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The
**MEDICAL DEPARTMENT
OF THE UNITED STATES ARMY
IN THE WORLD WAR**

REFERENCE ONLY

VOLUME IV

**ACTIVITIES CONCERNING MOBILIZATION CAMPS
AND PORTS OF EMBARKATION**

BY

MAJ. ALBERT S. BOWEN, M. C.

PREPARED UNDER THE DIRECTION OF
MAJ. GEN. M. W. IRELAND

The Surgeon General

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LETTER OF TRANSMISSION

I have the honor to submit herewith Volume IV of the history of the MEDICAL DEPARTMENT OF THE UNITED STATES ARMY IN THE WORLD WAR. The volume is entitled, "ACTIVITIES CONCERNING MOBILIZATION CAMPS AND PORTS OF EMBARKATION."

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PREFACE

In accordance with the plan adopted originally, of having separate volumes on special subjects, the major activities of the Medical Department in connection with mobilization camps are considered in other volumes of this history. Thus, in Volume III appear data pertaining to the medical supply of camps, and in Volume V, data concerning military hospitals; in Volume VI, all subjects collectively designated sanitation, but covering in detail the matters of housing, clothing, and feeding troops, physically examining them and protecting them from infectious and other disease conditions; in Volume VII, the training of Medical Department troops, not only in the Medical Department training camps, but also in divisional mobilization camps. From this it would seem at first glance that the subject of Medical Department activities concerning mobilization camps has been covered adequately. The above method of treatment, however, leaves untouched a number of details which go to make up a large part of the first chapter. Succeeding chapters deal specifically with, first, the National Army cantonments and National Guard camps, and then the two great embarkation ports—the port of Hoboken, N. J., and the port of Newport News, Va.

In connection with the embarkation ports, it is necessary to explain that, whereas the Medical Department activities relating to these ports, as recorded herein, pertained to both the embarkation of troops for overseas and their debarkation when they returned to the United States, since no official change in the designation of these ports was made when their major function changed from the embarkation to the debarkation of troops, this fact does not appear except in the body of the text. Ordinarily, the history of one of these ports would suffice for historical purposes, but, though in theory their problems were very much the same, their experiences were so divergent as to warrant full treatment of the activities of each, with this exception: Since the activities of embarkation and debarkation hospitals are recorded in Volume V, their detailed consideration does not form a part of this volume.

TABLE OF CONTENTS

	Page
PREFACE	v
CHAPTER I. Mobilization camps	1
II. National Army cantonments	41
III. National Army cantonments (continued)	103
IV. National Guard camps	159
V. National Guard camps (continued)	205
VI. Port of embarkation, Hoboken, N. J.	253
VII. Port of embarkation, Newport News, Va.	343
INDEX	483

CHAPTER I

MOBILIZATION CAMPS

For purposes of orientation it is necessary to explain here that, for the World War Army, two classes of camps were used, divisional and miscellaneous. The divisional camps comprised the tent group, for the National Guard divisions, and the cantonment group, for the National Army divisions. The reasons for having these two kinds of shelter, as well as the details connected with the selection of the sites for the camps and cantonments, are adequately set forth elsewhere.^a The miscellaneous group comprised the special camps, usually of semipermanent construction, that were intended for mobilizing and training special troops, such as the Quartermaster Department camp, Camp Joseph E. Johnston, Jacksonville, Fla., or for embarkation purposes, as for example, Camp Merritt, N. J.

With the exception of the camps used for embarkation purposes, this volume is concerned only with the camps and cantonments that were used for mobilizing and training combat divisions. No attempt is made to consider, in this chapter, camps and cantonments separately, because most of the topics discussed pertain as well to National Guard camps as to National Army cantonments. Where local differentiation is necessary, this is made.

PREMOBILIZATION PERIOD

Aside from its interest in the character of shelter to be provided, the interest of the Medical Department in the mobilization camps, during the period of their construction, was twofold, for it was necessary not only that suitable medical attention be afforded Army personnel, directly or indirectly concerned with construction, but it was essential also that the sanitation of each military reservation be adequately supervised pending the time of its occupation by divisional troops.

On each of these projects, thousands of laborers (in the cantonments where a greater amount of construction was to be done than in the tent camps, the laborers numbered from 10,000 to 14,000) were employed under the supervision of a constructing quartermaster and his corps of assistants.¹ Furthermore, a military guard was essential. To supervise the sanitation of the area and act as camp surgeon during this period of construction, a junior medical officer of the Regular Army was assigned to each camp and cantonment at the time work was begun.²

The contract of the constructor bound him to comply with basic sanitary measures in the area of construction. Therefore, employees of the contractor were assigned to such sanitary work as policing, removal of garbage, and the construction and care of latrines that were provided for the laborers.

^a Vol. VI, Sanitation, Sec. I, Chaps. IV and V.

With the presence of so many civilian laborers, it was inevitable that people who had all manner of edibles would flock to the camp area and establish stands for the sale of their wares. Since it was practically impossible to have these hucksters maintain their stands in a satisfactory manner it was necessary to forcibly remove most of them.

The camp surgeon frequently assumed the professional care of the contractor's employees, when they were suffering from minor illness or injury, and for this purpose a dispensary was established in one of the buildings, the completion of which was expedited by the contractor.

A campaign to effect the voluntary vaccination, against both typhoid fever and smallpox, of as many as possible of the civilian employees was carried out by the camp surgeon. The object of this was to have the camp free of these diseases when the time for mobilization arrived. Efforts along these lines were highly successful.

MOBILIZATION AND TRAINING PERIOD

(August 25, 1917, to November 11, 1918)

The first move toward actual mobilization in the camps was the arrival, in each case, of the major general who was to be in command, and his staff.³ This took place on or about August 25, 1917, in the majority of the camps, and was the official date of organization of the various divisions, although there were only small numbers of troops in the camps at that time.³ The prescribed strength of a division, in September, 1917, was approximately 28,000 officers and men, but various nondivisional organizations, casuals, etc., brought the total population of the camps to considerably higher figures.

In addition to organizing his division, the commanding general of each of the 16 National Army cantonments^b was to organize a depot brigade, each brigade to consist of brigade headquarters and such number of training battalions as could be formed from the personnel available.⁴ The ultimate purpose of these brigades was to receive and train men for the tactical divisions. They were not a part of the division, but so long as the commanding general maintained dual jurisdiction over the division and camp, they were under his control. As will be seen below the depot brigade became a highly important part of the camp organization, from the Medical Department viewpoint, particularly as regards the physical examination of personnel.

The division commander was also the camp commander prior to the time of departure of the first division to occupy the camp. Subsequently, though a new division was organized in a majority of the camps, there was a separation of the offices of camp and division commander, each with its incumbent and his staff.³

Though it is not the present purpose to consider in detail the tables of organization of a division, such details being more appropriately given elsewhere,^c it is essential for a proper understanding of what follows to appreciate what organizations comprised an Infantry combat division. Therefore the following tabulation has been prepared to show, on the one hand, the divisional organiza-

^b National Guard camps had no depot brigade.

^c Consult appendix, p. 1054 et seq., Volume VIII, of this history.

tion, as of August, 1917, and on the other, the attached Medical Department personnel.⁵ It should be added that certain changes later were made in the table upon which the tabulation is based but only in minor degree.

Divisional headquarters, Infantry division, maximum strength

	Attached Medical Department personnel	
	Commissioned	Enlisted
Division headquarters (including headquarters troops).....	3	8
Two Infantry brigades (4 regiments of Infantry, 2 machine gun battalions).....	30	404
One Field Artillery brigade (3 regiments, 1 trench mortar battery).....	16	83
One machine gun battalion.....	1	13
One regiment of Engineers.....	3	28
One field signal battalion.....	1	7
Train headquarters.....	3	12
Sanitary train.....	47	900

MEDICAL DEPARTMENT PERSONNEL

The Medical Department personnel of a camp, during this period, fell into two main groups, depending on whether it was assigned to divisional or camp organizations.³ As a general rule, and particularly until the spring of 1918, this separation had no significance as regards medical administration, the camp surgeon and the division surgeon being one and the same individual; but there were two camp organizations which, for a time, operated semi-independently—the base hospital and the auxiliary remount depot. Army Regulations gave to territorial department commanders the command of all military forces within the limits of their respective commands, except such as were exempted by the Secretary of War.⁶ The War Department, in the summer of 1917, included divisions to be organized among forces to be exempted from departmental command;⁷ and in October of the same year, added troops “attached thereto,” to the exempted list,⁸ thus placing the latter under the jurisdiction of camp and division commanders. This latter provision made the base hospital and the auxiliary remount depot dependent parts of a camp, and, in effect, gave to the division surgeon supervisory control over sanitation in these two units. Prior to this time, the division surgeon was forced to depend largely on the inherent good sense of the organization commanders of these two organizations and on his own diplomacy in securing concerted action throughout the camp area.

Aside from these two organizations, practically all of the Medical Department personnel in a camp was on duty with divisional organizations during the early period of the camps.³ This personnel was again of two classes, those serving with Medical Department units (sanitary train) and those serving with other units, principally combat.⁵ There were approximately 950 of the former and 600 of the latter.

COMMISSIONED

The commissioned medical personnel of the Regular Army was represented mainly by the division surgeon, the division sanitary inspector, the division veterinarian, and the division dental officer.³ This was not invariably true, as the first two of these positions were occupied in some camps by officers from the

National Guard or the Medical Reserve Corps. There were 7 medical officers with each regiment of Infantry, 1 with a machine gun battalion, 3 or 4 medical and 2 veterinary with a regiment of Field Artillery, 3 medical with a regiment of Engineers, 1 medical with a Signal Corps battalion, and 3 medical and 2 veterinary with the divisional trains.⁹ Each ambulance company had 5 medical officers, each field hospital company had 6, and 4 additional medical officers and 1 veterinarian were with section headquarters of the sanitary train.¹⁰ The totals were 49 officers with the sanitary troops and 55 with other divisional troops, a divisional total of 104. The original allowance for division headquarters was 3 medical officers. The allowance of dental officers was 1 for each 1,000 troops.¹¹

ENLISTED

Though a number of Regular Army enlisted men of the Medical Department were assigned to each division (usually 17 for an Infantry regiment),³ the bulk of the medical force obviously had to come from the draft. As regards the drafted men, efforts were made in the various divisions to select men with experience in lines of work which would be of assistance to them in the positions they would hold, as nurses, pharmacists, laboratory technicians, stenographers, supply men, etc.³ No general provision was made at first to allot such specially qualified men to organizations of the Medical Department, and it was only after the lapse of some time that there was a realization among division commanders in general that the care of the sick and wounded could not be delegated to such men as remained of a draft increment after combat organizations had chosen those whom they particularly desired.³ This failure to appreciate the technical nature of the work of sanitary troops was further evidenced, in some instances, for example, Camp Lee, Va.,¹² by the assignment to them of "conscientious objectors," who refused to do any work. In so far as the wishes of the selective service men were concerned, in December, 1917, the War Department gave authority for registrants, who so desired, to be inducted from local draft boards directly into any particular branch of the Army, but this required action through the War Department.¹³

In order to fill promptly the noncommissioned grades, promotion in these grades was gradually simplified and expedited as follows: By no longer requiring written examinations, or the 12 months' service in lower grades;¹⁴ division surgeons were given authority to appoint sergeants, first class, and sergeants and to reduce the former to a lower grade, in November, 1917;¹⁵ camp surgeons, after they were provided for, were given authority to appoint to and reduce from all noncommissioned grades.¹⁶ These special authorities, being war-time measures, were rescinded in 1919.¹⁷

MEDICAL DEPARTMENT ORGANIZATIONS

DIVISION SURGEON'S OFFICE

As stated above, the original allowance of officers for the division surgeon's office was 3, thus providing a sanitary inspector and 1 other assistant to the division surgeon.^d The enlisted force of the office was 8, only 2 of whom were

^d Specialist assistants were provided later for the division surgeon, but the assistants (a neuropsychiatrist, an orthopedist, a urologist, and a gas medical officer) did not form a part of his office personnel; they were assigned to the sanitary train.

noncommissioned officers.^{5 18} That this enlisted force soon became insufficient in numbers as the work increased is evidenced by the detail, in practically all divisions, of members of other organizations for temporary duty in this office.³

The division surgeon is both an advisory and an administrative officer.¹⁹ In his advisory capacity he makes recommendations concerning all matters pertaining to the sanitary welfare of the command and concerning matters pertaining to the personnel and equipment of the sanitary service under organization commanders. In his administrative capacity he is in command of the Medical Department personnel of the division.

To assist division surgeons in quickly mastering the details connected with their offices, the Surgeon General promulgated the following memorandum on the subject just prior to the time for the mobilization of troops in the fall of 1917:²⁰

ON DUTIES OF DIVISION SURGEONS AT NATIONAL ARMY CANTONMENTS

1. The inclosed regulations, circulars, letters memoranda, etc., are transmitted to the division surgeon for his information. Certain of them have been officially authorized; others are in the form of memoranda from this office intended as suggestions as to ways and means. Before laying out his campaign, the division surgeon should carefully digest these papers and adapt the ideas contained in them to his special problems.

2. In the absence of definite orders from the Chief of Staff of the Army regarding various matters pertaining to the administration of his department, he should be governed by Army Regulations, by the Manual for the Medical Department, by authorized circulars, etc., from this office, and by the suggestions contained in the inclosed communications, remembering always to keep in touch with the division chief of staff and the other departments in order that the work of the Medical Department may be coordinated with theirs.

3. The duties of the division surgeon, in the opinion of this office, may be broadly considered in their order of importance as follows:

- (a) Prevention of the introduction and spread of communicable diseases in the cantonment area.
- (b) Administration of prophylactic inoculations.
- (c) Sanitation of the cantonment area.
- (d) Physical examination of drafted men.
- (e) Organization and equipment of sanitary units.
- (f) Instruction and training of Medical Department personnel.

GENERAL CONSIDERATIONS

4. Immediately upon arrival the division surgeon should report to the division commander for instructions.

5. The division surgeon should carefully study his prescribed duties as outlined in the Manual for the Medical Department, consulting the index upon these subjects. In addition, his duties are those prescribed for the senior surgeons of the concentration camp, as outlined in paragraph 599, Manual for the Medical Department.

ORGANIZATION

6. Tables of Organization, 1917, provide for a sanitary inspector and other medical officer as assistant to the division surgeon. They also authorize 1 sergeant first class, 1 sergeant, 4 privates first class, and 3 privates.

7. The division surgeon and the sanitary inspector of the division having been assigned, the division surgeon should promptly select the other personnel and so organize his office that the sanitary duty pertaining to the Medical Department are completely equipped.

8. He will consult with the division quartermaster relative to office space and equipment. Medical supplies of the division surgeon's office (par. 884, Manual for the Medical Department) are being furnished without requisition.

9. Orders have been requested sending to the cantonment sufficient personnel to provide each regiment with 4 medical officers, 3 noncommissioned officers, and 14 enlisted men.

10. The division surgeon should supervise the organization of the various sanitary units. He should arrange with the division quartermaster for the formation and care of the sanitary trains.

EQUIPMENT

11. The division surgeon will make sure that all individuals and organizations are equipped with such articles of Medical Department property as are required by existing orders, and that all individuals and organizations pertaining to the Medical Department are completely equipped.

12. He should see that the standard supplies and equipment pertaining to organizations be maintained intact for active service in combat. To this end additional supplies should be issued from the hospital for routine use, for sick call, and for the treatment of trivial cases at infirmaries. The compressed surgical dressing materials of the field supplies are very expensive and should be used only to equip pouches, belts, and chests. Articles of post supplies should be utilized wherever practicable. (See par. 601, M. M. D., and supply letter No. 17.)

13. It is understood that at least 10 automobiles will be assigned to the quartermaster for routine use at the cantonment. In order to perform his duties efficiently, the sanitary inspector will require automobile transportation, and it is believed that sufficient automobiles have been allowed to enable this provision.

SUPPLIES

14. The initial stock of the medical and veterinary supplies for a divisional supply depot are being furnished without requisition, and the medical supply officer has been designated. Blank forms of the Medical Department and a stock of combined typhoid and paratyphoid vaccine have also been ordered to the depot. The division surgeon should see that the medical supply officer of his cantonment has sufficient assistance to organize his depot. He will have regimental surgeons draw their equipment and be prepared to examine and care for recruits upon their arrival. Supplies for the cantonment medical supply depot are being shipped as rapidly as possible.

15. Attention is invited to the copy of a letter from the Surgeon General's Office upon the duties of the supply officer at the cantonment, sent to each medical supply officer, and also to supply letter No. 17, copies inclosed.

16. An initial stock is being sent to the divisional supply depot without requisition. Thereafter maintenance supplies will be kept up by requisition from the camp supply depot, forwarded to the department surgeon for issue from the department depot. (See G. O. 96-E.)

17. The division surgeon may approve requisitions from organizations within his division for articles on the supply table. (See supply letter No. 17.)

18. Requisitions for articles not upon the supply table should be forwarded to the department surgeon for action. All requests should be scrutinized closely, to the end that issues may be economized as much as possible, compatible with the prompt and efficient service of organization.

19. Owing to the great demand for supplies which will occur with the mobilization of the National Guard and the National Army and the difficulties which are being experienced in obtaining them, requisitions should be limited at first to the quantities necessary for one month.

20. Any undue delay in delivery of supplies should be promptly reported to the Surgeon General's Office, that the defect may be corrected and that the supplies may be issued from other depots.

21. An initial supply for the base hospital of 500 beds and essential equipment is being sent without requisition. Additional supplies should be requested as needed.

22. At the beginning it will be practicable to issue for the cantonment two portable dental outfits. These should be stationed at the base hospital. As soon as more adequate supplies become available they may be issued, the first one to a brigade and later one to each

regiment, as may be deemed in your judgment most expedient. Requisitions for replenishment of dental supplies should be forwarded to the department surgeon.

23. Steps should be taken to secure from the divisional supply depot the blank forms, "Division surgeon's emergency supplies," paragraph 885, Manual for the Medical Department.

SANITARY SERVICE

24. The sanitary service of the cantonment is under the direction of the division surgeon. He should familiarize himself with the War Department sanitary order, and see that its provisions are carefully observed.

HOSPITALS

25. The plan for the cantonment contemplates the provision of a base hospital of 1,000 beds and of a small infirmary for each regiment. The infirmaries will have from 6 to 10 beds to provide temporary care for patients until they can be sent to the base hospital. A sheet showing the allowance of medical supplies at the camp infirmary is inclosed herewith.

26. The medical supplies of a field hospital have been sent to the cantonment for use should it be necessary in case of emergency before the supplies for the base hospital arrive. This will afford sufficient material to enable resourceful surgeons to meet any ordinary emergency. It should be preserved as nearly intact as possible for issue to a field hospital organization later on as soon as it can be spared. It is essential that adequate, even if small, hospital accommodations should be provided to be available upon the arrival of the men, some of whom may need immediate attention.

PROTECTIVE INOCULATION

27. The division surgeon will see that smallpox, typhoid, and paratyphoid vaccines are properly administered, and the proper notation made upon the vaccination register (Form S1, M. D.). Information should be furnished company and detachment commanders of the date and result of the last vaccination against smallpox and the date when the typhoid and paratyphoid vaccination was completed.

28. The department surgeon has been directed to have his departmental supply officer provide vaccine virus and sufficient vaccination registers (Form S1, M. D.).

29. It is especially enjoined that all men be thoroughly protected against smallpox. Every officer and man must be vaccinated upon entering into the service. If the first vaccination is ineffective, it will be repeated at the end of eight days.

CONTAGIOUS DISEASES

30. The division surgeon must have the drafted men examined promptly upon arrival to ascertain their freedom from contagious diseases. Any such case found will be promptly isolated.

INSTRUCTION

31. The division surgeon is responsible for the instruction of all individuals and organizations in personal and camp hygiene, and of the Medical Department personnel, commissioned and enlisted, in the routine work of the Medical Department in the field. An important factor in instruction will be the object lesson afforded by the administration of the camp and the measures inaugurated for the maintenance of sanitary conditions therein.

PHYSICAL EXAMINATION OF DRAFTED MEN

32. A detailed scheme for the physical examination is inclosed (Memo. No. 3).

THE DIVISION SANITARY INSPECTOR

The division sanitary inspector, as an assistant to the division surgeon, is primarily an advisory officer, but may in addition be assigned certain executive duties.²¹

The sanitary inspector is charged especially with the supervision of the sanitation of the command to which he is assigned. In this connection he inspects and reports upon the sanitary condition within the command, upon the occurrence of preventable diseases and the sufficiency of the measures taken for their prevention, and in general upon all matters affecting the sanitary care of troops.

CAMP SURGEON'S OFFICE

Medical Department activities which concerned the camp proper, as distinguished from activities of the division occupying the camp, were divorced from the division surgeon's office some time in the spring of 1918, dependent upon when the divisions originally formed left the camps. To insure a continuity of administrative activities, instructions were issued by the Surgeon General which required the departing division surgeon to leave behind a complete file of orders and communications pertaining to the camp, and personnel, both commissioned and enlisted, sufficient to meet the immediate needs of the command remaining.²² A medical officer ordinarily was ordered to each camp in time to assume the duties of camp surgeon. The instructions referred to were not complied with in many instances, particularly in the matter of leaving records behind, thereby creating much confusion and necessitating a rebuilding of the local organization.³

The organization of the camp surgeon's office varied with the populations of the various camps and with the primary functions of the camps, the number of commissioned officers in the office ranging from 5 to 12.³ The following positions formed the basis of the organization, the number of assistants and their assignments varying somewhat:³ Camp surgeon, camp sanitary inspector, camp dental surgeon, camp epidemiologist, camp nutrition officer, camp sanitary engineer. The nutrition officer and the sanitary engineer were officers of the Sanitary Corps, who assumed duties formerly performed by assistants to the sanitary inspector.³

THE DEPOT BRIGADE

In the National Army cantonments, the depot brigade occupied a position of prime importance, from the medical viewpoint. It comprised the greater part of the camp not occupied by the division in training, and it was a reservoir for all casualties and a replacement training center for all organizations within the camp limits.³ An office organization that was highly effective at one of the camps divided the medical work in the depot brigade into seven services—examination of recruits, remedial defects (later development battalion), venereal diseases, detention camp, quarantine camps, infirmaries, dental—and the seven specialist boards.²¹ This organization required from 73 to 82 medical officers, depending upon the number of battalions in training.

THE SANITARY TRAIN

During the war the sanitary train was composed of camp infirmaries, ambulance companies, and field hospitals.²¹ The sanitary trains that were formed when the first divisions were mobilized comprised 4 ambulance companies and 4 field hospital companies.²⁵ The ambulance company group and

the field hospital group were each under a director, the whole, as stated above, commanded by the division surgeon.

THE DIRECTOR OF AMBULANCE COMPANIES

For each division a medical officer of the grade of major was to be designated as director of ambulance companies.²⁴ The relationship of the director of ambulance companies to the division surgeon on the one hand, and to the ambulance companies on the other, was similar to that of a major of the line to the colonel of his regiment and to the companies of his battalion. He was to maintain no office of record but communications from the division surgeon to the ambulance companies and vice versa were to be sent through him for his information.

The director of ambulance companies was to make frequent inspections to ascertain whether all the companies possessed their regulation allowances of personnel and equipment, whether the personnel had been properly instructed, and whether the equipment was in good condition, and he was to take the necessary measures to correct any deficiencies found.

THE DIRECTOR OF FIELD HOSPITALS

For each division (except Cavalry) there was to be designated as director of field hospitals one medical officer of the grade of major.²⁵ The director of the field hospitals, like the director of ambulance companies, was to be immediately under the division surgeon and was to be the latter's executive in respect to the field hospitals of the division.

COMMANDING OFFICER, SANITARY TRAIN

On April 17, 1918, a headquarters sanitary train was provided for by Tables of Organization, so that now, in addition to a headquarters of the ambulance company section and of the field hospital section, each commanded by a major, Medical Corps, there was a headquarters, sanitary train, commanded by a lieutenant colonel, Medical Corps.¹⁰ This provision relieved the division surgeon of the immediate direction of the activities of the sanitary train.

INFIRMARIES

An infirmary was intended to be the center of the medical activities of an organization rather than of a camp area, and each organization to which a medical detachment was assigned had its infirmary.³ Those of the regimental organizations were housed in buildings planned and constructed for the purpose, while those of the smaller organizations were often located in such space as was available.²⁷ One standard infirmary building sometimes served two or more of the smaller organizations.

These standard buildings were planned when Tables of Organization prescribed 33 men in the medical detachment of an Infantry regiment. Construction had proceeded too far to permit of changes in the infirmaries when the strength of the medical detachments was increased to 48 men, in the early

fall of 1917, and the buildings were therefore too small to provide all facilities originally intended. To meet these conditions, it was necessary to assign a portion of the detachments to quarters in other buildings; however, additions to infirmaries were later constructed in many instances to house personnel.³ The approximate doubling of the strength of the Infantry regiments also, of course, increased the size of the area they occupied, and resulted in the area now occupied by two regiments. The third infirmary was seldom so located that it could be used to advantage as an infirmary, and thus usually resulted in so placing some of the smaller organizations as to leave them with no infirmary building available for their use.³

The infirmary building contained one 10-bed ward. The less severe cases of injury and illness were retained in the infirmaries in a few camps, and this plan often obtained temporarily in all during times of stress at the base hospital. It was usually necessary to bring patients' food from the companies to which they belonged and it was almost invariably cold when it arrived. Quite frequently, it did not arrive at all.³ These conditions were obviated by the establishment of messes in the infirmaries in 1918.³

Dental offices, at first, were located in the medical infirmaries. This proved so unsatisfactory that later separate dental infirmaries were established.³

MEDICAL SUPPLY DEPOTS

There was one medical supply depot in each camp, and this served the division, the base hospital, and the remainder of the camp.³ It was generally situated within the confines of the hospital area, the bulk of its work being concerned with the base hospital. It was a common experience of the first medical supply officer to have medical supplies arrive in carload lots (the initial stock was sent without requisitions) before his own warehouses were erected. It then became necessary to borrow personnel and transportation wherever available and to arrange for temporary storage space. Farm buildings not yet removed were occasionally available, but portions of various quartermaster warehouses were usually used. These spaces were required for other purposes within a few days, necessitating several shiftings of the medical supplies before the medical storehouses were sufficiently constructed to be occupied. They eventually consisted of four warehouses, with a total storage capacity of about 130,000 cubic feet.³

There was originally one medical supply officer for the entire camp. He was accountable for all medical supplies issued to the division, the base hospital and elsewhere. Divisional medical supply officers were authorized in the fall of 1917, but they were not to act officially as such prior to arrival overseas.²⁸ The enlisted personnel of the medical supply depot originally was drawn from the base hospital on a temporary duty status.²⁹ These men later were made a part of the permanent personnel of the depot, others from both the division and the base hospital were attached for instruction purposes, and a number of men were inducted directly for medical supply work.²⁹ Commissioned officers of the Dental Corps³⁰ and Veterinary Corps³¹ were assigned as assistants to the camp medical supply officer to supervise the supplies of their respective corps.

MEDICAL DEPARTMENT ADMINISTRATION

The training camps conducted for medical officers furnished each mobilization camp with a considerable number of both officers and enlisted men, so selected and grouped as to fill the key positions in the medical service of the division and to provide a surplus for other assignments.³² The division surgeon thereby had a skeletonized medical service placed under his command, with the necessity only for distribution of the individuals. Others coming directly from civil life were assigned tentatively to such vacant positions as they seemed best qualified to fill.³

The medical work in mobilization camps had two primary objectives, the training of medical department personnel, and the conservation of the health of all troops,³ including the care of those already ill. In addition to subjects which have a direct bearing on these two major divisions of medical work, there were numerous others having an indirect bearing. The physical examination of individuals before admission to or discharge from the military service constituted the greatest of these secondary problems.

TRAINING

Another volume of this history (Vol. VII) is devoted to the subject of Medical Department training; however, it is deemed appropriate here to reiterate the salient facts in connection with preparing, with the least possible loss of time, the divisional Medical Department personnel for their new duties. It is true many medical officers had received a course of basic training at one or the other of the medical officers' training camps prior to their assignment to divisions, but a great deal of additional training was essential after their arrival in the divisional camps. Furthermore, many medical officers arrived directly from civil life at the camps. The same statements apply to the enlisted personnel. It was highly desirable, therefore, to begin the training as soon as possible, but the necessity of examining the members of the frequently arriving increments of the draft largely limited training during the first few weeks to practical instruction through the actual performance of duty.³ Equipment and supplies were incomplete at first, so this enforced inactivity in organized training was not altogether without its advantages, giving the force an opportunity to become familiar with routine duties before the intensive training was inaugurated and before there were any considerable numbers of sick to require attention.³ Since dental equipment was practically nonexistent during this period, the dental officers were used largely on other work, particularly as assistants in the examination of drafted men.³³

The influx of recruits decreased in rate and volume after about November 1, 1917, and organized training was then taken up with vigor along both military and professional lines.³⁴ Night classes were much in vogue.³ There were two aspects to the professional training, the strictly professional and the application of military necessities to professional work.³⁵ The reserve officers included individuals with various degrees of medical education, experience, and ability, and it was necessary to organize classes which would tend to equalize individual professional ability by increasing the professional knowledge of

those lower in the scale. It was also necessary to so instruct all medical officers that they would perform professional duties in a manner that would accord with the military necessities. These necessities required a considerable amount of clinical work and the reduction of professional work to a routine, with a high degree of cooperation.³ Realization of the absolute necessity for these requirements was one of the most difficult impressions to make upon the average medical reserve officers.³

The training schedule for medical officers comprised the following list of subjects:³⁵ Setting-up-exercises, taken by medical officers daily with the troops to which they were attached; drills—marching, litter, ambulance, other means of transport; inspections—personnel and environment; equitation—saddling, bridling, care of animals; tent pitching; personal equipment of the soldier, its care; first-aid—using soldiers' equipment; examination of recruits, with papers and finger prints; general organization of the military forces of the United States; general organization of the Medical Department for war; relation of the Medical Department to the rest of the Army; paper work relating to the Medical Department; paper work relating to the Quartermaster's Department; paper work relating to the Ordnance Department; customs of the service; duties of the soldier; Army Regulations; Manual for the Medical Department; Field Service Regulations; military hygiene and applied camp sanitation, including sanitary inspections, map reading, use of compass, orientation; elementary road and position sketching; the regimental detachment—its use, equipment, and administration; the field hospital—its use, equipment, and administration; the Medical Department in campaign; the principles of sanitary tactics; the tactical use of Field Artillery (lecture by line officer); the tactical use of Cavalry (lecture by line officer); the uses of Engineer and Signal Corps troops (lectures by officers of service concerned); the service and mechanism of quartermaster supply in the field (lecture by quartermaster officer); map problems; war games; tactical walks and rides; practice marches and bivouacs; practical field maneuvers, including brigade and divisional problems, with not less than three night problems, utilizing regimental detachments, ambulance companies, and field hospitals in coordination; problems including the attack, retreat, planned defense, and re-encounter with all arms, as far as possible, carried out in actual conjunction with problems by line troops; handling of the ration, food economy, and mess management; courts-martial, and military law; the Articles of War; the Geneva and Hague Conventions; the rules of land warfare; military surgery; poison gases—protection against, and their effects; liquid fire; trench foot, war psychoses and neuroses; diseases common on the Western Front; malingering; cantonment, evacuation, base, and general hospitals, including their organization, administration, records, and management; sanitary service of the line of communications; contagious-disease hospitals, casual camps, convalescent camps, camps for prisoners of war; organizations, functions, and limitations of the American Red Cross; the civil sanitary function of the Army Medical Department in occupied territory.

³ Gas defense, and instruction concerning it, ceased to be a function of the Medical Department upon the organization of the Chemical Warfare Service, in June, 1918.—*Ed.*

All medical officers of the division were required to qualify in the entire course.³⁵ In addition, officers devoted three evenings a week to various conferences and lectures, the enlisted men were given an equally thorough training in their duties, and special schools were provided for enlisted specialists and for candidates for promotion.³⁵

CONSERVATION OF HEALTH

Every activity of the Medical Department had a more or less direct bearing on the health of the troops, but only preventive sanitary measures and the care of the sick will be considered here.

GENERAL SANITARY MEASURES /

Water supply.—The majority of the camps and cantonments were sufficiently close to large cities to utilize their water systems, but the development of independent sources of supply from either wells or neighboring streams was necessary at a number of the camps. While the water thus obtained from wells was usually of good quality, the ultimate decision was to chlorinate all supplies.³ That obtained from streams usually required sedimentation treatment, as a preliminary measure.³ The main line of supply for camps in the Western States was constructed of wooden staves.³⁶ Storage reservoirs or tanks were constructed to provide a reserve supply.³⁶

The quantity of water per day that was actually used exceeded the original estimate in nearly every camp.³ Where the supply was derived from a city system, it was frequently difficult to keep the city purification plant up to the standard desired by the Army, and the placing of an Army officer in charge of the plant was sometimes necessary.³⁷

Disposal of garbage and waste.—The Quartermaster Corps was responsible for the disposal of all wastes, and instructions governing this matter in cantonments were issued by the Quartermaster General on August 31, 1917.³⁸ These instructions provided for the separation of garbage, its removal to a garbage-transfer station, the cleaning of garbage cans, and the salvage of bottles, tin cans, and waste paper by a contractor.

Incineration of a large proportion of the garbage and manure was necessary after the arrival of troops, and this remained as the standard method of disposal of rubbish. The disposal of rubbish usually was accomplished at a dump rather than in an incinerator, all ashes and dirt being used to cover tin cans, unburnable refuse, etc.³ The site selected for the dump was preferably a low area where filling would be advantageous, or a steep slope which would assist in the distribution of the refuse.

As previously stated, disposal by contract did not become effective until about October 1, 1917, and these instructions were not generally in force in tent camps until a considerably later date.³ The adoption of other methods of disposal was necessary in certain camps where no one was found to undertake the contract. Until late in 1918 the disposal of liquid kitchen wastes in the tent camps was accomplished by evaporation in pans over incinerators, no sewerage system being available. Guthrie and Conley incinerators, or modifications of

/ For greater details concerning the subjects treated under this caption, consult Vol. VI, Sanitation.—Ed.

these, were the types commonly used. The consumption of fuel by this method was so great, however, that it was estimated that the fuel cost for a few months would be greater than the cost of installation of a complete sewerage system.³⁹ This method was also most unsatisfactory in results.⁴⁰ The evaporating capacity of the incinerators being limited, the kitchen police were so economical in the use of water in washing mess tables and mess equipment that the desirable degree of cleanliness was not attained.⁴⁰

To comply with the terms of the waste-disposal contracts, all refuse was separated by the organizations under the following headings: Strained garbage for hog food; bones; meats and fats; coffee grounds, tea leaves, fish heads, citrus-fruit rinds, dirty paper, and other combustible rubbish; tin cans and unbroken bottles; clean paper and cardboard; ashes, sand, dirt, and broken glass.³ A later requirement was the separation of all dry bread.³ The cans containing the garbage were at first kept inside the kitchens, but were later placed outside on a fly-proof stand. These receptacles were daily taken to the garbage-transfer station by the organizations, where the cans were emptied and cleaned by the personnel of the station.

The original idea of heating the can-washing water by means of coils from the incinerator and using the same water for the coils was not successful, as foreign material gained access to the coils and caused stoppages.³ The incinerator was not always in use when hot water was needed, and it ultimately was used only for incineration and was therefore expensive.³ Provision was made for the treatment of the wash water by a combined grease trap and settling tank where sewer connections were not available.³⁸

Sanitation of the transfer-station area was difficult in nearly every camp.³ In few instances were impervious surfaces provided surrounding the stations until well along in 1918. This area was consequently badly cut up by vehicles during wet weather, and garbage once spilled on the ground could not be recovered. At the worst, this resulted in a fly-breeding area of considerable size.

The two-can system was used, the filled cans received from organizations being replaced by clean, empty ones at the time of collection.³ To be successful, this demanded cans of a uniform diameter; otherwise there was extreme difficulty in matching cans and lids. The contractors generally removed the garbage from the transfer station in tank wagons or tank trucks, sometimes in barrels by train. When these receptacles leaked, as occasionally was the case, the resulting trail of liquid waste created a decided nuisance.

Either incineration or disposal by sale was satisfactory, from the medical point of view, for both garbage and manure. Incineration was ideal, but the question of cost and practicability was to be considered. Neither garbage nor manure burns readily; therefore a considerable outlay for incinerators, fuel, etc., is required when incineration is adopted, particularly during periods of heavy rainfall. The quantities of these wastes produced in large camps were enormous, amounting, for example, to 982,500 pounds of garbage in July, 1918, at Camp Sherman, Ohio,⁴¹ and an average of about 120 tons of manure per day when there were approximately 12,000 animals in camp.⁴² The necessary incidental expense, therefore, might be the deciding factor against the adoption of incineration.

Disposal of human excreta.—Both pit latrines and sewerage systems were employed in the mobilization camps.⁴³ Pit latrines were used generally in the tent camps and, to some extent, in the cantonments.³ Each of the latter was furnished with a sewerage system, as were some of the tent camps late in 1918.⁴³ These methods, therefore, will be discussed under the types of camps most generally concerned.

More or less complete sewerage systems were provided in the original plans for each cantonment.⁴³ Sewerage systems are the most desirable form of excreta disposal in camps when original cost and rapidity of installation are not determining factors. They possess additional value in serving as a convenient and satisfactory avenue for the disposal of liquid wastes from kitchens and bath houses, but, for satisfactory action of disposal plants, grease traps must then be installed between the sources of this liquid waste and the disposal plants.

The systems as first installed did not include a treatment plant when it was practicable to discharge raw sewage into neighboring streams.⁴⁴ Where treatment was required, single-story septic tanks without grit chambers were constructed.⁴⁴ Sprinkling filters were planned for use where the effluent could not be discharged into large streams, and automatic chlorinating apparatus was provided for in all cases except the few where sand filtration was to be used. Sludge beds were not constructed until the winter of 1917-18.⁴⁵ The installation of an 18-inch grease trap on each kitchen line was included in the original plans.⁴⁶

These systems were almost universally the source of much trouble in 1918. Complaints were received from civilian sources when sewage was discharged into small streams, either treated or untreated.⁴⁵ Some faults of the septic tanks were, they proved to be too small in capacity and soon acted merely as settling tanks and were rapidly filled; the sewage was of an unexpected quality, and the entirely too-small grease traps were so ineffective that the presence of grease in the septic tanks removed all chance of effective septic decomposition. Furthermore, the stone used in the sprinkling filters was often not properly graded as to size. The scarcity of experienced personnel excluded the possibility of these handicapped plants producing satisfactory results.

Correction of these faults was inaugurated in 1918, but had not been completely effected when construction was generally stopped by the signing of the armistice.⁴⁵ A single large grease trap on the main sewer line was rather generally tried, but the grease collected was so mixed with fecal material as to have no value and the trap merely acted as another settling tank to be cleaned. Large grease traps were then installed on each kitchen line, late in 1918, and served their purpose well when properly cared for. In this connection, it proved necessary to padlock them in order to prevent improper treatment by organizations, such as washing them thoroughly with hot water. Additional septic tanks were added to the disposal plant, as were sprinkling filters in some instances.⁴⁵

The removal and disposition of sludge and scum from the septic tanks was a major problem.⁴⁵ At few camps were sludge beds available as soon as needed, and recourse was had to disposal by burying. This involved great labor and

exposure of the sludge to flies before it was covered. Available space was often limited, and the distance necessary to transport the sludge increased as the closer areas were filled. Attempts to lighten the labor by using pumps was often unsuccessful owing to failure of the pumps to handle the sludge. It was necessary to cut and remove the scum by hand when the accumulation was particularly thick.

Pit latrines were used in the cantonments as an accessory to the sewerage system for outlying areas, or for areas not originally expected to be occupied by troops and for which no sewerage connections had been provided.³

The deep-pit latrine system was the disposal method chosen for all camps, where the period of occupancy was expected to be short, including the 16 National Guard camps.⁴³ Latrines had received their share of attention in the development of sanitation subsequent to 1898. The first improvement over the open pit in use during the Spanish-American War was the development, by the board which investigated the typhoid fever epidemics of that war,^{47 48} of the sanitary trough latrine. This consisted of a metallic trough covered with a wooden seat and emptied by means of an excavator tank wagon. The next development was the Havard box and its modifications, a box seat with self-closing covers placed over the deep pit. This was first used extensively in the camp at San Antonio, Tex., in 1911, with a urinal trough at one end discharging into the pit.⁴⁹ The last improvement of importance was the spraying of the inside of the pit and box with a mixture of kerosene (or crude oil) and lamp-black, substituted for the procedure of the daily burning out of the pit.⁵⁰ The blackness and oily odor were much more efficacious in repelling flies, the process was cheaper, and it avoided the breakage and charring of the box so common when burning was used. This method was introduced in the camps on the Mexican border in 1916 by troops of the New York National Guard, and was adopted by the War Department in 1917 as the standard treatment for latrine pits and their urinal troughs.^{50 51} This method was the first one employed which would wholly prevent fly breeding in latrine pits not absolutely fly-tight. The only later improvement of importance was the erection of overhead cover over the latrine shelters.³

Pit latrines, having the undesirable characteristic of tending to pollute the ground water supplies of adjacent areas, were the basis of many complaints from localities in which tent camps were established.⁵² A fault in construction occasionally found was the cutting of square and octagonal holes in the seat, probably because this shape was easier to cut than a circle or oval.³ Sometimes the holes were too small. Another inherent fault in the latrine system, when the camp was occupied for more than a few months, was the additional space required for new pits. Pits would serve for a period of several months when carried to a depth of 8 feet or more in a porous soil, and provided that a sufficient seating capacity was available. The period of use was much shorter in impervious soil, so to overcome this the use of excavator wagons to remove the liquid contents was resorted to in some camps.³ In still other camps, to avoid the digging of pits at too frequent intervals, each pit was made much larger in area than the box and the excess opening was roofed over with timbers covered with earth.

Disposal of animal excreta.—The problem of the disposal of manure concerned two areas, that of the camp proper and that of the auxiliary remount depot.³ While the ultimate disposition from both areas was ordinarily the same, the greater number of men available in the camp area permitted a dispersion of the labor required and a certainty of disposal in emergencies by measures other than those in routine use. The one point of interest in the camp area was the necessity for using receptacles impervious to fly larvæ or a ground area puddled with crude oil as storage space for the accumulated manure pending its daily removal.³ This discussion will therefore be confined to the auxiliary remount depot, where the removal of manure produced by thousands of animals over a comparatively large area was attempted by a relatively small number of men.³

The removal of manure from the corrals was an almost insurmountable task. At first, attempts at removal were made by hand loading into wagons, until the winter of 1917-18 resulted in such a mixture of mud and manure, with alternate freezing and thawing, that, what with the increase in animal sickness and the labor resulting therefrom, cleaning of corrals became impractical.³ Efforts were resumed as the fly-breeding season of 1918 approached, and facilities were increased. Animal-drawn scrapers were used in the corrals and details of several hundred men were obtained from the labor battalions.³ The majority of the depots succeeded in completing the cleaning by early fall, but, in a few instances, a portion of the old accumulation remained through the following winter.³ Experiences of the year 1919 were largely repetitions of those of 1918, the decrease in the number of animals present being counterbalanced by the difficulty in retaining personnel during the demobilization period.³

After its removal from the corrals, the disposition of this vast accumulation of waste product was still a problem.³ The method of disposition first employed was to spread it on neighboring farms with the understanding that it would be plowed under at once. Plowing under, however, was not always done, thus being sometimes responsible for fly breeding which affected the camp.³ This method of disposal was in common use during the winter of 1917-18 when the contractors could not obtain a sufficient number of ears for removal by rail.³ However, the roads in some sections of the country were so nearly impassable that drivers who had started to deliver loads to farms were forced to dump them before reaching their destinations, and the formation of large dump piles in the immediate neighborhood of the depot sometimes became unavoidable.³ Other camps attempted to burn all manure, but this was practically impossible where rainfall or snowfall was heavy, without a large expenditure for incinerators and fuel. Incineration in windrows was accomplished in a few places by the use of considerable quantities of kerosene or crude oil.³

The standard method of disposal of manure by the contractors was to ship it by rail for sale to farms.³ The organizations delivered it to a loading platform, usually in the general neighborhood of the auxiliary remount depot, where it was loaded into freight cars, the preferable open, or gondola type, not being commonly available. The original construction of these loading points, like the garbage transfer stations, did not include a concrete base, but this was ultimately obtained by a few camps.³ This base was needed not under the plat-

form itself but covering the adjacent area where the manure would be spilled in transferring loads, and including the area occupied by the track. Sufficiently extended markets for the manure were often obtained only through the efforts of the State agricultural schools in organizing the farmers over considerable areas for its reception in bulk and its distribution.

