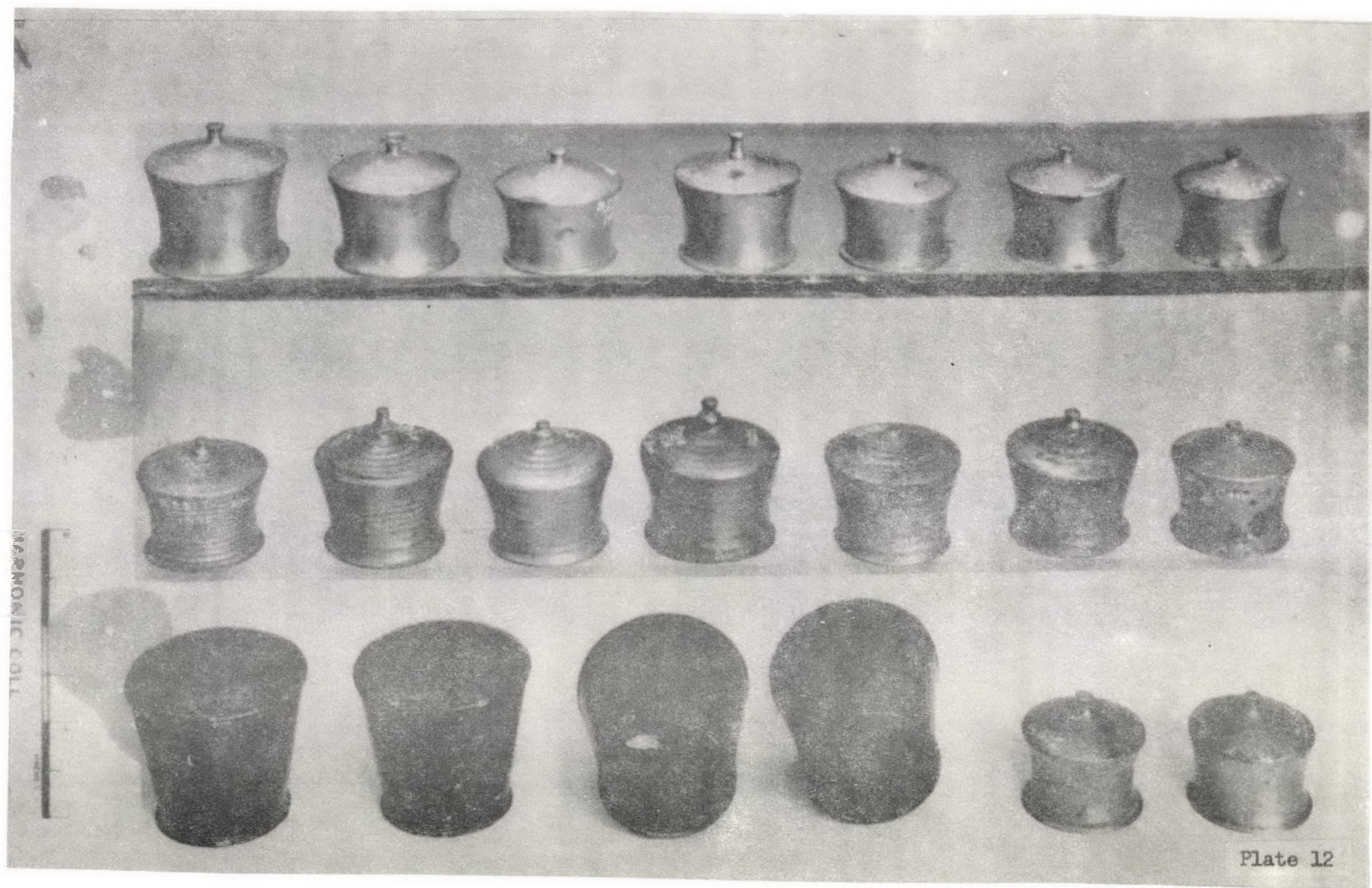


Plate 12

Plate 13

Scarificators, c. XVIII century, blood-letting (Harmonic
Collection, Wellcome Historical Medical Museum, MNHP File).