The difficulties encountered in the disposal of manure resulted often in the more or less forced use of compost piles.³ This method had been adopted by the British Army as a standard method,⁵³ and was authorized and gradually adopted in our camps in 1918, usually as an emergency method, pending removal by the contractors.⁵⁴ The British depended upon thorough packing of the surface of the pile, either with or without a covering of earth, to retain sufficient heat to prevent fly breeding in the outer few inches of the pile, the heat generated in the internal portions being amply sufficient to accomplish this.³² In our camps, reliance was placed on a careful dressing of the sides and margins and the application of borax or cresol solutions,³ although the regulations contemplated covering with packed earth.⁵⁴

The compost pile method possessed several advantages—it required only a short haul, it was available under all conditions, and it provided a disposition for manure that had been so mixed with earth or sand as to be unacceptable as fertilizer. Under only one condition was its use contraindicated, that being the presence of such a communicable disease as glanders. The manure then was completely incinerated.³ A number of adverse reports on this method were received, based on the finding of fly larvæ in the pile.³ In the most definite of these instances, the statement was made that the larvæ were present in the manure before its removal from the corrals and therefore did not constitute a valid objection to the method.⁵⁵ The method was perfectly satisfactory when properly carried out.

Supervision of foods.—This subject was covered by the representatives of three different departments. The regulation of food supplies in the extra-cantonment zone was supervised by the members of the United States Public Health Service, in the camp (for meats and dairy products) by the veterinarian, and in the messes by the camp nutrition officer.^{3 56} The supervision of foods in the extra-cantonment zone, and in the camp by the veterinarian is discussed below. The camp nutrition officer was interested primarily in the efficiency of the messes as regards a well-prepared and well-balanced diet and the avoidance of unnecessary wastage.⁵⁷ His best line of approach was through the camp school of bakers and cooks, as this school prepared men to serve as cooks and mess sergeants throughout the camp and maintained an inspection service of messes. Best results were obtained by working in cooperation with these inspectors and company commanders and through mess sergeant graduates of the school. This work assumed its fullest operation in the fall of 1918, when a generalized campaign for economy in the use of foodstuffs resulted in an immense reduction in the garbage sales in camps.

Epidemiology.—The major problems relative to prevention of disease and the care of the sick in a military camp concern communicable diseases. Since the treatment of these diseases is discussed in another volume of this history (Vol. IX), the present discussion is confined to the aspects of the problems with which the camp epidemiologist had to deal.

The duties of a camp epidemiologist were performed by the sanitary inspector to about January 1, 1918, when the office of camp epidemiologist was established.⁵⁸ The primary duty of the epidemiologist was to prevent the introduction and spread of communicable diseases.⁵⁹ This included the provision of proper hygienic surroundings for troops, the inspection of arriving troops, investigation of the source of infection, and the nature of the causative agent, investigation of the care of men sick with communicable diseases, detention and quarantine measures, and the preparation of reports and charts.

In the prevention of infectious diseases effort was directed toward those infections which came about by close association and by direct contact, and to the prevention of their spread by the detention of all new arrivals for two weeks, by the isolation of contacts and carriers, and by quarantine in hospital of patients with communicable diseases.

The relationship of close association and the rapid spread of infectious diseases, especially the respiratory infectious diseases, was well known before the World War, and was adequately demonstrated in our camps on the Mexican border in 1916; however, when the plans for the tent and barrack camps for the World War Army first were formulated, considerations of economy were paramount, and overcrowding in both kinds of camps was sanctioned,⁶⁰ in the belief that a liberal supply of fresh air would more than counterbalance the bad effects of the close proximity of the men. How the overcrowding eventually was remedied is more appropriately told elsewhere,⁹ and it is sufficient to say here that, in so far as the tent camps were concerned, the man capacity of each tent was established at 8,⁶¹ then at 5 in certain camps (Camps Beauregard, Bowie, and Wheeler) and 8 in others,⁶² and finally at 6, in the summer and in the absence of sickness, otherwise at 5.⁶³ As regards the cantonments, overcrowding existed there also, particularly during the winter of 1917-18, but eventually the allowance of dormitory floor space was established at not less than 50 square feet per man.³

In addition to increasing the tent and dormitory floor space per man, other measures were adopted that were calculated to counteract the deleterious effects of close association in sleeping quarters.³ Whereas double-deck bunks at first were considered as most highly undesirable because they cut the air space in half, and thus were prohibited, with the weight of opinion swinging to the relative greater importance of separation of sleeping men's heads over cubic air space, their use was approved by the Surgeon General under the condition that the bunks be not grouped in close proximity to each other.⁶⁴

Two means of guarding against the droplet transmission of respiratory diseases became standard throughout the camps—increasing the distance between the heads of bunks and the partial cubing of bunks.³ Increasing the distance between the heads of bunks was accomplished by reversing the position of alternate ones, so that the head of one was opposite the foot of each contiguous bunk. Draping a shelter tent half on its pole at one side of the head of each bunk answered the purpose of cubing.

At many camps it was found that the men ineffectually washed their mess kits; that is to say, the water in which the kits were washed was neither suffi-

⁹ Consult Vol. VI, Chap. V of Sec. I, of this history.

ciently hot nor of adequate soap content. Under such conditions it was believed that the transmission of acute respiratory diseases from man to man was favored. To correct this, general instructions were issued by the War Department⁶⁵ which required that when dishes and mess equipment were washed they were to be thoroughly rinsed in boiling water.

Since the introduction of communicable diseases into a camp was unavoidable, it being impractical to refuse entrance to an inducted man because he was suffering from one of these diseases, it was necessary to adopt means of preventing the transference of infection from him to others. The only practical method was to prevent the association of infected with uninfected persons during the period of infectivity of the former. The same was true when infectious diseases occurred among individuals already in the camp. The prevention of this association was accomplished by the use of the following measures:³ Inspection of troops upon arrival; detention of all arrivals in a state of mass isolation; isolation of contacts and carriers; quarantine of developed cases of the diseases in hospital.

Incoming troop trains were met by details of officers and enlisted men which included representatives of the Medical Department.³ The medical officers inspected the men at the detraining point and sent cases of sickness directly to the hospital. The remainder of the arriving group were then conducted to barracks reserved for their use in the depot brigade area, where they were kept in detention for a period of two weeks.³

These barracks were in a subarea which had been designated for this particular purpose.³ This system was built up gradually, and was not so definite in all camps, the principal variation being that these detention barracks were not always grouped in a definite area.³ Detention camps under canvas sometimes replaced the use of barracks, this possessing the distinct advantage of minimizing the number of secondary contacts of each new case.³

A further refinement carried out in a few camps, particularly when measles was concerned, was the separation of arrivals into two groups, immune and nonimmune, the classification being determined by the history as to previous attacks of the disease.³ The immunes were not held in detention.

Men held in detention were given all instruction and drill in groups separate from other troops during the detention period.³ The training cadre, cooks, etc., assigned to these groups were immunes, so far as practicable.

Contacts were the men who had been definitely exposed to a communicable disease or who had been closely associated with cases. The term at first included only those definitely exposed; however, it was soon amplified to include men who were probably exposed and even those who might have been exposed; but was ultimately confined, as a general rule, to known direct contacts and the men occupying the adjacent bunks.³ This was not true when dealing with epidemic cerebrospinal meningitis, when all men occupying the barrack involved, or even the entire company, were considered to be contacts.³ The most efficient method of handling the question from the housing point of view was to separate the contacts into small groups in order to limit the number of secondary contacts arising from succeeding cases. This was most practical when tentage was used, and tent camps for carriers and contacts were

established in the majority of camps and designated as "quarantine camps."³ Contacts were held until the period of incubation had passed, or until negative cultures were obtained in diseases demanding this method of determination of freedom from infection.

The standard procedure in the majority of the camps was to send all cases of communicable disease to the base hospital, but it was universally necessary to depart from this procedure during epidemic periods.³ At such times, the total capacity of the base hospital was frequently insufficient to accommodate the cases arising from one disease alone, and the establishment of secondary hospitals became mandatory. These were occasionally organized as regimental or brigade hospitals, but usually were operated as camp hospitals; they were manned by personnel from the sanitary train, supplemented from the regimental medical detachments when necessary. Personnel from the line was frequently necessary also during the influenza epidemic of 1918.³ Some, or all, of these camp hospitals were sometimes used as convalescent hospitals to supplement the base-hospital service, to enable the latter to evacuate its convalescents at an early date and thus increase the number of acute cases which it could handle during a given period.

Quarantine in hospital was conducted along familiar lines, its rigidity, as regards the medical personnel in attendance depending upon the disease concerned, the question of immunity, etc.³ The use of separate wards for specific diseases was not always possible during epidemic periods. Under such conditions, the cubing of beds was of material benefit. The use of gauze masks over the mouth and nose of all attendants was an innovation used particularly in the care of influenza and pneumonia cases.³

PHYSICAL EXAMINATION OF DRAFTED MEN

This was the greatest single task imposed upon the Medical Department during the early period of the camps, and it practically excluded detailed attention to other matters not fundamental.³ The examination of the 482,000 men called during September and October of 1917 required a vast amount of work made doubly difficult by the necessity of accomplishment within a short period of time and with a force of medical personnel which largely reported only a short while before the arrival of the draft contingents.^{3 34} This personnel was also largely without experience in the physical examination of men other than as individuals. The Surgeon General had directed that the examinations be conducted at the regimental infirmaries, and that they consist of two phases, a preliminary and a final examination.⁶⁶ The final examination was conducted by boards of specialists, and concerned only such men as were referred by the preliminary examiners; the preliminary examiners could not definitely reject them.⁶⁶ Since the men were being mustered into the service before they were given the preliminary physical examination at the camps, the action of the disability board was required before a rejected man could be discharged from the Army.⁶⁷

The special examiners consisted of experts in the lines of tuberculosis, orthopedics, cardiovascular diseases, neuropsychiatry, dentistry, and eye, ear, nose, and throat conditions. Only the first four were generally considered under the terms "special examiners" or "special examining boards."⁶⁸

The examining system was gradually improved until one examining board came into general use early in 1918.⁶⁹ This was a combination of the preliminary examiners and the special examiners into one unit which completed the examination of each individual in one day.⁶⁹ The boards used existing buildings, which were generally altered to a greater or less extent in their interior arrangement, adjacent buildings being sometimes connected by canvas or wooden closed corridors.³ In the more highly developed units the interior of the buildings was rearranged in order to meet with the requirements of rapid, complete, and accurate examinations of large numbers of men. Two-story barracks were used in the majority of instances, but infirmaries and mess halls were also used.

The whole system for the reception of recruits, including the physical examining board, was concentrated in the depot brigade when large draft increments were again received in the spring of 1918.³ This made possible a systematization and coordination of the functions of the various branches of the Army concerned, which had not been attained before. The work of the quartermaster and personnel officers was combined with the medical work in a few instances, so that an individual entering the physical examining station left it either on his way back to civil life as rejected or else completely uniformed and sworn into the Army.³ A special building for such combined services was authorized in October, 1918, but its construction, along with most new construction, was prevented by the signing of the armistice.⁷⁰

While minor differences existed in the physical examining systems used in the various camps, the general plans came ultimately to be the same.³ The system finally developed was to combine all examining personnel into one unit, but this unit consisted of a varying number of subunits.³ In general, there were two main divisions of each team, general examiners and special examiners. Over the whole was one officer responsible for its coordination. All recruits were now being examined before they were mustered into the service, but as they had been accepted by their local boards action by a physical disability board continued to be necessary. This latter board, while not officially a part of the physical examining board, was so closely associated with it as to constitute a subdivision of the examining board for all practical purposes.

The general plan of the system was to have a definite number of men report for examination at stated intervals. These were admitted in groups, and orderlies and railings were so placed as to guide the men from one examining station to another with no possibility of going astray. Traffic lines were so planned as to avoid crossing, if possible. Undressing stations were generally placed first on the route, but such steps in the examination as did not require the removal of clothing, as record taking, dental and neuropsychiatric examinations, sometimes preceded the undressing. Vaccination stations for smallpox were also placed near the beginning of the route to allow the vaccine to dry before the clothing was resumed. The typhoid inoculation was occasionally given at a station placed near the end of the route, particularly when transactions with the quartermaster and personnel departments followed, in order that the men might leave the examining station before the reaction to the inoculation became manifest. Each man to be examined carried his printed forms throughout the route, clerks making the necessary entries thereon at each station.

The general examining team was composed of medical officers experienced in conditions affecting the special senses, the heart, the lungs, and in orthopedics, neuropsychiatry, and surgery.³ Men whose condition was definitely within the limits for acceptance were finally accepted by the general examining team; doubtful cases and all marked for rejection were referred to the special examiners for final decision. These special examiners were the special boards who formerly conducted the final examination, and were generally given separate examining rooms where noise could be more or less excluded.³

The total personnel of the examining board was about 34 officers and 60 enlisted men. Usually, there were 3 orthopedic, 3 neuropsychiatric, 4 cardiovascular, and 10 tuberculosis examiners, the last working in two shifts. The number of men that could be examined daily depended mainly upon the number of medical officers available who were qualified to act in the capacity of special examiners, as officers to fill the other positions were sufficiently numerous to increase the examining board to any desired size.³ Each heart and lung examiner could accurately handle a maximum of 80 to 100 men per day, while each neuropsychiatrist could examine 250 daily.⁷¹ The maximum capacity of the average board was 400 men per day; frequently, however, from 800 to 1,000 were passed through daily.³

Numerous administrative features required careful attention. Lists of absentees were prepared daily, their commanding officers notified, and their forms placed in an "absentee" file. Men held for reexamination were particularly difficult to locate during the fall of 1917 for then they were scattered through all organizations, and transfers were frequent. This difficulty was largely avoided later by the retention of all newly arrived men in the depot brigade. Company commanders of all men found to have venereal disease were notified to have them report for treatment. Shoe sizes were determined with the aid of a mechanical measuring device and actual trial of sample shoes, and sizes were entered on slips which were later pasted in the service records. Printed forms and rubber stamps were used freely.³

SPECIALIST EXAMINERS

The work of the special examiners, sent in 1917 to the camps for the physical examination of draft troops, developed to much greater proportions than was originally contemplated, particularly those concerned with tuberculosis, nervous and mental diseases, cardiovascular disorders, and orthopedic conditions.⁷² Additions were made to the plans of operation and to personnel until the developments sometimes overshadowed the original objective of the specialists.⁷² The work thus became gradually divided into two sections, the "specialist" boards for physical examination and consultant work, and additional specialists of less experience for conducting the remedial efforts for the camp.⁷² The senior member of each specialty acted as consultant assistant to the division surgeon.

The consultant was often assigned to the base hospital for duty during the early stages of this development.⁷² He was thus incompletely subordinate to the division surgeon, although designated as consultant for the whole camp, and this condition interfered to some extent with the administrative efforts of the division surgeon.

The tuberculosis boards were first in the field with general surveys, but the nature of the disease with which they were concerned prevented the possibility of fitting tuberculous men for active military service within a reasonable time.⁷³ These efforts to remedy certain physical defects were at first conducted as a divisional function for those cases not requiring hospital treatment. The activities were later included in those of the development battalion,⁷⁴ and still later were transferred to the convalescent center.⁷⁵

The consolidation of the earlier separate general and special physical examinations into one process in the spring of 1918 removed the necessity for the specialist boards, and they were officially dissolved August 22, 1918.⁷⁶ Their members were then available primarily for duty as members of the physical examining boards, but the consultant could still be retained as such.

DISABILITY BOARDS

One board for discharge from the military service on surgeon's certificate of disability was convened at each camp early in the fall of 1917,⁷⁷ and provision was made for as many additional disability boards of tuberculosis examiners as might be necessary. The camp surgeon had no power of revision over the findings of these tuberculosis boards.

An increase in the number of disability boards for general work later became advisable, usually to 3—1 for the camp proper, 1 for the base hospital, and 1 for the development battalion.³ Because of the almost universal complaint that these boards functioned too slowly and that men were retained in the service who should have been discharged,³ investigations were made that developed that the avoidable delays in action were frequently due to the necessity of returning the form used to organization commanders for correction, and that improper retentions in the service were based on differences of opinion.³ Differences of opinion between the members of the disability board and the members of the various specialty boards also arose.³

The disability boards functioned best when they were most intimately connected with the physical examining system and were practically a part of it.³ The great bulk of their work was derived from this source, and when functioning as a part of the general examining board, all information available was at hand and everything could usually be completed at once except the part prepared by the organization commander.

DEVELOPMENT BATTALIONS

Development battalions were the culmination of a sequence of steps taken to fit for military duty those men who had remediable defects and to place to advantage those with minor defects which were not remediable. Eventually, their functions included the teaching of illiterates, physical exercises for convalescents, medical treatments for various types of ambulatory cases, the discharge of ineffectives, and the placement of men whose low mentality made them ineligible for general military duty.³

The necessity for some such organization was realized in 1917, particularly by the orthopedists in developing men with minor physical defects and by the neuropsychiatrists in placing men who were so undeveloped mentally that

they were fit for duty only as laborers.^{78 79} Special orthopedic classes were organized, and these functioned as separate detachments in some instances. Occasionally special organizations, larger in size and broader in scope, were formed, to which were assigned practically the same classes of men as later composed the development battalion, such as the "provisional regiment" of some 3,000 men organized in Camp Logan, Tex.⁸⁰ Companies or detachments of venereal cases were sometimes formed.⁸¹

Some form of special training organization had become quite general in the camps by the spring of 1918.³ Some of these were operated as convalescent detachments in the base hospitals, others were a part of the depot brigade or were independent organizations, commanded by line officers with medical officers to supervise the medical activities. These generally provided only for the building up of convalescent patients recently discharged from hospital, and the formation of such organizations was ordered by the War Department in March, 1918.⁸² The formation of special training organizations for other classes than convalescents was stimulated principally by the orthopedists. About half of the camps had orthopedic training organizations in May, 1918, and woodworking tools had made their appearance as part of the equipment.

These various experiences led to the formation of a development battalion in nearly every mobilization camp and the more or less prompt transference to it of the activities conducted in the special training detachments.⁸³ This transfer was generally made early in July, 1918.⁸⁴ The functions of the development battalion, much wider in range than those of the special training detachments, were to receive all unfit men and either to train them so as to make them fit for some military duty or to eliminate them from the service.⁸³ There were transferred to the battalions, therefore, men inapt for military service, drug addicts, those with criminal tendencies, morons, alien enemies, conscientious objectors, illiterates, venereal cases, convalescents and others with physical disabilities not warranting immediate discharge on surgeon's certificate of disability. Company commanders also availed themselves of the opportunity and transferred men whose names appeared on their rosters but who were not present, causing much confusion in the development battalions.⁸⁴ Many of these men never were located and their names were ultimately dropped from the lists.⁸⁴

Development battalions were part of the depot brigades, where such brigades existed.⁸³ Each had its permanent training cadre consisting of officers and enlisted men from both the line and the Medical Department,⁸⁴ the latter amounting to 2 officers and 19 enlisted men.⁸⁵ Additional medical officers were assigned or attached for duty as occasion demanded. The enlisted cadres were drawn largely from men transferred to the battalions for physical disabilities. Medical officers ordinarily took no direct part in the general administration, being concerned only with medical treatment and the supervision of physical exercises.⁸⁴

As regards the physical exercises, there were two methods in vogue, one in which the medical officers merely supervised the exercises and another in which they actually conducted them.⁸⁴ Medical officers made periodic physical

examinations of all men assigned to the development battalion,⁸⁴ and classified them according to their physical ability to perform military services, as follows:⁸⁶ Class A, fit for general military service; class B, potentially fit for general military service when treatment of their curable condition was completed; class C-1, fit for general military service in the Services of Supply overseas or any service in the United States; class C-2, fit only for special limited service in the United States; class D, unfit for any military service. Classification was made first within about 24 hours after arrival;⁸⁴ approximately 90 per cent could be permanently classified during that time. The specialists on the physical examining boards ordinarily examined all men before transfer to the development battalions, and, in some instances, were also in charge of all physical examinations within the battalions and supervised the medical treatments.⁸⁴

These periodic physical classifications of the men and their other qualifications together formed the basis on which a "rating" was made as to their actual ability to perform military duty.⁸⁴

The individual records in battalion headquarters consisted of Form No. 88, M. D., as used in the physical examination of recruits and various card indices. As the rating was subject to change with improvement in physical condition or education, this was usually determined only when a man's service in the battalion was to be terminated.

The various types of disabilities represented were more or less segregated by companies or battalions, and by color.⁸⁴ Two specialist activities, orthopedic and venereal, were largely concentrated in the development battalions by the transfer to them of the bulk of those cases present in a camp, and their camp clinics became parts of the development battalion.⁸⁴ The proportion of men in battalions as represented by the different classes of medical cases varied widely, but that of venereal cases was almost invariably highest, as much as 50 per cent in some instances. Orthopedic cases composed approximately 25 per cent, cardiovascular about 7 per cent, and neuropsychiatric usually less than 5 per cent. Venereal cases were divided and segregated by disease; syphilitics were further divided according to infectivity. The physical classifications were often so divided that the classification indicated the kind and duration of physical exercise to be taken, thus largely avoiding the necessity for special exercise classes in such types of cases as the cardiovascular, where graduated exercise was indicated.

There was a very general inclination on the part of camp commanders to invalidate the basic purpose of these organizations, the rapid development of unfit men, by interfering with instruction and treatments through using the battalions as a source for special details required for work throughout the camp.⁸⁴ However, reports made prior to the time of the signing of the armistice indicate that about 68 per cent of men transferred to development battalions were reclaimed for some kind of military service.⁸⁷

Demobilization ended the usefulness of the battalions except for some medical cases.⁸⁸ These, except venereals, were transferred to the newly formed convalescent centers. The development battalions were reduced to "development companies" in May, 1919, and formed a unit of the development group.⁸⁹ They were entirely dissolved soon afterwards.

SPECIAL DEPARTMENTS AND AREAS

DENTAL CORPS

A senior dental officer was sent to each mobilization camp early in September, 1917.⁹⁰ At first he was "the dental officer in charge",³³ later however, he was given the title of "the dental surgeon."⁹¹ Since tables of organization made no provision for this officer at division headquarters, he was given space in the office of the division surgeon.³³ ⁹² Members of the Dental Officers' Reserve Corps reported at about the same time as the division dental surgeon and eventually numbered about 35 in each camp.³³ Dental equipment available at first consisted of one or two field dental outfits, and pending the receipt of equipment and supplies requisitioned it was necessary to gather articles from any source available in order to provide emergency dental treatment for the troops.³³ In some instances purchases were made in the open market of such individual articles as were available, and dental furniture was improvised. Some of the dental officers had brought a number of their personal instruments with them, and these were purchased by authority of the Surgeon General.⁹³ Requisitions for field dental outfits were filled in October, 1917, and base outfits were received in numbers two or three months later.³³

During the early period of enforced professional inactivity dental officers were temporarily assigned to various positions and both professional and military instruction were taken up.³³ To further professional instruction, a camp dental society was organized and papers were presented, particularly on the more recent progress made in dentistry.³³ The enlisted dental assistants were very largely men with a dental education.³³

Divisional dental officers were at first attached to regiments. In October, 1917, however, instructions were issued by the Surgeon General to organize the divisional dental service into brigade units of 1 supervising and 10 other dental officers each.⁹⁴ Each unit was to occupy a dental dispensary building eventually, but meanwhile it was to be housed in regimental medical infirmaries and base hospitals pending the necessary construction. The dental offices in nearly all divisions remained in the infirmaries until the special buildings ^b were completed, about May, 1918.³³ Dental officers and their assistants remained attached to organizations and under the administrative control of the division surgeon during the period prior to their arrival in France.⁹⁵ Thirty-one dental officers and 32 dental assistants were assigned to each division for overseas service.⁹⁵

A dental survey of each tactical division was undertaken in the fall of 1917.³³ When completed, men having conditions liable to produce focal infections were given priority in treatment. The most common condition in this class was infected roots, so a great proportion of the dental work performed during the following months consisted of extractions. Recruits were thereafter examined and classified before being transferred from the depot brigade, although this was not the case in all camps.³³ In a total of approximately 50,000 men surveyed in one group, about one-half required dental treatment

^a See Vol. V, p. 108, fig. 63. for plans of dental infirmary building.—*Ed.*

of some kind; approximately 10,000 were examined in the spring of 1918, about two-thirds of whom were white and one-third colored; 22 per cent of the whites were found to have peridental infections and 19 per cent had focal infections; among the colored men, 15 per cent had peridental infections and 30 per cent had focal infections.⁹⁶

Certain general rules of procedure were established, by direction of the Surgeon General, in conducting the dental service of the camp.³³ These general rules were: Only those dental assistants who were graduates in dentistry were to be allowed to operate at the chair; the conservation of all teeth which probably would not provide a source for focal infection was to be practiced; all dental operations which were of sufficient importance to be classed as oral surgery were to be referred to the base hospital. Dental supplies were requisitioned from the medical supply depot, where a dental officer was usually stationed as an assistant medical supply officer.³³

Reports of general inspectors were first rendered in the spring of 1918.³³ These inspectors were of great assistance in obtaining the high standard of dental service so general in the camps, particularly through the transmission of the general policies of the Surgeon General's Office and by introducing measures found of value from experience in other camps.

Authorization was given in September, 1918, for 1 dental officer to each 500 men in training, and for 3 dental officers for each 1,000 beds in a camp hospital.⁹⁷ Three dental mechanics were also authorized for each camp and one additional for each camp hospital. Graduate dental assistants were authorized to apply for commissions in the Dental Corps.

One or two improvised dental infirmaries were added to the one of standard type in each camp during the summer of 1918.³³ These were of smaller capacity than the dental infirmaries and located in such buildings as were available. Arrangements were sometimes made for quarters for both officers and enlisted men in the vicinity, either in buildings or in tents, and the entire dental personnel of the camp was organized as a separate detachment.³³

VETERINARY CORPS

The veterinary service in the mobilization camps was furnished by the small and newly created Veterinary Corps of the Medical Department.⁹⁸ This corps was expanded by commissioning enlisted graduates in veterinary medicine, by calling to active duty members of the Veterinary Reserve Corps, and by the enlistment, assignment from the draft and transfer of enlisted men. Officers were few in number in the camps during the early fall of 1917, and there was no enlisted personnel in the corps until October, 1917.⁹⁸ No enlisted personnel was assigned to the camps proper, as differentiated from the division and the auxiliary remount depot, until about June, 1918.⁹⁹

The veterinary service operated as two quite separate sections, the division or camp service and the auxiliary remount depot.⁹⁹

Camp service.—Organization of the veterinary service of the division was accomplished shortly after regulations governing the Army Veterinary Service were issued late in 1917.⁵⁶ The status of the division veterinarian in his relation to the division surgeon was a tentative one prior to that time.³¹ Precedent

placed him as subordinate to the division surgeon, but Special Regulations, No. 70, W. D., gave him an independent status under the division commander. This was so unusual in Army custom when two officers concerned were members of the same department that considerable discussion, generally friendly, was aroused. The question was definitely settled by instructions from the Surgeon General which reiterated and amplified the statements of the special regulations referred to.¹⁰⁰

The divisional organization consisted of a division veterinarian, a division meat and dairy inspector, an evacuating section and a number of "veterinary units," a total of 12 officers and 51 enlisted men.^{56 101} Each veterinary unit consisted of 1 officer and 3 enlisted men, and the units were attached to Infantry brigades, Artillery regiments, and the divisional trains.^{101 102}

The two main divisions of veterinary work in the camp service were the care of animals and food inspection. In addition to these, the veterinary officers attended to the necessary administration and to the training of the veterinary enlisted personnel. Hospital facilities were provided by the veterinary hospital located in each auxiliary remount depot.⁹⁹

The care of animals included diversified lines of work, such as forage inspection, medical care, sanitation of stables and picket lines, and the instruction of line personnel in feeding, watering, shoeing, and the care and use of harness.⁹⁹ Serious cases of sickness and injury were sent to the hospital, while minor cases were treated at improvised dispensaries in the camp.⁹⁹ The animal ambulance which was furnished each camp, was seldom used.⁹⁹

A camp veterinarian was designated when the original division left the camp, generally about June, 1918.⁹⁹ He was provided with an assistant who was the meat and dairy inspector. The enlisted personnel consisted of 6 men, 2 of whom were designated as assistants to the meat and dairy inspector.¹⁰³

Meat and dairy inspection.—Meat and dairy inspection of the camps was largely performed by lay inspectors until taken over by the Veterinary Corps rather late in 1918.¹⁰⁴ These lay inspectors were representatives of the Bureau of Animal Industry assigned, through the efforts of the Quartermaster Corps, to inspect all meat purchased by that corps.¹⁰⁴ Inspection of the milk supplies was performed by the camp sanitary inspector or by an officer of the United States Public Health Service during the earlier period of the war.¹⁰⁴ These officers also generally supervised the local sources of meats and meat products, to some extent, at least, but instances are recorded where all supervision was lacking and in which it was badly needed.¹⁰⁴ Inspections of locally purchased meats and meat products, if made at all prior to June, 1918, were not systematized and therefore were ineffective.⁹⁹ The procedure usually employed during this ineffective period was to designate a point in the camp where local dealers were to present their products for inspection before delivery to the purchaser, but no check was provided to insure that they did so. The well-organized service later established by the Veterinary Corps required that the dealer's sales slips be stamped in duplicate at the time of inspection, one copy being retained at the inspection station. Periodic reports from organizations or presentation of their retained sales slips then provided a check on the reliability of the dealers and organizations. Organizations were not allowed to accept

deliveries accompanied by unstamped slips, and the dealer was barred from the camp if he failed to comply with the requirements. The inspecting station was conducted by enlisted men experienced in this work.

Storage provision for meat in quantities was not made in the camps until the summer of 1918, when cold-storage plants were completed.⁹⁹ Meanwhile, the refrigerator cars in which the meat was shipped were retained on sidetracks and issues were made directly from them as required.

The later developments of the dairy inspection service were handicapped by the wide separation of the large number of dairies necessary to supply a camp and by a lack of transportation and personnel.⁹⁹ This service was furnished by the United States Public Health Service throughout the camp period in some instances.⁹⁹ In others, dairies were scattered over such a large area that inspection was impracticable, and the pasteurization required for all camp milk was judged to afford sufficient protection against disease transmission through this medium.

Auxiliary remount depot.—With the new construction incident to mobilization, a remount depot was built at each divisional cantonment.¹⁰⁵ A remount depot had an official capacity of 5,000 animals and included barracks and shops. It was the function of these depots to receive and condition newly purchased animals and to turn them over to the divisions as required.

Construction of the auxiliary remount depots was begun early in the fall of 1917 and completed about the end of the year.⁹⁹ In many instances, unfortunately, the plant was laid out with regard to compactness rather than to the geographical features of the terrain, resulting in the location of corrals on low ground, placing the veterinary hospital on the slope above messes and quarters for personnel, etc.⁹⁹

The camp commander had control for the purpose of discipline and supply, and this was interpreted, in some instances, to include control of sanitation.³ This duality of responsibility naturally resulted in many difficulties for the senior veterinarian in the depot.⁹⁹

A troop of Cavalry was stationed at a number of the depots of southern camps early in the fall of 1917, but the Quartermaster Corps furnished the main portion of the personnel of the depots.⁹⁹ This corps also furnished personnel to conduct the veterinary activities until enlisted men from the Veterinary Corps were supplied late in 1917.⁹⁹ The veterinary personnel of a depot of standard size was eventually 6 officers and 75 enlisted men.¹⁰⁶ The Medical Department furnished a small detachment with one medical officer.¹⁰⁷

The duties of the veterinary personnel, aside from hospital duties, consisted in supervision of animal sanitation, daily inspection of all animals in corrals, the conduction of a horseshoer's school, and the supervision of animals en route when a shipment was made.⁹⁹

The corrals at remount depots were universally too large, from the veterinary point of view, and frequently were overcrowded.⁹⁹ Their size, and the omission of double fencing between them, made the control of communicable diseases among animals there very difficult, and for this reason they were later subdivided at some camps.⁹⁹ The fencing was usually of 2-inch plank top and bottom with 1-inch boards between, but the heavier material was used

throughout in some instances.⁹⁹ A long shed was provided in each corral for shelter. Sheds in the southern camps were closed on the north side, while those in the northern camps were closed on both ends as well as on the north side. Feeding racks consisted of V-shaped, slatted hay racks, with shallow feeding troughs on both sides at the bottom of the V and about 4 feet above the ground. Watering troughs were originally constructed of wood, with no protection against freezing;⁹⁹ however, concrete troughs were provided in the northern camps before the winter of 1918-19. These troughs were so shaped that they would not be damaged by freezing, and were provided with self-draining cut-offs on the inlet water pipe.⁹⁹ The overflow was removed by drainage ditches, with rock filling immediately surrounding the trough. Dipping vats were provided in 1918, but these were usually reported as faulty in dimensions.⁹⁹

When the auxiliary remount depots were constructed, stables were set aside for sick animals, in each instance and were designated veterinary hospitals. Little was done, however, toward providing accessory utilities essential to the operation of complete hospitals.¹⁰⁷

The veterinary hospital consisted of 4 or 8 stables, depending upon their size, 4 smaller buildings with concrete floors, 4 forage buildings, and corrals. The stables were of the double-stall type, with a number of box stalls in one end, and were used as wards. The buildings with concrete floors were for use as dressing and operating rooms. The capacity of a hospital was about 400 animals.

These meager accommodations were often overcrowded with the sick, whose presence, in the midst of great numbers of sound animals normally occupying the depots, rendered the handling of communicable diseases highly unsatisfactory. Estimates and plans eventually were prepared by the Surgeon General for the establishment of camp veterinary hospitals outside the remount depot areas, but further action was stopped by the signing of the armistice.¹⁰⁷

The highest animal disability rate occurred in the winter of 1917-18 and the early part of the following spring, when the bulk of the shipments of newly purchased animals was received.⁹⁹ This was due to several basic conditions—the large proportion of animals not immune to shipping fever, exposure to inclement weather after receipt, the absence of dry standings in the corrals, the opportunities for injury from loose or protruding nails and from stumps, and the infection of slight wounds from contamination with the mixture of mud and manure in the corrals. Pneumonia and strangles were particularly widespread and fatal. Dermatitis gangrenosa became common from infection of minor wounds when the spring rains converted the corrals into seas of mud. Picked-up nail was the most common cause of disability from injury.

The most dreaded disease was glanders, on account of its endemic and incurable nature and its communicability. While a few cases were discovered among contractors' animals in 1917, it was not generally reported until the spring of 1918.⁹⁹ Reports from the various camps indicate that general mallein testing was first adopted when divisions turned in their animals to the auxiliary remount depots, and that cases of glanders were then generally discovered. All animals in the camp and remount depots were then mallein tested by the

ophthalmic method; positive cases were destroyed and suspicious cases were isolated and retested later. Animals that were destroyed were autopsied and the carcasses incinerated.

All this involved the entire personnel of the depots in an immense amount of work. One corral at a time was thoroughly cleaned and disinfected, whereupon it could be used to contain animals which showed a negative reaction to the test. Double fences were constructed in order to prevent contact of these animals with others, and the corrals were sometimes subdivided in order to facilitate the work. The depot being quarantined and its activities thereby limited, the exercise of many animals was necessary which otherwise would not have been required. The serological test was used as a confirmation of other tests, and all animals were again tested after an interval. The intradermal mallein test was later adopted for routine use.

EXTRA-CANTONMENT AREAS

The territory contiguous to the mobilization camps generally included cities and towns in which sanitation not infrequently had been neglected.¹⁰⁸ By statutory provisions administrative matters in this connection were charged to local authorities, municipal or State, under the supervisory control of the United States Public Health Service. Since these communities were sources of danger to the health of commands unless brought up to the same standards of health as was required for the camps, the United States Public Health Service stationed officers of that service in the extra-cantonment area of each of the large mobilization camps, where they acted in conjunction with the local authorities in the education of the local public and the initiation and maintenance of proper health activities. Frequently, these Public Health Service officers were appointed deputy health officers, and were given authority to enforce the local regulations, which, in turn, were often drawn by themselves. Such a system, by which the local health officials, representatives of the United States Public Health Service and the Medical Department cooperated in the prevention of disease in both camps and the surrounding territory, resulted in the prompt notification of unusual health conditions, the control of epidemics, the hygienic regulation of eating and drinking places, public water, milk and other food supplies and their handlers, the prevention of fly and mosquito breeding, the disposal of waste and excreta, the care of ice plants, the control of prostitution, the treatment of the venereally diseased, and the prevention of illicit liquor dealing.

DEMOBILIZATION PERIOD

(November 11, 1918, to December 31, 1919)

PHYSICAL EXAMINATIONS

It was the duty of the Medical Department, in connection with demobilization, to examine physically all men before discharge and to make of record the results of each individual examination.¹⁰⁹ In accomplishing this use was made of the machinery for the physical examination of recruits with certain modifications.³ The main factor making this a difficult task, aside from the enormous numbers of men to be examined, was the fact that medical personnel had to be demobilized at the same time.

Various administrative difficulties led to the formation, early in 1919, of a "demobilization group" in each camp designated as a demobilization center.⁹⁹ These groups consisted, for all practical purposes, of the depot brigade converted into a plant to provide the means for handling large numbers of men rapidly and accurately during the process of discharge from the service.³ After demobilization of the troops that had been occupying a camp at the beginning of the armistice, a demobilization center constituted a great casual camp in which men were received by thousands, passed through the complicated business of physical examination, final record making, settling of accounts and discharge, all in the course of a day or two.³ The intricacy of this process required the close cooperation of all agencies concerned, and the physical examining board was therefore made a part of the demobilization group.⁹⁹

This board retained the general characteristics, during the early part of the demobilization period, under which it had functioned in examining men entering the service, and these characteristics varied somewhat in the different camps. Circumstances dictated certain changes in order to hasten the work, and definite standards were issued November 18, 1918. The board functioned under a chief medical examiner, and each team had a principal medical examiner. A well-balanced team consisted of 3 general; 1 dental; 3 orthopedic; 1 eye; 1 ear, nose, and throat; 3 cardiovascular; 6 tuberculosis; and 3 neuropsychiatric examiners. Such a team required the assistance of about 74 enlisted clerks and orderlies.³ A board of review was provided as a final authority.⁹⁹ No maximum limit was placed on the number of teams that might be employed in a camp.

The boards functioned approximately on this basis throughout the period, with minor changes as new conditions arose.³ In general, the later tendency was to reduce the number of teams and the number of officers in a team, detailing extra personnel to assist during periods when large numbers of men were arriving, and to increase the floor space available and the clerical force. The number of medical examiners varied, depending upon the number of men to be examined daily, from examining officers and 10 enlisted men, at a camp handling 200 men daily, to 16 officers and 35 enlisted men for a camp handling 800 men. These numbers were necessarily increased at times by the addition of personnel from other sources, owing to the requirement that demobilization be completed within 48 hours after the arrival of men in the demobilization center.¹⁰⁰ There was no other allowance of medical personnel made to attend to the routine medical duties of the demobilization group. The examining team, the board of review, the disability board and the chief medical examiner were brought together in one or more buildings reserved for their exclusive use, in order to expedite the work. Cooperation with the remainder of the demobilization group assured that the men would be presented promptly in the numbers desired and with the necessary papers. Mimeographed forms, rubbers stamps, and other equipment were used freely. Detailed findings of the physical examination of an individual were entered on Form 88 M. D., as used in the physical examination of recruits, and the final report for enlisted men was entered on Form 135-3, A. G. O. This final report included a statement as to any decrease during service of the individual's earning capacity in view of his occupation in civil life, expressed in percentage.¹¹¹ Men requiring hospital treatment, including all with active venereal

disease, were sent to the base hospital and were not discharged until their physical condition had reached the maximum to be expected. Permanently disabled men were discharged by the disability board.

Some regulation of the thoroughness of the physical examinations was necessary in the spring of 1919, but ultimately all examining boards made most complete examinations, including the eversion of eyelids, the use of specula for the ear, nose, and throat, and vision and hearing tests, in all cases.³

The majority of the men in our emergency army had been discharged before the end of September, 1919, and the demobilization groups were then dissolved.³ The few men remaining to be demobilized were thereafter examined by the small medical personnel remaining, usually by the recruiting officer.³

CONVALESCENT CENTER

The necessity for demobilizing the World War Army within a comparatively short period of time, together with the policy of returning to civil life men who had been sick or injured but no longer required treatment, in the best physical condition possible, prompted the formation of convalescent centers. The convalescent center was an outcome of the development battalion, wherein men were placed as not being fit for full military duty, and to undergo a course of graduated work. The return of disabled men from overseas emphasized the necessity for the continuance of this work for convalescents, and "overseas convalescent detachments" were ordered formed in each camp where there were convalescent soldiers returned from overseas.¹¹² Provision was soon made changing the designation of these organizations to "convalescent centers" and for admitting to them, in addition to overseas convalescents, such domestic convalescents as required to be built up physically before discharge.⁸⁸

The training cadres of the centers were obtained mainly from those of the development battalions,⁸⁸ and the administrative formation resembled that of the latter.⁷⁵ It was originally intended that all convalescents in the centers would be on a duty status, reporting to the base hospitals for such treatment as was necessary.¹¹³ This plan did not work out well, generally, as the center was usually at some distance from the hospital, and resulted in the division of the center into two departments—the center proper, and that portion represented by the convalescents requiring treatment, the latter being carried as "sick in hospital" and being actually retained there.⁷⁵ As the larger workshops available in a camp were usually likewise at a distance from the hospital, the curative work was also in two divisions.⁷⁵ The result of these conditions was that the center proper was composed of men who were about ready for discharge, hospital patients being retained in hospital until the hardening process was practically complete. The center proper therefore functioned mainly as a discharge center, and the men did not remain there long enough for any definite accomplishments in the workshops.⁷⁵ The curative work schedule of the base hospital was therefore the one which could be of any considerable value.

Graded physical exercise was the main reliance of the convalescent center, and the men were grouped in platoons or companies according to their physical ability to participate in the exercises.⁷⁵ Exercises of all kinds were usually given by line officers, or civilian physical directors from the Young Men's

Christian Association, but under medical supervision.⁷⁵ The actual supervision of exercises was not of much importance ordinarily, the principal medical function being to examine and classify the men for assignment to exercise classes.⁷⁵

The centers contained from 300 to 800 men each about March, 1919, then decreased in population until their function was taken over by the base hospitals, usually about June, 1919.⁷⁵ The center was a part of the development group during the latter part of its existence.

MEDICAL DEPARTMENT PERSONNEL

Emergency personnel of the Medical Department being as anxious for discharge as that of other branches of the service, and the remaining sick still requiring attendance, it became necessary by June, 1919, to adopt special recruiting measures in an effort to obtain a sufficient number of men to perform the duties imposed upon the Medical Department.¹¹⁴ Special recruiting campaigns were ordered conducted in each camp, a medical officer was ordered to be detailed as assistant to the camp recruiting officer for this purpose, and all demobilization centers were authorized to send recruiting parties through the neighboring country.¹¹⁵ All emergency men desiring discharge were to be demobilized by the end of 1919, and this required the reduction of the medical enlisted personnel in camps to the absolute minimum necessary to perform the duties required.¹¹⁶

CLOSING OF CAMPS

Generally speaking, the National Guard camps were closed in the spring of 1919, and the cantonments were occupied until the following fall or later.³ Several of the National Guard camps were turned over to the United States Public Health Service, in whole or in part, for use for hospital purposes.^{3 117}

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CHAPTER II

NATIONAL ARMY CANTONMENTS

CAMP CUSTER, MICH.^a

Camp Custer was located about 5 miles south of Battle Creek, Mich., which, at the time we entered the World War, was a manufacturing city of nearly 30,000 inhabitants. The northern edge of the cantonment, upon which most of the barrack buildings were constructed, lay on a bluff overlooking the Kalamazoo River bottom. To the southward the area was rolling; there were numerous patches of hard woods and many small lakes and marshes. Being located on the medial moraine of glacial drift, the character of the soil varied in different parts of the camp. At the western end, the surface of the ground was covered with a mixture of loam, with a small amount of clay, which mixture in rainy weather became a sticky mud. At about the center of the camp, near the location of division headquarters, there was an outcropping of sand, and though this facilitated the absorption of rains, during dry weather and when the winds were high it gave rise to much dust. At the eastern end of the camp, dust clouds often rose as high as 100 feet in the air. Because of the fact that all roads in camp, excepting the main concrete road, were not hard surfaced, the movement of troops along them raised much dust, necessitating treating the surface of these earth roads with a binder. The main highway between Battle Creek and Kalamazoo passed through the heart of the camp. This road was concrete. To the north of the reservation the Kalamazoo River flowed westerly. It was bridged to the site of the river pumping station of the camp water system. Helmer Creek, originating in Hart Lake, flowed through the eastern portion of the reservation. It was crossed by several foot and highway bridges. Various other small creeks were scattered throughout the reservation, thus amply providing for storm water drainage. The climate in this section of the country is severely cold in the winter, with the temperature as low, at times, as 20° F. below zero. The prevailing winds are westerly. The summers are moderately hot and dry.

On August 25, 1917, the commanding general, 85th Division, and his staff, together with the commanding officers of organizations, reported at Battle Creek, Mich. The organization of the camp was begun on the following day. The first increments of troops were received between September 1 and 15, 1917. Others were received from time to time. The strength during December, 1917, was approximately 24,000. The men sent to this camp were drafted men from the States of Minnesota and Wisconsin (eastern part, including Milwaukee). The 85th Division was organized here. This division moved overseas about August, 1918, subsequent to which time the 14th Division was organized. During 1918, beginning with April, increments of drafted men were sent to

^a Except as otherwise indicated, the statements of fact appearing herein are based on "Medical History of Camp Custer, August 25, 1917, to May 15, 1918," by Lieut. Col. C. J. Bartlett, M. C., division surgeon, 85th Division. The history is on file in the Historical Division, S. G. O.

this camp from time to time, by far the largest percentage coming from the State of Michigan. Additional drafted men were sent from Wisconsin, a considerable number from Indiana, Illinois, Pennsylvania, a few from Ohio, over 4,000 from West Virginia, 3,000 from North Dakota, and 2,000 from Alabama. A little less than 7,000 were received from other camps. The maximum strength of the camp, which was a little over 39,000, was reached in October, 1918.

The buildings of the cantonment were arranged in an L shape, the entrance to the camp practically bisecting the two limbs of the L. The barracks were located south of the main concrete road, which traversed the camp, and the stable section, quartermaster warehouses, and remount depot were situated to the north of the road. All barracks were of the "northern construction" type. Ventilators, located in monitors, extended the entire length of the buildings, providing ventilation direct to the second-floor squad room and through tubes to the first-floor squad rooms. Louvres, 6 by 18 inches and spaced at 10-foot intervals, were located in the ventilation monitors. In addition to this means of ventilation, in order to provide for further circulation of air, all windows were constructed so as to give full-size window openings and all casings were made one-quarter of an inch wider than the sash. All windows and doors of mess halls and kitchens were fly-screened.

The water supply for Camp Custer consisted of eight wells driven through glacial drift into the Marshall sandstone. These wells were located about 1,500 feet north of the Kalamazoo River in the southwestern part of Level Park. Ten-inch steel well casings were driven through the glacial drift and from 8 to 10 feet into the sandstone, thus sealing the sandstone from the overlying material. Ten-inch holes were then bored through the full depth of the sandstone to a blue clay substratum. The wells were about 200 feet apart, forming a line 1,400 feet long. The water level in the wells stood normally at an elevation of 798; the ground elevation of the site of the wells ranged from 812 to 818. The quality of the water was typical of the well water from the Marshall sandstone through this part of Michigan; that is, it was moderately hard and contained approximately 300 parts per million of total solids; bacteriologically, it was a thoroughly safe water. At the river pumping station, the lines from the eight wells were connected to the pumps through cast-iron suction pumps. The pumping equipment comprised three motor-driven centrifugal pumps, each having a rated capacity under a 200-foot total head, of 1,000,000 gallons per 24 hours. The level of the water in the storage tanks provided a static head of about 100 feet over the major portion of the cantonment. In order to increase this pressure, not only for normal consumption but also for fire protection, a booster pumping station was operated just below the tanks. This station comprised seven motor-driven centrifugal pumps designed to increase the water pressure at the station by 100 feet. The main supply to the camp from the hill pumping station was through two 12-inch lines of wood-stave pipe. These lines connected with the main distribution system and branch lines.

Two sewer districts were provided, both with outlets leading into the Kalamazoo River. The east outfall sewer was the largest and provided service to all areas of the cantonment except the Artillery and base hospital areas. The estimated population to be taken care of by the larger sewer was 29,000, and

the different portions of the sewer system ranged from 6 to 36 inches in diameter. As mentioned above, service for the Artillery and base hospital areas had an estimated tributary population of 6,000 and the size of the pipe ranged from 6 to 15 inches in diameter. Owing to the difficult and irregular terrain in the extreme eastern part of the cantonment, it was necessary to drain the sewage from the buildings of several of the regiments there, and then pump it into the east outfall. Normally one motor-driven centrifugal pump was sufficient to handle the sewage. The station operated practically automatically, and experience proved that one man was sufficient to care for it. Automatic electric circuit breakers, working by means of floats on the surface of the sewage, started and stopped the motor-driven pumps. On each of the two main outfall sewers, there were duplicate settling tanks with grit chambers. The purpose of these tanks was to remove the suspended matter from the sewage and thus relieve the load of organic matter on the Kalamazoo River and prevent the formation of offensive sludge banks thereon. Each plant provided a total displacement in the settling compartment above the hoppers of approximately five hours, based on a sewage flow of 55 gallons per capita. Sludge pipes were provided in each hopper for the removal of the sludge to the sludge-drying beds. At several points throughout the cantonment, it was not feasible at first to connect the buildings with the main sewer, so individual sewage disposal by means of cesspools was provided. These places included the truck company, incinerator, hill pumping station, and a group of buildings comprising the telephone exchange, Young Men's Christian Association auditorium, and several others. Plans were made in the spring of 1918 to eliminate the incinerator cesspool, and for caring for the above mentioned group of buildings by means of a sewage pumping station.

Garbage, after being separated at the kitchens, was hauled daily by the individual units to the garbage transfer station and there delivered to the contractor. The contractor removed all garbage and various other camp wastes daily. Garbage was collected in about 1,200 galvanized-iron cans. These were washed each day in hot water, by civilian labor, before being returned to the units. Carcasses of dead animals also were removed daily by the disposal company. Manure was in part sold by the reclamation department of the camp quartermaster's office, and shipped out of camp, at the rate of 10 cars a day, to a central receiving point, whence it was distributed by the State agricultural association. Part of the manure was disposed of by removal and covering with earth. At only one period during 1918 (in the latter part of the summer) did fly breeding occur in the manure dump.¹ This was a very warm spell in the latter part of August following a wet period. At that time flies began to breed in the manure before it could be covered. This was remedied largely by burning the discarded straw from the bedsacks of the men over the top of the manure. Combustible, nonreclaimable rubbish, ashes, etc., were carted to two dumps, one situated at each end of the camp.

Adjacent to each barrack building was located a standard latrine containing toilets, urinals, washing troughs, and shower baths with hot-water plants. All fixtures were connected with the main sewer by means of modern sanitary plumbing fixtures. Sanitary drinking fountains were installed in each toilet building by the camp quartermaster. In the outside areas, not adjacent to

the main sewer system, such as drill areas, pit latrines were constructed. Urinal soakage pits also were installed in various such areas for the convenience of the troops.

All buildings occupied by troops, with few exceptions, were heated by steam, furnished by 12 large and several small central heating plants scattered throughout the cantonment. Automatic control valves were installed in all steam-heated buildings to obtain a uniform temperature. The buildings not heated by steam had large heaters in each room.

Kitchens and mess halls were integral parts of barrack buildings, and, with the exception of having small sinks, drain boards, and pantries, were well arranged. Two companies of cooks and bakers received instructions in their work under expert supervision, and as the men qualified they were placed in the units. A central bakery was provided where all bread used in the camp was made. Milk was supplied to the entire camp by a large dairy company of Battle Creek.

Meat was supplied to the camp on monthly contract with the packing companies. These companies shipped the dressed meat in quarters in iced cars to the distributing plant, where it was inspected, weighed out, and issued to the units. Artificial ice, manufactured locally by the camp quartermaster, was issued with the meat. The ice plant had a capacity of 20 tons a day.

A central laundry was operated by the camp quartermaster for the convenience of the camp personnel. All labor in the laundry was done by civilians.

The stables throughout the cantonment were of cantonment type, having earth floors, swinging windows, and ventilators in a roof monitor. In most cases the stalls were elevated above the center aisle by means of cribbing, thus providing drainage and facilitating policing. The remount depot was located on a slightly elevated area north of the central portion of the cantonment. The stables there were open on three sides; the corrals had long feeding and drinking troughs.

The Medical Department personnel of the 85th Division comprised 299 officers and 2,055 men. In general the personnel was efficient. The original assignment of personnel to organizations was by locality; that is, men from a definite locality were assigned to a definite unit. This practice worked a hardship on certain of the Medical Department detachments that were unfortunate enough to draw foreign-born men of a low degree of intelligence. Many of these men subsequently were transferred to other organizations, and this system of assignment was discontinued, in so far as the Medical Department was concerned. Instruction of the Medical Department personnel was carried on under the supervision of the camp Medical Department training officer. Field exercises were given to the sanitary train, and included work by both day and night. A field problem was given each week in which one or more of the regimental medical detachments participated in conjunction with the sanitary train.

The medical supply depot was located in buildings which were a part of the base hospital. This was reported by the camp surgeon to be an unsatisfactory arrangement which interfered with efficient management.

The depot brigade consisted of headquarters and the cadres of a number of battalions. All men of the incoming draft were assigned to the depot brigade. Since there were no barrack accommodations in the depot brigade for incoming draft men, this was a "paper" assignment only, and the men were distributed for rations, quarters, and instructions among the various organizations of the division. When these organizations were below 50 per cent strength, the incoming draft men could be segregated; otherwise, segregation was practically impossible.

There were the following specialist boards and services: Orthopedic; neuropsychiatric; tuberculosis; psychological; cardiovascular; examining units for incoming drafts; special examiners. The orthopedic examiners inspected all newly arrived men before their acceptance. Examinations to determine whether or not shoes had been fitted properly were continuously made. The neuropsychiatric examiners were assigned to the examining units to inspect each man before acceptance. In addition they examined all men who were to be tried by a general court-martial, to determine the mental responsibility of the men. All cases of doubtful mentality among officers and enlisted men were referred to a neuropsychiatrist for study and an expression of opinion. The tuberculosis examiners surveyed the personnel of the camp in January, 1918; subsequently, they were attached to the examining units to examine all men of the incoming drafts. There was one cardiovascular examiner, who had one or more assistants detailed when incoming drafted men were to be examined. The work done was thorough and satisfactory. Two psychologists also examined the personnel of the camp. Especial attention was paid by them to the attendants at the officers' training camp. The drafted men of the first increment were assigned directly to organizations and then examined by the respective organizational medical personnel. All cases for rejection were referred to a board of special examiners, which was centrally located. This procedure was abandoned when the system of assigning all men to the depot brigade was inaugurated. Subsequently, the examination of men of the incoming drafts was conducted by units of medical officers, consisting of one officer in charge and five assistants. The number of such units depended entirely upon the space available in which such examinations could be made. Inasmuch as no building definitely was assigned in the plan of the cantonment, for these examinations, at the time draft increments were received some building or buildings had to be vacated for this work. Under such conditions, the work of physically examining the men could not be done as expeditiously, nor could the men examined be safeguarded as well as the circumstances required.

The prevalence of measles did not constitute a serious condition at any time in Camp Custer.¹ German measles was present in considerable numbers during the first 10 months of the camp, and the true measles incidence reached 176 cases in December, 1917. Both types were practically absent after July, 1918, and only 19 deaths were recorded as due to measles and its complications prior to the year 1919.

While influenza was prevalent prior to the epidemic in the fall of 1918, the maximum occurrence of 371 cases in April, 1918, was not alarming.¹ The fall epidemic began September 23, reached its height on October 2, with 980

admissions, and was definitely over before the end of October, with an occurrence of about 7,650 cases. There were 427 deaths.¹

The majority of the cases of pneumonia occurring prior to March, 1918, were of the lobar type.¹ The proportions of the two types were reversed after this period, the total numbers of the two for the period prior to September, 1, 1918, being about equal. After September 1, the cases were nearly all of the bronchopneumonic type.¹ The large number reported as primary bronchopneumonias during the fall of 1918 were undoubtedly related to influenza.

"Other respiratory diseases" constituted a large part of the total admissions for disease in 1918, and the 1,074 cases in September possibly included many cases of influenza.¹ There was a total of 5,672 cases reported for the year.

Mumps was endemic throughout the camp period prior to the year 1919.¹ The greatest occurrence was in February, 1918, 414 cases, with a total of 1,723 cases for the period.

Three development battalions were organized in the summer of 1918, and by August contained 3,886 men, 1 battalion consisting exclusively of colored men.² There were about 2,300 men remaining in November after the transfer elsewhere of 4,000.³ Meanwhile, the battalion that had formerly been reserved for colored men had been changed to a venereal battalion, and at the time in question contained about 1,200, both white and colored.³ This battalion was housed in tents, while the other battalions were in barracks more or less scattered and intermixed with barracks occupied by divisional organizations.⁴ Each battalion had its own receiving office, and the assignment of men to companies was not determined by their disability. The battalions had been reduced to two companies by February 1, 1919, consisting of 26 venereal cases and the training cadres.⁵

The work of the convalescent center, while amounting only to a hardening process preparatory to discharge, was unusually well organized.⁶ All convalescents received from other stations were admitted to the base hospital and examined and assigned by a board of medical officers within 24 hours of arrival. Those assigned to the convalescent center were reported as ready for discharge when no further improvement in their condition could be expected, and were then presented to a board of review. The necessary medical histories were prepared when the men arrived at the hospital, and résumés of these accompanied them when they were discharged to the convalescent center.

There were 530 men in the center January 29, 1919.⁵ The number present then varied to a maximum of 263 until the center was closed March 22, 1919.⁷

Demobilization began about the middle of November, 1918, in the development battalion, followed by discharges from the depot brigade and of casual troops sent from other stations. About 10,000 officers and men were discharged before the end of the year, 1918.⁸ Demobilization was active until about July 1, 1919, prior to which time some 92,000 officers and men were examined and discharged, mainly from the 14th, 32d, and 85th Divisions.^{9 10} During the height of the work, the examining board consisted of 35 officers, whose record of men examined in one day was 2,250.⁹ The board was later

reduced to 11 officers. The orders in force for this reduced board required the examination of 400 men per day, but 1,161 were passed upon on one occasion. Camp Custer was maintained as an Army post throughout the year 1919.¹⁰

CAMP DEVENS, MASS.

Camp Devens was located on an irregular plateau, about 300 feet above sea level, just outside of the city of Ayer, and approximately 30 miles from Boston.¹¹ The terrain is rolling, and at the time of the construction of the cantonment the location was wooded with a second growth, mostly hardwood, of small size. The soil for the most part is gravelly but shows the variety common to glacial drift; consequently the cantonment was relatively free from high-flying dust in dry weather and sticky mud after rains.¹² The climate is characteristic of New England; that is, it is moderately cold in winter and not excessively hot in summer. Just to the north of the cantonment the Nashua River passed. This was of interest chiefly by reason of the fact that the towns above the cantonment discharged their sewage into it.¹³ To the south as well as to the east, and near by, were several ponds of varying size, which drained by means of small streams into the Nashua River. One of these, draining Robbins and Tufts Ponds, flowed through the cantonment. The main roads of the surrounding country were hard surfaced (bitulithic); collateral roads were made of gravel and oiled and rolled.

Since this was a National Army cantonment, the enlisted men were almost entirely drafted men. The first increments of troops were received during the month of September, 1917, and came from the New England States and part of New York.¹¹ The strength gradually increased during 1917 until it reached a monthly average of 28,000 in December. During 1918 large numbers of men were sent to this camp, most of them coming from the New England States and New York; however, during the month of August 7,570 were sent from the State of Florida; also, 16,596 men were sent there from other camps during the year. The first division to be organized at Camp Devens was the 76th, which in the summer of 1918 moved overseas. After this time the 12th Division was organized and the camp again was filled with drafted men.

The division was housed in frame buildings. These, the camp surgeon reported, were practically always overcrowded, though at certain periods this was more pronounced than at others.¹⁴ Accommodations were provided for only 36,000 men, but this figure often was exceeded, more especially in August and September of 1918, when the strength was approximately 45,000 and 48,000, respectively.¹⁴

One dug well, 50 feet in diameter and 28 feet deep, furnished the bulk of the water supply, and was the only source of supply at first.¹⁵ Since the quantity soon proved insufficient, during the winter of 1917-18 the purchase of water from the city of Ayer was necessary. The well was situated near one of the ponds referred to above, and an effort was made to increase the flow of the well by pumping water from the pond to an improvised filter bed near by and on a higher level, but the flow in the well was not perceptibly increased.¹⁵ Then, 40 wells were driven to a depth of 40 feet in the summer of 1918, and their supply siphoned into the large well.¹⁵ Although this water was potable, the presence

of the adjacent pond made chlorination advisable. This was first accomplished by dosing the large well with a solution of chloride of lime, but later a liquid-chlorine machine was installed.

A contract was in force early in October, 1917, which called for the delivery of garbage by the quartermaster to a central point.¹⁶ Removal by the original contractor was not satisfactory, but improved after he sublet the contract in the spring of 1918.¹⁷ As regards sanitation at the transfer station, considerable early difficulty was experienced, because the construction of the garbage-transfer station was faulty, in that the supporting timbers of the unloading platform were above the concrete floor, the platform itself was of an openwork type, and adequate provision for the disposition of waste water had not been made.^{18 19} These faults eventually were corrected.

About 50 pit latrines and two incinerator latrines were necessary in certain parts of the camp, none of the pit type being allowed on the watershed of the well supplying the cantonment.¹⁸ An unusual feature of these pit latrines so late as the summer of 1918 was the use of urinal cans rather than troughs. The latrines were treated efficiently with coal oil and lampblack, so that at no time were they breeding places for flies or a menace to health.¹⁴ At the main well and at the grenade field on the watershed incinerator latrines were used. These proved entirely satisfactory.¹⁴

The same individual who contracted for the removal of the garbage also contracted to remove the manure, by railroad.¹⁷ During the winter of 1917-18 some difficulty was experienced, for cars and labor were scarce, and 35 earloads were on the ground early in the spring of 1918 awaiting shipment.¹⁷ On the whole, however, the manure was satisfactorily removed, and the fly problem in the camp was a very minor one.¹⁴

The collecting portion of a sewerage system for the cantonment was completed by the end of the year 1917, and the disposal plants soon after.¹⁴ Sewage meanwhile was discharged into the Nashua River without treatment. The main disposal plant consisted of sand beds located on a knoll of sand and gravel;²⁰ no underdrains were provided, the effluent sinking into the soil. Each mess in the cantonment was provided with a grease trap, and these were apparently satisfactory for months.¹⁴ In the summer of 1918, however, it was observed that the high grease content of the sewage was gradually interfering with the operation of the disposal filter beds. The grease traps were small and mostly of the single-compartment type. These were replaced by larger types with a baffle, thereby furnishing an opportunity for the grease to separate from the liquid.^{21 22} A capacity of at least 1 gallon per capita served by the mess was considered necessary.

Only 12 regimental infirmary buildings were constructed originally, with a bed capacity of 10 each.²³ The number of infirmaries was later increased to 18,¹² but some of these were evidently housed in buildings not of the infirmary type, for four had no bed capacity. None of them routinely accommodated bed patients.

Medical training during the first two months of the 76th Division period was confined mainly to the physical examination of draft troops and training in the duties required in the internal administration of the organizations.²⁴ The extremely cold weather and the entire lack of personal equipment for officers

and enlisted men until May, 1918, handicapped the outdoor training.^{25 12} A weekly meeting was held at which the division surgeon, all organization surgeons, the directors of ambulance and field hospital companies, and the commanding officer, adjutant, and chiefs of services of the base hospital discussed any controversies arising which concerned the care of the sick.²⁵ Prior to the departure of the 76th Division, copies of all orders, instructions, etc., concerning the camp surgeon's office were prepared for the future use of that office.²⁵ The entire Medical Department personnel of the 12th Division was trained at this camp from August 1 to December 30, 1918.¹⁴ The division was under orders to be ready to sail for France at the time the armistice was signed. At this time the Medical Department personnel was completely organized and equipped. Discipline was reported to be excellent and training preliminary to field service was excellent. The period for field training was interrupted by orders to sail, so this training was not completed.¹⁴

Measles was present in considerable numbers each month after October, 1917, the highest incidence being 183 cases in January, 1918.²⁶ Measles cases were removed from their organizations and sent to the base hospital where they were cared for in measles wards. The whole of an organization involved was sometimes placed in quarantine for 15 days, during which period of time physical inspections were made at frequent intervals to detect new cases as soon as possible.¹⁴ Sometimes only the members of an involved squad were quarantined, and sometimes a whole squad room was quarantined. The latter method was used to the exclusion of others during the winter, though the isolation of squads proved to be just as satisfactory a method.¹⁴ Transfers from one organization to another were permitted, provided the transfers included infected units.

Pneumonia played a very large part in the morbidity and mortality rates of the camp.¹⁴ At the base hospital, it was estimated that pneumonia could be held accountable for 45 per cent of days lost from sickness. The disease attacked both officers and enlisted men, but was approximately four times more frequent among enlisted men than among officers; furthermore, there were no complicating cases of empyema among the officers. Medical officers suffered to a greater extent than officers of other branches of the service. This was not because of contact in the care of cases of pneumonia; on the contrary, no medical officer, so far as it could be determined, contracted pneumonia while attending a case of this disease. The same statement is true of nurses and enlisted ward attendants. Lobar pneumonia occurred more frequently among the colored troops; bronchopneumonia, among the white troops. The cases of empyema complicating pneumonia were predominantly pneumococcal, but the mortality was highest among cases in which the streptococcus was present.¹⁴

Influenza in epidemic form was by far the most serious of the epidemics of the camp.¹⁴ It invaded the camp at a period (September, 1918) when the overcrowding of the barracks was most marked and came completely unheralded. The result was that in the course of a week or 10 days not only was the base hospital overwhelmed with patients but the regimental infirmaries as well. Medical Department personnel was entirely too inadequate to meet the occasion and it was only after considerable delay that the personnel deficiency was overcome. By the time the disease had exhausted itself more than 14,000 cases had

occurred; there were 2,796 instances of complicating pneumonia, and 757 deaths. The case mortality was approximately 28 per cent.¹⁴

The occurrence of mumps was greatest during the period April to June, inclusive, 1918, and the last three months of the year.²⁶ The 537 cases in the first-named period and the 326 in the second were sufficiently numerous to cause some uneasiness, because of the noneffectiveness produced.²⁶

Epidemic cerebrospinal meningitis was relatively uncommon, as compared with the experiences of some of the other camps.¹⁴ The only time when it seemed to be assuming epidemic character was immediately after the influenza epidemic of September-October, 1918. This disease appeared first in September, 1917, and new cases arose each month throughout the year 1918.²⁶ There were 9 deaths in the 35 cases occurring in 1918.²⁷

The cardiovascular examinations of drafted men in the fall of 1917 were conducted by two specialists employed as contract surgeons.²⁸ Approximately 2 per cent of all men examined were referred to this board, amounting to 646 men. Of these, 384, approximately 60 per cent of referred cases and over 1 per cent of all drafted men, were rejected.²⁸ By the summer of 1918, this work was performed by a board of six medical officers which examined all recruits, rather than referred cases only.²⁹ The entire enlisted personnel of the development battalion and such men as were referred by regimental surgeons were also examined. The board was increased to 8 members, which examined 14,914 men in a period of about 10 days late in July.³⁰ A large room was shared with the tuberculosis board for this work, the cardiovascular examination being made first in order to eliminate at once the question of tachycardia arising from nervousness or from previous exercise. The percentage of the total draft rejected, 2.64, was about twice as high as in 1917. The causes of rejections fell largely under the general heading "functional cardiovascular disease or myocardial insufficiency," determined by failure of the pulse rate to fall below 100 after several minutes of recumbent rest following exercise.³⁰

A foot survey of all men in the camp was conducted in the spring of 1918.³¹ The men stood on the mess tables for observations as to shoe fitting, then removed shoes and socks for the foot examination. Two thousand could be examined in one day if there was no delay in their presentation. About 18 per cent of the men examined were found to have actual foot trouble or potentially weak feet,³¹ and 80 per cent were wearing shoes which were too short.³² This examination was conducted by the orthopedic surgeons stationed with the various brigades, by forming an examining team of four for each brigade as the brigades were successively examined. That military life had improved the foot conditions of 800 candidates for the officers' training camp was demonstrated by the development of the structures of their feet, their freedom from corns and callosities, and evidence of marked improvement in foot conditions which had existed when they entered the service.³³ Only four candidates were rejected. The draft increments received after the spring of 1918 were given the orthopedic examination as a part of the general examination, including an assignment of shoe size.³⁴ The system employed soon became systematized and was very flexible. The requisite number of examining units was used, each unit consisting of one orthopedist and six clerks. Each unit could examine

from 40 to 60 men per hour. A special blank form was used, to accomplish the entry of the proper shoe size in the service record, the issue of the proper size, and any alterations that were indicated. This blank was made in the form of instructions from the commanding general of the camp, as previous forms without such instructions had been more or less ignored.³⁴ The shoes issued were inspected at a later date. In this connection, many of the reclaimed shoes that were issued to the troops were found to be unfit for use, owing to the poor condition of the inner portion of the sole; some had been resoled when a hole existed entirely through the sole.³⁵ The quartermaster's stock supply of shoes eventually became so complete as to permit giving all men their proper size. It was found that the greatest numbers were required in sizes 8½, 9 and 9½, E.³⁵ A central orthopedic dispensary was established, and a report of conditions found in men examined as well as the treatment recommended was sent to the organization surgeon who had referred the man to the dispensary.³⁵

The depot brigade received all incoming men and segregated them for two weeks.¹² During this period of time they were examined and inoculated, and all records completed.¹² The depot brigade also received men fit for domestic service only, when their organizations went overseas.¹² The depot brigade was discontinued and transformed into a "demobilization group" on May 24, 1919.³⁶

There were about 650 men in the development battalion by the middle of July, 1918.²⁹ A month later, there were 3,050 men in three battalions, and the organization functioned as a part of the depot brigade.³⁷ By the middle of October there were 4,152 men in four battalions.³⁸ Of these men, about 134 were venereal cases, 151 neuropsychiatric, 368 cardiovascular, 800 non-English speaking, and 1,271 orthopedic.³⁸ The venereal cases were segregated in one company, but the orthopedic cases were scattered through many companies.³⁴ The development battalions ceased to exist about January 1, 1919.³⁹

An "overseas convalescent detachment" was organized early in December, 1918, as part of the depot brigade, and received some 400 men during the succeeding month.³⁹ Though the conversion of this detachment into a convalescent center was late in the making, the medical officers assigned were inexperienced in that class of work, and definite schedules for the work required were not so planned as to avoid conflicts.⁴⁰ The medical work of the center was, on the whole, efficient. Of the several thousand men discharged, very few were held by the board of review for further treatment.⁴⁰ The largest number of men in the center at one time was about 840, and there were 117 remaining early in July, 1919.⁴¹

The dental service was well organized and efficient, although the volume of work turned out was relatively small.⁴² Discipline was excellent, and the majority of the dental assistants were graduates in dentistry.⁴²

Veterinary conditions in the camp, even as late as when the 12th Division was formed in the summer of 1918, were not good—stable floors were in very bad condition, there were many tree stubs and stumps in the corrals and the fences were poor, and protruding nails were to be found in stables and corrals.⁴³ A central examining station for the inspection of locally purchased meats was established, but dairies supplying milk to the camp could seldom be inspected as

no transportation was available.⁴⁴ The location of the remount depot on wooded and rolling terrain gave excellent natural drainage and some shelter, but this advantage was offset by projecting roots in corrals.⁴⁵ Being a northern camp, the corral sheds were inclosed on three sides.⁴⁵ This auxiliary remount depot was still in operation at the end of the year 1919, although no officer of the Veterinary Corps was then on duty there.⁴⁶ The veterinary hospital was desirably situated, in that it was conveniently accessible from all parts of the auxiliary remount depot.⁴⁵ It was composed of 4 wards, each consisting of 2 small buildings and 2 barns. One barn in the hospital group was divided into box stalls, the others each had 4 box stalls and 22 double tie stalls. One ward was designated as a receiving ward. The four most prevalent diseases in the order of their numerical importance were thrush, dermatitis, colic, and lymphangitis. Glanders was first discovered in January, 1918, and 67 animals were destroyed during the succeeding three months.⁴⁵ One other case was discovered in October, 1918.⁴⁷

Camp Devens was maintained as a demobilization center throughout the year 1919, but the great bulk of the work was completed during the first nine months of the year, when 115,000 of the 194,000 men passing through the camp were demobilized there.³⁶ This immense volume of work necessitated an examining team of 18 to 23 members, a maximum of approximately 4,500 men being examined in one day.⁴⁸ Examination and discharge were accomplished so rapidly that troops remained in the camp for a comparatively few hours, and a proper state of police of the grounds was thereby made very difficult to maintain.³⁶ The "sanitary process plant" (delousing) was working 24 hours a day and could handle nearly 200 men and their clothing every hour.³⁶ Approximately 19,000 men were found to have a disability, and less than half of these claimed a disability before examination.³⁶ This difference was partly due to a deliberate denial of knowledge of an existing disability in an effort to expedite discharge. On the other hand, one-third of the claims of disability were not substantiated. Many of these attributed existing acute conditions which were not permanent disabilities to previous gassing.³⁶ The disability group was discontinued September 30, 1919.³⁶

CAMP DIX, N. J.

Camp Dix was located near Wrightstown, N. J., about 20 miles southeast of Trenton. The site is a sandy plateau about 25 feet above sea level, and was well drained. There were, however, several large cranberry swamps to the south and east.⁴⁹

The first increments of drafted men were from the States of New Jersey, Delaware, and the western and southern counties of New York State.¹ The first men arrived between September 1 and 15, 1917. The strength gradually increased, giving a mean monthly strength of a little over 22,000 men for the month of December. During 1918, large numbers of men were sent to this camp from New Jersey and New York, and a considerable number from Pennsylvania, Delaware, Illinois, Massachusetts, Maryland, and North Carolina. Some scattered troops came from Rhode Island, New Hampshire, West Virginia, and other States. In addition to these men, who were mobilized for the

78th Division, a large number of troops passed through Camp Dix, after the departure of the 78th Division for overseas, about May, 1918, when this was used as an embarkation camp. In 1919, it became a debarkation camp. The maximum strength of the camp was for August, 1918, when the mean monthly strength was approximately 54,500.⁴⁹

The men were housed in barracks, the capacity of which was about 38,000 men.¹ The camp surgeon reported that at various times, and especially while divisions were in the camp, the population was increased greatly beyond the housing facilities and that as a result it was necessary to use many tents; furthermore, even with this expedient, there was overcrowding to an alarming degree.⁴⁹

Existing surface wells furnished the only source of water during the first month of the construction work.⁵⁰ This supply was inadequate, and the wells, which had shown no colon bacillus contamination at first, invariably did so after being pumped dry, apparently being contaminated by drainage from near-by barns and privies. Three shallow artesian wells were drilled in July and August, 1917, which barely sufficed to supply all personnel. The third of these promptly filled with sand and was wasted effort and expense. The water was distributed in truck loads of milk cans to elevated barrels, with faucets, placed throughout the camp. The permanent supply of the camp was obtained from a stream which drained an area of pine barrens, cedar swamps, and cranberry bogs.⁵¹ During the fall cranberry-picking season this area was contaminated by the Italian pickers.⁵² The large vegetable content and low alkalinity imparted a brownish color to the cold water and a reddish tinge to hot water, and required an unusually high degree of chlorination during the summer.⁵¹ At times it was acid in reaction, and then was destructive to boilers, etc.⁵² The ice made from this water was unattractive in appearance.⁵³ One well was drilled early in 1918 to dilute the main supply and thus raise the alkalinity, thereby reducing the organic acids held in solution and, at the same time, the corrosive action.⁵² The main volume of water from this well was ultimately used to feed the boilers at the pumping station, the excess being added to the camp supply.⁵⁴ Wells were sunk at the refrigerating plant and at the power plant of the base hospital in order to furnish these two institutions with a more suitable supply.⁵⁴ The pump in the well at the refrigerating plant went out of commission in September, 1919, a month after installation, and was not then repaired, as the water would be clear until spring.⁵⁵ The main pumping plant was constructed in a pit 10 to 12 feet below the ground level and at about the same level as the water in the adjacent stream.⁵⁶ It was protected by an earthen embankment which threatened to give way during a high-water stage in 1919.⁵⁶

Before the arrival of the troops, incinerators of the "Koerper" type disposed of all kitchen waste.⁵⁰ One incinerator 8 by 4 by 4 feet disposed of all garbage from a cafeteria feeding 1,400 men. Relaying of the brick was required only once in 10 days, owing to the sandy nature of the soil.⁵⁰ The above-mentioned incinerators disposed of all garbage during the summer of 1917, except coffee grounds.⁵⁰ It was found the garbage would not burn if it contained these, but as they would not attract flies, they were put into open pits which were filled

to within 1 foot of the top and then covered with earth.⁵⁰ Small sheds were built near the incinerators to house the men permanently detailed from the cafeteria employees to manage them.⁶⁰ The disposal of garbage by contract began in November, 1917, and, as was true of many other camps, there was difficulty in obtaining a proper cleaning of the cans and in the prevention of soil pollution at the transfer station.^{57 58 59} Great difficulty was experienced also in preventing the exposure of garbage in the cans, as the retention of lids to fit the cans of the different sizes in use was almost impossible. However, the system was working exceptionally well in the spring of 1918.⁵³ A concrete loading platform was constructed in the summer of 1918 to facilitate garbage removal by train.⁶⁰ The drainage from this platform was led into cesspools. The occasional difficulty encountered in placing and removing freight cars was eliminated later in the year when the contractors established a pig farm and removed the garbage by trucks.⁶¹ The cesspools at the transfer station failed at about this time and the drainage was discharged into a small stream. As this caused a decided nuisance, the cesspools were rebuilt and additional ones constructed.⁶¹ A modern can-washing department and a Nyc odorless incinerator were later added to the equipment of the transfer station, but this latter was so inefficient that it was little used.⁶⁶

For the use of the laborers engaged in constructing the cantonment, pit latrines were provided during the summer of 1917, with urinal cans instead of troughs.⁵⁰ The pits were covered with the double row, 8-hole type of seat, and their use by contractors' employees was continued into the summer of 1918.⁶²

The disposition of manure by contract was inaugurated early, a farmer removing it three times a week during the summer of 1917.⁵⁰ Another contract on a more extensive basis was entered into in the fall, under which the manure was removed in railroad cars.⁵⁸ At this time the ground in the vicinity of the manure transfer station was burned over each evening with straw and oil.⁶⁰ Separate loading platforms were ultimately constructed for the camp and the auxiliary remount depot, and aprons installed to catch the manure that fell between the platform and the cars.⁵¹ The camp commander authorized the formation of a compost pile for the auxiliary remount depot in June, 1919, to which was partially credited the prevalence of flies in the camp during that summer, although the camp surgeon reported that fly breeding was satisfactorily controlled by daily spraying of the pile with a larvacide.^{54 55}

The camp sewerage system was completed in the fall of 1917.⁵⁷ The disposal plant consisted of the usual cantonment type of modified Inhoff tank, the untreated effluent being discharged into a small stream.⁵⁷ The capacity of the disposal plant proved to be totally inadequate, and during the following summer sewage contamination of the stream was evident to ocular and olfactory senses for 9 miles below, and complaints from individuals and communities were continuously coming in.⁶³ It was necessary periodically to empty the over-worked septic tanks into near-by shallow excavations, until a fly-breeding area of 1,000 square yards was created.⁶⁴ Large increases made in the settling tank capacity, trickling filter areas, etc., did not entirely relieve the situation, and the chlorination of the effluent from the filters was adopted.⁶³ The last of the new disposal units was completed in March, 1919, subsequent to which time the

effluent was satisfactory.⁵⁵ The installation of new grease traps on all kitchen lines in November, 1918, caused a decided improvement in sewage disposal.⁶³ Each trap was provided with a lock, only the inspector and the detail cleaning the traps having keys.⁶⁵ The grease trap contents were removed in iron dump carts to the garbage transfer station, where it was allowed to stand until the grease arose to the surface, where it was skimmed and sold to the contractor.⁶⁶ The residue, containing too much grease to allow of its disposition on the sludge beds, was emptied into large pits located near the stream which received the effluent from the sewage disposal plant.⁵⁶ During the period of unsatisfactory operation of the disposal plant, the New Jersey State Board of Health prohibited the watering of cattle in the stream receiving its effluent.⁵⁵

Large numbers of barracks and officers' quarters were found to be infested with bedbugs during the year 1919.⁵⁵ The most successful treatment of these buildings consisted in the use of a portable steam sterilizer and spraying apparatus, operated by a special detail of 1 officer and 20 men.⁵⁵ All bedding was sterilized, and all cracks and corners of the buildings were sprayed with a solution of crude oil on three successive occasions at intervals of 10 days.

The fluctuating strength of the camp in 1919 was largely responsible for very poor company messes.⁶⁶ Difficulty was experienced by mess officers in estimating the supplies that would be needed, and the capacities of the kitchens were often taxed to the utmost, a kitchen planned to feed 250 men sometimes actually feeding 500 to 600.⁶⁶ The abolition of the rations savings system and the forced purchase through the quartermaster were also potent factors. If a mess sergeant made a savings during the month, it reverted to the Government; if he spent more than the allowance, the difference was paid from the company fund, providing there was one, otherwise the company commander paid it; consequently, each mess sergeant spent a little less than his allowance each month and the camp as a whole showed quite a large ration savings.⁶⁶ This made it appear that the ration allowance was more than sufficient, while in reality it was insufficient. Furthermore, although the camp was surrounded by truck farms, it was necessary to purchase this produce, in the quantities demanded by the quartermaster, in Philadelphia, with consequent delay in delivery, uncertainty of procurement, and damage to certain varieties during transportation.⁶⁶

German measles was present throughout the greater part of the year 1918, occurring most frequently in January, with 149 cases.⁴⁹ The incidence of true measles was remarkably low, being only 45 for the month of May, its highest point. Camp Dix suffered somewhat from the spring epidemic of influenza in 1918, having 1,191 cases in March.⁴⁹ The fall epidemic began September 10 and ended October 13, with 5,367 cases admitted to the base hospital.⁶³ Overcrowding in the base hospital was avoided by using 18 barracks as a "hospital annex," by using other barracks as a field hospital, and by retaining many minor cases in quarters.⁶⁷ The "annex" was administered by the base hospital, the other group of barracks by the field hospital section of the 34th Division sanitary train. The depot brigade provided 36 tents for use for "quarters" cases, and a room in each barracks throughout the camp was set aside for similar use. Additional medical officers were ordered to the camp, civilian nurses were obtained, and the services of men from line organizations who had had nursing experience were

utilized. Many "quarters" cases were not reported,⁶⁷ but 6,033 cases of influenza are on record for the two months.⁴⁹

The cardiovascular board was not primarily concerned in the examination of recruits until the spring of 1918.⁶⁸ The regimental surgeons made the physical examinations and referred cardiovascular cases to a "reexamining board" at the base hospital. A "disposition board" in the depot brigade assigned cardiovascular cases to limited duty or to the base hospital for treatment. Authority to discharge any case already mustered into the service rested with the disability board, comprising members of the base hospital staff.⁶⁹ An attempt to retrain a group of functional cardiovascular cases in the winter of 1917-18 was disappointing in results.⁶⁹

The camp was divided into five zones during its occupancy by the 78th Division, each under the supervision of an orthopedic surgeon who visited each infirmary in his zone at a stated hour.⁷⁰ The work in the quartermaster's shoe repair shop was also supervised by an orthopedic surgeon, not only as to alterations for orthopedic conditions, but also as to the selection of used shoes which were suitable for general repair and the quality of the repair work done. Any general follow-up system of the drafted men who required shoe alterations, etc., was impracticable after the change in the examination system of draft increments was made in the spring of 1918.⁷⁰ The Form 1010 used in the examinations made no provision for entries concerning shoe sizes or foot conditions, and men accepted were assigned to the depot brigade for distribution to organizations. The only way to locate a man once accepted for service was through the camp personnel office, and the only way to regain contact with those requiring shoe alterations was to wait for them to report at an infirmary for treatment, as no record of a recommended treatment was made at the time of examination.

The United Public Health Service did not assume supervision of the extra-cantonment zone, but the New Jersey State Department of Health established a branch office in Wrightstown and acted in the same capacity.⁵⁸ The local health authorities were so indifferent to conditions concerning the welfare of the soldiers that Wrightstown was closed to soldiers for a month in the spring of 1918.⁶⁴ The camp sanitary inspector supervised shops and booths dealing in foods and drinks.⁵¹

The precursor of the development battalion was a "physical reconstruction battalion," organized in the early spring of 1918, at the instigation of the orthopedic service.⁷¹ Its purpose was to care for men who required supervision while participating in limited physical exercise, such as foot and cardiovascular cases and convalescents from the hospital. While there were 800 foot cases in the camp in June who should properly have been placed in the development battalion,⁶⁴ only about 300 of these were actually enrolled on July 20.⁷² There were 4,756 men in the battalions in October, 2,409 of whom were venereal, 294 orthopedic, and 22 cardiovascular cases.⁷³ The venereal cases were segregated in separate companies. Cardiovascular cases were divided into three classes for training, as follows: Those given light calisthenic exercises; those given light calisthenics and two hours drill daily; those given ordinary physical exercises and the drills of a training company. Foot cases were likewise divided into three classes: Those given foot exercises on boards and light police duty; those given

foot exercises, light police duty, and two hours' drill per day; those given foot exercises and most of the ordinary training work. The battalions functioned as a part of the depot brigade.

The convalescent center was established about the first of the year 1919, and was housed in two-story barracks.⁷⁴ The men were not grouped according to the disease but according to the degree of physical condition, as this method tended to remove the psychological influence of association with similar cases. The knowledge that men were ready for discharge from the service when they reached "class 1" was an incentive which tended to counteract the lowered morale due to their long periods in hospital, uncertainty as to disposition, desire to go home, compensation questions, etc. The center was organized as an independent unit of five companies, and the strength was not allowed to exceed 1,200, including the permanent cadre.⁷⁵ This limit was set in order to insure the prompt discharge of men who had reached a suitable physical condition; and on one occasion when it was exceeded, all officers of the organization were confined to the area until the necessary reduction occurred. The administration was so efficiently organized that any man could be readily found at any hour of the day for exercise or treatment. The permanent training cadre was large in proportion to the number of convalescents—344 to 424 in April, 1919, of which 40 were of the Medical Department.⁵¹ The number of convalescents steadily diminished from about 700 in January until 100 were remaining when the center was closed on May 31, 1919.⁷⁶

Four dental officers arrived early in September, 1917, and 25 more arrived during the month.⁷⁷ At this time there were eight portable dental equipments on hand and additional instruments and equipment were purchased from the arriving officers sufficient to assemble nine emergency outfits. To offset this deficiency in equipment the officers improvised operating chairs from scrap lumber and opened offices in such available places as would place dental service easily available to all organizations. Twenty-two portable and three base outfits were received later in the fall, and 16 additional dental officers arrived. The base outfits were installed in the base hospital and the portable outfits in the regimental infirmaries. As the number of officers exceeded the number of portable outfits available, officers alternated in working at the chair. The first dental infirmary was completed at an unusually early date, April 26, 1918, and was supplied with 21 complete base outfits with laboratory equipment and with 22 dental officers.⁷⁷ The volume of work demanded additional facilities, and a second dental infirmary was opened in September, 1918, with 10 officers, 9 portable outfits, and 1 base outfit, and a third infirmary was established in October, with 21 officers and 20 portable outfits.⁷⁷ Neither of these two dental infirmary buildings was specially constructed for that use. During demobilization, effort was made to put the mouths of the men to be discharged in the best possible condition before their return to civil life.⁷⁸ The work done in the camp from October 1, 1917, to April 30, 1919, amounted to 41,132 patients treated, 19,040 teeth extracted 79,923 permanent fillings, 7,423 temporary fillings and 4,622 root canals filled.⁷⁷

Records of veterinary activity prior to June 1, 1918, are not discoverable; however, though at that time the newly assigned camp veterinarian had no assistants, he soon secured two officers and six enlisted men. A centrally located building was secured to serve as a dispensary. The animal ambulance service was conducted by the auxiliary remount depot, and was always far from prompt, delays in removing animals being as great as three days.⁷⁹ Daily visits were made to all stables, at which time the stable sergeants presented their daily reports of animals and harness; animals, picket lines, etc., were inspected. Locally purchased meats were presented at the refrigerating plants for inspection before delivery. Dairy inspections were somewhat limited, owing to lack of transportation and the large number of dairies concerned. The State Health Department of New Jersey tested all dairy herds for tuberculosis every six months, so this item was removed from the necessary activities of the Army officials.⁷⁹ The dairies were not up to standard in 1919, and interviews with some of the largest producers, in an effort to have them improve conditions and bid on the milk contract for the camp, were discouraging.⁸⁰ The military regulations were considered by the producers to have been so strict that they preferred to sell to the large dealers, who had few regulations.⁸⁰ During the demobilization period, all veterinary officers arriving in the camp reported to the camp veterinarian for disposition.⁸¹ Each officer was offered 15 days' leave and the option, if his services were desirable, of being discharged from the service, of remaining in the service temporarily, or of accepting temporary service which would probably lead to a commission in the Regular Army. Various provisions were connected with the 15 days' leave at its termination, reporting to the nearest demobilization camp at its termination. The ruling finally adopted was to grant leave at once and allow the officer, at its termination, to report for discharge to the nearest demobilization camp.