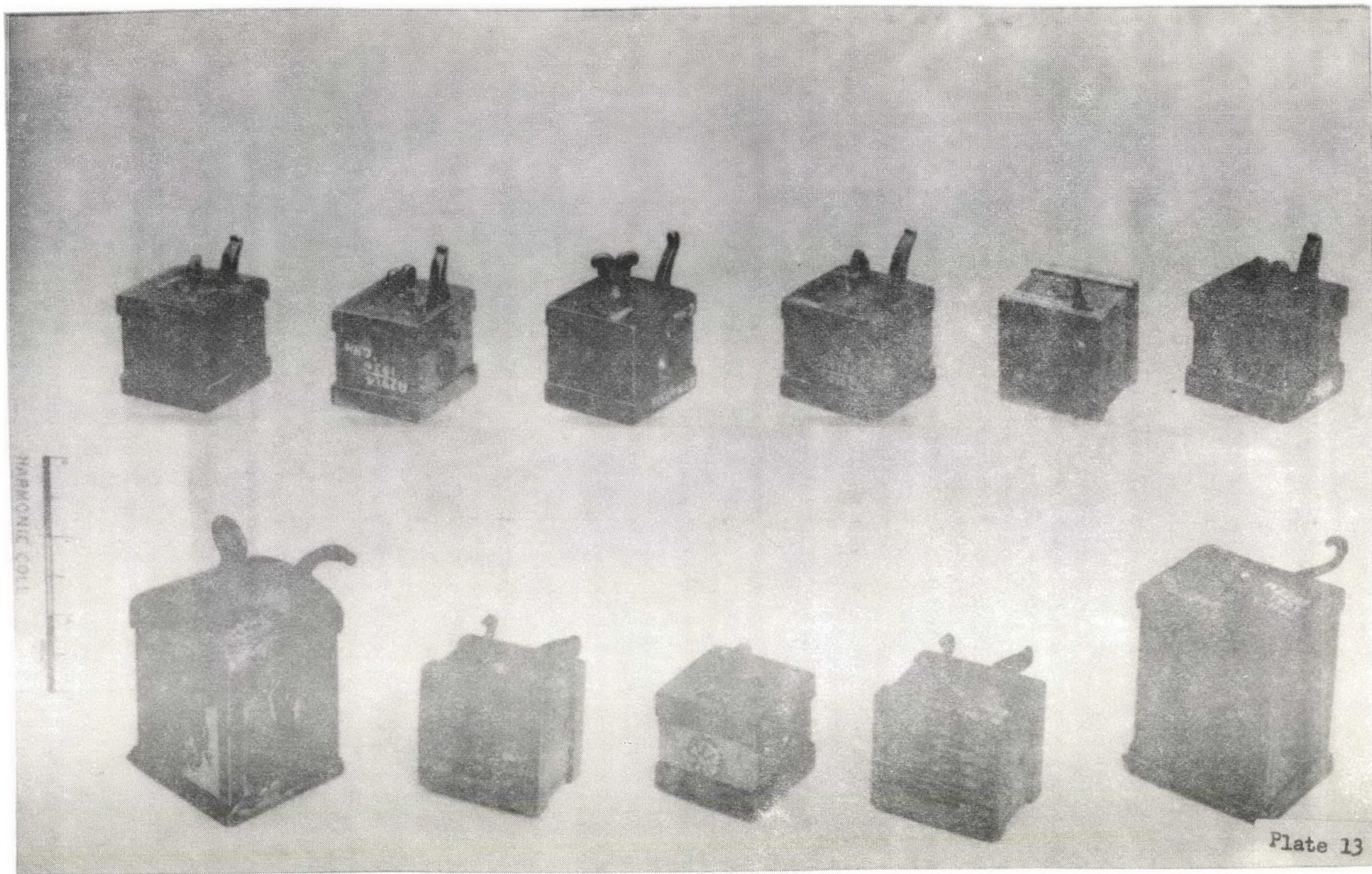


Plate 13