At the remount depot, four large buildings of 23 box stalls each, arranged in a row end-to-end, each comprised a veterinary hospital.⁸² Until April, 1918, the veterinary officers served on the roster for veterinary officer of the day. Then this roster was discontinued and thereafter both veterinary and quartermaster officers were placed on one roster for general service as officer of the day. Veterinary officers and enlisted men were instructed in drill for one hour each day during the summer of 1918. Infantry drill was used at first, then Cavalry dismounted drill, and finally a provisional troop was formed and drilled in mounted formations. Early records are incomplete, but the most prevalent diseases among the animals were pneumonia, influenza, intestinal disturbances, and periodic ophthalmia.⁸² There were 503 cases of pneumonia, mostly in the winter of 1917-18, with 150 deaths, and 1,150 cases of influenza, with 61 deaths. Two cases of glanders were discovered in the fall of 1918, the only ones of record. A very ingenious cipher was devised in one hospital for the identification of animals.⁸² The symbols were composed of combinations of straight lines by which any number could be represented, and the proper symbols were clipped in the hair with curved scissors. They were then plainly visible for about three weeks.⁸³

For demobilization purposes, the physical examining team was composed of 55 officers and 60 clerks in January, 1919.⁸⁴ On January 8, 34,655 men had

already been examined.⁸⁴ The total number of demobilization examinations made at Camp Dix prior to 1920 was 316,494, disabilities being found in 23,454.⁸⁵ The greatest number of men examined in one day was about 5,300.⁸⁶ Advantage was taken of the opportunity given by the demobilization examinations in 1919 to obtain comparative measurements of the physical development of a large number of men.⁸⁴ Two civilians from the Surgeon General's Office, directing the activities of 66 enlisted assistants from the line, took and recorded the measurements of about 1,000 men per day over a considerable period of time.⁸⁴ An anonymous writer criticized the demobilization examinations to the Secretary of War, stating that they were perfunctory, that all men who were supposed to have been presented to the board of review were not seen by that board, that the main effort of the examiners was to protect the rights of the Government rather than the individual, that the recorded results of examinations were frequently in error, that accurate information was not obtained from many soldiers of foreign extraction owing to language difficulties, that the disabled soldier was not generally aware of his rights before discharge, and that the board of review had no satisfactory basis upon which the percentage of disability was based.⁸⁷ The camp surgeon refuted all of these criticisms except two—he was not satisfied that the throat examinations had always been complete, and there was a possibility that men intended for the board of review had failed to follow the directions given them. He believed, however, that a man who avoided this board could not have his papers completed without discovery of the omissions, and all chance of such an evasion of the board was removed by changing the station of the directing orderly.

Camp Dix was the center for the reception of nearly all casual officers arriving from overseas.⁸⁸ Each officer of the Medical Department was interviewed in order to ascertain which ones were willing to remain in the service temporarily. Those who desired discharge usually received it the same day, even when the interview took place as late as 1 p. m. A delousing and sterilizing plant was put in operation about February 1, 1919, but the boilers were inadequate and became disabled after being in operation two days. A locomotive was then placed on an adjacent siding to furnish steam pending the installation of new and larger boilers. Uniforms were put into the sterilizers in bundles during the earlier period and came out so badly wrinkled that it was necessary to establish a pressing department with 40 large pressers. With 4 portable sterilizers for the men's personal clothes, 160 men were passed through every 50 minutes. Blankets were replaced from stock. As the routine was eventually developed, the men were marched to the entrance of the plant with their surplus clothing in barrack bags. These bags were placed in the sterilizers. The men then entered the building and disrobed, their clothing being hung on coat hangers in sterilizers. The men then passed before a medical officer who examined them for vermin, skin diseases, etc., and on into the bathroom where the soap used had an admixture of kerosene. Any man found infested with vermin had all the hair on his body clipped before bathing. After the shower bath the men received clean underwear and socks and their own uniforms, taking the latter to the pressing room. After dressing, they proceeded to the sterilizers where their surplus clothing was returned to them. Shoes were sterilized by spraying with gasoline. The capacity of the plant was 2,500 men per day.

CAMP DODGE, IOWA

Camp Dodge was located 10 miles north of Des Moines, Iowa, on the westerly slope of a ridge which formed the eastern bank of the preglacial Des Moines River Valley, but now lies to the west of this river.^{89 90} Through this ancient valley now runs a small stream, Beaver Creek.⁹⁰ The gentle slope of the camp site provided excellent drainage,⁹¹ but a terminal moraine across the Beaver Creek Valley created a swampy area of considerable extent a mile northwest of the camp.⁹⁰ The soil of the camp site was a pervious sandy loam⁹¹ while that of the valley was an alluvial deposit many feet in depth which became very muddy after rains.⁹² Records from 1915 to 1919, inclusive, show a maximum range of temperature from 18° below zero to 110° F. above, an annual rainfall from 28 to 42 inches, and an annual snowfall from 25 to 40 inches.⁹²

The divisional staff of the 88th Division arrived August 25, 1917, and formally opened the camp, and about 2,000 officers, nonecommissioned officers, and detachments of enlisted men, training cadres for the division to be formed, arrived within a few days.⁹³ A sufficient number of buildings were completed by September 1 to allow a small increment from the draft to be brought in, some 3,000 arriving September 5.⁹³ The strength of the 88th Division had been reduced to less than 9,000 men by May, 1918, and a large proportion of the 7,000 men in the depot brigade were colored men.⁹⁴ The division moved to a port of embarkation in August, 1918, and the 19th Division was organized the same month, the last of the Regular Army units reporting in October.^{95 96} The 19th Division was demobilized in Camp Dodge in January, 1919, and the 4th Division, Regular Army, arrived in the camp from overseas in August, 1919.⁹⁷ The maximum population of the camp, about 46,000 was reported in July, 1918.⁹⁸

The first source of water developed consisted of driven wells, connected with a dug well 50 feet in diameter as a pumping reservoir.⁹¹ These wells were all about 40 feet deep and located in the Des Moines River Valley. An additional supply from the river was passed through sand filter beds in the fall of 1917 and used without being treated, thus contaminating the whole distributing system.⁹⁹ This second source was used only until two additional wells were driven, when this entire plant was removed. The number of driven wells was eventually increased to 22.⁹⁹ The water from the wells was chlorinated.

The sewerage system of Camp Dodge was completed in the fall of 1917.⁹⁹ The effluent from the septic tanks was discharged into a near-by stream without treatment, the dilution having been sufficient to prevent the formation of any nuisance. The only fault that developed in the system was temporary blocking from deposition of sewage at several points where there was an insufficient velocity of the sewage flow. The auxiliary remount depot had a separate sewerage system of the same type.¹⁰⁰ Waste water from the bathhouses and kitchens of the main camp was drained into the sewers.⁹⁹ In the portion of the depot brigade which was later established under canvas, water from the bathhouses was carried away in surface ditches, and the liquid kitchen waste was at first run into seepage pits. The use of these soon was discontinued, and the liquids then were carried to a sewer line and poured into a manhole. The use of pit latrines was necessary in some sections not covered by the sewerage

system.¹⁰¹ As the water supply came from wells on the rifle range, a Conley incinerator was installed there instead.

The disposal of garbage by contract was begun about November 1, 1917, the contractor paying at a rate of 5 cents per person for an unstated time.⁹⁹ Garbage unsuitable for hog feed was destroyed in an incinerator located a half mile from camp. The camp transfer station was of unusual excellence, consisting of a platform in a building, steam jets and hot water in the can-washing section, a sedimentation tank in the wash-water disposal system, concrete roads on both sides, and a railway siding on one side.⁹¹ The only criticism was that the garbage was removed in barrels in freight cars and that both were very foul.¹⁰² All garbage was hauled to the transfer station by the Quartermaster Department, where it was sorted by the contractor, but the kitchens made the primary separation into the specified classes.¹⁰¹ Their failure to do this properly interfered with the satisfactory working of the contract.¹⁰³ A campaign against wastage of food early in 1918 was so successful that the contractor had to buy corn to feed his hogs and to reduce their number.¹⁰³ Although his barrels and cars were still filthy in the late spring, little could be done about it until another contractor could be found, as the one then present was desirous of voiding his contract.⁹⁴ Conditions at the transfer station became increasingly worse.⁹⁵ Liquids leaked through the floors of the cars until there was an accumulation of organic filth, in August, 1918, 6 inches deep which was almost a solid mass of fly larvæ, and everything in sight was covered by a black mass of myriad flies. This condition was due to the local attempt to hold the contractor responsible for the sanitation of the transfer station without active interference from Army authorities. Just when this condition was corrected is not stated, but the transfer station was in excellent condition and the contract was working in a satisfactory manner in February, 1919.¹⁰⁴

Prior to February, 1918, the manure was removed by contractors to a point some distance from the camp.⁹⁹ Another firm then took the contract, the Army delivering the manure at a point on the reservation where it was burned.¹⁰³ The Government received nothing for the manure, and the contractor made his profit from the potash recovered. This method of disposal was discontinued about the end of the year, 1918, the quartermaster thereafter attempting to burn it in piles, but so unsuccessfully that there were 20 acres covered with windrows of unburned manure in June, 1919.¹⁰⁵

Red Cross Ambulance Company No. 30, organized in Denver, Colo., and Red Cross Ambulance Company No. 21, organized in Flint, Mich., formed the nucleus of the sanitary train of the 88th Division, the remainder being formed from draft troops.¹⁰²

Fifteen infirmary buildings were constructed, only 12 of which were used for the purpose intended, in 1917, owing to the inconvenient location of 3.¹⁰⁶ One of these latter was occupied by the tuberculosis board. The capacity for bed patients was 10 for each infirmary. One area a mile long had no infirmary building and no suitable space in existing buildings for use as such. Some infirmaries cared for mild cases of illness in the spring of 1918 and some sent all to the base hospital.⁹⁴ All 15 were operating in the early summer of 1918, but only a few had established a mess.¹⁰¹

The large volume of cool air present under the barracks was used to lower the temperature of the mess storerooms during the summer.¹⁰⁷ The storeroom windows were kept open and protected by awnings, the door into the kitchen was kept closed, and protected holes were cut in the storeroom floor. This method was so effective in the care of perishable food supplies that it was quite generally adopted throughout the camp.

The question of food conservation was studied early in Camp Dodge, with the result that the garbage from the 16,000 men in camp in December, 1917, amounted to 5 tons daily, which was below the average for the mobilization camps.¹⁰⁸ This was accomplished by detailing one officer in each regiment and separate organization to make a written report on food wastage, by general care, and by requiring that each man who left unconsumed food on his plate would have this remaining portion served to him at the next meal. The field bakery was a model in the sanitary handling and in the quantity of its products.¹⁰⁸ It was well screened, scrupulously clean in facilities and personnel, and bread was issued through a screened and double-trapped chute directly into the boxes belonging to the individual companies. All entrances were vestibuled, with two screen doors, all window screening was covered with cheesecloth to keep out dust, and a man was continually on duty in the vestibules to kill flies.⁹¹

The physical examination of drafted men was made on the second day after their arrival.¹⁰⁹ Two teams, of 38 officers and 88 enlisted men each, made the physical examinations of draft troops in 1918.¹¹⁰ Each team had two team captains in addition, one of whom passed on the results of the completed examinations and the other supervised the work. Another officer acted as manager of the entire program, and was responsible for the building, the care of records, police, schedule, etc. One team worked in the forenoon and one in the afternoon, in one barrack set aside for their use. One thousand men could be examined per day, and 89,994 men were examined during the year.

There was little relationship between measles and climatic conditions at Camp Dodge, such as existed in the majority of camps, the high waves of incidence being associated rather with the arrival of new troops.¹⁰⁷ The first crest occurred in January, with 250 cases for the month, March showed the highest of all, with 356, and July followed, with 261.⁹⁸ The rise to 112 cases in November was probably due to cross infections in the base hospital, measles cases being mistaken for influenza.¹⁰⁷

Influenza was prevalent in Camp Dodge almost from the first, with a high incidence, during the earlier period, of 955 cases for March, 1918.⁹⁸ Very few cases were reported in August, 1918. The first case of the epidemic in the fall of 1918 was admitted to the base hospital on September 18.¹¹¹ The exact source of the epidemic was doubtful, but it was evident that the disease followed the lines of travel. The influence of acquired immunity to this disease was proved by the difference in its incidence in two regiments of Infantry. One had recently come from Alaska and a post in Washington, and had not been exposed to influenza. The other had been exposed in the Hawaiian Islands and had had 300 cases. Forty-eight and one-half per cent of the former were affected and only 6.5 per cent of the latter. The epidemic covered the period

from September 20 to October 20.¹⁰⁷ The number of cases which occurred during this epidemic is variously stated.¹⁰⁷ A report originating in headquarters, Camp Dodge, Iowa, states that there were 10,008 cases among the 33,070 men in the camp. This is a considerably higher figure than the number of cases reported to the Surgeon General, but probably includes many minor cases which did not get on the official reports and is therefore more nearly accurate. The disease occurred in smaller numbers through the remainder of the year 1918 and the following winter, with only 189 cases in 1919.¹⁰⁰

The occurrence of pneumonia shows a decided peculiarity, in that there were three separate waves, each wave having a distinct etiologic factor.¹¹² There were some 276 cases prior to March 20, 1918, comparatively mild in character and mainly of the lobar type. The second wave, from March 20 to May 10, produced nearly 400 cases of clinically lobar pneumonia, of a severer type and due to the hemolytic streptococcus. From May 10 to September 20 there were 125 cases of the lobar type in which the hemolytic streptococcus was not greatly in evidence. The third wave was due to the fall epidemic of influenza, this disease being very largely responsible for the 2,400 cases and almost 700 deaths.⁹⁸ The frequency of empyema as a complication during the first wave steadily increased to its maximum of about 28 per cent of cases in January.¹¹² Empyema in the second wave occurred in about 35 per cent of all cases. The communicable nature of the pneumonia of the second wave was shown by the fact that the major portion of the cases occurred among the colored troops, where it originated, and the white troops in their vicinity.¹⁰² There were 110 cases of pneumonia in 1919, usually secondary to some acute condition.¹⁰⁰

Meningitis was no more than potentially alarming except in the winter of 1917-18 when 20 cases occurred during December and January, although 1 or more cases were reported nearly every month.⁹⁸ Only 3 cases arose in 1919.¹⁰⁰

In the extra-cantonment zone, the local board of health was active in the fall of 1917, and the United States Public Health Service was actively cooperating with the board.⁹¹ All houses within a radius of 10 miles were provided with sanitary privies, the owner furnishing the material and the county the labor. All booths for the sale of food and drinks were kept in a satisfactory condition, and the board of health furnished the division surgeon with daily reports of contagious diseases. The following summer, the efficiency of the United States Public Health Service representative was excellent, the State board of health was active, but the city board of Des Moines was inactive.⁹⁵ The United States Public Health Service had discontinued its activities by September, 1919, but the boards of health were both active in the supervision of places where food and drinks were sold and of fly and mosquito breeding.¹¹³

A detention camp in Artillery stables which were not in use was planned early in 1918, to have a capacity of 2,000,¹⁰³ but the camp was eventually established in tentage with a capacity of 10,000.¹¹⁴ Meanwhile the construction of buildings to provide a detention camp for 4,000 men and a quarantine camp for 1,000 was begun about July 1, 1918, and largely completed when construction was stopped at the end of the year.¹¹⁵

There were two development battalions in existence by the middle of August, 1918, with a total strength of approximately 4,300 men.¹¹⁶ One battalion was for white troops and the other for colored troops; there were about 500 venereal cases among the whites and 1,500 among the colored men. Two medical officers were assigned to each battalion for duty. Early in November, there were 6 medical officers on duty with the 2 battalions, and 1 sergeant and 10 privates of the Medical Department with each battalion.¹¹⁷ There were 2,177 men in the battalion, of which 465 were venereal cases, 262 orthopedic, 182 cardiovascular, and 605 neuropsychopathic. The development battalion was absorbed by the convalescent center in January, 1919.¹¹⁸

Soon after the convalescent center was organized, there were 5 medical officers, 24 line officers, 15 enlisted men of the Medical Department, and 170 enlisted men from the line on duty with the convalescent center.¹¹⁹ The men in the center were divided into two main groups, casuals and convalescents, the casual group containing all those who were ready for discharge. Assignment of convalescents to the five platoons of the convalescent group depended on the character of the disability and the length of time required to fit them for discharge. Some of the 523 convalescents were retained in the base hospital. There were 1,572 men in the center, at the end of January, 1919,¹²⁰ in April, 1919, there were 8 medical officers, 37 line officers, 18 enlisted men of the Medical Department and 246 enlisted men of the line on duty with the center.¹²¹ About 6,800 men passed through the convalescent center before it was closed on May 31, 1919. The number of men in the center at the end of January was never exceeded.¹²⁰

The dental officer who was to have charge of the dental service for the 88th Division arrived at Camp Dodge September 4, 1917.¹⁰² The first steps in the organization of the work were the securing of 25 dental chairs from the University of Iowa and the purchase of 5 outfits of supplies and instruments in the open market in Des Moines. Thirty-two dental officers arrived a week later. The supplies purchased and those brought to the camp by the individual officers were distributed and work was started about October 1. Each officer made a dental survey of the men in the organization to which he was assigned, the men reporting at the dental office for examination. As the presence of foci of infection was considered to be the most serious dental condition in soldiers, those needing extraction were called in first, then treatment and filling work were begun. All broken appointments were investigated, and disciplinary action initiated when repeated. When it was later found that some men were willfully neglecting the care of their teeth, dental surgeons were required to accompany the medical officers on the regular semimonthly physical inspections and to examine the men as to oral cleanliness. Provision was made for military instruction of dental officers and the instruction of enlisted assistants. A weekly meeting of all dental officers was held, at which the division dental surgeon issued his general instructions. The Camp Dodge Dental Society was formed and held weekly meetings, at which the programs covered the special fields concerning Army dentistry. Courses of instruction in the various techniques were carried on during the same period. A dental infirmary was opened late in June, 1918, but the available equipment was at first sufficient to keep

officers employed only on alternate days.¹²² A second infirmary was opened in October, again with insufficient equipment. This latter infirmary was closed about February 1, 1919. Dental work with recruits was not well organized until August, 1918, when the plan was adopted of confining this work mainly to that of oral hygienic nature, including the extraction of teeth which it was not practicable to treat.¹²² This work, like that of the remainder of the camp, was interrupted by the influenza epidemic, when the dental officers were used as assistants to ward surgeons in any and every position in which their services could be used.

Available records of the veterinary activities date from August, 1918.¹²³ Animals were quartered in the closed type of stables.¹²⁴ No epidemics of disease occurred in the camp, and to prevent their introduction from outside sources all animals privately owned, or strayed and caught, were inspected and mallein tested before being allowed to come into contact with Government animals.¹²⁴ The rarity of colic was notable. All meats and meat products locally purchased were presented at the refrigerating plant for inspection before delivery.¹²³ Any dealer who failed to comply with this requirement was barred from the camp for 15 days for the first offense by a camp order.¹²⁵ There was no instance of a second offense being committed. About 15 farms in the adjacent country which furnished raw milk for sale in the camps were inspected every two weeks or oftener, any animal found dead on these farms from an unknown cause was reported to the division veterinarian, and all cattle were tuberculin tested and reactors slaughtered.¹²³

At the remount depot manure was allowed to accumulate in the corrals from the time first occupied until May, 1918, when they were thoroughly cleaned and the manure removed weekly thereafter.¹²⁶ The water troughs in the corrals were originally constructed of wood and their capacity was inadequate. These were replaced by concrete troughs of larger size in September, 1918. Boxes were built about the water pipes and filled with manure as a protection against freezing. The south sides of the sheds in the corrals were open and two windstorms in the spring of 1918 destroyed over half of them. A large corral was divided into three sections in September, 1918, and used as a quarantine corral. The hospital consisted of 8 corrals, 8 ward buildings, 4 operating-room buildings, and 4 forage-room buildings. The wards contained a total of 80 box stalls and 112 open stalls. Deaths during the winter of 1917-18 were due principally to influenza and pneumonia—125 of the former and 68 of the latter. The first case of glanders was detected in August, 1918, and three others reacted positively to the mallein test prior to March, 1919.¹²⁷

Demobilization began November 22, 1918, and was conducted by a special force organized for the purpose and known as the demobilization group.¹²⁸ The force conducting the physical examinations, during the period of most active work, consisted of 16 officers and 35 enlisted men, working in one shift from 7.30 a. m. to 5 p. m.^{105 129} This force was augmented by three or four medical officers during periods of special stress, usually about five days in each month.¹²⁹ One medical officer and one enlisted man were detailed to examine officers. The men to be demobilized were grouped for examinations, when practicable, such as in the execution of exercises before the orthopedist.

The only important change made in the technique of the examinations was the introduction of a routine inspection of the ear drums in June, 1919.¹²⁸ The maximum number of men examined in one day was 2,971.¹³⁰ Demobilization was officially discontinued November 25, 1919, the force having examined 208,827 men.¹²⁸ Disabilities were found in 14,782 men.¹³⁰ Only 2,228 were retained for further treatment, 88 of these on account of active tuberculosis and 173 for venereal disease.¹²⁸ The explanation of these small numbers was that the bulk of men with disabilities had been eliminated by previous inspections held between the point of debarkation and a camp so far inland as Camp Dodge. Venereal disease was more common among the men who had served only in the United States than among the men who had served only in France. The difference in the venereal incidence found in the demobilization and mobilization examinations was striking and is an argument in favor of repeated inspections. Camp Dodge was still functioning as an Army post at the close of the year 1919.

CAMP FUNSTON, KANS.

An area in the eastern part of the Fort Riley, Kans., military reservation, lying in the alluvial plain of the Kansas River, was selected as the site of Camp Funston.¹³¹ High bluffs bordered this plain on the north, and it was traversed by a sluggish, tortuous creek. The city of Manhattan lay 14 miles to the east, Junction City 8 miles to the west, and the post of Fort Riley 4 miles to the west. The summers were very hot and the winters cold. The country was subject to severe windstorms; and as the main rainfall occurred in late spring and early summer, severe dust storms were common during the fall and winter. The mud was thick and adhesive and appeared to be almost bottomless during the rains. The roads in the surrounding country were unimproved.

Drafted men were sent to Camp Funston from several Western States.¹³² The first troops arrived between September 1 and 15, 1917, and the strength was gradually increased. The maximum monthly strength in 1917 was approximately 27,000 in December. During the year 1917, troops came from Colorado, Arizona, New Mexico, South Dakota, Kansas, Missouri, and Nebraska. A few were received from other States and approximately 500 from other camps. The 89th Division was organized here and moved overseas about June, 1918. A part of the 92d Division also was organized here and moved overseas at about the same time as did the 89th. After these divisions left, the 10th Division was organized. During 1918, drafted men were received from the same Western States named above, also from Florida, Louisiana, Oklahoma, and Alabama. A considerable number of men were received also from other camps. The maximum strength was for September, when there were approximately 50,000 men in camp.

The troops were quartered in barracks, the layout of which was in straight lines running east and west. Several faults in the early construction of the camp which were of interest to the Medical Department were noted. The steam-heating system of the barracks was of the low-pressure type which had no provision for a return flow; the waste steam discharging under the buildings condensed in sufficient quantities, in some instances, to flow out and form large muddy areas.¹³² As first constructed, only about one-third of the kitchens

were screened.¹³³ Dining room and kitchen table tops were constructed from matched lumber, and it was necessary for the organizations to reconstruct them with removable boards to insure thorough cleaning. There were two ranges in the kitchens, but only one was connected with the hot-water tank, as it was feared that two connections would produce a greater pressure than the soldered-joint tanks would withstand. As it was soon proved that the demand for hot water was so great that there never was any, both ranges were connected.¹³³

Five bored wells near the camp area, about 40 feet deep, furnished the water supply in the fall of 1917.¹³⁴ Since the water was not potable untreated, it was chlorinated. A temporary reservoir was located on the hill overlooking the camp, but certain areas which were at an elevation above the main camp were without water at times.^{131 133} The number of wells was later increased to nine, the new ones extending to a maximum depth of 70 feet.¹³⁵ The water having a high iron content and being very hard, a softening and iron-removal plant was constructed in the fall of 1918. Two water lines were connected with the Fort Riley system as an auxiliary supply, but this was not used to any great extent.¹³⁶ Only three wells were maintaining a good flow by the end of the year 1919, with a capacity estimated to be sufficient for 30,000 troops, allowing 50 gallons per man per day.¹³⁷

The strained garbage was destroyed in four cone-pit incinerators prior to the time of its disposal by contract early in October, 1917.¹³⁴ These incinerators effectually disposed of about 325 cans of garbage daily. Though the garbage transfer station was not completed until after November 15, 1917, it was in use at that time.¹³³ It was poorly located, one side being inaccessible to trucks. The can-washing system included hot-water coils in an incinerator, but the garbage was so well separated at the kitchens that there was very little refuse to burn, necessitating an excessive use of coal.¹³⁸ Also, since one of the washing tanks served as a reservoir for hot water, fragments of garbage would block the coils.¹³⁷ A medical officer was on duty at the transfer station to insure its proper operation as well as to check on food waste.¹³¹ The quartermaster transported the garbage to the transfer station in cans which were emptied into the tank trucks owned by the contractor.¹³⁶ Later, when the detention camps were established, the tank trucks there collected directly from the kitchens, and a steam boiler, mounted in a wagon, followed to sterilize the cans with live steam. The detail in charge of this did not wash the cans, however.

As no one could be found who would remove the manure from the camp without expense to the Government, it was burned in windrows.¹³³ Difficulty in removal of manure during the winter of 1917-18 and attempts to burn it in two large piles resulted in an accumulation, but burning in smaller windrows proved efficient in the spring of 1918, and the winter's accumulation was destroyed.¹³⁹ The ashes from the burned manure were used at the refuse dump to cover burned refuse and garbage which could be disposed of in no other way. About 300 tons of manure were produced daily in the early fall of 1918, a small part of which was pressed with coal slack into briquettes and used as fuel under boilers. This experiment was highly successful and warranted extension.¹³⁶

The camp sewerage system was in use before the middle of November, 1917.¹³⁸ As there were no towns below the camp for some distance, the sewage

was discharged into the river without treatment. The system discharged by gravity when the river was low, but required the use of automatic pumps when the river was high.¹³⁶ The construction of the outfall was faulty, in that the sewage was discharged onto the bank of the stream rather than directly into the water.¹³⁶ The auxiliary remount depot and one of the detention camps were connected with the main camp system.¹³⁶

Because of the dust nuisance in camp, and particularly because it was believed that so much dust in the air in the fall of 1917 caused a mechanical irritation of the air passages, thus predisposing to respiratory diseases, all camp roads and a goodly part of the exposed ground were oiled.¹³⁶ This attempt to prevent flying dust proved unsuccessful: it did not penetrate sufficiently to bind the earth well, consequently the inhabitants of the camp were annoyed with a heavy, oily dust instead of the impalpable, dry dust. Watering roads and grounds, and the planting of grass proved much more effective in laying dust than did oiling.

The ambulance service of the camp, until the departure of the 89th Division for overseas, was furnished by the motorized ambulance companies of the sanitary train of that division.¹⁴⁰ Much difficulty was experienced during the winter of 1917-18 because of the freezing of the water in the radiators of the ambulances. To overcome this, efforts were made to have the ambulance sheds inclosed and heated, but a recommendation to this effect was disapproved by War Department.¹⁴⁰ Because several ambulance radiators froze up while the ambulances were operating between the camp and the hospital, 3 miles to the west of the camp, the expedient of replacing the water of the radiator with petroleum was resorted to, with very satisfactory results. After the departure of the 89th Division, a camp ambulance service of 34 men and 12 ambulances was organized, with personnel from the depot brigade.¹⁴¹ This service was improved later when assumed by a camp ambulance company of 122 men, 18 motor-drawn and 12 animal-drawn ambulances.¹⁴²

A quarantine camp under canvas was established during December, 1917, with 2,500 beds and a field hospital on duty to furnish medical attendance.¹⁴³ A detention camp of similar size was established in February, 1918, also with a field hospital on duty.¹⁴³ Both of these camps were officially designated as detention camps, the former as detention camp No. 1, or Camp Pawnee, and the second as detention camp No. 2, or Camp Republican. There were 1,209 men in detention camp No. 1 at the end of January, 1918; 600 were meningitis carriers, 550 were mumps contacts, 50 were measles contacts, and 9 were diphtheria contacts.¹⁴⁴ To administer the camp required 30 line officers, 15 medical officers, 190 enlisted men from the line, and 50 enlisted men from a field hospital. Medical officers from the Medical Officers' Training Camp at Fort Riley held sick call twice a day, and a medical officer inspected the camp every two hours during the night to insure that proper ventilation of the tents was maintained and to care for any sick. A guard was stationed in each street at night, and a part of his duty was to notify his superior of any emergency sickness and to act as a guide to the medical officer who responded to the call. To prevent sickness from exposure and from contact infection while men were waiting in line for treatment, culturing, etc., each man wore an overcoat, during the winter,

and the waiting line was marched in circles with not less than one pace distance. The actual waiting line at the entrance to the treatment room was kept short, five men at a time being dropped from the marching column as necessary. These measures reduced the sick rate to a point well below that of Camp Funston. Detention camp No. 1 was entirely occupied by the development battalion in November, 1918, and over half of this command were occupying one-story barracks.¹⁴⁵

A "remedial battalion," established as a part of the depot brigade, was a predecessor of the development battalion.¹⁴¹ It was considered by a general sanitary inspector as "an unnecessary evil," since 70 per cent of its 900 strength in June, 1918, were unable to do much of anything, and the efforts to improve this inefficient, crippled lot of men had made them worse. Three development battalions, efficiently organized, were operating in August, 1918, with a strength of 6,410 men.¹⁴⁶ One battalion was reserved for white venereal cases and one for all colored men. Each battalion was divided into four companies. Company A consisted of men fit for combat duty. Company B was divided into two sections, one composed of men who were then fit for domestic service only but who would eventually probably be fit for combat duty, and the other composed of men who would never be fit for anything but special service. Company C comprised men who would ultimately graduate into Company B and possibly into Company A. Company D included all who were to be discharged for disability. A reorganization of the battalions into two regiments of three battalions each was later made, one regiment composed of white men and the other of colored.¹⁴⁵ There were 4,375 men in the 2 regiments in November, of which 1,742 were venereal cases, 357 orthopedic, 346 neuropsychopathic, and 195 cardiovascular.

The convalescent center was organized in January, 1919, with about 250 convalescents.¹⁴⁷ Scarlet fever and measles contacts were placed under its control,¹⁴⁷ the other work of the center consisting exclusively of demobilization activities, owing to an absence of instructions as to its real purpose.¹⁴⁸ By April, the center was composed of two sections, a general section in Camp Funston and a separate section at the base hospital in Fort Riley.¹⁴⁹ All men requiring vocational courses or occupational therapy were sent to the latter place, but practically all administrative work was centered in Camp Funston. The permanent cadre of enlisted men numbered 88. The greatest number of convalescents in the center was about 400, in April; the final report of the convalescent center was rendered May 10, 1919.¹⁵⁰

An excellent system of physical examination was organized early in 1918, use being made of two barracks with an inclosed passageway to an intervening latrine and bath.¹⁴¹ Recruits were met at the railroad station and taken directly to the first barracks, where their civilian clothes were packed in suitcases for shipment back to their homes. The men then proceeded to the bathhouse and took hot baths, the quartermaster furnishing soap and towels. All examinations were made on one floor of the second barracks. If a man was accepted, he was furnished with a complete equipment by the quartermaster; if rejected, his civilian clothes were returned to him. The board also reexamined men who had been accepted with supposedly remediable defects.

German measles was quite prevalent in September, 1917, during which month there were 349 cases, then was rare until January, 1918, when 290 cases were reported, and rare again after May, 1918.¹³² True measles was seldom reported until November, 1917, when there were 148 cases. There was a second wave rising to 110 cases for the month of April, 1918, and a third extending over the fall of 1918, with a crest of 272 cases in November.

Influenza was epidemic in Camp Funston almost from the beginning, 922 cases being reported in November, 1917, and 2,480 in March, 1918.¹³² The fall epidemic of 1918 produced 3,534 cases in September and 11,290 in October. The base hospital was soon filled, so several buildings, erected by welfare organizations, and a number of barracks were converted into temporary hospitals.¹⁵¹ Field hospitals of the divisional sanitary train manned these emergency hospitals, with the assistance of commissioned personnel from the base hospital, depot brigade, and specialists' boards, and of nurses from the base hospital.¹⁵² Enlisted men from the line were hastily trained to take temperatures and care for patients. All cases even suspected of having pneumonia were sent to the base hospital.¹⁵¹

Lobar pneumonia was the predominant type prior to the influenza epidemic in the fall of 1918, chiefly primary. The same type was in the majority during the influenza epidemic,¹³² undoubtedly due to the inclusion of influenzal pneumonias with the primary cases. Even in the cases which followed influenza, there were 50 per cent more lobar pneumonias than bronchopneumonias, but this is accounted for by the deliberate classification as lobar pneumonia of cases which showed a large area of consolidation which was still less than one lobe.¹⁵¹ There were 4,678 cases of pneumonia in 1917 and 1918, with 1,226 deaths.¹³² The entire command was inoculated with pneumococcus lipovaccine, with an encouraging decrease in the incidence of pneumonia at the end of the year.¹⁵³ Primary pneumonia was practically eliminated.

Mumps was of importance in Camp Funston on account of the large numbers of men involved and its continual presence.¹³² There was a small epidemic of 226 cases in September, 1917, but the disease had almost disappeared in December. There was an explosive increase in January, 1918, to 1,402 cases, and 1,992 cases occurred in February. Convalescent cases were cared for in barracks designated for that purpose.¹⁴³ Covered passages were built connecting these barracks with the lavatory and toilet sheds. The incidence steadily decreased thereafter until a gradual increase began in October which reached 463 cases in December.¹³²

Meningitis was continually present from September, 1917, to the close of the year 1918, with a total of 148 cases.¹³² This was not surprising, as the surrounding States had constituted an endemic center of the disease for many years, and the bulk of the troops were drawn from these States.¹³³ The identification and care of carriers was an immense undertaking, 1,200 being in the quarantine camp at one time in February, 1918.¹⁴³ The entire command was cultured, the proportion of carriers in organizations usually varying from 5 to 8 per cent, but being as high as 12 per cent.¹⁵⁴ The immunization of the entire command against cerebrospinal meningitis was initiated in January, 1918, but available records do not show its completion.¹⁵⁵

A complete disruption of the dental service of the camp occurred when the two divisions departed in May and June, 1918.¹⁵⁶ Every dental officer left with the divisions, and new and inexperienced officers were sent as replacements. A visiting dental inspector assisted in the reorganization of the service by installing certain dental officers in the dental infirmary building which had formerly been in use, by arranging for the final steps necessary in the completion of a new dispensary building, and by the collection and distribution of equipment, etc. The dental work performed from October 1, 1917, to April 30, 1919, included the following: 17,167 extractions, 57,453 permanent fillings, 4,911 temporary fillings and 4,952 root canal fillings.¹⁵⁷

The first enlisted men of the Veterinary Corps, 89th Division, were obtained December 15, 1917, by transfers from various medical detachments.¹⁵⁸ The balance of the enlisted men for the veterinary service of the division were obtained in February, 1918. The commanding officer of each unit followed a prepared schedule in instructing the men in his unit, and lectures were delivered to officers and enlisted men of the line on the proper fitting of harness, etc. The stables were inclosed structures, most of them with 32 double stalls each. The windows were open constantly, being so constructed that the entering current of air was directed upward. Animals were stabled at night, groomed on the picket line, and turned into the corral for the remainder of the day when not in use.

All fresh milk received in camp prior to the summer of 1918 was furnished by firms in Kansas City which were bonded to supply only Pasteurized milk from tuberculin-tested cows.¹⁵⁹ A new contract was let to a firm in Junction City in August, 1918, with the same conditions, after an initial inspection had been made of the dairy herds which were to furnish the milk.

The remount depot was poorly located, the area being too flat to afford efficient drainage.¹⁶⁰ Fortunately, the soil was sandy and mud did not last long after a rain. The corral sheds were inclosed on three sides. There were two fenced pastures of 800 acres each, and when the grass was short the animals were herded outside.¹⁶¹ Extensive ditching and filling was performed by 100 civilian workman in the spring of 1919.¹⁶² The maintenance cost of the depot was so excessive that plans were approved for its removal to a more suitable site, but there is no record that the move was made. Eight ward buildings, eight stables, and eight other buildings, with corrals, constituted the veterinary hospital.¹⁶⁰ The leading causes of animal disability prior to February, 1919, were as follows: Influenza, 1,165 cases; wounds, including picked-up nails, 652; pneumonia, 590; strangles, 343; thrush, 153. Four cases of glanders occurred in April, 1918.

The physical examinations in connection with demobilization were begun in November, 1918, with 10 examining teams of 6 medical officers each.¹⁶³ At this time, however, only four teams were operating, the other teams being in training. All medical officers of the 10th Division were given instruction in this work, one officer from each organization being assigned to a team for a period sufficient to allow him to become competent. Two boards were conducting the examinations in January, 1919—a division examining board and a camp examining board—one functioning in the convalescent center.¹⁴⁷

In April, 1919, one board was located at the convalescent center at the base hospital, and was conducting about all the activities of the convalescent center.¹⁶⁴ This board was attempting to make the demobilization examinations of all men having a disability, leaving only strictly sound men for the regular camp board. It was duplicating the work of the camp board in many respects. There was a board of review connected with this board which had no relation to the board of review connected with the camp examining board. Little coordination obtained between the camp board and the demobilization unit. The board did not know at what times or in what numbers men would appear for examination, and no appointments could be made beforehand. The system in use in the demobilization unit was based on making the pay rolls for groups of 20 men, priority of names on the rolls depending on the availability of correct statements for entry in the "remarks" column of the pay rolls. It was necessary to maintain these groups as originally constituted, through the entire process of demobilization until discharged, in order to avoid error. Forms for use by the examining board were forwarded to the board in advance, so that the necessary data could be transcribed on local record forms before the men were presented for examination. The board of review connected with the camp examining board also examined all officers to be demobilized. Only one disability board was in existence, as required by Army Regulations, but it functioned in two sections, one for medical cases and one for surgical cases. Formal demobilization was discontinued July 15, 1919, the small numbers presenting after that date being examined by a board at the base hospital.¹⁶⁵ In all, 77,862 officers and men were examined, and 2,790 were found with some form of disability.

CAMP GORDON, GA.

Camp Gordon was situated 12 miles from Atlanta, Ga., in a country of rolling hills which had originally been densely forested.¹⁶⁶ In addition to the many small streams tributary to the Chattahoochee River,¹⁶⁶ there were numerous springs and marshy places in the camp area.¹⁶⁷ The soil was a mixture of sand, clay, and loam, which was easily converted into dust or mud as weather conditions varied. Although the temperature seldom reached 100°, the long summers were marked by periods when the heat was oppressive. Excessive rain or wind storms did not occur. Improved roads in the surrounding country were not the rule.¹⁶⁸

During 1917, the first drafted men were received from Alabama, Georgia, and Tennessee.¹⁶⁹ The first troops arrived between the 1st and 15th of September. Something over 22,000 men were received from the other camps. In 1918, the largest number of drafted men came from the State of Georgia, some from Alabama, a considerable number from Tennessee, as well as from New York, Illinois, Ohio, and Iowa; also a considerable number from other camps. The maximum strength was in August, 1918, when there were approximately 47,500 men in camp. The 87th Division was organized here and moved overseas about May, 1918. After this division left, the camp was used as a replacement camp and was again filled with drafted men.¹⁶⁹

When construction was begun, the camp site was dotted by numerous farm houses and barns, all in a most insanitary condition.¹⁶⁷ Each farm had

a "dug" well, usually contaminated, as were all springs and streams. As a preliminary to construction work, all buildings were razed and the sites policed, burned over, and finally, plowed. Wells and springs were closed and sealed, and wells located on neighboring farms were placarded to the effect that their use was prohibited by all persons except the occupants of the houses.¹⁶⁷ The camp area was divided into districts for construction purposes, and the burlap bag system was adopted to care for the policing.¹⁶⁷ Bags were placed at convenient places for the disposition of refuse, the water boy collected all waste from the laborers' central lunching points, and all bags were emptied into other bags at a central point in each district. The use of temporary latrines was necessary pending the completion of the sewerage system.¹⁷⁰ Pit latrines were used for soldiers and for the civilian employees in general, and straddle trenches for the sewer, grading, and moving gangs.¹⁷⁰ As many of the civilians engaged in the construction work boarded at local farmhouses, frequent surveys of the adjacent territory were made. Several cases of typhoid fever were found and the necessary steps were taken to prevent its introduction among the camp employees.

The city of Atlanta furnished water for Camp Gordon, the source being the Chattahoochee River.¹⁶⁷ While the major portion of the watershed was sparsely inhabited there was an area in its lower reaches which contained numerous houses and one village, the sanitation of which was far from satisfactory.¹⁶⁷ Since the water usually was turbid, it was sedimented, treated by coagulation, and was then filtered. Though this method was satisfactory, and no colon bacilli were found in the filtered water ordinarily, the water was chlorinated by the city.¹⁷¹ At the camp, five 200,000-gallon storage tanks were constructed.¹⁷² These proved inadequate, for in the spring of 1918, when 3,000,000 gallons of water were being used daily, there was insufficient water in the tanks at times for fire protection.¹⁷³ In consequence, 4 additional storage tanks of 200,000 gallons capacity each were constructed in September, 1918.¹⁷⁴ During the summer of 1918, a few colon bacilli appeared in the water,¹⁷⁵ and because the city chlorinating apparatus was not to be relied upon, the Quartermaster Department, in July, 1918, installed a liquid chlorine apparatus at the camp.¹⁷⁶

The camp sewerage system, although incomplete, was of necessity put into use on September 20, 1917, the effluent from the septic tank being discharged into a small creek, without treatment.¹⁷⁷ One-half of a sprinkling filter was put in operation December 5, 1917, receiving half of the effluent from the septic tank.¹⁷⁷ This disposal plant was unsatisfactory from the beginning.¹⁷⁴ There was poor distribution of the sludge in the septic tank, no digestion, and offensive odors were produced. It was necessary to remove the sludge by hand labor in February, 1918, and bury it.¹⁷⁴ Later, however, it was discharged into the creek on several occasions during periods of high water. Stone of improper quality and sizes and mixed with dirt had been used in the construction of the sprinkling filter, with a resultant pooling of the sewage.¹⁷⁴ The discharge of the faulty effluent from this portion of the filter bed and of raw sewage direct from the septic tank resulted in numerous complaints from

property owners along the stream below.¹⁷⁸ Ultimately the whole mass of stone was removed from the filter bed and the bed reconstructed properly.¹⁷⁸ In addition, a grease trap on the main sewer line, screen and grit chambers, and sludge beds were added. These improved the effluent of the septic tank but made little change in the digestion of solids.¹⁷⁸ The grease collecting in the trap was mixed with so much fecal matter that it was of no value and had to be buried, and the grit chambers held a deposit of sludge rather than grit.¹⁷⁹ A 24-inch grease trap was then constructed in each kitchen drain, but these were too small and much grease was carried through into the main sewers and interfered with the digestive process in the septic tank as before.¹⁷¹ It was necessary to use crude oil on the scum in the septic tanks to prevent fly breeding.¹⁸⁰ A suction pump was installed in the winter of 1918-19 to remove the sludge from the septic tank, but it failed to work.¹⁸¹ The completion of an additional septic tank in March, 1919, and the coincident reduction in the population served by the sewerage system, at last resulted in a tank effluent which was clear and free from all odor.¹⁸²

Waste water from the bathhouses and kitchens was discharged into the sewerage system.¹⁶⁶ Before the completion of this system, liquid waste from the kitchens was passed through improvised grease traps into soakage pits.¹⁶⁷

At first, farmers were allowed to remove the garbage in the cans, the only requirement being that they clean the cans before returning them.¹⁶⁷ Soon after mobilization was begun, however, a contract was let for garbage and wastes disposal. The firm which had contracted for the disposal of all varieties of waste unfortunately fired the incinerator, for the disposal of the garbage not suitable for hog food, too soon after its construction,¹⁸³ and as a result the incinerator had to be temporarily discontinued for repairing, thus necessitating burning the garbage either in deep trenches or at the dump.¹⁸⁴ The various organizations were responsible for the delivery of the sorted garbage at the transfer station.¹⁶⁶ The contracting firm accepted all varieties of garbage except coffee grounds and the rinds of citrus fruits, and was willing to remove the same directly from the kitchens but was not permitted to do so.¹⁸⁵ The garbage was removed from the transfer station in iron tank wagons, but a can-washing system was not installed at the station until the spring of 1918.¹⁷³ The incinerator again became out of order in the winter of 1919, and the unusable garbage was burned, as well as possible, at the dump.¹⁸²

Manure was hauled away by farmers until January, 1918,¹⁶⁶ when a contract was let for its disposal.¹⁸⁵ The contractor was to build a loading platform, and the Army was to put in the concrete floor and keep the latter policed.¹⁸⁵ Inability to obtain cars caused the suspension of the contract a month later, and the disposal of the manure to farmers was resumed, with fairly satisfactory results.¹⁸⁶ It was again being removed in freight cars before May, 1918,¹⁷³ but the major portion was later used as fertilizer on the farms which were operated by the Quartermaster Department.¹⁸⁰ Removal by rail had been discontinued by the summer of 1919; the contractor now hauled manure from the camp proper to a near-by farm, and formed a compost pile with manure from the auxiliary remount depot.¹⁸⁷ The pile was trimmed, oiled, and the edges of it were burned in an effort to stop its fly breeding.¹⁸⁷ This method of storage, being unsatisfactory, was discontinued in August.¹⁸⁸

With the exception of the division surgeon and the division sanitary inspector, who were assigned to the division by War Department orders, a nucleus of Medical Department personnel, consisting of both officers and enlisted men, was assigned to the 82d Division from the Medical Officers' Training Camp, Fort Oglethorpe, Ga.¹⁵⁹ The Medical Department organizations were then completed by assigning to them the requisite number of selective service men. In this connection it is appropriate to state here that early training in some of the divisional Medical Department organizations, particularly the sanitary train, was seriously handicapped because the division headquarters transferred away from them many especially qualified enlisted men to other branches of the service within the camp, and without regard to the value of the men to the organizations from which they were transferred, and replaced them with men of inferior intelligence and ability or with physical defects.¹⁷⁷ The regimental medical detachments were particularly unfortunate in this respect, for not only was advancement in training difficult but they were confronted with the fact that many of the men were physically unfit, by reason of minor disabilities, for overseas service, thus necessitating a further replacement.¹⁷⁵ After the 82d Division left the camp for the American Expeditionary Forces, there remained in the camp 241 officers and 1,079 enlisted men of the Medical Department,¹⁶⁶ of whom 8 officers and 8 enlisted men were on duty in the camp surgeon's office.¹⁹⁰

A squad of 15 men, working under the supervision of the camp sanitary engineer, formed the nucleus of the first sanitary squad of the 82d Division, in January, 1918.¹⁸⁵ The personnel finally selected for the two squads which were to accompany the division overseas consisted of men with excellent qualifications.¹⁷³ A camp sanitary squad of 26 men was used for drainage work after the departure of the division.¹⁷³ The strength was soon increased to 50, a labor battalion furnishing the labor required for camp sanitation.¹⁷⁵ In September, 1918, 31 men were in the squad, with an addition of from 50 to 100 men detailed from the depot brigade. This number was reduced to 21 during the winter of 1918-19,¹⁹¹ but was again increased in the following spring, 2 sergeants first class, 4 sergeants, 2 corporals, and 18 privates being detailed for the work.¹⁹² In May, the enlisted personnel of the squad was replaced by civilian laborers under competent foremen.¹⁹³

A two-story barrack building was used for the physical examination of drafted men, but as no changes were allowed to be made in its internal structure it was not particularly adapted to the purpose.¹⁷⁴ The only passageway between floors was an outside stairway, and several stages of the process were necessarily simultaneously conducted in each room.

The examining board consisted of 14 medical officers and 32 enlisted men.¹⁶⁵ Drafted men upon arrival were inspected for contagious and infectious conditions, and then sent to the casual detachment.¹⁶⁶ Inside of 48 hours, as a rule, they were ordered for physical examination, a group of 60 reporting every 45 minutes under a commissioned officer.¹⁶⁶ Three blank forms were used. One of these was in duplicate, so that original entries of the results of the physical examination could be made on the one to be retained, later to be transcribed to the others as required.¹⁶⁶ An abbreviated note was made in the corner of a man's examination form if a defect was found, for the purpose of quickly bring-

ing the defect to the attention of the special examiner. Enlisted men made the routine tests of sight and hearing.

Measles seldom was reported until November, 1917.¹⁶⁹ The number increased to 495 cases for December, almost disappeared in February, 1918, then gradually increased to 190 cases in August.¹⁶⁹

Influenza was prevalent in Camp Gordon from the first, and reached a crest of 723 admissions in December, 1917.¹⁹⁴ The crest of the second wave came in April, 1918, with 856 cases, and the third wave began in August, with 238 cases.¹⁹⁴ For September and October, 1918, the bulk of the cases of influenza were reported locally as "nasopharyngitis," at the request of the camp surgeon,¹⁹⁴ since inflammation of the conjunctivæ and nasopharynx was a common symptom.¹⁶⁹ The fall epidemic began in troops on the rifle range, early in September, and there were about 5,000 cases by October 12.¹⁶⁹ The epidemic reached its maximum on September 25, but the incidence of the disease remained high until October 9. Official reports for September and October showed only 896 cases, but about 4,400 of the cases reported as "other respiratory diseases" should undoubtedly have been included in the influenza total.¹⁶⁹ A final report from the camp surgeon placed the total number for the two months at 6,011.¹⁷⁶ Two features of the efforts made to control the influenza epidemic in the fall of 1918 are credited with being mainly responsible for the unusual results obtained.¹⁷⁶ The incidence of influenza reached its highest point about two days after the introduction of the use of chlorinated water as a twice-daily gargle and nose douche by the entire command.¹⁷⁶ Every person in the camp was also required to wear a gauze mask continuously. The measures for handling the epidemic were so arranged that the intensive training of recruits was not interrupted, and the October shipment of trained men was delayed only nine days.¹⁷⁶ Masks were worn and the chlorinated-water treatment was continued on troop trains en route to ports of debarkation, with the result that no cases of influenza or pneumonia were reported to have developed en route.¹⁷⁶

The incidence curve for pneumonia followed rather closely that for influenza, with high points in January, April, and August, 1918.¹⁶⁹ The only surprising difference is that the high point for pneumonia in the summer occurred in August, when the influenza curve was on the rise, rather than later and closely following the high point for influenza.¹⁶⁹ The low incidence of pneumonia as an influenza complication in the fall of 1918 was undoubtedly due to error in diagnosing such cases as primary pneumonias.¹⁶⁹ Even so, the death rate for influenza pneumonias was unusually low.

Mumps occurred in two long waves, the first beginning in September, 1917, and more or less steadily rising to the crest of 789 cases in May, 1918.¹⁶⁹ The second wave began in July and reached the crest of 318 cases in November, 1918.¹⁶⁹ There was a total of 4,838 cases prior to January 1, 1919.

A section of the depot brigade, with a maximum housing capacity of 2,000 men, was used for detention purposes in connection with the arrival of men newly assigned to the camp.¹⁷³ This section was used also for quarantine purposes, there being no special quarantine camp.¹⁷³ The method of detention and quarantine was as follows:¹⁷³ As soon as the men reported at the camp they

were inspected, by designated medical officers, for contagious and infectious diseases, including venereal or acute or chronic skin infections. Such men who were found to be suffering from any of the above conditions immediately were taken care of either by admitting them directly to the local base hospital, in the event they were suffering from contagious disease, or giving them necessary and appropriate treatment, if such treatment was all that was necessary. Men not admitted to hospital were placed in quarantine in the respective barracks to which assigned. Here a careful check was made while this quarantine was in force, and if any of the contagious or infectious diseases occurred among them, the case involved was immediately removed to hospital, and his bedding and personal clothing were sent to hospital for disinfection. If the case removed was one of epidemic cerebrospinal meningitis or diphtheria, throat cultures of all contacts immediately were made by an officer from the hospital laboratory to determine the presence of carriers. If such were present they, too, were removed to hospital for appropriate treatment. The quarantine extended over a period of 14 days.

A development battalion was organized the middle of July, 1918,¹⁷⁵ and two battalions were operating a month later, with a combined strength of 2,621,¹⁹⁵ over one-third of whom were venereal cases, quarantined in a special camp.¹⁷⁴ As at first organized, the battalions were not accomplishing their purpose; that is, men with irremediable defects were not being sufficiently rapidly discharged from the service, and men with remediable defects were not being returned to a full duty status as soon as they might have been. So, in September, 1918, a reorganization was effected. Men now were separated into sections representative of the different classes of cases.¹⁷⁴

The convalescent center was organized in January, 1919,¹⁹¹ the first report rendered showing a convalescent strength of 405.¹⁹⁶ This was increased to 482 one week later, then gradually fell to from 40 to 60 during June and July.¹⁹⁷ The center was divided into four companies in April, under the command of a line officer, and with six medical officers attached.¹⁹² The center was closed about August 1, 1919.¹⁹⁷

The remount depot was located on very rolling terrain, traversed by several small streams.¹⁹⁸ The local physical characteristics were apparently not considered when the depot was laid out, resulting in the location of some shelters and feeding racks on low ground and the unnecessary inclusion of low, wet areas within the corrals.¹⁹⁸ Furthermore, the depot was close to the confines of the camp proper, and on account of its nearness to troop quarters, as well as the general unsuitable terrain, local protests were made against the proposed plans before construction was started.¹⁹⁵ The objections were overruled by War Department on the ground that the disadvantages were not of such prime importance as to warrant the delay incident to a change in plans at that time.¹⁹⁹ A two months' period of cold weather in the winter of 1917-18, followed by warm weather, caused an accumulation of mud and manure that was knee deep in places.¹⁹⁸ The report of this condition by a visiting inspector initiated marked activity in efforts to put the place in a presentable condition.²⁰⁰ Drainage was improved, low-lying areas were fenced, and rotary sweepers, scrapers, etc., provided to insure the daily removal of manure.¹⁷⁷ All of the winter's accumu-

lation of manure, except about 100 earloads, had been removed by May, and the general condition of the depot was excellent.¹⁷⁷ Conditions suffered a relapse later, for there were 6 to 18 inches of manure in nearly every corral in June, 1919, and an enormous number of flies were breeding there.²⁰¹

Twenty-nine medical officers constituted two teams to make the physical examinations in December, 1918.²⁰² This arrangement was changed to 1 team of 20 in January, 1919. Examinations were made on four days a week, and the daily capacity was something over 400. The system was much improved later by using three teams in eight-hour shifts, taking a man's complete medical history and making a thorough physical examination.²⁰³ One thousand five hundred men per day could then be examined over an indefinite period, and 48 hours was the maximum time allowance for accomplishing discharge, except for cases which were retained for treatment.²⁰³

Camp Gordon ceased functioning as a demobilization center on November 5, 1919. Meanwhile 116,228 men were examined, among whom only 969 were determined to have disabilities.²⁰²

CAMP GRANT, ILL.

Camp Grant was located in the north central part of Illinois, on the Rock River, 1 mile from the city limits of Rockford.²⁰⁴ The camp area was fairly flat, sloping gently toward the river,²⁰⁵ with a precipitous descent to the bottom lands.²⁰⁴ The river banks were wooded. The soil was loam overlying gravel and sand,²⁰⁴ and did not absorb water readily; large areas retained the surface water for 24 hours or more after heavy rains.²⁰⁵ There were two concrete roads to Rockford,²⁰⁴ but the majority of the roads in the vicinity were unimproved.²⁰⁵

The first increments were drafted men.²⁰⁶ The first of these arrived between the 1st and 15th of September, 1917. During 1917, practically all the drafted men sent here were from the States of Illinois and Wisconsin; those from Illinois came from Chicago and surrounding countries, including some of the large cities. The maximum monthly mean strength during the year 1917 was approximately 28,000 in October. It declined then and the mean strength in December was approximately 22,000. The 86th Division was organized here and moved overseas about August, 1918. Following this, the camp was used as a replacement camp, and was again filled with drafted men. It reached its maximum strength in October, when 56,000 men were in camp for the month. During 1918 large numbers of men were received from Illinois, Minnesota, Wisconsin, a considerable number from Indiana, Mississippi, North Dakota, Idaho, North Carolina, Louisiana, South Dakota, and Nebraska. Also, a large number was received from other camps.²⁰⁶

A company of Engineers and another of Infantry from the Illinois National Guard arrived at the site selected for Camp Grant in the latter part of June, 1917, the former for construction duty and the latter for guard duty.²⁰⁷ Reserve officers of the Quartermaster Corps, United States Army, arrived at about the same time, and an officer of the Medical Corps, United States Army, reported July 10 to act as sanitary inspector.²⁰⁷ There were 1,500 civilians at work when the sanitary inspector arrived, and the number was rapidly increased to 8,000.

One temporary well furnished an inadequate supply of water, the additional supply being hauled from near-by farmhouses in tank wagons. The latrine pits, which were being constructed when the sanitary inspector arrived, were lined with concrete. This was at once discontinued, and the contractor furnished a detail of 100 men, with 3 wagons, to construct pits as required and to care for those already in use. The pits were placed as a rule, in the areas which would later be the company streets. These pits were treated with chloride of lime, only those in outlying areas being burned out, owing to the fire risk from the great quantities of shavings, scrap lumber, etc., lying about. Seepage pits were constructed at the kitchens, kitchens and messes screened, stables regulated, and arrangements made with a local reduction plant to remove the garbage. Flytraps were constructed, a group of boys hired to bait the traps and to kill flies, and fly poison and fly paper used. An incinerator of sufficient size to burn all wastes, including the manure, was constructed. Persons living in the buildings or on the grounds without authority were removed. Analysis of the sources of water supply of adjacent dwellings was obtained through the State University of Illinois. An educative campaign was inaugurated before the civilian workers were urged to accept vaccination for typhoid fever, with excellent results. The contractors completed a regimental infirmary building at an early date and used this as a dispensary for emergency and minor treatments of their employees.²⁰⁷

The first temporary well provided for the construction crew was supplemented, in July, by two additional temporary wells.²⁰⁷ The presence of gas-forming bacilli necessitated chlorination of the water from all three. In August, 1917, eight wells were driven near the Rock River to a depth of from 120 to 180 feet, and a 300,000-gallon reservoir was constructed.²⁰⁸ The water was at first chlorinated, due to the presence of colon bacilli,²⁰⁸ but the contamination had disappeared by November.²⁰⁹

As stated above, garbage was removed from the contractor's messes by a firm conducting a reducing plant.²⁰⁷ A contract for the disposal of the camp garbage was let early in September, 1917.²⁰⁸ The organizations were to transport the garbage to the transfer station and the contractor was to remove it in the cans for hog feed.²⁰⁵ The condition of the garbage transfer station was reported as being extremely unsatisfactory in October.²⁰⁵ A wide area about the station was littered with rubbish; a large pile of half-burned organic rubbish was near the station; the ground where the carts backed to the platform was soft, rutted, and mixed with trash and garbage; and the cans were very inefficiently cleaned. These conditions were not corrected for some time, being worse, if anything, six weeks later,²¹⁰ but the station was in excellent condition a year later.²¹¹

In the absence of a contract for removal of the manure after the arrival of troops, it was hauled to a dump 2 miles distant.²⁰⁸ A contract was let later, and it was being removed by rail late in October, 1917, but numerous piles were still found about the camp.²⁰⁵ In the summer of 1918, the contractor was hauling the manure away and burning it for the potash recovered from the ashes.²¹² A year later, the comparatively small amount then being produced was hauled to neighboring farms.²¹³

The camp sewerage system was completed early in September, 1917,²⁰⁵ and, unlike most of the cantonments, included provisions for carrying off the storm water.²⁰⁴ The untreated sewage was discharged into the Rock River.²⁰⁵

A camp nutrition officer was first appointed in October, 1918.²¹⁴ A camp mess supply had been established prior to that time to provide a means of centralization of outside purchases with the resulting benefits of quantity purchase, central inspection, etc.²¹⁴ This institution, supplementing the commissary, provided the messes at all times with an available variety of food substances for the formation of satisfactory menus. The nutrition officer made careful inspections of the messes, sometimes in conjunction with the inspectors from the school of bakers and cooks, who regularly visited those messes where student cooks were detailed. As the messes in operation were too numerous to permit the nutrition officer personally to supervise them at all times, a form for weekly reporting by the organization sanitary inspector was devised. This report gave information on sanitary conditions and showed the frequency with which various articles of food appeared on the menus.

The physical examination of drafted men was not well organized for the first increment.²⁰⁸ The men were assigned to organizations and uniformed, then waited a week before being examined, owing to the nonarrival of the duplicates of a certain form. After the first of the year 1918, the examinations were made at the depot brigade, use being made of a building of a welfare organization.²¹⁵ One end was divided into three dressing compartments with a capacity of 75 men each. From these the men passed a table where they received the blank forms to be used, then they went to the general examining units, and finally they passed through an aisle, at the end of which there was a neuropsychiatrist. If accepted, they were vaccinated, their identification records made, and they passed before a representative of the camp surgeon for final review. Men rejected by the general examining units were reviewed by special examiners and by a representative of the camp surgeon, and, if finally rejected, by the latter examiners, they were conducted to the dressing room and then to a large tent where the personnel officer and the quartermaster made out their final papers and discharged them. The average number examined per day was 1,880. The time required for the examination of a man varied from 13 to 24½ minutes, dependent upon the type of the individual. The average for the different sections was as follows: General examination, 4½ minutes; waiting in line, 2 minutes; inoculation, ½ minute; identification record, 6 minutes; and final inspection, 3 minutes.

Influenza was not as prevalent in Camp Grant in 1917 and the first half of 1918 as it was in many other camps, attaining a maximum monthly incidence of about 300 cases in April and May, 1918.²⁰⁶ The fall epidemic began September 21 with extreme suddenness, and nearly every organization in the camp was involved within 48 hours.²¹⁶ Of the approximately 40,000 men in the camp, 10,736 were attacked during the period September 21 to October 31, inclusive,²¹⁷ and 8,000 of these were attacked during the first 10 days. Many of these cases were mild and were not officially reported as influenza.²¹⁶

Pneumonia, the lobar type especially, was quite prevalent from the first, with three minor waves occurring in January, April, and July, 1918.²⁰⁶ The

great increase in the fall began in September and reached its crest in October, with 2,544 cases for the two months.²⁰⁶ The majority of cases prior to the year 1919, both primary and secondary, were reported as being of the lobar type. Laboratory examinations indicated that the infection was due to a virulent strain of the pneumococcus, and that the hemolytic streptococcus and the influenza bacillus appeared infrequently.²¹⁸ The mortality rate was relatively low prior to the influenza epidemic of the fall of 1918, but it then suddenly increased to approximately 45 per cent.²⁰⁶

The United States Public Health Service did not participate in the supervision of the extra cantonment zone at Camp Grant, control being invested in the Illinois State Board of Health, with local authorities actively participating.²¹⁹

Neither a quarantine nor detention camp was maintained, infected companies being isolated in their barracks and while at drill.²¹² In the depot brigade, separate detention barracks were designated in each unit. The construction of quarantine and detention camps was begun in November, 1918,²¹¹ but was suspended before the end of the year.²²⁰

The first development battalion was organized July 1, 1918, with 459 men, in three companies.²²¹ The strength increased rapidly and on August 14 there were 4,071 men, in four companies. The second battalion was organized on August 14 by the transfer to it of 1,934 colored men from the 1st Battalion. Eight medical officers were on duty with the battalions at that time, not including six who conducted the camp venereal clinic. Men were transferred to the battalions in such large numbers that they were at first distributed to companies indiscriminately, the segregation of venereal cases in separate companies being the only attempt at classification.²²² The men were physically examined and classified as soon as rosters of the companies could be prepared, but little could be done in the way of physical training because of the inadequacy of officers, both medical and line. There were six battalions early in November, with approximately 4,000 men. Five battalions consisted of colored men, about 98 per cent of whom were venereal cases. Venereal cases in all battalions were segregated by companies, and they were restricted to their company areas by guards. At this time, there were 21 officers and 48 enlisted men of the Medical Department on duty with the battalions and 13 officers and 27 men with the camp venereal infirmary.²²²

The convalescent center was organized in January, 1918, the center personnel consisting of 5 officers and 14 enlisted men of the medical department and 29 officers and 67 enlisted men of the line, with a convalescent strength of 646.²²³ The number of men examined during February was 1,319.²²⁴ In March, the center personnel comprised 9 officers and 27 enlisted men of the Medical Department and 31 officers and 33 enlisted men of the line.²²⁴ The convalescents were classified upon arrival as (1) fit for discharge, (2) soon fit for discharge, (3) requiring longer stay in the center, and (4) requiring hospital treatment.²²⁵ The second and third classes were placed in one company and were, for all practical purposes, under the control of the medical officers, thus enabling the center to carry out its original purpose, although the major function of the center, owing to the large proportion of class A men, was the discharge of recovered convalescents. The convalescent center was discontinued

as a separate organization May 15, 1919, becoming thereafter a department of the base hospital.²²⁶ Necessary personnel of both the medical department and the line were transferred to the hospital for temporary duty until such time as the hospital personnel were capable of continuing the special training.

A dental officer of the Regular Army arrived September 9, 1917, to take charge of dental officers and dental supplies and 30 officers of the Dental Reserve Corps arrived within the next two weeks.²²⁷ There was no dental equipment in the camp except such personal articles as the dental officers had brought, and these were used to give emergency treatments. A course of military drill and instructions was at once started for the new officers and a number assisted as mess officers, giving inoculations, etc. Fourteen portable dental outfits, all incomplete, were received by October 1. Three dental officers were assigned to each Infantry regiment, two to each Artillery regiment, and the surplus to the depot brigade, after the receipt of the second draft increment.²²⁷ The first dental infirmary building was completed in May, 1918, but was not occupied at once, as there were no near-by quarters available and the dental officers were then quartered with organizations, some as distant as three miles.²²⁸ It proved to be so inconveniently located that it was abandoned, and a barracks in a more suitable location was remodeled for the purpose.²²⁷ This was occupied in December, 1918. A dental detachment was organized after the departure of the 86th Division.²²⁷ It consisted of all dental officers and enlisted men in the camp except those at the base hospital, and functioned as a separate organization. Because such a number of portable dental outfits had been taken for use at colleges with the Students' Army Training Corps, a plan to divide the day from 7 a. m. to 6 p. m. so that the equipment could be used by two shifts daily, was tried. This plan proved impracticable, however, appointments made for the earlier and later hours conflicted with meal hours, retreat, etc., and it was given up.

The remount depot was opened about September 15, 1917, the enlisted veterinary personnel being obtained entirely by details from the Quartermaster Corps until November, when 20 men were transferred from that corps to the Veterinary Corps.²²⁹ Men rejected, for overseas service only, in the spring of 1918 were transferred to the remount detachment until its quota of 75 men was filled. Because the corrals were incomplete in the winter of 1917-18, the sheds being entirely open and no hay racks constructed, and because of deep snowfall in the winter and much mud in the spring, coupled with an inability to obtain medical supplies in any but insignificant quantities, the result was many weakened animals and deaths from pneumonia. The veterinary hospital was well situated, being separated from the remainder of the remount depot by a railroad spur, loading corral, and a warehouse.²³⁰ Sixteen buildings constituted the 4 wards, each ward having 4 box stalls and 98 standing stalls. The floor of one ward building was of pine construction, the remainder of clay. The first case of glanders was discovered March 25, 1918. Positive reactors to the mallein test were reported each month from camp sources, to include August, 1918, and each month, with one exception, from various sources, to include February, 1919. An additional reactor was found in June, 1919. Seventy-one animals were destroyed.

During the period of demobilization, the physical examining board comprised 2 examining teams of 16 medical officers each, and a board of review.²³¹ The chief medical examiner, the board of review, and one team occupied the lower floor of one barracks and the other team occupied another barracks four blocks distant. The work in the first building was all conducted in the two large rooms, and in one large room in the second building. This arrangement led to crowding and confusion, and required that all cases for the board of review from the second team dress and walk to the first building for final examination. At first the board maintained an average of about 7,000 examinations per week. As many as 2,000 men in one day were examined, and it was believed that the board as then constituted could have handled a maximum of over 4,000 daily, with some decrease, however, in the thoroughness of the examinations. Demobilization was discontinued about September, 1919, after the examination of 211,272 men, 6,328 of whom were found to have a disability.²³² The greatest number examined in one calendar month was 40,187, in June, 1919, and the greatest number examined in one day was 3,765.²³²

CAMP JACKSON, S. C.

Camp Jackson was situated about 5 miles from Columbia, S. C., on a rolling, sandy ridge which ranged from southeast to northwest.²³³ A large swamp adjoined the western boundary of the camp and contained about 300 acres, through which Gill Creek ran. There was also another swamp extending through the camp site, in which was located the headwaters of Wild Cat Creek. The channel of Gill Creek through the larger swamp was dredged and straightened practically the entire distance to the Congaree River, 8.2 miles. The swamp to the east of the camp was cleared of all but a few outstanding timbers and was drained; ditches and latrines were dug, and laterals run. The area was practically drained, leaving it in such condition that mosquitoes would not breed.²³⁴

The first drafted men arrived between September 1 and 15, 1917.²³³ During 1917 the men came from Florida, North Carolina, and South Carolina. About 3,144 came from other camps. The mean strength for the month of December, 1917, was approximately 19,000. During 1918, a large number of drafted men was sent to this camp. A large number came from South Carolina and North Carolina, a considerable number from Florida, Tennessee, Alabama, Georgia, and 1,600 from Maryland, 5,900 from New York, 7,200 from Ohio, and 8,500 from Illinois. Also a considerable number was received from other camps. The maximum strength was in July, 1918, when there were approximately 44,000 men in camp.²³³

The staff officers of the 81st Division assembled in Camp Jackson August 25, 1917. Headquarters and the Infantry brigades of the 81st Division moved to Camp Sevier before June 1, 1918,²³⁵ and the Artillery brigade left for the port of embarkation about July 27.²³⁶ The camp functioned as an Artillery replacement center after the departure of the Infantry.²³⁶ The Artillery brigade of the 31st Division arrived about August 15 and departed for overseas service October 31.²³⁶ The depot brigade was transferred to Camp Sevier early in September,²³⁶ but was returned to Camp Jackson about the end of the year.²³⁷

Plans were formulated in the summer of 1918 for increasing the capacity of the camp to 100,000²³⁸ and additional housing facilities for 38,000 men were constructed 2 miles north of the main camp, but never occupied.²³⁶

The city of Columbia derived its water supply from the Congaree River just below its formation by the confluence of the Broad and Saluda Rivers.²³⁹ The watershed was not thickly populated, and there were no large settlements for 75 miles above Columbia. The city supplied Camp Jackson through one 16-inch main having a maximum capacity of 3,000,000 gallons daily, the water being treated by sedimentation, coagulation, filtration, and chlorination. Sedimentation was very incomplete, for channels had formed in the earthen basin which carried the water to the outlet almost immediately after entrance. The city did not consider it necessary to chlorinate the water at all times, but this measure was demanded by the Army as a routine, partly because the filters were running at their maximum capacity to supply the needs of both the camp and city.²⁴⁰ The quantity available was so insufficient in the summer of 1918 that sections of the camp were without water during certain periods of the day.²⁴¹

The collection lines of the sewerage system and a septic tank were completed early in October, 1917.²⁴⁰ The septic tank was a temporary expedient for disposal pending the completion of the modified Inhoff tanks and chlorination works of the permanent disposal plant. The effluent from the permanent septic tanks was chlorinated and discharged into a small creek which flowed through inhabited territory for 5 miles before joining the Congaree River.²⁴² Sedimentation and digestion were incomplete, however, owing to the too small capacity of the septic tank,²³⁹ and resulted in the pollution of the creek bed and banks and complaints from inhabitants along its course.²⁴¹

Standard pit latrines, sprayed daily with lampblack and oil, were used for contractor's employees, and for all troops prior to the completion of the sewerage system.²⁴³ They were also used for troops that were under canvas, during the entire camp period.²⁴⁴

The bulk of the garbage was removed by farmers during the early days of the camp, but a portion was spread on the ground near the rubbish dump to dry, so that afterwards it could be burned.²⁴³ Since the material was not completely consumed by this method of incineration, it was necessary to substitute the use of a rock-pit crematory.²⁴³ An incinerator was soon constructed of sufficient size to consume the garbage of all the troops then in the camp,²⁴⁰ and this was in use until a contract was let in November, 1917, for its removal.²⁴⁵ Garbage was removed under this contract before the garbage transfer station was completed, and the organizations were therefore responsible for the cleaning of the cans. The contractor used tank carts for removal, and as no can-washing facilities were provided, the cans were burned out.²⁴⁶ In June, 1918, two can-washing tanks were installed in which the washing was done by hand, and the output of the three men employed was six cans per minute.²⁴⁷ The incinerator was used to destroy the class of garbage not taken by the contractor, its operation for about five hours per week being required, using waste wood for fuel.

Manure was at first removed by organizations to neighboring farms,²⁴³ but the removal was soon performed by contract.²³⁹ Delivery was made to the

contractor at the loading platform by organization wagons, and the contractor disposed of it to farmers, shipping by rail such quantities as the available cars would permit, and hauling the remainder to neighboring farms where it was to be spread and plowed under on the same day. The removal was unsatisfactory in the fall of 1917, as the contractor used only 14 wagons when more than twice that number were required.²⁴⁴ The roads were impassable and freight cars scarce in the following winter, and manure accumulated in the auxiliary remount depot in great quantities.²⁴⁵ The depot had been cleared of the accumulation by May, 1918, however, and the contractor was then keeping the depot in a very good condition, cleaning the corrals himself and shipping all manure in box cars.²⁴⁶ The formation of a compost pile outside of the camp limits was permitted late in 1918 to care for surplus manure which could not be shipped.²³⁹ This method proved to be unsatisfactory, because of improper care of the pile.²³⁹

The prevention of malaria was the greatest administrative problem confronting the camp authorities from the time that the site for Camp Jackson was selected.²⁴³ While the barracks were situated on high ground, they were un-screened, and, as mentioned above, there were swamps on two sides of the site. Extensive drainage operations were undertaken, for not only would malaria carriers be introduced by incoming troops, but the disease was prevalent in the neighborhood.²⁴³

Three examining boards were operating in regimental infirmaries in the spring of 1918.²⁴⁶ Each board could examine 500 men per eight-hour day. In July, the boards were consolidated into two.²³⁸ Arriving increments were met at the station by medical and other officers. They were examined for contagious diseases, the headings of all forms were filled in, and a tag was placed on each man which he carried on his person during the period of his stay in the depot brigade. The results of the physical examinations were later entered on these tags for transmittal to the personnel officer. The examining boards were furnished with lists of the men which indicated the companies to which they were assigned, and the boards notified the company commanders as to when and where the men would be examined. Each of these boards could examine 1,000 men daily.

German measles was reported from the first, in small numbers until November, 1917, when there were 364 cases.²³³ The incidence then dropped nearly as abruptly as it had risen. As regards measles, there had been only 13 cases reported prior to October 19, 1917. At this time, troops from Camp Gordon and Camp Pike arrived.²⁴⁵ Since no information had been received at Camp Jackson that the troops arriving from the camps referred to were measles contacts the men were sent directly to various regiments.²³⁴ The 93 cases arising among these men during the 12 days following the arrival of the first contingent thus created numerous centers from which the disease rapidly spread throughout the command.²³⁴ There were about 1,900 cases by the end of the year, probably including many cases of German measles, as routine differentiation was not made.²⁴⁹ Two succeeding waves occurred, 253 cases in June and 114 in November, 1918.²³³

The highest incidence of influenza prior to the fall of 1918 was 362 cases in April.²³³ The fall epidemic began about the 18th of September and had expended its force one month later.²⁵⁰ The cases officially reported numbered 5,279 in September and 3,263 in October.²³³

The pneumonias occurring in 1917 were difficult to differentiate as to type, but the majority of cases were consecutive to measles and of the bronchopneumonic type.²⁴⁰ The mortality was about 40 per cent. The greater portion of the increase in the fall of 1918 was due to influenza, but nearly as many cases were reported to have been primary.²³³ The bronchopneumonic type was in the majority in both classes. The mortality rate prior to September 1, 1918, was about 19 per cent, not so much less than the rate after that date, which was about 24 per cent.²³³ All of the 332 pneumonia cases occurring in the year 1919 were a part of the aftermath of the epidemic in the preceding fall and occurred during the first six months of the year.²⁵¹

Mumps was so prevalent throughout the camp during 1917 and 1918 as to be classed as epidemic at all times.²³³ With two exceptions, there was no calendar month in which less than 100 cases occurred. The high point occurred in January and February, 1918, with 1,326 and 1,173 cases respectively. There were 5,112 cases prior to 1919.

The first case of meningitis occurred in a man who had been transferred from Camp Gordon.²³⁴ Later two fully developed cases were taken from a troop train arriving from Camp Pike. Meningitis, although occurring with much less frequency than some other diseases, was the most alarming of all,²⁴⁹ and some inadequate measures for control were in vogue at times.²⁴⁵ Men from a wagon train in which a case had arisen were held under a modified quarantine which permitted them to attend to their duties about the camp. They were released from these incomplete restrictions after 12 days without being cultured for contacts, under the impression that the laboratory could not do that work. Cases had arisen in the measles ward of the base hospital, and some of the patients in this ward were returned to duty, under the same mistaken impression, by direction of the division surgeon. A visiting inspector ordered both of these two classes to be retained in quarantine until cultures were made and reported upon. At least 24 of the early cases were stated to have contracted their infection in the measles ward.²³⁴ The culture work was not successfully carried out until about December 20, 1917.²⁵² As some fulminating cases had died before evidence of meningitis developed, all admissions to the base hospital were cultured.²⁴⁹ The severity of the disease began to decrease at about this time, and the incidence decreased from 106 in December to 51 in January.²³³ Conditions had so improved by December 30 that the close quarantine of the camp was raised.²⁵³ The disease appeared in eight different localities in South Carolina during the following week, and some of these cases were clearly traceable to contact with Camp Jackson. The Public Health Service then requested that the quarantine be resumed and offered all its assistance available.²⁵³ While only 11 cases occurred in February, a visiting board of civilian physicians discovered that the carrier detection work at Camp Jackson had been very faulty.²⁵⁴ The detection of the meningococcus by the methods used had been neither precise nor uniform. Although 30,000 cultures had been

made, only about 40 carriers were then being detained, and not one of them was a chronic carrier. The board examined 25 men who had been returned to their organizations from the carrier camp and found 9 to be still harboring meningococci in the nasopharynx. The board also found 9 carriers in a group of 96 men examined from 1 organization, while the base hospital laboratory found only 3. These 3 were found negative by the board on both the original and a second examination. Furthermore, cases of meningitis had occurred in organizations after repeated culturing, as many as 10 occurring in 1 organization of about 100 men. Many cases occurred in Columbia,²⁴⁶ and cases arose in the camp each month of the year 1918, with one exception.²³³ One hundred and twenty-six cases were officially reported in 1917 and 152 in 1918. Other reports from the camp give 117 as occurring in 1917²³⁴ and 196 in 1918, with no month of 1918 free.²⁴⁴ Twelve cases occurred in 1919, all prior to July 1.²⁵¹ The mortality was about 40 per cent for 1917 and about 20 per cent for 1918.²³³

Malaria was prevalent in the territory surrounding Camp Jackson, and 50 per cent of the men in the camp from Arkansas, Louisiana, and Florida had enlarged spleens and were judged to have been gamete carriers.²⁴⁸ Therefore, the possibility of the occurrence of many cases of malaria in Camp Jackson was a constant stimulus to an effort to control the disease. Though 469 cases of malaria were reported from the camp from its inception to December 31, 1919, very few of these were contracted at the camp.²⁵⁵

A detention camp, consisting of a training battalion of the depot brigade, was established in the fall of 1917.²⁴⁵ By the summer of 1918, however, the whole depot brigade was being conducted on detention camp principles; no visitors were allowed within it except on business, and buildings in which cases of communicable diseases arose were quarantined under guard.²⁴¹ Meanwhile, a quarantine camp for contacts had been established, under tentage, with a capacity of about 500.²³⁸ By the end of the year 1918, the casual detachment was conducting a quarantine camp for use only by organizations being demobilized.

The development battalion was organized in July, 1918, and comprised 1,700 men, with 5 medical officers on duty.²⁴¹ Four battalions had been formed by the middle of August, with a total strength of 3,171.²⁵⁶ Three of these battalions comprised venereal cases only. Nine medical officers were now on duty with these four battalions, with the part-time assistance of three others. The battalions were administered by the depot brigade, while this brigade remained in the camp, in such a way as practically to exclude participation by the Medical Department.²⁵⁷ When the depot brigade was transferred to Camp Sevier, S. C., in September, 1918, 3,400 of the men in the development battalions were transferred with it. Many men remained, however, and by the middle of October the strength of the battalions was 4,720. There were 1,100 men, in 3 battalions, in January, 1919, and these were being rapidly demobilized.²³⁷

The convalescent center was established January 18, 1919, with 8 medical officers, 21 line officers, and 29 enlisted men on duty as a permanent cadre and with 63 convalescents.²⁵⁸ The center was composed of 2 companies, 1 for colored men and 1 for white men. The center was later reorganized, with 4

platoons, assignment to platoons being based on physical condition.²⁵⁹ The largest number of convalescents reported in the center at one time was 434, on April 14, 1919.²⁶⁰

When the camp was organized, the 21 dental officers in camp, having as yet no equipment, were utilized in giving instructions on the care of the teeth and on physical examining boards, until five portable dental outfits were received late in September, 1917.²⁶¹ By dividing the articles in these outfits, using the personal instruments of dental officers, and constructing chairs from rough lumber, a working outfit was provided for each dental officer. Thirty base dental outfits and three laboratory equipments were received late in December. The second floors of two regimental infirmaries were secured as dental infirmaries, and 14 base outfits and 1 laboratory equipment installed in each. These dental infirmaries were in operation early in January, 1918. Two standard dental infirmary buildings were completed in May, 1918, and the two dental units were removed from the regimental infirmaries to the new buildings, with an additional base outfit for each.

A dental survey of the command was begun about October 1, 1917, and emergency work and the removal of conditions which promised to cause future trouble were given priority in all dental operating.²⁶¹ The removal of foci of infection by extractions, etc., was done as soon as practicable after the individual had been examined. The early concentration of the work in the two infirmaries was of decided assistance to the camp dental surgeon in bringing the dental service to a high point of efficiency in the summer of 1918. The officers had good quarters, comparatively few extractions were being done in an effort to conserve teeth, records were well kept, and discipline was excellent.²⁶² All dental officers in the camp except five left with the 81st Division.²⁶¹ Replacements for them were received until there were 65 dental officers in the camp by August 1, 1918. About 20 portable dental outfits were received, and these were installed in the two dental infirmaries, in addition to the base outfits already there.

The enlisted strength of the veterinary detachment was 3 privates in June, 1918, which was increased to a maximum of 36 of all grades in September.²⁶³ These men were selected from the draft, primarily because they were unfit for overseas duty, but an endeavor was also made to obtain men who had had previous experience with animals. No provision was made for the inspection of locally purchased meats, such purchase being negligible. Dairies supplying milk to the camp were inspected and graded monthly.

The remount depot was located partly on low, swampy ground and partly on rolling terrain, but the sandy nature of the soil prevented the formation of much mud.²⁶⁴ The location of the veterinary hospital was faulty, in that the direction of both the drainage and the prevailing wind was from the hospital toward the enlisted men's barracks.²⁶⁵ The construction of a new hospital in another location was approved before the armistice was signed, but was not undertaken.²⁶⁶

The group for the physical examination of demobilizing troops at first consisted of 57 medical officers divided into 4 teams.²⁶⁷ The examining force was later much reduced, only 14 officers being engaged in June, 1919.²⁶⁸ Prac-

tically the entire 30th and 81st Divisions, as well as other organizations, were given a very complete examination before the work was discontinued about July 15, 1919.²⁵¹ Incomplete reports show that more than 70,000 men were examined, and that more than 2,000 of these had disabilities.²⁶⁹

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- (83) Report of Surgical Hospital Unit No. 1, Remount No. 303, Camp Dix, N. J., by 2d Lieut. Horst Schreck, V. C. On file, veterinary division, S. G. O., unnumbered.
- (84) Letter from Maj. S. V. Balderston, M. C., to the Surgeon General of the Army, January 13, 1919. Subject: Report of observations of physical examinations at Camp Dix, N. J. On file, Record Room, S. G. O., 702-1 (Camp Dix) D, storage.
- (85) Monthly reports of physical examination made prior to separation from the military service other than by certificate of discharge for disability at Camp Dix, N. J. On file, Record Room, S. G. O., 370 (Demobilization Examination, Camp Dix) D.
- (86) Report of sanitary inspection of Camp Dix, N. J., by Col. J. B. Clayton, M. C., June 23, 1919. On file, Record Room, S. G. O., 721-1 (Camp Dix) D.
- (87) Letter from the camp surgeon, Camp Dix, N. J., to the Surgeon General of the Army, June 24, 1919. Subject: Physical examinations at demobilization camps. On file, Record Room, S. G. O., 370.01-2 (Camp Dix) D.
- (88) Letter from the camp surgeon, Camp Dix, N. J., to the Surgeon General of the Army, June 3, 1919. Subject: Medical Department status at Camp Dix. On file, Record Room, S. G. O., 320.2 (Camp Dix) D.
- (89) Report of water supply at Camp Dodge, Iowa, for November, 1918, by Capt. H. G. McGee, S. C., camp sanitary engineer. On file, Record Room, S. G. O., 671 (Camp Dodge) D.
- (90) Report of the camp sanitary engineer, Camp Dodge, Iowa, for the month of February, 1919. On file, Record Room, S. G. O., 671 (Camp Dodge) D.
- (91) Report of sanitary inspection, Camp Dodge, Iowa, November 19, 1917, by Col. Weston P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Dodge) D.
- (92) Memorandum from Col. Henry Beeuwkes, M. C., for the Chief of Staff, January 7, 1920. Subject: Camp Dodge, report of medical officer covering inspection of January 7, 1920. On file, Record Room, S. G. O., 721-1 (Camp Dodge) D.
- (93) Letter from the division surgeon, 88th Division, Camp Dodge, Iowa, to the Surgeon General, U. S. Army, March 12, 1918. Subject: Annual report of the division surgeon, 88th Division, Camp Dodge, Iowa. On file, Record Room, S. G. O., 319.1 (Camp Dodge) D.
- (94) Letter from Col. P. M. Ashburn, M. C., to the Surgeon General of the Army, May 1, 1918. Subject: Special inspection of Camp Dodge, Iowa. On file, Record Room, S. G. O., 721-1 (Camp Dodge) D.
- (95) Report of special sanitary inspection, Camp Dodge, Iowa, August 12, 1918, by Col. A. E. Truby, M. C. On file, Record Room, S. G. O., 721-1 (Camp Dodge) D.
- (96) Letter from the division surgeon, 19th Division, Camp Dodge, Iowa, to the Surgeon General, U. S. Army, January 24, 1919. Subject: Medical history. On file, Historical Division, S. G. O.
- (97) Letter from the camp surgeon, Camp Dodge, Iowa, to the Surgeon General U. S. Army, January 23, 1920. Subject: Annual report for calendar year 1919. On file, Record Room, S. G. O., 319.1-2 (Camp Dodge) D.
- (98) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. I, 212-220.

- (99) Letter from Maj. J. T. B. Bowles, S. C., to the Surgeon General, November 14, 1917. Subject: Special sanitary inspection of Camp Dodge, Iowa. On file, Record Room, S. G. O., 721-1 (Camp Dodge) D.
- (100) Letter from the camp surgeon, Camp Dodge, Iowa, to the Surgeon General of the Army, January 6, 1920. Subject: Annual report for the calendar year 1919. On file, Historical Division, S. G. O.
- (101) A medical history of Camp Dodge, Iowa, by Lieut. Col. J. R. Shook, M. C. On file, Historical Division, S. G. O.
- (102) Medical History of the 88th Division, unsigned, prepared for the records of the Surgeon General's Office. On file, Historical Division, S. G. O.
- (103) Report of special sanitary inspection, Camp Dodge, Iowa, February 8-9, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Dodge) D.
- (104) Report of special sanitary inspection, Camp Dodge, Iowa, February 5, 1919, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Dodge) D.
- (105) Report of sanitary inspection of Camp Dodge, Iowa, made on June 14, 1919, by Col. E. R. Sehreiner M. C. On file, Record Room, S. G. O., 721-1 (Camp Dodge) D.
- (106) Letter from the division surgeon, 88th Division, Camp Dodge, Iowa, to the Surgeon General, U. S. Army, November 24, 1917. Subject: Infirmaries. On file, Record Room, S. G. O., 632-6 (Infirmaries, Camp Dodge) D.
- (107) Report on sanitation, Camp Dodge, Iowa, undated and unsigned. On file, Historical Division, S. G. O.
- (108) Report of preliminary nutritional survey at Camp Dodge, Iowa, December 21, 1917, by Capt. Frank C. Gephart, S. C. On file, Record, Room, S. G. O., 720.1-3 (Nutritional Survey, Camp Dodge) D.
- (109) 3d ind., from the chief psychological examiner, Camp Dodge, Iowa, October 16, 1918, to the camp surgeon, Camp Dodge, Iowa. On file Record Room, S. G. O., 702 (Psychological Examinations, Camp Dodge) D.
- (110) Report of sanitary inspection of Camp Dodge, Iowa, June 9, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Dodge) D.
- (111) A report on influenza at Camp Dodge, Iowa, undated and unsigned. On file, Record Room, S. G. O., 710-1 (Camp Dodge) D, Storage (undated).
- (112) Report on influenza and pneumonia at Camp Dodge, Iowa, by Lieut. Col. Joseph L. Miller, M. C. On file, Record Room, S. G. O., 710-1 (Camp Dodge) D.
- (113) Report of sanitary inspection of Camp Dodge, Iowa, made on September 24, 1919, by Col. J. B. Clayton, M. C. On file, Record Room, S. G. O., 721-1 (Camp Dodge) D. D.
- (114) Report of special sanitary inspection of Camp Dodge, Iowa, made on November 6, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Dodge) D.
- (115) Medical history of Camp Dodge, Iowa, July 1, 1918-December 31, 1918, by Capt. H. G. McGee, S. C., sanitary engineer. On file, Historical Division, S. G. O.
- (116) Letter from the surgeon, 163d Depot Brigade, Camp Dodge, Iowa, to the Surgeon General of the Army, August 16, 1918. Subject: Information concerning development battalions. On file, Record Room, S. G. O., 322.052 (Camp Dodge) D.
- (117) Report of sanitary inspection of development battalions at Camp Dodge, Iowa, on November 6, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Dodge) D.
- (118) Letter from Capt. Homer M. Austin, M. C., Camp Dodge, Iowa, to the Surgeon General, January 30, 1919. Subject: Convalescent center. On file, Record Room, S. G. O., 704.2-1 (Camp Dodge) D.
- (119) Letter from Capt. J. Gurney Taylor, M. C., Camp Dodge, Iowa, to the Surgeon General, U. S. Army, January 30, 1919. Subject: Convalescent center. On file, Record Room, S. G. O., 704.2-1 (Camp Dodge) D.
- (120) Weekly strength reports from the convalescent center, Camp Dodge, Iowa. On file, Record Room, S. G. O., 704.2-1 (Camp Dodge) D.

- (121) Letter from Capt. Homer M. Austin, M. C., Camp Dodge, Iowa, to the Surgeon General, U. S. Army, April 12, 1919. Subject: Convalescent center. On file, Record Room, S. G. O., 704.2-1 (Camp Dodge) D.
- (122) Letter from First Lieut. William S. Louisson, D. C., Camp Dodge, Iowa, to the Surgeon General, U. S. Army, March 25, 1919. Subject: History of dental service. On file, Dental Division, S. G. O., unnumbered.
- (123) Report of meat and dairy inspection activities (Camp Dodge, Iowa), by Capt. Elmo P. Coburn, V. C. On file, Veterinary Division, S. G. O.
- (124) Veterinary history of the war (Camp Dodge, Iowa), by Capt. Elmo P. Coburn, V. C. On file, Veterinary Division, S. G. O.
- (125) History of veterinary activities, Camp Dodge, Iowa, from August 29, 1919, to December 20, 1919, by Maj. George H. Coon, V. C., camp veterinarian, Camp Dodge, Iowa. On file, Veterinary Division, S. G. O.
- (126) Letter from Capt. Edward J. O'Hara, Camp Dodge, Iowa, to the director of the Veterinary Corps, undated. Subject: Questionnaire. On file, Record Room, S. G. O., 314.7 (Auxiliary Remount Depot No. 322) R.
- (127) Letter from the veterinarian, Auxiliary Remount Depot No. 322, Camp Dodge, Iowa, to the Surgeon General, U. S. Army, January 22, 1919. Subject: Supplemental questionnaire of a veterinary history of the war. On file, Record Room, S. G. O., 314.7 (Veterinary History, Auxiliary Remount Depot No. 322) R.
- (128) Letter from the chief examining officer, demobilization group, Camp Dodge, Iowa, to the camp surgeon, January 17, 1920. Subject: Report of the activities of the Medical Department, demobilization group, ending November 25, 1919. On file, Historical Division, S. G. O.
- (129) Letter from the camp surgeon, Camp Dodge, Iowa, to the Surgeon General, U. S. Army, June 9, 1919. Subject: Physical examination for discharge. On file, Record Room, S. G. O., 370.01-2 (Examinations, Camp Dodge) D.
- (130) Monthly reports of physical examination made prior to separation from the Military Service other than by certificate of discharge for disability at Camp Dodge, Iowa. On file, Record Room, S. G. O., 370.01-2 (Camp Dodge) D.
- (131) A medical history of Camp Funston, Kans., undated and unsigned, prepared for the records of the Surgeon General's Office. On file, Historical Division, S. G. O.
- (132) Annual Report of the Surgeon General U. S. Army, 1919, Vol. I, 264-274.
- (133) Report of special sanitary inspection, Camp Funston and base hospital at Fort Riley, Kans., November 14-17, 1917, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Funston) D.
- (134) Sanitary report for the month of September, 1917, at Camp Funston, Kans., from the sanitary inspector, 89th Division. On file, Record Room, S. G. O., 721.5-1 (Camp Funston) P-D.
- (135) Sanitary report of Camp Funston, Kans., for October, 1918, by Capt. Chester M. Everett, S. C. On file, Record Room, S. G. O., 721 (Camp Funston) D.
- (136) Sanitary report for the month of August, 1918, Camp Funston, Kans., by Second Lieut. George B. Zimmele, S. C. On file, Record Room, S. G. O., 721.5 (Camp Funston) D.
- (137) Letter from the camp surgeon, Camp Funston, Kans., to the Surgeon General of the Army, January 30, 1920. Subject: Annual report for calendar year 1919. On file, Record Room, S. G. O., 319.1 (Camp Funston) D.
- (138) Letter from Maj. J. T. B. Bowles, S. C., to the Surgeon General, November 15, 1917. Subject: Special sanitary inspection of Camp Funston, Kans. On file, Record Room, S. G. O., 721-1 (Camp Funston) D.
- (139) Sanitary report for the month of February, 1918, Camp Funston, Kans., by Capt. Frank L. Morse, M. R. C. On file, Record Room, S. G. O., 721.5 (Camp Funston) P-D.
- (140) Letter from the Surgeon General to the Chief of Staff, December 8, 1917. Subject: Sanitary report Camp Funston. On file, Record Room, S. G. O., 721-1 (Camp Funston) D.

- (141) Report of sanitary inspection of Camp Funston, Kans., made on June 7 and 8, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Funston) D.
- (142) Report of sanitary inspection of Camp Funston, Kans., November 3, 4, 5, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Funston) D.
- (143) Report of special sanitary inspection, Camp Funston, Kans., February 3, 4, 5, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Funston) D.
- (144) Report on Detention Camp No. 1, Pawnee Flats, Fort Riley Reservation, February 8, 1918, by Lieut. Col. M. L. Crimmins, Inf., commanding. On file, Record Room, S. G. O., 333.1-1 (Camp Funston) D. Storage, 1918.
- (145) Report of special sanitary inspection of development battalions at Camp Funston, Kans., on November 2, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Funston) D.
- (146) Letter from the camp surgeon, Camp Funston, Kans., to the Surgeon General of the Army, August 15, 1918. Subject: Development battalions. On file, Record Room, S. G. O., 322.052 (Development Battalions, Camp Funston) D.
- (147) Report of sanitary inspection of Camp Funston, Kans., on January 22, 1919, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Funston) D.
- (148) Letter from Capt. J. Gurney Taylor, M. C., and Capt. Homer M. Austin, M. C., to the Surgeon General, February 3, 1919. Subject: Convalescent center. On file, Record Room, S. G. O., 704.2-1 (Camp Funston) D.
- (149) Letter from Capt. Homer M. Austin, M. C., to the Surgeon General, U. S. Army, April 7, 1919. Subject: Convalescent center. On file, Record Room, S. G. O., 704.2-1 (Camp Funston) D.
- (150) Weekly strength reports of convalescent center, Camp Funston, Kans. On file, Record Room, S. G. O., 704.2-1 (Camp Funston) D.
- (151) Letter from special board, Camp Funston, Kans., to the Surgeon General, U. S. Army, October 31, 1918. Subject: History of recent epidemic of influenza. On file, Historical Division, S. G. O.
- (152) Letter from Col. L. A. Conner, M. C., to the Surgeon General, U. S. Army, October 11, 1918. Subject: Report of special sanitary inspection of Camp Funston, made October 8 and 9, 1918. On file, Record Room, S. G. O., 721-1 (Camp Funston) D.
- (153) Annual report on sanitation for the calendar year 1918, Camp Funston, Kans., by Lieut. Col. Glenn I. Jones, M. C., division surgeon. On file, Record Room, S. G. O., 319.1 (Annual Report, 10th Division) G.
- (154) Sanitary report for the month of December, 1917, Camp Funston, Kans., by Lieut. Col. F. W. Weed, M. C. On file, Record Room, S. G. O., 721.5 (Camp Funston) D.
- (155) Letter from First Lieut. Frederick L. Gates, M. R. C., Base Hospital Fort Riley, Kans., to Lieut. Col. J. L. Shepard, January 9, 1918. Subject: Vaccination for meningitis, weekly report No. 2. On file, Record Room, S. G. O., 720.3 (Camp Funston) D.
- (156) Letter from J. P. Harper, D. R. C., to the Surgeon General of the Army, undated. Subject: Dental inspection at Camp Funston. On file, Record Room, S. G. O., 333 (Dental Inspection, Camp Funston) D.
- (157) Letter from the camp dental surgeon, Camp Funston, Kans., to the Surgeon General, U. S. Army, March 19, 1919. Subject: History of dental service at Camp Funston, Kans., for period of war. On file, Record Room, S. G. O., 703 (Camp Funston) D.
- (158) History of the Veterinary Corps, 89th Division, by Capt. C. W. Likely, commanding officer, 314th Mobile Veterinary Section. On file, Veterinary Division, S. G. O.
- (159) Letter from the camp veterinarian, Camp Funston, Kans., to the director of the Veterinary Corps, Office of the Surgeon General, September 4, 1919. Subject: Veterinary history. On file, Record Room, S. G. O., 314.7-2 (Camp Funston) D.

- (160) Letter from the acting veterinarian, Auxiliary Remount Depot No. 323, Camp Funston, Kans., to the director of the Veterinary Corps, S. G. O., February 1, 1919. Subject: Veterinary history of the war. On file, Record Room, S. G. O., 314.7 (Veterinary Auxiliary Remount Depot, No. 323) R.
- (161) Letter from the veterinarian, Auxiliary Remount Depot No. 323, Camp Funston, Kans., to the Surgeon General of the Army, August 16, 1919. Subject: Continuation of veterinary history of the war. On file, Record Room, S. G. O., 314.7-2 (Auxiliary Remount Depot No. 323) R.
- (162) Report of special sanitary inspection, Camp Funston, Kans., April 17-18, 1919, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Funston) D.
- (163) Monthly report of physical examinations made prior to separation from the Military Service other than by certificate of discharge for disability at Camp Funston, Kans., month ending November 30, 1918. On file, Record Room, S. G. O., 370.01-2 (Camp Funston) D, 1918.
- (164) Letter from Maj. S. V. Balderston, M. C., to the Surgeon General of the Army, April 11, 1919. Subject: Submittal of Camp Funston, Kans., report. On file, Record Room, S. G. O., 333 (Camp Funston) D.
- (165) Report of sanitary inspection of Camp Funston, Kans., made on July 27, 1919, by Col. Paul C. Hutton, M. C. On file, Record Room, S. G. O., 721-1 (Camp Funston) D.
- (166) Data for medical and surgical history of the war (Camp Gordon, Ga.), undated, by Maj. Edward A. Southall, M. R. C. On file, Record Room, S. G. O., 314.7 (Medical History, Camp Gordon) D.
- (167) Sanitary report for the month of August, 1917, at Camp Gordon, Ga., by Capt. William T. Cade, Jr., M. C., sanitary inspector. On file, Record Room, S. G. O., 721.5-1 (S2d Division, Camp Gordon) D.
- (168) Report of special sanitary inspection, Camp Gordon, Ga., October 9, 1917, by Col. H. C. Fisher, M. C. On file, Record Room, S. G. O., 721-1 (Camp Gordon) D.
- (169) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. I. 278-290.
- (170) Report of special sanitary inspection, Camp Gordon, Ga., August 28, 1917, by Col. H. C. Fisher, M. C. On file, Record Room, S. G. O., 721-1 (Camp Gordon) D.
- (171) Letter from the camp sanitary engineer, Camp Gordon, Ga., to the Surgeon General, undated. Subject: Sanitary engineer's report for month of November, 1918, Camp Gordon, Ga. On file, Record Room, S. G. O., 720-1 (Camp Gordon) D.
- (172) Letter from Maj. James T. B. Bowles, S. C., to the Surgeon General, February 7, 1918. Subject: Special inspection of water supply and sewage disposal at Camp Gordon, Ga., by Capt. E. J. Tucker, S. C., January 25, 1918. On file, Record Room, S. G. O., 721-1 (Camp Gordon) D.
- (173) Report of sanitary inspection, Camp Gordon, Ga., by Col. W. P. Chamberlain, M. C., May 7-8, 1918. On file, Record Room, S. G. O., 721-1 (Camp Gordon) D.
- (174) Report of special sanitary inspector, of Camp Gordon, Ga., September 13, 1918, made by Col. A. E. Truby, M. C. On file, Record Room, S. G. O., 721-1 (Camp Gordon) D.
- (175) Report of special sanitary inspection of Camp Gordon made on July 17, 1918, by Lieut. Col. F. W. Weed, M. C. On file, Record Room, S. G. O., 721-1 (Camp Gordon) D.
- (176) Letter from the camp surgeon, Camp Gordon, Ga., to the Surgeon General, U. S. Army, January 20, 1919. Subject: The annual report of the camp surgeon for the calendar year 1918. On file, Record Room, S. G. O., 721.5 (Camp Gordon) D.
- (177) Letter from the division surgeon S2d Division, Camp Gordon, Ga., to the Surgeon General of the Army, March 7, 1918. Subject: Annual report. On file, Record Room, S. G. O., 319.1 (Camp Gordon) D.
- (178) Letter from the camp sanitary engineer, Camp Gordon, Ga., to the Surgeon General of the Army, August 7, 1918. Subject: Report of water, sewage, garbage, and drainage for Camp Gordon, Ga. On file, Record Room, S. G. O., 720-1 (Camp Gordon) D.
- (179) Letter from the camp sanitary engineer, Camp Gordon, Ga., to the Surgeon General, U. S. Army, October 8, 1918. Subject: Report of water, sewage, garbage, and drainage, for Camp Gordon. On file, Record Room, S. G. O., 720-1 (Camp Gordon) D.

- (180) Letter from the camp sanitary engineer, Camp Gordon, Ga., to the Surgeon General, undated. Subject: Sanitary engineer's report for month of December, 1918, for Camp Gordon, Ga. On file, Record Room, S. G. O., 720-1 (Camp Gordon) D.
- (181) Letter from the camp sanitary engineer, Camp Gordon, Ga., to the Surgeon General, undated. Subject: Sanitary engineer's report for the month of January, 1919. On file, Record Room, S. G. O., 720-1 (Camp Gordon) D.
- (182) Letter from the camp sanitary engineer, Camp Gordon, Ga., to the Surgeon General, U. S. Army, April 7, 1919. Subject: Report for the month of March, 1919. On file, Record Room, S. G. O., 671 (Camp Gordon) D.
- (183) Sanitary report for the month of October, 1917, at Camp Gordon, Ga., by Maj. William T. Cade, jr., M. C., Sanitary Inspector. On file, Record Room, S. G. O., 721.5 (Camp Gordon).
- (184) Sanitary report for the month of November, 1917, at Camp Gordon, Ga., by Maj. William T. Cade, jr., M. C., Sanitary Inspector. On file, Record Room, S. G. O., 721.5 (82d Division, Camp Gordon).
- (185) Report of sanitary inspection, Camp Gordon, Ga., January 7-8, 1918, by Lieut. Col. C. F. Morse, M. C. On file, Record Room, S. G. O., 721-1 (Camp Gordon) D.
- (186) Report of special sanitary inspection, Camp Gordon, Ga., February 18, 1918, by Col. P. M. Ashburn, M. C. On file, Record Room, S. G. O., 721-1 (Camp Gordon) D.
- (187) Letter from the camp sanitary engineer, Camp Gordon, Ga., to the Surgeon General, undated. Subject: Sanitary engineer's report for the month of June, 1919, for Camp Gordon, Ga. On file, Record Room, S. G. O., 720-1 (Camp Gordon) D.
- (188) Letter from the camp sanitary engineer, Camp Gordon, Ga., to the Surgeon General, September 9, 1919. Subject: Sanitary engineer's report for the month of August, 1919, for Camp Gordon, Ga. On file, Record Room, S. G. O., 720-1 (Camp Gordon) D.
- (189) Medical history of the 82d Division, unsigned, prepared for the records of the Surgeon General's Office. On file, Historical Division, S. G. O.
- (190) Report of special inspection of Camp Gordon, Ga., made by Lieut. Col. F. W. Weed, M. C., on May 31, 1918. On file, Record Room, S. G. O., 721-1 (Camp Gordon) D.
- (191) Report of special sanitary inspection, Camp Gordon, Ga., January 13-14, 1919, by Lieut. Col. H. B. McIntyre, M. C. On file, Record Room, S. G. O., 721-1 (Camp Gordon) D.
- (192) Report of sanitary inspection of Camp Gordon, Ga., on April 17, 1919, by Col. Jere B. Clayton, M. C. On file, Record Room, S. G. O., 721-1 (Camp Gordon) D.
- (193) Letter from the camp sanitary engineer, Camp Gordon, Ga., to the Surgeon General, U. S. Army, June 9, 1919. Subject: Report for the month of May, 1919. On file, Record Room, S. G. O., 721 (Camp Gordon) D.
- (194) Report of sanitary inspection, with special reference to the influenza epidemic at Camp Gordon, Ga., made October 12, 1918, by Lieut. Col. Joseph L. Miller, M. C. On file, Record Room, S. G. O., 721-1 (Camp Gordon) D.
- (195) Memorandum from Maj. Frederick E. Jenkins, M. R. C., Camp Gordon, Ga., to the camp surgeon, August 13, 1918. Information concerning development battalions. On file, Record Room, S. G. O., 322.052 (Development Battalions, Camp Gordon) D.
- (196) Letter from the convalescent center, Camp Gordon, Ga., to the Surgeon General, U. S. Army, January 28, 1919. Subject: Weekly report December 11, 1918, to January 25, 1919. On file Record Room, S. G. O., 704.2-1 (Camp Gordon) D.
- (197) Correspondence from the convalescent center, Camp Gordon, Ga., to the Surgeon General, U. S. Army. Subject: Weekly reports. On file, Record Room, S. G. O., 704.2-1 (Camp Gordon) D.
- (198) 1st Ind., Hq. 82d Division, Camp Gordon, Ga., February 1, 1918, to the Surgeon General of the Army. On file, Record Room, S. G. O., 721 (Camp Gordon) D.
- (199) Copy of telegram from Col. I. W. Littell, Cantonment Division, Washington, D. C., to Constructing Quartermaster, Camp Gordon, Ga., August 30, 1917. On file, Record Room, S. G. O., 721 (Camp Gordon) D.

- (200) 7th Ind., from the division surgeon, 82d Division, Camp Gordon, Ga., April 3, 1918, to the Surgeon General, U. S. Army. Copy on file, Record Room, S. G. O., 721 (Camp Gordon) D.
- (201) Report of sanitary inspection of Camp Gordon, Ga., by Col. J. B. Clayton, M. C., June 12-13, 1919. On file, Record Room, S. G. O., 721-1 (Camp Gordon) D.
- (202) Monthly report of physical examinations made prior to separation from the Military Service other than by certificate of discharge for disability at Camp Gordon, Ga. On file, Record Room, S. G. O., 370.01-2 (Camp Gordon) D.
- (203) Letter from the camp surgeon, Camp Gordon, Ga., to the Surgeon General, U. S. Army, January 28, 1920. Subject: Annual report for the year 1919. On file, Record Room, S. G. O., 319.1-2 (Camp Gordon) D.
- (204) Preliminary data for the medical history of Camp Grant, Ill., by Maj. Henry H. Thompson, M. R. C. On file, Historical Division, S. G. O.
- (205) Report of special inspection, Camp Grant, Ill., October 25 and 26, 1917, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Grant) D.
- (206) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. I, 292-305.
- (207) History, U. S. Army Base Hospital, Camp Grant, Ill., by Lieut. Col. Henry C. Michie, M. C., commanding. On file, Historical Division, S. G. O.
- (208) Report of special inspection, Camp Grant, Ill., September 10, 1917, by Col. Henry A. Shaw, M. C., special sanitary inspector. On file, Record Room, S. G. O., 721-1 (Camp Grant) D.
- (209) Letter from Maj. J. T. B. Bowles, S. C., to the Surgeon General, November 14, 1917. Subject: Special sanitary inspection of Camp Grant, Ill., October 30, 1917. On file, Record Room, S. G. O., 721-1 (Camp Grant) D.
- (210) Report of special inspection of Camp Grant, Ill., December 12-13, 1917, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Grant) D.
- (211) Report of sanitary inspection of Camp Grant, Ill., on November 7-8, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Grant) D.
- (212) Report of sanitary inspection of Camp Grant, Ill., by Col. A. E. Truby, M. C., August 19, 1918. On file, Record Room, S. G. O., 721-1 (Camp Grant) D.
- (213) Report of sanitary inspection of Camp Grant, Ill., by Col. J. B. Clayton, M. C., September 22-23, 1919. On file, Record Room, S. G. O., 721-1 (Camp Grant) D.
- (214) Condensed report of activities of the camp nutrition officer, Camp Grant, Ill., by First Lieut. John H. Murphy, M. C., camp nutrition officer, January 16, 1919. On file, Record Room, S. G. O., 720.1 (Camp Grant) D.
- (215) Report of special sanitary inspection, Camp Grant, Ill., made June 10, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Grant) D.
- (216) Report on influenza epidemic at Camp Grant, Ill., September 21, 1918, to November 5, 1918, unsigned. On file, Historical Division, S. G. O.
- (217) Report of special inspection relating to the epidemic of influenza and pneumonia at Camp Grant, made October 7, 1918, by Col. L. A. Conner, M. C. On file, Record Room, S. G. O., 721-1 (Camp Grant) D.
- (218) A report on the influenza epidemic at Camp Grant, Ill., undated and unsigned. On file, Record Room, S. G. O., 710-1 (Camp Grant) D, Storage (undated).
- (219) Based on reports of sanitary inspections of Camp Grant, Ill. On file, Record Room, S. G. O., 721-1 (Camp Grant) D.
- (220) Annual report for 1918 to the Surgeon General by Lieut. Col. Geo. B. Lake, M. C., camp surgeon, Camp Grant, Ill. On file, Record Room, S. G. O., 319.1 (Annual Report, Camp Grant) D.
- (221) Memorandum from Maj. Wm. W. Arscott, M. R. C., brigade surgeon, 161st Depot Brigade, Camp Grant, Ill., to the camp surgeon, Camp Grant, Ill., August 16, 1918. On file, Record Room, S. G. O., 322.052 (Development Battalions, Camp Grant) D.
- (222) Report of sanitary inspection of development battalion, Camp Grant, Ill., made on November 6, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Grant) D.

- (223) Letter from Capt. J. Gurney Taylor, M. C., Camp Grant, Ill., to the Surgeon General, U. S. Army, January 27, 1919. Subject: Convalescent center. On file, Record Room, S. G. O., 704.2-1 (Camp Grant) D.
- (224) Letter from Capt. Homer M. Austin, M. C., Camp Grant, Ill., to the Surgeon General, U. S. Army, March 6, 1919. Subject: Convalescent center. On file, Record Room, S. G. O., 704.2-1 (Camp Grant) D.
- (225) Letter from Capt. Turner Z. Cason, M. C., Camp Grant, Ill., to the Surgeon General of the Army, March 10, 1919. Subject: Convalescent center. On file, Record Room, S. G. O., 704.2-1 (Camp Grant) D.
- (226) Letter from the camp surgeon, Camp Grant, Ill., to the Surgeon General, U. S. Army, May 15, 1919. Subject: Convalescent center. On file, Record Room, S. G. O., 704.2-1 (Camp Grant) D.
- (227) History of dental service at Camp Grant, Ill., by Lieut. Col. H. O. Scott, D. C., March 29, 1919. On file, Dental Division, S. G. O.
- (228) Letter from Maj. Clement V. Vignes, D. R. C., to the Surgeon General of the Army, May 4, 1918. Subject: Dental inspection at Camp Grant, Ill., made on May 4, 1918. On file, Record Room, S. G. O., 333 (Dental Inspection, Camp Grant) D.
- (229) Letter from the camp veterinarian, Camp Grant, Ill., to the director of the Veterinary Corps, Office of the Surgeon General, February 26, 1919. Subject: Report on veterinary histories of the war. On file, Record Room, S. G. O., 314.7 (Veterinary, Camp Grant) D.
- (230) Letter from the veterinarian, Auxiliary Remount Depot No. 321, Camp Grant, Ill., to the Surgeon General, U. S. Army, undated. Subject: Veterinary history. On file, Veterinary Division, S. G. O., unnumbered.
- (231) Report of special investigation of the conduct of the physical examination of troops prior to separation from the service, at Camp Grant, Ill., February 24, 1919, by Maj. S. V. Balderston, M. C. On file, Record Room, S. G. O., 333 (Inspection, Camp Grant) D.
- (232) Monthly reports of physical examinations made prior to separation from the military service other than by certificate of discharge for disability at Camp Grant, Ill. On file, Record Room, S. G. O., 702 (Examinations, Camp Grant) D, 370 (Demobilization physical examinations, Camp Grant) D, and 370.01-2 (Camp Grant) D.
- (233) Annual report of the Surgeon General, U. S. Army, 1919, Vol. I, 350-363.
- (234) Letter from the division surgeon, 81st Division, Camp Jackson, S. C., to the Surgeon General, U. S. Army, March 12, 1918. Subject: Annual report, Camp Jackson, S. C. On file, Record Room, S. G. O., 319.1 (Camp Jackson) D.
- (235) Medical history of Camp Jackson, S. C., unsigned, prepared for the records of the Surgeon General's Office. On file, Historical Division, S. G. O.
- (236) Letter from the camp surgeon, Camp Jackson, S. C., to the Surgeon General, U. S. Army, January 13, 1919. Subject: A brief history of Camp Jackson, S. C., from July 31 to December 31, 1918. On file, Historical Division, S. G. O.
- (237) Report of sanitary inspection of Camp Jackson, S. C., on January 9-10, 1919, by Lieut. Col. H. B. McIntyre, M. C. On file, Record Room, S. G. O., 721-1 (Camp Jackson) D.
- (238) Report of special sanitary inspection of Camp Jackson, S. C., made July 20, 1918, by Lieut. Col. F. W. Weed, M. C. On file, Record Room, S. G. O., 721-1 (Camp Jackson) D.
- (239) A sanitary survey of Camp Jackson, S. C., by Maj. Edward J. Scannell, M. C., camp surgeon's office. On file, Historical Division, S. G. O.
- (240) Letter from Maj. J. T. B. Bowles, S. C., to the Surgeon General, October 12, 1917. Subject: Special sanitary inspection of Camp Jackson, S. C., September 28, 1917. On file, Record Room, S. G. O., 721-1 (Camp Jackson) D.
- (241) Letter from the camp surgeon, Camp Jackson, S. C., to the general sanitary inspector, July 15, 1918. Subject: Sanitary report. On file, Record Room, S. G. O., 721 (Sanitary report, Camp Jackson) D.

- (242) Letter from the division sanitary inspector, 81st Division, Camp Jackson, S. C., to the Surgeon General, U. S. Army, December 16, 1917. Subject: Sewage disposal. On file, Record Room, S. G. O., 672-2 (Camp Jackson) D, storage, 1917.
- (243) Report of special sanitary inspection, Camp Jackson, S. C., August 24, 1917, by Col. H. C. Fisher, M. C., special sanitary inspector. On file, Record Room, S. G. O., 721-1 (Camp Jackson) D.
- (244) Letter from the camp surgeon, Camp Jackson, S. C., to the Surgeon General, U. S. Army, January 21, 1919. Subject: Annual report, Camp Jackson, S. C., for the year ending December 31, 1918. On file, Record Room, S. G. O., 319.1 (Annual, Camp Jackson) D.
- (245) Report of special sanitary inspection, Camp Jackson, S. C., November 30, 1917, by Col. H. C. Fisher, M. C., special sanitary inspector. On file, Record Room, S. G. O., 721-1 (Camp Jackson) D.
- (246) Report of sanitary inspection, Camp Jackson, S. C., by Col. W. P. Chamberlain, M. C., May 14-15, 1918. On file, Record Room, S. G. O., 721-1 (Camp Jackson) D.
- (247) Letter from the camp sanitary engineer, Camp Jackson, S. C., to the Surgeon General of the Army, August 31, 1918. Subject: Garbage and waste disposal. On file, Record Room, S. G. O., 720.7 (Camp Jackson) D.
- (248) Letter from senior surgeon J. H. White, U. S. Public Health Service, and Maj. Wm. D. Wrightson, S. C., to the Surgeon General, February 8, 1918. Subject: Sanitary inspection, Camp Jackson, S. C. On file, Record Room, S. G. O., 721 (Camp Jackson) D.
- (249) Letter from a board of medical officers, Washington, to the Surgeon General, U. S. Army, January 11, 1918. Subject: Epidemic diseases at Camp Jackson, S. C., January 9, 1918. On file, Record Room, S. G. O., 721-1 (Camp Jackson) D.
- (250) A memorandum from the office of the camp surgeon, Camp Jackson, S. C., entitled "Admissions," unsigned. On file, Historical Division, S. G. O.
- (251) Letter from the camp surgeon, Camp Jackson, S. C., to the Surgeon General of the Army, January 13, 1920. Subject: Annual report, Camp Jackson, S. C., for the year ending December 31, 1919. On file, Record Room, S. G. O., 319.1-2 (Camp Jackson) D.
- (252) Letter from the commanding general, Camp Jackson, S. C., to The Adjutant General of the Army, December 24, 1917. Subject: Cerebrospinal meningitis. On file, Record Room, S. G. O., 710 (Meningitis, Camp Jackson) D.
- (253) Letter from Rupert Blue, Bureau of Public Health Service, to Surgeon General W. C. Gorgas, U. S. Army, January 7, 1918. On file, Record Room, S. G. O., 721.9 (Camp Jackson) D.
- (254) Letter from Edwin O. Jordan, the University of Chicago, Department of Hygiene and Bacteriology, to Col. F. F. Russell, Surgeon General's Office, U. S. Army, February 20, 1918. On file, Record Room, S. G. O., 710 (Meningitis, Camp Jackson) D.
- (255) History of malaria control, Camp Jackson, S. C., by Maj. G. B. Baseom, S. C. On file, Record Room, S. G. O., 725.11-1 (Camp Jackson) D.
- (256) 1st ind., office of camp surgeon, Camp Jackson, S. C., August 17, 1918, to the Surgeon General, U. S. Army. On file, Record Room, S. G. O., 322.052 (Development Battalions, Camp Jackson) D.
- (257) Letter from Maj. John R. McDill, M. C., to the Surgeon General, U. S. Army, October 14, 1918. Subject: Development battalions. On file, Record Room, S. G. O., 322.052 (Development Battalions, Camp Jackson) D.
- (258) Letter from Capt. George H. Steele, M. C., Camp Jackson, S. C., to the Surgeon General, January 29, 1919. Subject: Care of convalescents at Camp Jackson. On file, Record Room, S. G. O., 704.2-1 (Camp Jackson) D.
- (259) Report of work done at convalescent center, Camp Jackson, S. C., by Maj. W. J. Kesterson, M. C., surgeon, March 30, 1919. On file, Record Room, S. G. O., 704.2-1 (Camp Jackson) D.

- (260) Weekly strength reports from convalescent center, Camp Jackson, S. C. On file, Record Room, S. G. O., 704.2-1 (Camp Jackson) D.
- (261) History of the dental service at Camp Jackson, S. C., unsigned, prepared for the records of the Surgeon General's Office. On file, Record Room, S. G. O., 703 (Camp Jackson) D.
- (262) Letter from Maj. Clement V. Vignes, D. R. C., to the Surgeon General, undated. Subject: Dental inspection at Camp Jackson, S. C. On file, Record Room, S. G. O., 333 (Dental, Camp Jackson) D.
- (263) History of the camp veterinary detachment, Camp Jackson, Columbia, S. C., June 1, 1918, to August 31, 1919, by Capt. Earl Kropf, V. C., camp veterinarian. On file, Record Room, S. G. O., 314.7-2 (Camp Jackson) D.
- (264) Letter from the veterinarian, Camp Jackson, S. C., to the Surgeon General, August 18, 1919. Subject: Veterinary history of the war. On file, Veterinary Division, S. G. O.
- (265) Memorandum from the Inspector General, to the Surgeon General and the Chief of the Construction Division, February 3, 1919. On file, Record Room, S. G. O., 333 (Veterinary Hospital, Camp Jackson) D.
- (266) 5th ind., from the Quartermaster General, October 14, 1918, to The Adjutant General of the Army. Also, letter from the Director, Purchase and Storage, Remounts Division, to The Adjutant General of the Army, February 8, 1919. Subject: Veterinary hospital, Auxiliary remount depot, Camp Jackson, S. C. On file, Record Room, S. G. O., 333 (Veterinary Hospital, Camp Jackson) D.
- (267) Unnumbered indorsement from the camp surgeon, Camp Jackson, S. C., December 6, 1918, to the Surgeon General, U. S. Army. On file, Record Room, S. G. O., 327.21-1 (Camp Jackson) D, Storage, 1918.
- (268) Report of sanitary inspection of Camp Jackson, S. C., by Col. Jere B. Clayton, M. C., on June 11, 1919. On file, Record Room, S. G. O., 721-1 (Camp Jackson) D.
- (269) Monthly reports of physical examinations made prior to separation from the military service other than by certificate of discharge for disability at Camp Jackson, S. C. On file, Record Room, S. G. O., 370 Demobilization, Physical Examinations, (Camp Jackson) D, and 370.01-2 (Camp Jackson) D.

CHAPTER III

NATIONAL ARMY CANTONMENTS (Continued)

CAMP LEE, VA.

Camp Lee was situated on a plateau 160 feet above sea level, 3 miles from Petersburg, Va., and 20 miles from Richmond.¹ Its western margin was bounded by the tidal estuary of the Appomattox River. The soil was sandy loam, the drainage excellent. There were, however, some marshes, chiefly salt marshes, near the mouth of the Appomattox River, which were breeding places for mosquitoes.

The first troops were received between September 1 and 15, 1917.¹ The strength at the end of 1917 was approximately 36,000. The 80th Division was organized here and moved overseas about May, 1918. After this division left, the camp was used as a replacement camp. During 1918, large increments of troops were received. There were a great many men from Virginia, West Virginia, Pennsylvania, and a considerable number from other camps, as well as a few scattered men from other States. The maximum strength was for the month of July, 1918, when there were approximately 57,000 men in camp.¹

The city of Petersburg supplied Camp Lee with water.² The city supply was derived from two polluted streams,² and the treatment and pumping plant was antiquated and in poor repair.³ The water was treated by sedimentation, coagulation, filtration, and chlorination, but its quality was open to suspicion at all times. The city made certain repairs and alterations in the plant late in 1917 and allowed the Army to station a chemist there to supervise its operation.⁴ Although 3,000,000 gallons of water were delivered to the camp daily in the summer of 1918, the leakage was so excessive that the amount was barely sufficient for the camp needs.⁵ The possibilities in the situation were further complicated by the undependability of the emergency pump in the city water-works plant.⁶ This pump was started by a small compressed air tank. If the pump failed to start on the first attempt, it required about two hours to refill the air tank by the only means available, a bicycle pump. A sufficient supply was provided before the end of the year 1918 by increasing the plant, and this allowed a reserve supply, which would flow by gravity, sufficient for 12 hours' use.⁷

Until the garbage disposal contract went into force in November, 1917, by which time the garbage transfer station had been completed, destruction of garbage by burning it in windrows was attempted.⁸ This method of disposal was unsatisfactory, because the destruction was incomplete. The contract was broken in March, 1918, and a small part of the garbage was then removed by farmers and the remainder burned in an incinerator which was far too small for the purpose.⁹ Experience in managing the incinerator so improved conditions that the method was satisfactory in May, but the cans could not be thoroughly washed in the large wooden tubs provided for the purpose at the transfer station.¹⁰ A new contract was in force in the fall of 1918, the contractor removing the garbage to a pig farm one-half mile distant.¹¹

Disposal of manure was first accomplished by gifts of portions of it to farmers, spreading it on neighboring fields, and by burning it.¹² A contract for the removal of manure was let late in September, 1917,¹² but a shortage of railroad cars resulted in large quantities being left about the camp. These conditions obtained until after June, 1918, and in addition difficulty was being experienced at the loading platform.¹³ This loading platform was large enough for carts only, so the manure was forked by hand from the wagons, in which it arrived, into the carts and from the carts into the cars, with spilling during both transfers. Beginning at some date before the end of 1918, the organizations delivered the manure to the contractor at a compost pile on a near-by farm.¹¹ A compost pile was formed near the remount depot in 1919, on a compact oiled base, and borax was used on the pile as a larvacide.¹⁴

The camp sewerage system was in use early, before the end of September, 1917.¹² Since there was no disposal plant, the sewage was discharged untreated into a small creek, and complaints from landowners soon arose.⁸ A camp disposal plant was completed during the summer of 1918.¹⁵ As with other cantonment sewage disposal plants, trouble was experienced with sludge disposal from the septic tanks, and, in an attempt to overcome this grease traps were constructed at the kitchens and at the disposal plant.¹¹ The creek carrying the effluent from the plant passed through a marshy area, just above tide-water, which became very foul,¹¹ and a dredge was constructed to improve the channel.¹⁶ The operating crew of the dredge dammed the stream in order to float the dredge,¹⁶ and this soon resulted in a deposition of a semisolid mass of sewage 600 feet long and alive with fly larvæ.¹⁷ This fly breeder filled the camp with flies and was discovered by a visiting entomologist who reported conditions to both the Surgeon General and the Secretary of War, but the condition had been corrected before notices from those offices were received at the camp.¹⁶

Mumps was of considerable importance during the entire camp period prior to the spring of 1919, being constantly present and threatening.¹ It attacked the camp in four waves, the two largest producing crests of 561 cases in September, 1917, and 990 cases in December, 1917. This second wave was prolonged, 2,708 cases occurring during the months December, 1917, to March, 1918, inclusive. The third wave crest amounted to 120 cases in July, 1918,¹ and the fourth to 363 cases in January, 1919.¹⁸

The value of the psychological ratings was so highly considered by the authorities in Camp Lee that the tests were extended to include all officers and men in the 80th Division.¹⁹ The reports were in surprising agreement with other records in the personnel office, and the commanding general announced that they would be given considerable weight when considering the advancement of any officer or enlisted man.¹⁹ Each company commander was required to furnish a list of whom he considered his best 50 men and his poorest 50 men.²⁰ These estimates conformed so generally to the psychological ratings that the commanding general considered that the two together formed a valuable index to the company commander's ability to "size up" men.²⁰ The psychological examinations, in 1917, were given to those enlisted men who were referred by their commanders, chosen because they were irritable, seclusive, sulky, depressed cranks, the butts of practical jokes, dull or stupid, showing marked emotional

reactions, as vomiting or fainting at bayonet drill, slovenly in dress, etc.²⁰ In testing the men, each group was first asked to fill in the answers to certain questions for general information on the forms used. Those who were unable to do so were at once assigned to the illiterate group, and were given a mechanical skill test instead. There was one mistaken impression which was almost universal among company commanders—the completed tabulations of the tests of organizations were considered to be indices of the total personalities of the men rather than of their mental abilities alone.²¹ Although the opinions of the value of psychologic examinations, as expressed a year later, were not so comprehensively enthusiastic, they were still held as well worth while and as of particular value in a replacement camp as aids in eliminating the mentally unfit and in assisting the personnel force to select men with special qualifications to fill requisitions from the War Department.²²

The neuropsychiatric work at first consisted also in examining men referred by company commanders and by psychologists.²³ A special survey was conducted in November and December, 1917, in an effort to outline some system for the detection of the psychopathic cases which would be more comprehensive.²³ The first trial was to select those men who had been placed in the low mental age groups by the psychologists, but the psychopathic cases were not thus reached. An effort was then made to select men by watching large groups assembled for psychologic examinations, drills, etc., but this was found impractical. The suggestion of a short interview with every man in camp would have taken too much time. Company commanders were asked to refer all men who should have been discharged, but this resulted in the reference, largely, of men the teaching of whom required merely the expenditure of considerable time and attention, and the psychopathic persons were still missed. It was finally decided that the original method of selection by company commanders was the most efficient that was practical, and that they would eventually refer most of the cases which should be examined.

The division surgeon, 80th Division, considered that foot problems and others of a similar nature were purely medical and to be met entirely by the medical officers of the division.²⁴ He considered that it was distinctly prejudicial for a visiting consultant to bring these matters before other than medical personnel, and that medical officers who did not have sufficient knowledge of them for the purpose of their work were inefficient. This attitude was undoubtedly the correct one for an ideal organization, but ideal conditions had not been found to exist at other camps. Nevertheless, in deference to the division surgeon's wishes, the talks usually given to all officers were here confined to those of the Medical Corps. The division surgeon agreed that line officers should receive this instruction, but believed that it should be given by the divisional medical officers. The necessity for cobbling outfits was realized early and requisition for 19 for the division were forwarded in December, 1917.²⁵ Six weeks later, these requisitions were found in the office of the Quartermaster General in Washington. As they had not specified the organizations for which the outfits were intended, no action had been taken except to pigeonhole them.

Meanwhile, the camp shoe repair shop was attempting to do all repair work and shoe alterations for the camp and for the division by operating 24 hours each day.

The United States Public Health Service started work in the extra-cantonment zone at an early date.²⁶ A sanitary survey for typhoid fever, and hookworm infection, of food vendors, etc., was completed before the end of August, 1917, and sanitary privies were being installed. Harmonious relations existed between the Public Health Service, the Army, the county health officials, and the wideawake city health officer of Petersburg. Some booths where foods and drinks were sold were closed during the following month, and action against certain others was placed in the hands of the district attorney.¹² Stringent regulations were issued governing these places, and enforced.⁹ An officers' club was closed for two days for noncompliance with the regulations. The local boards of health were not very active in the following spring, but were fairly efficient under the urgings of the Public Health Service representative. Military personnel were not allowed to enter the town of Hopewell in August, 1918, owing to its lack of activity in sanitary matters.²⁷

Construction of quarantine and detention camps was urged in June, 1918, on the grounds that their absence formed a continual menace from communicable disease and delayed the departure of troops ordered overseas through the necessity of retaining them as long as communicable diseases were found among them.⁵ A quarantine camp for 5,000 men, housed by squads, was recommended. Authority was received later for the construction of a detention camp with a capacity of 3,000.²⁷

Three development battalions were organized in July, 1918, two of them being devoted exclusively to venereal cases owing to the presence of 4,000 such cases which had accumulated from various sources.²⁸ One of these venereal battalions was reserved for colored men.²⁷ Before the middle of August, the strength of the colored venereal battalion was 2,246, of the white venereal battalion was 2,311, and of the third battalion, 1,226. Each battalion was divided into four companies, and the training cadre of the 3 battalions included 73 officers, 12 of whom were medical officers. An additional battalion of 300 aliens had been formed by November, with a total strength in all battalions of about 6,800.²⁹ The battalions became so reduced in the spring of 1919 that they were transferred into a "development company" at the base hospital.³⁰ This company consisted of about 40 chronic venereal cases in July, with a training cadre of 3 officers and 29 enlisted men, and was dissolved about August 1, 1919.³⁰

The convalescent center was established early in January, 1919.³¹ There were 711 men attached to the center by the middle of the month, but only 52 required further retention.³² Forty line officers, 5 medical officers, and 19 enlisted men of the Medical Department were on duty with the center. The training cadre totaled 356 a month later,³³ with 559 convalescents in the center, 219 of whom needed further hardening.³⁴ Seven of the cadre were medical officers, 94 were line officers, 4 were physical directors and 26 were enlisted men of the Medical Department.³³ The center was well organized by March and the men were contented.³⁵ All treatments required other than physical exercises were given at the base hospital. The 591 men were organized into 2 battalions

and 8 companies, with a training cadre of 396. Eight medical officers and 120 line officers were on duty. By June, there were only 291 men in the center and the training cadre had been reduced to 76, 12 of whom were themselves convalescents.¹⁴ The center was then known as "convalescent companies, demobilization group."

The first dental officer to report at Camp Lee arrived August 23, 1917.³⁶ The delivery of his portable dental outfit was delayed, so an improvised chair, orange-wood sticks, and a few forceps from medical field equipment were used during the interim for such dental work as was permitted. Thirty-nine dental officers arrived in September.³⁶ As there were only two portable dental outfits in camp, the majority of these officers were impressed to inoculate and vaccinate the arriving drafted men. One base dental equipment was received in November and installed at the base hospital. Fifteen more were received in December and assigned to the base hospital and various regimental medical infirmaries, and an additional 15 men were received in February, 1918. The few dental officers remaining in the camp in May, 1918, were performing the proper amount of permanent work and were giving attention to the conservation of teeth.³⁷ The dental assistants had been carefully selected and were unusually efficient. The first dental infirmary was nearly ready for occupancy in May, but as the plumbing and electric fixtures were not connected, the building was not occupied until July. A general reception room, a smaller one for officers, an office, X-ray room, and four operating rooms occupied the first floor. Each of the latter was large enough for two chairs, one was completely equipped for handling all kinds of extractions, and one was reserved for colored men. The second floor was occupied by an operating clinic with 14 chairs, a laboratory, two supply rooms, cloak rooms, and toilet. A mess hall in a medical infirmary was utilized as a second dental infirmary, with seven chairs, and these two cared for the troops of the main camp. The mess hall in the veterinary training school was also converted into a dental clinic, at first with only one base outfit but later with three. The auxiliary remount station had one base outfit. Small offices with one or two chairs were established in various other organizations. Another 15 base equipment and authority to construct a second dental infirmary building were received in September, but this construction had not been started when the armistice was signed. Dental officers assisted in the physical examination of 38,963 drafted men from June 8 to August 16, 1918. Of these, they rejected 618, found 371 fit for domestic duty only, and discovered that 10,596 were suffering from infected roots. From May, 1918, to February, 1919, inclusive, 61,543 initial dental examinations were made, 20,270 permanent and 2,328 temporary fillings placed, 3,081 root canal fillings made, 30,299 extractions performed, 312 dentures made, and 286 repairs made to bridges, crowns, and dentures. Calculi were removed in 7,863 cases and mouths freed from focal infections in 16,349 instances.

There were 247 animals left in the camp proper after the 80th Division had turned in its stock to the remount depot, but this number had increased to 1,124 in August, to 1,439 late in September, and to 1,643 early in November, 1918.³⁸ The arrival of a portion of the 8th Division later increased the number to about 1,800. Ten shoeing shops were in operation during the period of greatest activity.

Meat from packing plants was inspected and issued from refrigerator cars prior to the completion of the cold-storage plant in July, 1918.²⁸ There was little or no control of meats and meat products purchased locally until the summer of 1918, when the purchase of such foodstuffs through the camp supply officer was directed. Inspection was then made at the time of issue. A Pasteurizing plant within the camp limits was the only authorized source of fresh milk, so the inspection of local dairies was not considered necessary.

The veterinary training school which was located at this camp was organized in the fore part of the summer of 1918 for the purpose of mobilizing and training organizations of the Veterinary Corps.³⁷ The first group of organizations to be formed were Veterinary Hospital Units Nos. 7, 8, 9, 10, and 11, and Mobile Veterinary Hospital Units Nos. 1 and 2. These left camp late in July with a total strength of 43 officers and 1,662 men.³⁹ Veterinary Hospitals Nos. 12, 13, 14, 15, and 16, Base Veterinary Hospital No. 2, and Corps Mobile Veterinary Hospital No. 3 were then formed, and the list in September included Veterinary Hospitals Nos. 17, 18, 19, 20, and 21, Corps Mobile Veterinary Hospital No. 4, and Section B of Army Mobile Veterinary Hospital No. 1.³⁹ Veterinary Hospitals Nos. 19, 20, and 21 were composed of colored men. The above units and Mobile Veterinary Hospital Units Nos. 7 and 8 left for overseas service in October, with a total strength of 132 officers and 3,880 enlisted men.⁴⁰ The following organizations only were reported in November: Army Mobile Veterinary Hospital No. 2, Base Veterinary Hospital No. 3, Corps Mobile Veterinary Hospitals Nos. 5, 7, 8, and 9, Replacement Unit No. 5, and Veterinary Hospitals Nos. 22, 23, 24, and 25.³⁹ Veterinary Hospital No. 25, Corps Mobile Hospitals Nos. 7 and 8, and Army Mobile Veterinary Hospital No. 2 left in November, with a total strength of 15 officers and 355 men.⁴⁰ The following organizations were authorized but not formed: Corps Mobile Veterinary Hospitals Nos. 6, 10, 11, 12, and 13, Veterinary Hospitals Nos. 26, 27, 28, 29, and 30, and Veterinary Replacement Unit No. 6.⁴¹ These organizations would have required a personnel of 47 veterinary officers, 5 medical officers, 2,075 enlisted men of the Veterinary Corps, and 55 enlisted men of the Medical Department.⁴¹

The corrals of the remount depot were at first placed largely on low land which became so muddy that it was necessary to move them to higher ground.⁴² The corral fences were more substantial than at many camps, being constructed with 2 by 6 inch planks top and bottom and 2 by 4 inch between.⁴³ The corral sheds were inclosed on three sides, some sheltering a feeding and hay rack. In addition to the larger corrals, there were 14 paddocks and small corrals which held an average of about 60 animals. The water troughs eventually used were of concrete and so shaped that they would not be damaged by freezing. The depot was suffering from a number of insanitary conditions in January, 1918.⁴⁴ The barracks were overcrowded, great quantities of manure remained in the corrals, shelter and personnel were inadequate for the many sick animals, and the plumbing and sewers had not yet been connected, although ready for use since September 10. However, conditions here were very satisfactory in August, 1918, owing to an energetic and capable commanding officer.²⁷

The veterinary hospital was of the usual type.⁴⁵ An epidemic of contagious pustulous stomatitis started in October, 1917, and rapidly spread to all animals

in the depot in spite of quarantine attempts. It produced no permanent disabilities in animals affected, one attack conferred immunity, and the epidemic had burned itself out in January, 1918. Influenza and strangles also involved most of the animals during the exceptionally severe winter of 1917-18. The first case of glanders was discovered in February, 1918, and testing resulted in detection of 14 more by May.⁴⁵ The hospital was taken over by the veterinary training school in November, 1918, and operated as a camp hospital in order to provide practical instruction for the officers and men assigned to the school.⁴⁶

The physical examinations on demobilization were so regulated as to give the maximum degree of completeness commensurate with practicability.⁴⁷ The eyelids were not ordinarily everted, for such practice would have required the washing of the hands preceding each examination and the use of three examiners instead of one. Direct examination of the external auditory canal and of the nares with reflected light was considered sufficient for the ordinary case. Tongue depressor and mirror were used for the throat examination. Men who were being sent to other camps for discharge were at first not given a chest examination, as they would be examined again at the place of discharge. This was later changed to include an examination of the heart and lungs. A visiting medical inspector approved the methods employed, but considered that the examination of men transferred to other camps for discharge was a waste of time and should be replaced by an inspection only, as the object sought was to prevent travel by men who were physically unfit for the trip or were suffering from communicable conditions.⁴⁸ From the beginning of demobilization in November, 1918, to the close of the year 1919, 138,520 men were examined, and 7,738 of these were found to have disabilities.⁴⁸ The greatest number examined for discharge in one month was the 27,975 in June, 1919. In addition, 3,577 men were examined in that month before transfer to other stations. These examinations were performed by two teams of about 20 officers each during the early part of the year 1919, but one similar team was sufficient in June.

CAMP LEWIS, WASH.

Camp Lewis was a U-shaped camp built on a rather narrow strip of flat land between hills, about 1 mile from American Lake,⁴⁹ with the cities of Tacoma and Olympia, Wash., lying 16 and 17 miles to the north and west, respectively.⁵⁰ The remainder of the 60,000-acre reservation consisted of large areas of gently rolling prairie and occasional hills covered with a heavy growth of fir,⁵¹ though one area of swamp existed in the vicinity of the camp. Moderate rainfalls prevailed from about October 15 to June 1, with an average monthly precipitation of 4.95 inches during the period October to May, inclusive, in 1917-18.⁵⁰ The hills contiguous to the camp acted as watersheds which, during heavy rains, caused considerable water to flow through the camp.⁴⁹ While the soil of the greater part of the reservation consisted of a few inches of loam overlying gravel, and was so porous that it was suitable for manuevering troops within a few hours after a heavy rain,⁵¹ the continual drilling later caused the camp area to become nearly impervious to water and extensive surface ditching was necessary.⁵² The light top soil was ground into great quantities of impalpable dust during the dry season, which extended from about June 15 to September 15.⁵⁰

There was no excessive heat in the summer and the nights were so cool as to require light wraps for complete comfort. There was usually a period of about 10 days each winter which was clear and cold, the thermometer falling to the neighborhood of zero. A paved road connecting Tacoma and Olympia passed through the camp.

The first increments of drafted men arrived at Camp Lewis between September 1 and 15, 1917.⁵³ During 1917 the troops came from Washington, Montana, Utah, California, Idaho, Wyoming, and, during November, a few from New York. The mean strength for December, 1917, was approximately 37,000. The 91st Division was organized here and moved overseas about July, 1918. After this the 13th Division was organized. Large increments of troops were received during 1918 from the States mentioned. In addition, there were 4,714 from Minnesota and a considerable number from North Dakota, Colorado, Nevada, and Georgia. The maximum strength was in June, 1918, when the mean strength for the month was approximately 44,000.⁵³

A large spring at the head of Lake Sequallitchew, 1 mile from camp, made available an estimated quantity of 3,500,000 gallons per day of water.⁵¹ The water was practically sterile,⁵¹ so though a chlorinating apparatus was installed its use was unnecessary, and it was operated only once every 15 days, as a test. Storage tanks were provided, with a capacity of 600,000 gallons. The pumps which lifted the water to the storage tanks were electrically driven and the tank capacity was sufficient for only six hours' use. An interruption of the power line on one occasion resulted in the draining of all tanks and water lines before discovery, and serious damage to water-heating apparatus was narrowly averted.⁵⁴ Later eight driven wells were added to the system as an emergency source of supply should the spring ever fail.⁵⁵

The sewerage system was completed before the end of September, 1917.⁵² The outfall sewer terminated in Puget Sound at the main tide level. Since there was no treatment of the sewage, a number of complaints were made by owners of land in that neighborhood, but these complaints diminished in frequency until none were being received a year later.⁵⁵

An unusual expedient was used in the disposal of excreta during the construction period, and continued for the use of outlying details of men, etc., during the entire camp period.⁵² Dry-earth closets were mounted on skids, which made them easily removable to any point desired.⁵⁴ These latrines were in use throughout the camp when the first draft increment was received.

A contract for the disposal of garbage was let before the end of September, 1917, under which the Quartermaster Department removed the garbage in cans from the organizations, delivered it to the contractor at the transfer station, one-half mile outside of camp, washed the cans and returned them to organizations.⁵⁴ Under this system the garbage was used for feeding hogs on a farm 6 miles from camp. Waste in the messes was gradually reduced until the contractor received only 10 ounces of garbage per man daily in the summer of 1918.⁵⁶

The contractor was to receive the manure at a station near the auxiliary remount depot and sell it to farmers in the neighborhood.⁵⁰ Since the terms of the contract allowed him to refuse all manure which contained a large proportion of extraneous matter, such as corral scrapings, it was necessary to spread

this latter material thinly on open spaces at some distance from the camp. The contractor could also refuse to accept all manure when he had no market for it.⁵¹ These phases of the contract were objected to locally on sanitary grounds and resultant conditions came to a crisis in the summer of 1918,⁵⁴ when the contractor ceased to take the manure. Efforts were made then to burn it.⁵⁷ However, a great deal of manure had collected in the corrals of the remount depot during the winter and immense numbers of flies were present in all parts of camp. Since little effort was being made locally toward exterminating them⁴⁹ and considerable carelessness was evident in the protection of food,⁵⁷ several small outbreaks of diarrhea among the command were considered to have a possible connection with the prevalence of flies.⁵⁸ The policing of all corrals, left unoccupied by the departure of the 91st Division, was completed in August and the cleaning of the remount corrals was continued.⁵⁸ Approximately 6,000 tons of manure were disposed of in August, 1918, mainly from the remount depot. The situation was entirely under control by September.⁵⁵ Identical conditions again arose in the remount depot in the following winter,⁵⁹ but energetic action resulted in clean corrals, and almost no flies were in evidence when the warm weather again arrived.⁶⁰

Camp Lewis was fortunate in the selection of drafted men for service in the Medical Department, in that the camp commander realized the necessity of furnishing that department with men of a high type and allowed the personnel officer to assign men with premedical and hospital experience for duty with Medical Department organizations.⁵⁰ There were 286 officers and 2,284 men of the Medical Department on duty in the camp in May, 1918, 108 officers and 1,236 enlisted men being assigned to the 91st Division. Of the total within the camp limits, 31 were dental officers on duty with the division and 22 more were on camp duty; 12 officers and 46 enlisted men of the Veterinary Corps were on duty with the division, and 18 officers and 77 enlisted men were on duty with camp organizations.

The enlisted personnel of the sanitary train of the 91st Division was composed very largely of volunteers, and about one-half of them were men with college or hospital experience.⁵⁰ The first of the organizations to arrive were Provisional Ambulance Company D, from San Francisco, Calif., and Provisional Hospital Company B, from Portland, Oreg., in July, 1917.⁶¹ A provisional field hospital detachment arrived from the medical training camp at Fort Riley, Kans., in August, 1917,⁵⁰ and two more provisional ambulance companies reported.⁶¹ American Red Cross Ambulance Company No. 14, organized at Eugene, Oreg., and American Red Cross Ambulance Company No. 19, organized at Portland, Oreg., reported in September, 1917.⁶² From these organizations and some drafted men, the four ambulance companies and four field hospitals of the sanitary train were organized.

The Oregon State Council of Defense gave to each drafted man from that State a leaflet which emphasized the importance and duty of every man to keep himself physically fit to perform the duties of a soldier, and referring particularly to venereal disease.⁵⁰ Since men in the camp from Oregon showed a lower rate for communicable diseases than did those from other States, an effort was made to have the governors of all States sending troops to Camp Lewis to instruct their men in the same way, with what result is not known.

There was no camp laundry, so some organizations installed one small washing machine for each two companies in latrine buildings.⁵⁰ This plan was not generally adopted and was not satisfactory; the capacity of the laundry was too small; the water was not hot enough; the capacity of the baths was reduced by two shower heads; the building was crowded and the floor flooded. One drying house was built in 1918 for each two companies, the many rainy days during the late fall, winter, and early spring making some arrangement for the drying of clothing necessary.⁵⁰

The best method of handling the discharge of soldiers on account of physical disability was a problem.⁶³ Several disability boards existed in the camp in the summer of 1918, and it was found that frequently when one board refused to recommend discharge, the man's commanding officer would refer his case to other boards until he found one which was more obliging. This practice led to the dissolution of all these boards except one, but this one soon had many waiting cases and was in constant conflict for refusal to discharge men when so recommended by the specialists. These conditions resulted in the formation once again of several boards, seven in number, each composed of one class of specialists, except for one general board. The development battalion had its own disability board during its existence, for, after a specialist had recommended a man for a period of training, it was difficult to convince him later that the man would never be of any particular value as a soldier.

It was planned to use the regimental infirmaries as examination buildings for the first draft increment, but, as the infirmaries were not then completed, four wards of the base hospital were utilized instead.⁵⁴ The examination of a maximum of 2,200 men per day was attained by using a large force and working 11 to 12 hours daily; however, the frequency of errors resulting confirmed the opinion that this was too rapid for accuracy, and examinations of the second increment were limited to 1,000 per day. The procedure in 1918 differed from that employed at other camps, in that two days were required for completion of the examination.⁵⁷ The first day was taken up by the special boards consisting of 23 tuberculosis, 12 cardiovascular, 6 orthopedic, and 4 neuropsychiatric examiners, with 50 enlisted assistants. These boards occupied an entire barrack. On the second day, the men received the general physical examination in another building where 10 medical officers and 41 enlisted men from the line were working. About 1,300 men per day were examined. While this method caused much confusion and lost motion and required an excessive personnel, the quality of the work was exceptionally good.

German measles was prevalent early in Camp Lewis.⁵³ There were 316 cases in September, 1917; then it practically disappeared, only to rise suddenly to 1,063 cases in December. It was of little importance after January, 1918. On the other hand, true measles was surprisingly infrequent, 92 cases in February and 91 in October, 1918, being the highest points.⁵³

Influenza affected the camp throughout the period of 1917-18, in what was practically one long wave with two major and two minor crests.⁵³ In only 3 months of the 16 concerned did the incidence fall below 200, and it was never below 100 after September, 1917. The first minor crest arrived late in the fall of 1917 with 552 cases in November and 549 in December. The next in order

was a major crest in the spring of 1918, with 1,291 cases in March and 1,518 in April. The second minor crest followed, with 493 cases in July. The highest of all was caused by the epidemic, in October, and the rise and fall of this crest were much sharper, although the base was gradually extended in both directions. There were 2,129 cases during October. The daily incidence never attained 100 after October 24, yet it did not remain persistently below 20 until another month had elapsed. The morbidity and mortality rates were lower than at most camps and lower than in surrounding cities.⁶⁴ This favorable status was attributed to the preventive measures adopted—the usual ones, in general, but, in addition, the avoidance of chilling and fatigue among the well men and the hospitalization of every case of fever.⁶⁴

Lobar pneumonia was the predominant type in 1917, also it occurred in the majority of cases of pneumonia during the early part of 1918, but was very much in the minority after July, 1918.⁶³ An increase in the incidence of pneumonia was evident in September before influenza had attained epidemic proportions, and, like the same disease, the high incidence was maintained for a considerable time after the real epidemic was past.⁶⁴ The extraordinary number of primary cases of pneumonia reported in the fall of 1918 would indicate that many of them would have been attributed to influenza at other camps.⁶³ The mortality rate for all types was under 10 per cent both during the fall of 1918 and before.

The presence of mumps in the camp was a constant source of annoyance throughout 1917 and 1918.⁶³ Its highest rate of occurrence came at a period somewhat later than in other camps, 1,109 cases developing in March, 1918. There was a total of 3,554 cases for that year.

As regards special professional work, the neuropsychiatric board examined only the men referred to it by the recruit examiners, organization commanders, etc., in the fall of 1917.⁶⁵ These numbered 778 cases in September and November, 228 of whom were rejected. An attempt was made to select the men who should be so examined by observing them while they were awaiting examination by the tuberculosis board, but without success. The examinations revealed several interesting conditions, among others being the development of acute phases in men with psychoneurosis, brought about by the moderate stress of camp life, and the fact that men with juvenile court records frequently were not favorably influenced by the camp discipline.

Experience with psychological ratings by the end of the year 1918 led to the opinion on the part of the camp commander that these were of decided value, largely through a saving in time in arriving at conclusions that would eventually be attained by other methods.⁶⁶ While he believed they should be used as a guide in conjunction with other methods rather than as an infallible rule, they proved of value in selecting men for special duties or training, including candidates for officers' training camps, and in eliminating promptly men who were inapt, troublesome, or of defective intelligence. He considered that the work was more closely related to that of the personnel officer than that of the medical officer and should be transferred to the former branch; also, that the psychological rating might replace the system then in use for the intelligence rating of officers, as it had been found that the former method gave about the

same results as the average of the combined opinions of several superior officers, the method then in use.

Of the 46,750 men examined in the camp prior to November 22, 1917, 1,646 were referred to the cardiovascular board, and 416 of these were rejected.⁶⁷ The proportion of cases referred by the general board decreased as the members of the latter became more experienced and relied more on their own judgment. Of 22,000 men examined in the spring of 1918, 5,000 had thyroid enlargement.⁶⁰ These goiter cases at first were referred to the neuropsychiatric board for final decision as to acceptance or rejection, but later this determination was made by the cardiovascular board. Comparatively few of all cases gave a definite history of rheumatic fever, but such history was usually present in the cases of organic heart disease. The blood pressure was taken before and after exercise in the early period of the work, but the difference was so slight that it was immaterial and this phase of the work became impracticable when the volume of the work increased. The system of depending on the examination of only those men who should be referred to the cardiovascular board did not result satisfactorily, for many men were accepted who were later found to be unfit.⁶⁸ The system was changed in July, 1918, a board of 12 officers being divided into two sections, one rapidly examining all recruits and referring cases to the second section of seven officers for careful examination.⁶⁸ The men were presented to the preliminary examiners in groups of 40, stripped to the waist. The examiners rapidly passed down the line observing, palpating, and auscultating the cardiac area in order to rule out cases which should not take active exercise. An enlisted drill master then had the men bend forward and touch the floor, rapidly, 40 times. This exercise was used because it was both vigorous and noiseless. The examiners then again examined the men, more carefully this time. In the second section, enlisted men took the pulse, standing and supine, had the men hop on 1 foot 100 times, counted the pulse immediately in the supine position and again after two minutes had elapsed. The medical officer then completed the examination. Men with goiter were not rejected for enlargement of the thyroid alone unless it was of sufficient size to prevent the wearing of the military coat without alteration of the collar, as toxic symptoms had been found to be extremely rare. Under the old system, of 40,851 men examined, 2,474 were referred to the cardiovascular board and 411 of these were rejected, 1.2 per cent.⁶⁸ Under the new system, of 30,697 men examined, 4,213 were referred and 873 rejected, 2.8 per cent. The strenuous exercise made for more accurate diagnosis, tending to accentuate murmurs at the apex and to cause those at the base to disappear, and bringing out presystolic and diastolic murmurs. Tachycardia without a history of previous trouble was found to be very suspicious of the impending onset of an acute infectious disease.

Neither a quarantine nor a detention camp was established as such; however, a section of the depot brigade was set aside for detention purposes in April, 1918,⁴⁹ The buildings in this section belonged to several designated companies to which all arriving men were assigned.⁶³ Organizations were quarantined in their own barracks when the necessity arose. That this method of handling infectious diseases appeared to be successful was shown by the results after the reception

of the draft increment in June, 1918, when 28 cases of measles occurred.⁵⁶ Only 10 of these were secondary cases; the original 18 cases occurred in 17 separate organizations; the 10 secondary cases were confined to five companies.

Organized in the summer of 1918, the strength of the development battalion was 1,493 on August 20, 1918,⁶⁹ and reached 2,158 early in October.⁷⁰ As regards the latter number, there were at least 300 men in camp who should have been transferred to the battalion, but this could not be done because buildings were not available.⁷¹ Furthermore, the work was not well organized, and medical officers in general were still confused as to the difference between the proper functions of a disability board and the development battalion.⁷¹ No venereal cases were transferred to the battalion until December, 1918, and then only the cases of chronic gonorrhoea.⁷² There were then about 1,200 men in the battalion, about 100 being venereal cases. When the battalion was absorbed by the convalescent center, the venereal cases were formed into a separate venereal detachment.⁷³

Personnel and facilities for conducting the convalescent center were excellent.⁷³ The organization provided was for battalions of 500 men, 4 companies to each, to include all convalescents not ready for full duty and all members of the development battalion except the venereal cases. All men in the center were on a duty status, and those who had started prevocational work while in hospital were sent to the base hospital reconstruction service as day pupils. All convalescent detachments received at the camp were first assigned to the convalescent center for classification, men requiring further treatment being then transferred to the base hospital. The records that were used consisted of cards and reports, the outstanding feature of which was the medical classification by a series of colors. Individual filing cards showed this classification by a colored celluloid sticker which projected above the top of the card. Separate rosters were made of all men classified under each color. The number of convalescents in the center was highest about February 22, 1919, gradually declining from that time to about 160 before the center was closed May 31, 1919.⁷⁴

There were 2 dental officers (1 Regular Army and 1 National Guard) in the camp when the first camp dental surgeon reported on September 2, 1917.⁷⁵ The equipment available at this time consisted of one complete field outfit and one field chair. Twenty field outfits arrived early in October and nine more a month later, but these were incomplete in instruments and appliances of various kinds. These field outfits were later replaced by base outfits. Dental officers were first assigned one to each regiment, but later, one or two additional were assigned according to the strength of the organizations. Instruction in pertinent administrative work was given, and road marches and physical exercise were conducted as day courses while awaiting the arrival of equipment; following receipt of this, semiweekly evening instruction was given. A dental survey of all troops in the camp was made in December, 1917. A dental infirmary building, having 20 chairs, was opened May 1, 1918, and a second infirmary with 12 chairs was opened September 4. A summary of all dental work performed from October 4, 1917, to February 28, 1919, included the treatment of 47,635

individuals, 18,432 extractions, 26,805 amalgam fillings, and 18,863 other fillings of various kinds.

The veterinary personnel of the camp area in the spring of 1918 comprised 30 officers and 123 enlisted men, 12 officers and 46 men being assigned to the division.⁵⁰ The only connection which the camp veterinarian had with the auxiliary remount depot was the supervision of strictly sanitary conditions which might affect the health of animals, and this amounted to only a reporting duty. All fresh milk and vegetables used in the camp were purchased from a local firm which had been given a concession and had erected a large cold-storage plant within the camp limits.⁵⁰ During one month 29,124 gallons of milk were sold in the camp, and only 10,545 gallons of this were sold in bulk.⁵⁹ No provision was made at any time for the inspection of meats purchased locally by organizations.⁷⁶ Dirt flooring of stables and picket lines was very unsatisfactory at Camp Lewis owing to the nature of the soil.⁷⁷ No hard standings were constructed until after the camp was occupied by the 13th Division. Eventually nearly all stables and picket lines were very greatly improved by constructing standings from available material—cobblestones, planks, or wooden blocks.

The remount depot covered an area of approximately 40 acres, and was situated at the end of the southern arm of the camp.⁵⁰ The natural drainage was poor, the mixture of mud and manure became deep after the fall rains of 1917 set in, and scratches became so prevalent that all animals except the sick were removed to pastures several miles distant. Extensive drainage ditches were dug and the manure was removed in the summer of 1918, but the depot was not in good sanitary condition until some time in August.⁵⁸ The removal of manure required an enormous amount of work.⁵⁶ When this was being expedited after the departure of the 91st Division, a force of 2 commissioned officers and 130 men removed 1,368 wagon loads in six days. Glanders was present to an alarming degree while the camp was occupied by the 91st Division, and the disease was not entirely eradicated until November, 1918.³⁷

The organization necessary for the physical examinations of demobilization consisted of the physical examining board for recruits reorganized into one team.⁷⁵ This board, comprising 32 officers and 40 to 50 enlisted men, operated in a barrack building remodeled for the purpose. This building was so subdivided by partitions and railings as to enable large bodies of men to be handled without confusion or delay, but the noise and dirt incident to the large numbers of men passing through were constant sources of annoyance. An X-ray equipment in the building avoided the delay which would have arisen had this work been done at the base hospital. Large tents and canvas shelters were erected during the rainy season as waiting rooms. The men to be examined were ordered up at stated hours by organizations or in groups. Each man brought with him his Form 135-3 A. G. O., with the first two pages completed. A clerk took this form as the man entered the building and transferred the name, rank, organization, and Army serial number to a Form 88 M. D. The man, carrying his papers, then entered a room, removed all clothing and placed it in a pigeonhole open at both ends. The line then passed across an elevated platform where the feet were examined, passed the general examiners,

and, in groups of 20, on to where a series of exercises demonstrated the degree of function in all joints. Clothing was then resumed to the waist and the remainder carried upstairs to the eye, ear, nose, and throat and to the dental examiners. Examination by the tuberculosis and cardiovascular specialists followed, the latter examiners putting the men through exercises in groups of 20. The neuropsychiatric section then completed the examination. Clerks made the requisite entries on the forms at each station. The men then returned downstairs, turned in their papers, and completed dressing. The proper entries were made on the papers and verified, the papers signed by a medical officer, and all men whose papers showed no disability claimed or found were dismissed. The technique of the examination included eversion of the eyelids, speculum examination of the ear drum and nares and the use of head mirror and tongue depressor in every case.⁷⁹ There was a decided tendency on the part of the camp authorities to speed up demobilization by prolonging the working hours of the examining team.⁷⁸ The added fatigue reduced accuracy, and an agreement was finally reached which fixed a maximum number to be examined daily. The final conclusion was that a board to examine 1,000 men per day should be composed of 1 chief examiner, 1 dental officer, 2 for the ear, nose, and throat, 2 for the eye, 5 each of general orthopedic, neuropsychiatric, and cardiovascular examiners, and 10 tuberculosis examiners, with a liberal allowance of clerks and orderlies. During the demobilization period, from December 1, 1918, to October 6, 1919, 66,190 men were examined and 1,175 found with disability.⁸⁰

CAMP MEADE, MD.

Camp Meade was situated nearly midway between Baltimore, Md., and Washington, D. C.⁸¹ The elevation here is between 100 and 200 feet above sea level. The soil was sandy loam, and the ground well drained by the Patuxent River, which borders the western boundary of the camp. Near the river there was some springy ground, during the war, and some *Anopheles* mosquitoes were found in the summer and autumn, when the camp first was established.⁸¹

The first increments of drafted men reported during the month of September, 1917, coming from the States of Maryland, eastern Pennsylvania, and a few from the District of Columbia.⁸¹ During the latter part of October a little over 1,000 men were received from the State of Tennessee. The mean strength for the month of December, 1917, was approximately 37,000. The 79th Division was organized here and moved overseas about July, 1918. After that time the 11th Division was organized here. The camp was used also as an embarkation camp. A large number of drafted men were received during the year 1918. These men came from Maryland, Pennsylvania, West Virginia, District of Columbia, Delaware, Tennessee, Ohio, New York, Connecticut, Rhode Island, North Carolina, Massachusetts, New Jersey, Georgia, and Virginia. Also considerable numbers were sent from other camps. The maximum strength was in the month of October, 1918, when approximately 48,000 men were in camp.

The men were quartered in frame barracks of the northern cantonment type, laid out in the straight-line plan.⁸¹

The water supply for the camp was derived from the Little Patuxent River, a small and muddy stream about 50 feet in width, 3 in depth, with a fairly rapid flow.⁸¹ This stream flows through a relatively thickly settled community, thus receiving considerable pollution. Two miles up the river from the intake is located the Maryland State Reformatory, which, during the earlier camp period, emptied its raw sewage directly into the stream. Later, however, efficient Imhoff tanks and sprinkling filters were installed at this institution, thus eliminating one source of gross pollution of the Little Patuxent River. The water for the camp was pumped from the intake station by electric-driven pumps to the filtration pump in the camp. At the intake station there was a device for adding lime when the alkalinity of the water decreased sufficiently to render it necessary. At the filtration plant alum was added to the water in the sedimentation tank. The water then passed through rapid sand filters and was chlorinated. From the clear-water tanks the water was pumped electrically to the distributing tank, located on a near-by hill. The water was examined daily by the Quartermaster Department and by the laboratory at the base hospital. The supply was steady and satisfactory.

A water-carriage sewer system was used in the camp, with the exception of several small groups where the pit latrine system was used.⁸¹ The sewage disposal plant, 1½ miles south of the camp, consisted of a battery of septic tanks, the effluent of which emptied into the Patuxent River 1½ miles lower down. Although the disposal plant was successful in theory, practically it failed from two causes: The tanks were on a single battery allowing no opportunity to divert the-sewage into other tanks, while the sludge in the first set was undergoing decomposition; grease from the company kitchens flowed without stoppage to the septic tanks, giving rise to the collection of a hard layer on the surface of the sludge and otherwise interfering with septic action. The original grease traps for the company kitchens were too small, were buried underground, and were never cleaned. Even had they been cleaned, their size was inadequate to stop grease from reaching the mains. In July, 1918, the septic tanks broke down completely, being filled with sludge. At this time, raw sewage was diverted into a brook, which emptied into the Little Patuxent River at the camp target range. The sludge remaining in the tanks was removed by shoveling it into wheelbarrows, and later by an ejector. The situation was deplorable—large numbers of flies were bred in the sludge, and the odor at both the disposal plant and target range was highly offensive. Constant complaints were received at the camp from the civilian population on the banks of the Patuxent below the camp. Rebuilding of the whole disposal plant in a much larger form was necessary before satisfactory results could be obtained, but the new plant was not completed until 1919.

For the disposal of garbage during the construction period of the camp, the building contractor had constructed one Woodruff incinerator. This was of insufficient size, however, to care for all the garbage, and led to the dumping of the excess on the ground back of the kitchens.⁸² Removal by contract did not begin until about two months after the camp officially was opened.⁸³ Meanwhile, neighboring inhabitants removed a portion of the garbage and the remainder was destroyed in large "rock-pile" incinerators which, at the

same time, sterilized the cans. The contractors removed the garbage in trucks until the roads became impassable early in 1918,⁸⁴ when gondola cars were utilized in hauling it to a pig farm 2 miles distant.⁸⁵ Complaints from neighboring residents led to the abandonment of the pig farm in the summer of 1919 and the removal of the garbage to an abattoir in Baltimore.⁸⁶ An unusual feature of the garbage transfer station in Camp Meade was the early (about February, 1918) installation of a thoroughly efficient can-washing machine, at a price of \$600.⁸⁷

Manure also was disposed of by contract.⁸⁵ Under this contract, organizations were to deliver the manure to a loading platform on a railroad siding. At first this arrangement was decidedly unsatisfactory, for it was impossible to prevent the ground along the sides of the tracks from becoming saturated with manure.⁸¹ Though every effort was made to keep the place clean, and though the ground was kept thoroughly oiled, these means proved ineffective. After repeated efforts, authority was obtained to build a concrete loading platform.⁸¹ This authority was several times granted and then revoked, but finally a concrete platform was constructed in the fall of 1919. The manure was hauled away from the loading platform in railroad cars. There is no discoverable record of a shortage in railroad cars for the purpose, until the latter part of 1919, when, as an expedient, a compost pile was authorized by the camp commander, to be located about 1½ miles from the remount depot, and for use when railroad cars were not available.⁸⁸

In the main, the medical officers were secured from medical officers' training camps, and the Medical Department enlisted men from the draft.⁸⁹ The total strength of Medical Department personnel in the camp during the time it was occupied by the 79th Division was about 152 medical officers, 28 dental officers, 7 veterinary officers, and 1,106 enlisted men, a grand total of 1,293.⁸⁹ One field hospital and one ambulance company of the sanitary train of the 79th Division arrived from Camp Greenleaf late in August, 1917; two ambulance companies were American Red Cross organizations and the remainder of the train was organized from drafted men.⁸⁹

A camp surgeon was designated in May, 1918, and an office organized in order to accomplish two purposes: To enable the division surgeon to devote all of his attention to the task of preparing for overseas service, and to insure the continuity of camp medical supervision after the departure of the division.⁹⁰ The enlisted personnel of the office consisted of seven men. The camp surgeon was empowered in the fall of 1918 to issue orders locally affecting personnel of the Medical Department without reference to the chief of staff.⁹¹

The physical examination of the drafted men ordinarily was conducted in an infirmary building by one board.⁹⁰ When necessary, additions were made to the board and one or more additional infirmaries used. About 800 men could ordinarily be examined in one day, the maximum attained being 1,500. The arrangement of the examining stands was somewhat objectionable, in that crossing of the traffic streams was involved at two points.

German measles was present throughout the camp period.⁸¹ Though never present in large numbers, its cases exceeded those of true measles until February, 1918. The differentiation of German measles and mild cases of

scarlet fever encountered was reported as being difficult.⁸⁷ Measles did not reach epidemic proportions at any time, the high points of incidence being 112 cases in January and 139 cases in November, 1918.⁸¹

Influenza was present, but to a moderate degree, during the winter of 1917-18 and the following spring.⁸¹ There was a sudden increase to 372 cases in December, 1917, and a recrudescence to 359 in the following March. Very few cases occurred during the summer months. The fall epidemic began with the appearance of a few cases September 17, 1918, but the onrush began with 286 cases on September 22.⁸⁴ Advance preparations had been made upon receipt of news of the epidemics raging at Camp Devens and Camp Dix, many patients being removed from the base hospital wards to tentage, and the personnel of the regimental infirmaries being similarly quartered. The disease spread so rapidly, however, that these measures were entirely insufficient. The base hospital was expanded to 3,700 beds, infirmaries were filled, two regiments of Infantry were ordered to the target range under canvas and their vacated barracks opened as auxiliary hospitals by the sanitary train of the 11th Division,⁸⁴ and an evacuation hospital took over the buildings of the welfare organizations.⁹¹ The evacuation hospital treated a maximum daily number of about 2,000 cases, the two field hospitals about 4,000, and the infirmaries about 1,000. There was a total occurrence of 11,400 cases before the epidemic terminated rather abruptly about October 15, after affecting about 25 per cent of the population.⁸⁴ The line organizations furnished officers and men freely to relieve the medical personnel of all hospitals of nonmedical duties.

Pneumonia, mostly primary and lobar, was common prior to the summer of 1918, but during the following fall⁸¹ it was mostly secondary and bronchopneumonia. The amount of floor space allotted to each influenza case had no influence on the percentage of those developing pneumonia, this being the same, 25 per cent, in a temporary hospital where the allowance was 50 square feet, as in others where it was 100 square feet.⁸⁴

An important feature of the early work of the cardiovascular board was the large group of cases of hyperthyroidism found in drafted men.⁹² This class proved, after trial, to be of no use as soldiers, easily becoming physically and mentally exhausted.

Camp Meade adopted an unusual and very effective method for the prevention of the aggravation of existing orthopedic conditions during the early and strenuous days of the military life of a recruit.⁹³ Border-line cases, who would be liable to acute strains if forced to undergo the routine early training, were placed in special training detachments under selected line officers and with a modified training schedule.

The special battalion formed in the spring of 1918 and designated solely for the reception of venereal cases was the forerunner of the development battalion.⁹⁴ The original plans set aside a portion of the depot brigade area sufficient for four battalions, with about 700 men for assignment to them. One company was reserved for white orthopedic cases and one for colored orthopedic cases.⁹⁵ Some 2,500 men were added to this number when the 79th Division left for overseas and a number was received from Camp Upton, N. Y., the total number in the battalions on July 23, 1918, being 6,722.⁹⁴ A cadre of 723 was

assigned for administrative and training purposes. Two battalions were then practically reserved for venereal cases, with a few such cases in the others. One battalion was exclusively colored, nearly all cases being venereal, and another was largely colored and largely venereal. The two races were not entirely segregated in companies in the latter battalion. The strength had decreased to 4,900 by the last of October, in six battalions.⁹⁶ Venereal cases still formed the largest class, with 1,917 men, and orthopedic cases were second, with 905 men. Fifteen medical officers were on duty with the battalions. The venereal cases were segregated in separate companies and by companies into syphilitic and gonorrhoeal cases. They were not restricted to their company areas but only to the camp limits. There were only 726 men in the one remaining battalion early in February, 1919,⁹⁷ those requiring further retention having been largely transferred to the convalescent center.

The convalescent center was organized as a separate battalion of the depot brigade and had a strength of about 1,800 on February 1, 1919.⁹⁸ The training personnel consisted of 40 line officers, 15 medical officers, 6 physical directors, and 28 enlisted men. The idea of having the center as a part of the depot brigade rather than as a separate organization was objected to by the Surgeon General's Office, on the ground that it was contrary to published orders. Much correspondence on the subject ensued, but the center remained in the depot brigade.⁹⁹ Each man was required to carry a card showing his daily duty, treatment, and exercise schedules. Participation in curative shop work was not voluntary, as in most other camps, but was assigned as a part of the treatment. The shops were so excellent in size, variety, and equipment that nearly every man was interested. These shops were all under the management of the educational officer of the base hospital. Five thousand three hundred and one men passed through the center before it was closed on May 17, 1919.¹⁰⁰ Twenty were dropped as absent without leave at the time of closure.

As regards the Dental Corps, before the receipt of field dental equipment in October, 1917, the time was occupied by instruction of members of this corps along both military and professional lines.¹⁰¹ After their receipt, the portable outfits were used in the regimental infirmaries, but these buildings did not afford space sufficient to care for the great volume of work. A small building was therefore taken over and occupied as a dental dispensary about November 1, 1917, with chairs and cabinets from 10 base outfits. The electrically operated dental engines could not be used owing to the absence of the necessary electrical connections. The portable outfits in the regimental infirmaries were later replaced by base outfits and the former placed in storage. A standard dental infirmary building was occupied about March 15, 1918, with provision for 12 operators. A second building, previously used as a medical infirmary, was opened in July, 1918, as a dental dispensary, with 10 chairs. Another building of the same type was opened as a third dental dispensary in September, where 15 portable outfits were installed. There were about 55 dental officers on duty in the camp, and 6 of these were assigned to duty in the first dental infirmary to be opened, a similar number of portable outfits having been installed there in addition to the base outfits already present.

The physical examinations prior to discharge were conducted in January, 1919, by a board of review of 5 members, a chief examiner and 4 assistants, and a team of 31 officers.¹⁰² The team consisted of 10 tuberculosis experts, 3 cardiovascular experts, 2 orthopedists, 5 ophthalmologists, 5 neuropsychiatrists, 3 otolaryngologists, 1 genitourinary expert, 1 surgeon, and 1 dental officer. The examining capacity of the board varied from 1,000 to 1,400 per day, as members were given short leaves of absence in order to sustain morale.⁹⁷ The board consisted of 23 officers and 21 enlisted men in June, 1919.¹⁰³ This was a greater number than was approved by the Surgeon General's Office, but was found necessary for accuracy when there was no prescribed maximum as to the number of men to be examined daily. The eyelids were everted, ears, nose, and throat examined with a speculum, and the stethoscope was used in all cases. The demobilization group was discontinued about September 30, 1919, the small number of examinations required thereafter being made by one medical officer at the camp hospital.¹⁰⁴ Of the 96,075 total men examined, 2,313 were found to have a disability.¹⁰⁵

CAMP PIKE, ARK.

Camp Pike was located on a high, timbered, rolling plateau 7 miles from Little Rock, Ark.¹⁰⁶ Sandy loam, with clay in places, overlaid a rock formation to the depth of a few feet only. Several small streams flowed through the reservation and one through a corner of the camp. Though the excellent natural drainage led to quick drying after a rainfall, it likewise led to the production of much dust. The winters were mild; the summer days were hot and, for the most part, dry, but the nights were fairly cool. The average rainfall was about 50 inches, fairly well distributed throughout the year but gradually decreasing to the monthly minimum in October.

This camp received its first increment of drafted men in September, 1917.¹⁰⁷ The men were from the States of Alabama, Arkansas, Louisiana, and Mississippi. During the latter part of the year, additional troops were received from other camps. The strength for the month of December, 1917, was approximately 31,500. The 87th Division was organized here and moved overseas about June, 1918. After this division left the camp was used as a replacement camp. Large numbers of men were sent to this camp during 1918, a considerable number coming from the four States mentioned, as well as from Tennessee, New Mexico, Missouri, Iowa, and Oklahoma. A few were sent from other States and a few from other camps. The maximum strength was in September, 1918, when there were approximately 54,500 men in camp for the month.

The men were quartered in frame barrack buildings.¹⁰⁷ The incoming draft of July and August, 1918, filled the barracks to their capacity, thus necessitating the use of tents and sheds for the overflow.

Five wells furnished water to the camp during the early construction period, but these were abandoned when the permanent supply system was completed.¹⁰⁶ The city system of Little Rock furnished water for the camp, the main source being the Arkansas River, though water from several rather deep wells was added to reduce the alkalinity of the river water.¹⁰⁸ Treatment

consisted in sedimentation, coagulation, rapid sand filtration, and chlorination. The supply was inadequate in the summer of 1918,¹⁰⁹ so additional quantities were hauled to the camp on one occasion in railroad tank cars, tank trucks, and galvanized-iron cans. Furthermore, at this time, the appearance of the colon bacillus in the camp supply was reported, the source of the contamination, however, being undetermined.¹¹⁰ Pollution was again reported in September, 1918, whereupon analyses were made by civilian agencies which practically proved that the technique of water examinations used in the base hospital laboratory was faulty and that there was no contamination of the water.¹¹¹ An actual contamination occurred over a year later following the repair of a section of the main pipe line, but disappeared in a few days after draining, flushing, and treating with chlorinated lime the seven 2,000,000-gallon storage tanks.¹¹²

The original plans for the sewerage system at Camp Pike called for the discharge of the effluent from a septic tank and sprinkling filter into a small stream which emptied into the Arkansas River 25 miles away.¹¹³ Since this stream was practically dry during the greater part of the year, the local representative of the United States Public Health Service objected early to the contemplated discharge of practically untreated sewage into such a small stream.¹¹³ However, the originally planned system, with the exception of the sprinkling filter, was completed in October, 1917.¹¹⁴ As was true at other cantonments, the septic tank was too small and was faulty in design.¹¹⁵ It had already filled with sludge when the sprinkling filter beds were put into operation, and because the amount of sludge discharged upon the latter threatened to clog the filter beds, their use temporarily was discontinued. A small sludge bed was constructed in February, 1918, but the sludge was in such condition that it promptly clogged the bed and a cesspool of decomposing sludge was formed. In April an attempt to pump the sludge into trenches for burial was not entirely successful. The filter beds still were not in use in May, 1918.¹¹⁶ By this time the septic tank had filled with sludge; therefore the sewage was passing through rapidly and without change, the nozzles and filter beds were clogged, and the raw sewage was being by-passed directly into the stream. These conditions resulted in a fouling of the stream bed for many miles, and innumerable complaints of the foul odors were being received both from within and without the camp. The septic tanks were then cleaned and operation of the sprinkling filter resumed, but the retention time was too short to prevent the finer suspended matter from passing to the sprinkling filter, and the effluent from the latter was very offensive in odor and appearance.¹⁰⁹ As a remedial measure a large grease trap was constructed at the disposal plant in September, 1918,¹¹⁷ and later small grease traps were installed on each kitchen line.¹¹⁸ Then new septic tanks were constructed at the end of the year; construction of new filter beds had been begun but was discontinued after the armistice was signed.¹¹⁰ Sludge disposal was effected in February, 1919, by placing a temporary dam across the creek and flushing the sludge into the stream with the release of the stored water.¹¹⁸ Though the new septic tanks contained thick deposits of scum in the summer of 1919 and were producing a very bad effluent, this was being cared for in a very satisfactory manner by the filter beds. The

new sludge beds were satisfactory, but all available space in the immediate neighborhood for burying the thick deposits of scum forming in the tanks practically had been used by this time. There was heavy fly breeding in a large number of piles of sludge in the vicinity of the disposal plant.

Garbage was hauled to a central transfer station where it was delivered to contractors.¹⁰⁷ The removal of garbage by contract, however, was not satisfactory even so late as December, 1918.¹¹⁹ Many organizations at that time were still using rock-pile incinerators inefficiently, and some whose garbage was removed reported that it was transferred from their cans to others in a cart in the neighborhood of the kitchens, the washing of the cans being left to the organizations. The contractor hauled the garbage to a hog farm about 1 mile from the camp.¹⁰⁶ The fact that the hog farm was only a mile from camp and was very unsanitary gave the Army authorities considerable concern.¹²⁰

Manure was at first distributed on neighboring farm land,¹⁰⁷ but was soon removed by rail through the efforts of the chamber of commerce in Little Rock.¹¹⁴ Manure from the camp proper was largely burned in windrows, but the heavy rains and mixture with earth prevented the successful use of this method at the remount depot.¹¹² Manure accumulated in the corrals of the auxiliary remount depot in the winter of 1917-18 in such quantities that it was not completely removed throughout the year 1918.¹¹⁰ Although a detail of 200 casual soldiers was used, a shortage of wagons prevented removal as fast as the corrals were cleaned. Some manure was hauled to farms and some was shipped out by rail, but the formation of a compost pile became necessary.¹¹² This method occasioned a severe criticism in the summer of 1919 by a visiting inspector, who found many fly larvæ in the pile, and stated that the use of a phenol solution as there practiced did not kill the larvæ. Extended correspondence resulted, the Surgeon General's Office objecting to the use of phenol for such a purpose, and to the method in general. Local authorities contended that the fly breeding occurred in the corrals before the manure was placed on the compost pile, that the phenol killed larvæ, that it was surplus stock of a Government manufacturing plant, and that the method was entirely successful and the most practical for local conditions. The method was abandoned, however, in favor of special platforms which allowed burning in windrows in spite of heavy rains.

While typhoid fever was extensively prevalent in the surrounding territory, this region was mainly notorious as a malarial district.¹⁰⁸ Active measures toward the suppression of malaria were begun in June, 1917, and included the screening of all barracks at a later date.¹⁰⁸ The measures taken were so effective that of the nearly 500 cases of malaria treated during the year 1918, only 1 was contracted locally, and this infection was acquired while the man was outside of the area which was under mosquito control.¹²¹

The physical examination of drafted men was conducted in a regimental infirmary and three adjacent smaller buildings by a board of about 21 officers and 34 enlisted men, in June, 1918.¹²² Thus, about 700 men could be examined daily. However, though the work was well organized, its division among four separate buildings did not promote efficiency in the general management.

Many cases were diagnosed as influenza in the winter of 1917-18 and the following spring, the highest monthly incidence being 487 in January.¹⁰⁷ The

diagnoses of "bronchitis" and "influenza" in the infirmaries began to increase in number about September 1, 1918, but it was not until September 22 that influenza of the epidemic type was reported by the base hospital.¹²³ There was a total of 90 cases on that day which were later recognized as influenza. The spread was rapid from that date until October 2, when there were about 1,300 new cases. The decline was as rapid, reaching less than 100 cases October 12. A total of 10,886 cases was reported for the two months of September and October.¹⁰⁷ To care for this large number of sick, an Infantry regiment vacated its 48 barracks in order that they might be used as a hospital annex, thus providing for 1,800 patients with 100 square feet of floor space each.¹²⁴ There was a rapid decline in the number of admissions during the remainder of the year, but 161 cases were reported in January, 1919,¹²⁵ and a few in March.¹²⁶

Pneumonia occurred in alarming numbers from the early days of the camp until well into the spring of 1919.¹²⁶ It was particularly dreaded when complicating measles, since there was a mortality of more than 50 per cent of these cases prior to September 1, 1918, and the rate for post-measles lobar pneumonia in January, 1918, was 76 per cent. Scarlet fever also furnished a number of cases of pneumonia as a complication, one report stating that there were 313 such cases prior to January 1, 1918,¹²⁷ but this figure is probably erroneous, as only 384 cases of scarlet fever as a primary disease were officially reported during that period.¹⁰⁷ The records show primary pneumonia of the lobar type to have been in the majority throughout the period prior to the year 1919, but some cases were so diagnosed in the winter of 1917-18 which were, in reality, secondary to measles, and the figures given for primary and secondary cases during the influenza epidemic are surprisingly high as regards the proportion constituted by the former class.¹⁰⁷

Measles was present among the National Guard troops before the camp was opened; so men arriving in the first draft increment, in September, 1917, were kept in detention for 10 days and, at the time no outbreak of measles occurred.¹¹⁴ However, when 11,000 men later arrived within 24 hours, the number was too large to permit this detention period with the facilities available; and measles at once became widespread¹¹⁴ and was not brought under control until all nonimmune men had all been infected, about the end of the year 1917.¹²⁸ Nine hundred and thirty-five cases were reported in October, 1,826 in November, and 1,266 in December.¹⁰⁷ This disease was prevalent throughout the year 1918, and reached an incidence of 375 cases in July and 603 in October,¹⁰⁷ in spite of the fact that newly arrived troops were quarantined and remained free from measles during that period.¹²⁹ The favorable influence experienced in the fall of 1918 in treating influenza cases in barracks led to its adoption for measles when the decline of the influenza epidemic permitted.¹²⁹ Organizations occupying standard barracks each set aside the necessary buildings to provide each of its measles cases with 150 square feet of floor space. Each case was treated as a bed patient; beds were semieubicked; burnable sputum cups were used; all patients and attendants were masked. Thus treating the cases in barracks avoided the restricted floor space, intermingling of disease, etc., which were more or less unavoidable at the base hospital owing to the great number of its patients.

Mumps cases were present in considerable numbers in September, 1917, but practically absent in November.¹⁰⁷ The incidence then rose rapidly to 1,140 cases in January and 1,286 in February, 1918, declined rapidly to about 200 in April, and then slowly rose to 813 in December, 1918. Five hundred and seventeen cases were admitted in January, 1919,¹²⁵ but there were none on the records by the middle of March.¹²⁶ As was the case with measles, the use of barracks was necessary in hospitalizing the great numbers of cases occurring in the winter of 1917-18 in order to relieve the pressure on the base hospital.¹²⁸

Camp Pike also had a comparatively large number of cases of meningitis. There were 32 cases in the fall of 1917 and 63 during the year 1918.¹⁰⁷ The laboratory service here was reported as being very ineffective in the detection of carriers. Neither the chief of the service nor his laboratory equipment were adequate for the needs in 1917.¹¹⁹ Only about 30 cultures a day were made at this time, and reliance was placed on smear examinations only.

A foot survey of the entire enlisted personnel early in 1918 revealed that weak-foot was the most common of the more important foot defects, and that flat-foot was the second.¹³⁰ Improperly fitting shoes were found on over 68 per cent of the men. This was partly due to the method in vogue in assigning shoe sizes, as the enlisted men's statements as to size worn were accepted as correct for civilian life, and a size one or one-and-a-half larger was assigned as proper for the military shoe. The size was estimated from inspection if an enlisted man did not know the size of the shoe he was wearing. These improperly fitted shoes could not be replaced until they were worn out, and local conditions did not permit accurate fitting when the recruits arrived.¹³¹ Arrangements were made by May by which shoe fitting became a part of the physical examination of all drafted men received.¹³² Orthopedic cases in regiments were listed at their infirmaries and formed into classes which received treatment and foot exercises under the supervision of the regimental surgeon.¹³³

Representatives of the United States Public Health Service assumed sanitary control of the extra-cantonment zone in June, 1917.¹⁰⁸ Their activities included antimosquito work, the extension of city sewerage and water systems, the installation of sanitary privies, the inspection of dairies, the administration of typhoid vaccine to dairymen and other volunteers, etc. The city of Little Rock appropriated \$50,000 for antimosquito work, the American National Red Cross supplied nursing and laboratory assistance, and the United States Department of Agriculture sent a milk inspector. The general sanitary conditions were rated as from "poor to bad," but were gradually improved under the cooperative action of the United States Public Health Service and local health authorities.¹¹⁴ Reports of communicable diseases were regularly sent to the division surgeon. Food handling places and barber shops were inspected and graded into three classes, and troops were not allowed to patronize those which were not satisfactory.¹⁰⁶

The quarantine of arriving troops was attempted by retention in barracks in the depot brigade for two weeks,¹³⁴ but frequently was inefficient.¹³⁵ Construction of both quarantine and detention camps was under way in the fall of 1918,¹³⁶ but because of the armistice, the quarantine camp only was completed.¹¹⁰

One development battalion had been organized by August, 1918, at which time it contained 250 white and 359 colored soldiers.¹³⁷ Four medical officers and 12 line officers were on duty with the organization. The strength had increased to 303 white and 360 colored about October 1, not including the training cadre. Since no venereal cases, illiterates, non-English speaking persons, aliens, etc., had been assigned to the battalions, this strength was far below what it would otherwise have been.¹³⁸ It was estimated that there were about 12,000 men in the camp who should have been assigned to the battalion, including 3,500 venereals then under treatment.¹³⁸ In November, however, there were 6 battalions, 3 of which were reserved for the 2,706 venereal cases.¹³⁹ The strength of the battalions now was 4,652, with 44 officers and 102 enlisted men as the cadre. The two battalions remaining by the following spring were demobilized March 1, 1919.¹¹²

The first report concerning the convalescent center was dated January 23, 1919, at which time there were 224 men in the center.¹⁴⁰ Camp Pike conducted the center as two distinct parts, each rendering separate reports, the center proper and the base hospital section, the men assigned to the former being ready for discharge.¹⁴¹ There were 60 men of this class early in February, with 5 medical officers, 7 line officers, and 24 enlisted men constituting the training cadre. Men in the hospital section were carried as "sick in hospital."¹⁴² This system was not in accordance with instructions governing convalescent centers, but the room and facilities were available at the base hospital and the work could be most conveniently conducted there. It was therefore recommended that the center be discontinued as such and the work continued as a part of the function of the base hospital.¹⁴³ Approval was given May 1, 1919, and the center was closed about May 24, 1919.¹⁴⁴

A dental officer, designated as "in charge of dental services," arrived in Camp Pike September 7, 1917.¹⁴⁵ The first of his future subordinates reported the following day, and 24 more had arrived by the 20th of the month. Available time was occupied by instruction until six incomplete field dental outfits were received late in October. These were installed in the base hospital and regimental infirmaries, and officers worked with them in relays in order that all might participate in the work. Sufficient equipment had been received by January 1, 1918, to outfit each of the 34 dental officers then on duty. They were organized into three units early in November, 1917, one for each brigade in the division, but the absence of suitable buildings prevented their employment as such until a dental infirmary was opened May 1, 1918. One unit of 14 officers was assigned to this building. Another building was fitted as a second infirmary in June, 1918, the two accommodating the dental personnel remaining in camp after the departure of the 87th Division. A third infirmary was occupied in October, the dental personnel having been increased in relation to the increased camp population, the second floor of a building being utilized for the purpose. The following dental work was done during the period November, 1917, to February, 1919, inclusive: 35,069 individuals were treated; 16,859 extractions were made; 35,946 permanent and 7,287 temporary fillings were made.

In connection with the veterinary service of the camp, only Pasteurized milk was allowed on sale in the camp.¹⁴⁶ The cows on the many dairy farms from which the supply was obtained were tuberculin tested by officers of the United States Public Health Service. The Army veterinary service supervised the sanitation of these dairies. The corrals of the remount depot were situated in a well-drained area and were inclosed by substantial fencing of 2-inch material.¹⁴⁷ The flow of water to the watering troughs was efficiently controlled by a float-feed system. The capacity of each corral was about 200. The four wards of the veterinary hospital consisted of four buildings with a capacity of about 100 each, nearly all stalls being of the box type without windows but with half doors. The buildings were well separated but located in the most inaccessible part of the depot. Glanders was discovered in the depot after the 87th Division had turned in its animals, prior to departure for overseas in June, 1918, and resulted in the destruction of 72 animals. The two most common causes of disability among animals were influenza and wounds. There were 1,081 cases of the former and 1,692 of the latter during the period November 30, 1917, to August 1, 1919. About two-thirds of the latter were due to kicks.

During demobilization, a separate detachment formed from officers and enlisted men of the Medical Department constituted the physical examining board.¹⁴⁸ The chief medical examiner was also the commanding officer of the detachment, in which there were 17 officers. The major part of the examination work was done in a regimental infirmary building; the tuberculosis examinations were made in a near-by small building, and a similar one housed the special examiners of the eye, ear, nose, and throat and the board of review. Only men requiring special examinations were referred to the tuberculosis examiners, so this third building was not necessarily involved in the examination of each individual. The daily rate of examination in March, 1919, was about 400. Later the infirmary and the tuberculosis examination buildings were connected by a shed which constituted a waiting and dressing room.¹²⁶ The examinations were thorough, with one exception.¹⁴⁸ The cardiovascular examiners were stationed at the head of the stairs and depended upon the stair climbing to supply the necessary exercise before examination. This did not work out as expected, for the stream of men dammed back on the stairs and moved slowly, a step at a time. The board was composed of 26 officers in July, divided into three teams, and could examine 1,000 men daily.¹⁴⁹ Demobilization as such ceased November 30, 1919,¹¹² after the physical examination of more than 105,400 men, 3,152 of whom had a disability.¹⁵⁰

CAMP SHERMAN, OHIO

Camp Sherman was located on the plain of the Scioto River, just outside the city limits of Chillicothe.¹⁵¹ The soil here is sand and gravel overlain with a thin stratum of clay. The drainage of the camp site was toward the river, although in many places the ground was low and required extensive ditching.

The troops were drafted men, the first increments reaching camp early in September, 1917.¹⁵¹ The first troops were from Ohio and western Pennsylvania. Most of them during 1917 were from Ohio. There were 1,105 from Oklahoma. The strength for the month of December, 1917, was approximately

34,500. The 83d Division was organized here and moved overseas about June, 1918. After this division left, the camp was used as a replacement camp, and was filled with increments of drafted men, the largest percentage of them coming from Ohio, although quite a large number came from Pennsylvania, Tennessee, Indiana, and 1,000 each from West Virginia and Alabama. Considerable increments were also received from other camps. The maximum strength was for the month of July, when there were approximately 36,000 men in camp for the month.

The troops were quartered in frame barracks.¹⁵¹ There were accommodations for 2,664 officers and 39,743 men. During August, 1918, it was necessary to quarter some units in tents, and 3,000 men belonging to the remount depot in stables.

The water supply for the camp was obtained from 6 cased wells, 4 of which were 8 inches and 2 were 24 inches in diameter.^{151 152} Their depth varied from 75 to 110 feet and they all were within 500 feet of the river. The quality of the water was excellent, as shown by numerous bacteriological examinations at the base hospital laboratory. However, on account of occasional contamination, the entire supply of water for the camp was chlorinated, using 0.28 to 0.30 part of liquid chlorine to each 1,000,000 parts of water. The water was stored in 10 wooden tanks of 550,000 gallons capacity.

The sewerage system consisted of 10 miles of piping, from 8 to 30 inches in diameter.¹⁵¹ On account of the flat surface of the ground there was considerable trouble with the drainage. An inverted syphon in the main sewer also gave trouble. This condition, however, was remedied. The sewage disposal plant, which was located at the south end of the camp, was operated intermittently. It never proved to be entirely satisfactory. An attempt was made to chlorinate the effluent, but since this was ineffective, and particularly since the cities of Chillicothe and Circleville both emptied their raw sewage into the river, chlorination of the effluent as well as the use of the disposal plant were discontinued on October 1, 1918, and raw sewage from the camp thereafter was emptied into the river.

All waste was classified and transported by each organization to the camp garbage transfer station, where it was disposed of. Edible garbage was removed under contract; unedible garbage and other burnable waste were incinerated.¹⁵¹ Grease from grease traps was removed to the transfer station and disposed of by sale to contractors, to be used in the manufacture of soap. Manure was disposed of under contract by removal from the camp on railroad cars. Manure did not accumulate in the camp and was not a breeding place for flies except at the remount depot, where the lack of adequate drainage rendered it impossible to keep the corrals properly cleaned and to destroy the breeding places. An active campaign was carried out against flies and mosquitoes, consisting of thoroughly policing the entire camp area, the use of flytraps, fly swatters, etc.

To prevent the breeding of mosquitoes, drainage ditches and stagnant pools frequently were oiled; barrels and fire pails of water frequently were emptied.

There was an unusually good control of the messes in the camp in 1918 through the school for bakers and cooks, the instructors in the school also

servicing as mess sergeants.¹⁵³ Special instruction was given these men, the consumption of less meat and canned goods and more fresh fruit and fresh vegetables was urged, and food wastage was decreased to such a point that the garbage contractor complained that the garbage was composed mostly of potato parings. It was difficult to maintain these high standards with the later rapid changes of the demobilization period. The majority of the messes then discarded the "family style" of serving in favor of mess kits and the line system.¹⁵⁴

Influenza was present from the early days of the camp, and its incidence steadily rose until 1,132 cases were reported in April, 1918.¹⁵¹ Following this the decline was abrupt and the disease occurred in negligible numbers after May, except for the epidemic in September and October, 1918. When the fall epidemic started, the camp commander gave the camp surgeon authority to issue any orders which he considered necessary to handle the situation.¹⁵⁵ Barracks adjacent to the base hospital were evacuated at once for hospital use. Fifty-two barracks were eventually thus used, avoiding overcrowding in the base hospital and allowing 100 square feet of floor space for each patient. This barracks annex was operated by Evacuation Hospital No. 28, under the supervision of the base hospital. One noteworthy feature in the care of cases was forced by circumstances.¹⁵⁶ Hand basins were used as receptacles for sputum, owing to a shortage of paper sputum cups. These were set on the floor beside the beds, with three paper napkins spread in each. They had the advantages of protecting the floor from contamination, they were easily cleaned, and the napkins were easily removed and burned. This epidemic was remarkable for its short duration and its high mortality rate. Beginning September 27, it reached its highest point on October 3 with 1,036 new cases, and was over by October 13. It produced a total of 7,000 cases, 30 per cent of which were complicated by pneumonia, and 11 per cent died. Seventy per cent of 4,000 influenza cases investigated were in recruits of not more than one month's service. This class of men constituted about 46 per cent of all men in camp.

Pneumonia created a situation which was somewhat alarming from the first month of the camp, but, fortunately, the monthly incidence prior to the fall of 1918 remained comparatively low, 78 being the highest, in January.¹⁵¹ The cases in the main, were of the primary lobar type. Bronchopneumonia was in the majority during September and October, 1918; about two-thirds of all cases of pneumonia were classed as primary bronchopneumonia, although they occurred during the influenza epidemic. The mortality of all pneumonias during these two months was 31 per cent, and that of the cases complicating influenza was over 45 per cent.¹⁵¹

Six development battalions were organized, and by November, 1918, they contained 6,000 men. Eighteen medical officers were on duty with them in addition to those members of special examining boards whose duties included certain work with men in these battalions.¹⁵⁷ The most noteworthy result of professional work in the battalions was the cure and return to duty of 1,800 men with chronic urethritis.

The convalescent center was organized in January, 1919, with about 1,000 convalescents in 2 battalions of 4 companies each.¹⁵⁸ There were 8 Medical

Department officers, 63 line officers, and 512 enlisted men in the training cadre.¹⁵⁹ A large proportion of this cadre had served in the development battalions, which greatly facilitated the organization of the convalescent center. As the center was used partly as an out-patient department of the base hospital, there was a tendency to relegate the medical aspect of the work to a position of secondary importance to that of the line work. Since most of the work, except classification and hardening exercises, was done in the base hospital, there was little reason for the existence of the center.¹⁶⁰ This center had an unusually large, more or less constant, population, seldom dropping below 500, and running as high as 1,038.¹⁶¹

The first dental officer reported August 13, 1917, and the first division dental surgeon a month later.¹⁶² Pending the arrival of dental equipment the time of dental officers was spent in classwork. When the field dental outfits were received they were placed in regimental infirmaries and the base hospital, those at the base hospital being replaced by base outfits by November 1. Twenty-three base outfits were installed in the new dental infirmary about June 1, 1918, and a second building was converted to similar use in November. The oral hygiene exhibit of the Ohio State Dental Society was held in the camp in December, 1918, accompanied by a series of lectures. The camp commander was so impressed with the instructional value of the exhibit that he ordered all officers of the camp to attend. The character of the dental work done in the camp in the spring of 1918 was below the average of other camps, and the registration of the work was universally wrong and incomplete.¹⁶³ The poor work was due to a wholly inadequate number of dental surgeons and a lack of transportation.¹⁶⁴ These two factors resulted in the division dental surgeon functioning without an assistant and being unable to cover any considerable distance during the very limited time available for inspections. The work performed several months later, however, was reported as excellent.¹⁶⁵

The veterinary services in both the camp and the auxiliary remount depot was reported as being inefficient in the winter of 1917-18, particularly as concerned the prevention of disease.¹⁶⁶ Administration was poor, sick animals were promiscuously transferred, segregation stables were not available and prophylactic measures were not enforced.

Prior to September, 1918, meat purchased locally by organizations was inspected at a designated point in the camp before delivery.¹⁶⁷ As much of the local supply was from animals slaughtered locally and without Government inspection, the dealers were not allowed to sell such meat in the camp. In order to provide a supply of small cuts which would meet the camp requirements, three packing companies were allowed to maintain refrigerator cars in the camp from which these small quantities could be purchased. Local dealers were allowed to deliver meat in the camp, provided that they handled only Government inspected meats.

The remount depot was located along the Scioto River, and trouble was immediately experienced from poor drainage in the corrals.¹⁶⁸ The surface soil of loam and clay was impervious to water, and drainage ditches to the river washed so badly at their outlets that this method of drainage had to be abandoned. Sumps extending into the underlying gravel were successful until

they and the connecting ditches became clogged with mixed mud and manure. Originally there were 10 corrals, but these were later divided so as to form 23, and 2 new ones were added. The original fences were of woven wire, but these proved unstable and the wire was replaced by 2-inch plank. Mud formed in the corrals to excessive depths and manure was not removed until the spring of 1918. The corrals were then thoroughly cleaned and thereafter the manure was removed from them successively. This was an unsatisfactory method, as those first cleaned were filthy before their turn came again. Corrals for convalescing animals were formed by the division of one large corral into six smaller ones; two isolation corrals were built. The veterinary hospital was separated from the remainder of the depot by a large gravel pit and railroad track.¹⁶⁸ It comprised 8 wards and subsidiary smaller buildings, each ward having its own paddock and a capacity of 52 animals. Since buildings were located in a depression, the ground was covered with water to a depth of from a few inches to several feet after rains. Sick animals were indiscriminately mixed in these miserable wards in the winter of 1917-18. At this time, the hospital was also overcrowded and no provision had been made for using the windows for ventilation. Conditions were corrected by filling the depression with gravel, covered with a top coat of clay, and remodeling the windows. Approximately 3,850 animals arrived at the depot in January and February, 1918, and at least half of them suffered from contagious pneumonia.¹⁶⁸ The first case of glanders was discovered in May, 1918, and 21 animals were destroyed before the disease was finally eradicated in November, 1918. An accumulation of manure in the corrals, congested corrals, hot weather, and frequent rains were responsible for 352 cases of gangrenous dermatitis in the summer and fall of 1918, and resulted in the death of 7 horses and 86 mules. Removal of the animals in the corrals to stables in the camp and to pastures terminated this outbreak, but a more severe one occurred when the animals were returned in December, 1918. There were 727 cases before this second outbreak was ended by placing the animals in corrals in the camp where they could be placed in dry stables at night. Clipping the hair locally and a mechanical cleansing, with an unbandaged after treatment, resulted in a much lower mortality (19 cases) and more rapid healing than had been attained formerly when they were treated in hospitals. Nearly all animals were infected with lice in the early spring of 1918, but were cured by two dippings in a cresol solution.

During the early demobilization period the physical examining board consisted of 36 officers and 41 enlisted men.¹⁶⁹ The work was done in a small barracks which did not provide sufficient room, and the place was too noisy for accurate work, due to the locating of the dressing room on the second floor. An average of about 1,000 men examined daily was being maintained. Later, a brick, steam-heated farmhouse with two frame additions was obtained for examination purposes.¹⁶⁰ Here, as high as 2,000 men were examined in one day, but about 1,500 was the greatest number that could be handled without sacrificing accuracy. By June there were 19 officers on the board, which was an insufficient number to perform the work properly.¹⁷⁰ Tuberculosis experts each could accurately examine only about 150 men per day, but were actually passing on more than 600. The cardiovascular examiners were handling 950

per day when about 400 should have been their limit. In conducting the examination, no exercise was given before the heart was examined. As a routine the eyelids were not everted, nor were the ear and nose examined with a speculum.¹⁷¹ The demobilization group was discontinued September 4, 1919.¹⁷² A total of 173,233 men were examined, 11,561 of whom were found to have a disability.¹⁷³

CAMP ZACHARY TAYLOR, KY.

Camp Zachary Taylor was situated on the outskirts of the city of Louisville, Ky., in a gently rolling country.¹⁷⁴ Two small streams flowed through one end of the camp site, and several stagnant pools and a large swamp existed rather close to the southern boundary. The soil was clay and loam which quickly absorbed the rainfall.

This camp received its first increment of drafted troops in September, 1917, from southern Illinois, Indiana, and Kentucky.¹⁷⁵ Increments of drafted men were sent from these same States during September and October, and a little over 2,000 from other camps. The mean strength for December, 1917, was approximately 23,000. The 84th Division was organized here and moved overseas about September, 1918. A large number of drafted men was sent to this camp during 1918. These came from Illinois, Indiana, Kentucky, Ohio, Wisconsin, Louisiana, Alabama, Tennessee, and North Carolina. A considerable number was received also from other camps. The maximum strength was in September, 1918, when the strength for the month was approximately 57,000. After the 84th Division left, this camp was used as a Field Artillery replacement camp; Camp Knox adjoining was used as a Field Artillery firing center.

The troops were quartered in frame barracks of the southern construction type.¹⁷⁵

The water supply for the camp was the same as that for the city of Louisville, and came to the camp from the city through a 12-inch main.¹⁷⁵ The source of the water was the Ohio River. For purification, the water was sedimented, coagulated with aluminum sulphate, filtered, and treated with chlorine. The filtering plant had a capacity of 74,000,000 gallons per day. There were five 200,000-gallon storage tanks at the camp, from which water was distributed to all parts of the camp by electrically driven pumps. Repeated examinations showed that the water was of good quality; its quantity was ample.

The sewage was disposed of by a water-carriage sewage system, the main sewer emptying into a 30-inch "county sewer," which was a part of the sewage system of the city of Louisville.¹⁷⁵ This emptied the sewage, untreated, into the Ohio River. Thus the camp was relieved from the operation of a sewage disposal plant, which was the cause of so much trouble and concern at most of the other cantonments.

When the camp was started, the problem of garbage disposal was placed in the hands of the camp sanitary inspector by the camp commander.¹⁷³ Accordingly, in September, 1917, a contract was entered into with a local inhabitant who hauled the garbage away in cans to a pig farm. The garbage transfer station was practically completed by the middle of October, at which time the garbage was removed in tank trucks.¹⁷⁶ Organization garbage cans were

washed with hot water and lye in a very satisfactory manner. The personnel handling the garbage were civilians hired by the sanitary inspector.

At first manure was burned,¹⁷⁷ but soon it was disposed of by contract, delivery to the contractor being made in piles on the ground at designated points.¹⁷⁶ The contractor sold it to farmers in the neighborhood. Because of the deep snow in the winter of 1917-18, disposal by the contractor could not be made, consequently a large accumulation resulted.¹⁷⁸ It was later removed by rail.¹⁷⁹ There was a period when removal from the auxiliary remount depot was impossible, and 2,500 loads were placed in a compost pile.¹⁸⁰ This was treated with a formaldehyde solution as piled, apparently with very satisfactory results from the fly-breeding standpoint.

The physical examination of drafted men was not well systematized with the first increment of the draft.¹⁷⁷ This was largely because headquarters did not send to the examining board a certain duplicate form, as required, but expected to assemble the originals and duplicates of some 40,000 men at a later date and have the medical officers then fill out and sign the duplicates. This system was at once changed when its impracticability was pointed out. Furthermore, the division surgeon failed to send to the examiners the printed instructions defining the requirements of the examinations, with the result that each organization was making the examinations according to its own interpretation and with considerable uncertainty and confusion. In the spring of 1918, when increments of the second draft were received, the examinations were conducted throughout the 24-hour day, by dividing the examining group into three reliefs.¹⁸¹ There was a further division of the examining group into general and special examining boards. The general boards did not pretend to make a detailed examination of abnormalities found, but referred such cases to the special boards. The general boards worked in the regimental infirmaries, where they examined men at the rate of about 1,000 per day; in addition they examined all men in their organizations twice daily for infectious diseases. Late in May the minimum number of daily examinations was set at 2,000, as 17,000 men were scheduled to arrive and the division was to change station. Two thousand eight hundred men were examined in one day on one occasion.

Influenza was constantly present in considerable numbers from the early days of the camp, particularly during the winter of 1917-18 and the following spring when the monthly incidence varied from 200 to 600.¹⁷⁵ The fall epidemic of 1918 began September 21, with 25 admissions, rapidly increased to a flat peak over the period from October 1 to October 6, then rapidly declined during the next two weeks.¹⁸² The final declination of the epidemic was protracted, the daily admissions not falling below 10 until November 18, and not remaining below 10 until after November 26. There were 12,676 cases from September 16 to the end of November. The problem of hospitalization of influenza patients during the fall epidemic was met by placing in tents all other patients of the base hospital whose condition warranted this action, by utilizing porches and the barracks of the personnel, and by utilizing some 40 barracks as an annex.¹⁸³ Catholic "sisters" from neighboring parochial schools and enlisted men from the line constituted the entire nursing force of this annex, which was administered by the base hospital.

Admissions for primary lobar pneumonia were relatively high continuously during 1917 and 1918.¹⁷⁵ The main points of interest, aside from the effect of the influenza epidemic, were the high mortality from bronchopneumonia following measles, about 35 per cent of cases, and the change of the predominating type from lobar to bronchopneumonia in the fall of 1918.¹⁷⁵

In the winter of 1917-18, the hemolytic streptococcus was responsible for an increasing number of both local and general infections to such an extent that these were considered in the same light as the acute infectious diseases.¹⁸⁴ The distribution of carriers was general, and involved 83 per cent of one organization. The organism was particularly pernicious when associated with measles, causing a great increase in the percentage of complicating conditions and increasing the severity of the complications, particularly pneumonia. The virulence of the strain of the organism increased as the incidence of measles subsided, and this fact was cited as proof that these infections constituted a separate disease entity.

Measles appeared in October, 1927, and was present throughout the following year in sufficient numbers to cause concern at all times.¹⁷⁵ Its highest incidence of primary admissions occurred in December, 1917, with 374 cases, and the second highest incidence occurred in October, 1918, with 434 cases.

Cerebrospinal meningitis was more common here than in the majority of the large camps, 23 cases being reported in 1917 and 48 in 1918.¹⁷⁵ Nearly one-half of the cases occurred during the winter of 1917-18, and there was another small outbreak of 12 cases in October, 1918. The mortality was particularly high in the latter period, 58 per cent.

There was no specially constructed quarantine camp at Camp Zachary Taylor; however, a group of barracks was used intermittently as a quarantine camp, when its use was not necessary for the shelter of troops.¹⁸⁵

There was one development battalion in August, 1918, with a strength of 2,308.¹⁸⁶ Two medical officers were assigned to the battalion, and the specialists of the camp disability board spent the greater part of their time there. Early in October, there were 3 battalions of 4 companies each, with a total of 5,551 men; four companies were reserved for venereal cases.¹⁸⁷ There were only two battalions a month later, one being reserved for venereal cases. Both battalions received colored soldiers, but in separate companies. Medical officers were not directly concerned with the physical training. The battalions were discontinued about the first of the year 1919.¹⁸⁸

The convalescent center was organized late in January, 1919, with a total strength of about 1,000, approximately one-half of which consisted of the training cadre.¹⁸⁸ All convalescents of the center, including those undergoing treatment in the base hospital, were under the administration of the center. This center handled an unusually large number of convalescents prior to the middle of May, 1,360 being the greatest number reported as present at any one time.¹⁸⁹ The center was closed about the last of August, 1919, an unusually late date.

No dental equipment being available during the early days of the camp, dental officers were used as members of physical examining boards and for other duties.¹⁹⁰ Equipment was purchased in small quantities, some from

arriving dental officers; some was received from the medical supply depot. Such acquisitions were put into use as fast as collected, and dentists in Louisville temporarily supplied offices and equipment in the city for eight dental officers. All dental officers were assigned to organizations until base equipments were received in the spring of 1918, when they were divided into three units. The 11 officers of 1 unit, installed in a large room in a regimental infirmary building with 10 base outfits, then constituted a dental infirmary. Another dental infirmary was conducted in the depot brigade area, and the third unit operated the clinic at the base hospital. One dental officer was designated as an assistant to the medical supply officer to supervise the issue of dental supplies. Operative dentistry was made uniform by selecting the better men as instructors. Particular emphasis was placed on the proper performance of amalgam restorations. Dental inspections revealed that about 60 per cent of all men required some form of treatment. Prior to March, 1919, 41,584 individuals were treated, 40,598 permanent fillings, 9,022 temporary fillings and 4,703 root canal fillings were placed and 19,520 teeth extracted.

In connection with the camp veterinary service, there was little supervision of meat purchased locally by organizations until June, 1918, when all but Government inspected meats were barred from the camp.¹⁹¹ In the following August, the inspection of all meat purchased locally was inaugurated.

One half of the area occupied by the remount depot was high and rolling and the other half flat.¹⁹² Corrals in the latter area were abandoned on account of the formation of mud during wet weather. The Southern Railroad occupied the dividing line between these two areas. When veterinary officers arrived in September, 1917, there was no remount veterinary detachment. Men were borrowed from the Quartermaster Corps to care for the animals and 75 men from the Sanitary train were later attached for duty. It was not until February, 1918, that the first men were transferred to the veterinary detachment.

Eight buildings, each 30 by 100 feet, served as wards of the remount veterinary hospital.¹⁹² Each of these consisted of 8 box stalls and 32 standing stalls, with a driveway the full length of the center of the building. Pneumonia, influenza, and strangles were prevalent during the winter of 1917-18. The first case of glanders was discovered late in May, 1918, and led to the destruction of 9 horses and 1 mule. Another case was detected in the following December.

During the demobilization period 13 officers constituted the physical examining board, and, in addition, 3 contract surgeons were on half-time duty.¹⁹³ The greatest volume of work occurred in December, 1918, but the board was not often required to handle over 500 men per day although its capacity was 1,000 or more. Measurements were taken for use in the making of clothing patterns in September, 1919, as part of the routine examination.¹⁹⁴ The demobilization group was discontinued late in September, 1919, after demobilizing 153,513 men, 17,811 of whom had a disability.¹⁹⁵

CAMP TRAVIS, TEX.

Camp Travis was situated on rolling ground adjoining Fort Sam Houston and the city of San Antonio, Tex.¹⁹⁶ The soil consisted of loam with an admixture of clay, the so-called "gumbo," and formed a very tenacious mud

when wet and a light, fine dust when dry. The average annual rainfall was about 27 inches.¹⁹⁷ During the cool months, extreme and sudden changes in temperature accompanied the "northers." In the summer, the days were hot, but were followed by nights which were made comfortable by the Gulf breezes. One very tortuous stream flowed along one edge of the camp site. The roads through the surrounding country were of gravel or asphalt.

The cantonment received its first increments of drafted men in September, 1917.¹⁹⁸ All of the troops during the year 1917 were from the States of Texas and Oklahoma. The mean strength for December, 1917, was approximately 33,000. The 90th Division was organized here and moved overseas about June, 1918. After this division left, the 18th Division was organized. During the year a large number of drafted men was sent to this camp, by far the greater number being from the State of Texas. There were, however, many from Oklahoma and some from Colorado, Louisiana, Arkansas, and New Mexico. Several increments also were received from other camps. The maximum strength was in September, when approximately 35,500 men were in camp for the month.

The troops were quartered in frame barracks, of the southern cantonment construction, the ground plan of the camp being in practically straight lines.

The water supply was obtained from the city system of San Antonio, the original source being 15 artesian wells.¹⁹⁹ The water was uniformly of excellent quality and not excessively hard. A 5,000,000-gallon reservoir near camp furnished a reserve fire supply which was not used for drinking purposes.

The sewerage system for the camp was completed early and connected with the city system, which discharged the untreated sewage into a lake 6 miles distant.²⁰⁰ Small grease traps were installed on each kitchen line.

The garbage disposal system was not satisfactorily conducted until after October, 1917.²⁰⁰ This was because the garbage transfer station had not yet been constructed, consequently a portion of the garbage was hauled to the pig farm in cans in a fairly satisfactory manner. All garbage was collected by the sanitary squads in November and delivered to the contractor at the transfer station.²⁰¹ This method was changed in 1918 by requiring organizations to haul their own garbage.²⁰² Waste garbage was burned at the dump.²⁰³ The garbage transfer station was kept in exceptionally good condition,²⁰⁴ as was the hog farm.²⁰⁵

At first all manure was burned in a gully near camp with the aid of the inflammable rubbish collected and of crude oil.²⁰⁰ Kerosene later was substituted for the crude oil as being more efficient.²⁰⁶ No market had yet been found for manure in March, 1918, but the aid of the Federal and State agricultural agencies had been enlisted and a very low freight rate had been obtained.²⁰⁵ Only 10 per cent was being shipped for agricultural purposes toward the end of the year. An estimated quantity of 40,000 tons from the auxiliary remount depot was composted by the English packing method during the summer of 1918.²⁰⁷ A pile 500 feet long, 100 feet wide, and 6 feet deep was so free from fly breeding that horses driven onto the pile were not even restless.

In the physical examination of drafted men, the system employed prior to the summer of 1918 was somewhat unusual. The general examinations were made at the regimental infirmaries, the boards for the examination of special organs or senses operated at other locations, and all doubtful cases were referred to a special examining board at the base hospital.¹⁹⁷ All examining was later completed in three barracks connected by canvas-covered corridors.²⁰⁸ The maximum number examined in one month in 1918 was almost 19,000.²⁰²

Both measles and German measles were present in the camp in 1917, but it was considered to be impossible to differentiate them in all cases, owing to the occurrence of atypical rashes.²⁰¹ An attempt to segregate the two classes in separate wards proved to be impracticable in most instances,¹⁹⁸ as only 19 cases of German measles were reported against 3,887 cases of true measles.¹⁹⁶ It was necessary to establish a camp under canvas for the great numbers of measles contacts.²⁰² There were comparatively few cases of measles during the year 1918, the highest monthly occurrence of primary cases being 156 in March.¹⁹⁸

Epidemic influenza was introduced by men arriving from Camp Taylor, Ky., the first cases reporting sick September 29, 1918.²⁰⁹ The incidence then rose with startling rapidity for several days and reached the high point of 1,006 on October 7.²¹⁰ The decline was slower and less regular, and the epidemic was not definitely over until well along in November. Fortunately, decisive steps in preparation were taken early. A group of barracks which would permit of expansion was selected on September 30, as a hospital annex and possession taken the next day. Personnel was obtained, some from the base hospital, some from the sanitary train, and the remainder from line troops. Administrative organization was complete and detailed, various groups successively performing the necessary steps in cleaning and equipping the rooms as wards. The annex opened October 2, an excess of personnel being assigned to each ward as it opened until the necessary work had been reduced to the normal amount. During this initial stage, there was one nurse and one medical officer per ward. Later, each ward surgeon had 2 wards to care for and each nurse 2 to 4. The annex was closed November 20, after handling 10,942 influenza cases in 76 two-story barracks. A secondary rise in December resulted in 948 cases.

Pneumonia truly constituted an epidemic in Camp Travis during the fall of 1917 and the following winter, and was particularly prevalent in January, 1918, when 439 cases occurred.¹⁹⁸ A total of 1,837 cases was reported prior to the influenza epidemic in the fall of 1918. During that epidemic, all cases of pneumonia originating in the base hospital annex were transferred to the base hospital as soon as recognized.²¹⁰ Quinine was used as an adjuvant in the treatment of a series of cases, with very encouraging results. Less than 1.4 per cent of the 367 moderate cases died, and only 25 per cent of the 76 severe cases. The mortality of the entire series was 5.28 per cent.²¹⁰

Mumps was largely responsible for the high sick rate during 1917 and the following winter.¹⁹⁸ There were 1,732 cases before the end of 1917, and 4,717 in the first two months of 1918. The incidence then slowly decreased until September, 1918, when a slow rise was initiated which reached the figure of 390 admissions in December, 1918.

The vast number of communicable diseases present in the fall of 1917 and the following winter prevented any great activity among the orthopedic surgeons until about February, 1918.²¹¹ The division surgeon was actively interested, however, and had obtained the incorporation of three excellent foot exercises in the prescribed setting-up exercises. The three orthopedists were assigned to the work of foot measurement and shoe fitting, in addition to their other duties, without being given any enlisted assistants.²¹² This resulted in the neglect of their other work, in the unsuccessful attempt to avoid interference with the progress of military training, until the work was reorganized by the division surgeon. Company supply sergeants were required to issue shoes of the sizes called for by actual foot measurements.

Early in November, 1917, supervision of the extra-cantonment zone was assumed by the United States Public Health Service and excellently administered.²⁰⁸ Meanwhile, the city board of health of San Antonio was actively cooperating in a limited field, but such measures as mosquito prevention, sanitation, and the supervision of food stores was not undertaken in a general way outside of the reservation boundaries.²⁰⁰

Mention of a quarantine camp, under canvas, is first found in March, 1918.²⁰⁴ This camp had a capacity of 1,000, white and colored soldiers were segregated,²¹³ and it was maintained until demobilization was nearly complete.²¹⁴

The development battalion at Camp Travis was largely the outgrowth of an organization started under another name in April, 1918.²¹⁵ Its total strength was 1,631 by the middle of August, with 4 officers and 9 enlisted men of the Medical Department included in the training cadre.²¹⁶ Changes were made in the commissioned training personnel at about that time which increased the efficiency of the work.²¹⁷ There were 4 companies early in September, 1 of which was composed exclusively of 250 men with foot defects. Seventy-five men had been discharged for disability and 378 had been so developed as to be fit for combat duty. Venereal cases were not assigned to the battalion, but nearly all convalescents from the base hospital and all recruits needing shoe alterations or orthopedic treatment were. There were 2,913 men in 3 battalions by September 20. The white venereal cases composed one battalion, orthopedic cases another, and the third was composed of all other cases. Three battalions of colored venereal cases had not been assigned to the development battalions. Nine officers and 32 enlisted men constituted the Medical Department representation in the training cadre. The number of line personnel engaged in training is not known, but the venereal battalion alone had 240 enlisted men assigned for this purpose. About 30 per cent of the men in the battalion were examined daily and every man at least every 10 days. In the white venereal battalion, one company was reserved for cases which were apparently cured and were awaiting the expiration of the period of observation. Physical training, classification, and final disposition were entirely in the hands of the medical personnel, line officers being responsible for administration and discipline and assisting in training.²¹⁸ For physical-training purposes, the men in each company were divided into four classes, the weakest being placed in the fourth class and given one hour's light work forenoon and afternoon. Special exercises were prescribed for those requiring them. A school was held daily

for the practical instruction of the noncommissioned officers who assisted in the training. Upon the formation of the convalescent center, the venereal battalion and one colored battalion were continued to care for venereal cases.

Two development battalions and one battalion of the colored development group were transformed into the convalescent center early in 1919.²¹⁹ The number of convalescents to be assigned to each battalion was limited to 500. The Medical Department cadre consisted of 13 officers and 32 enlisted men to care for 282 convalescents, early in February. The last report available was made April 12, 1918, 1,880 convalescents having been assigned to the center during its operation.²²⁰

The 30 dental officers and their assistants assigned to regimental medical infirmaries were transferred to the newly opened dental infirmary in April, 1918.²²¹ All but two of these officers left with the 90th Division and were replaced in July by officers of the Dental Reserve Corps called to active service. Three small dental infirmaries were later established. A building utilized for quarters and mess for all dental officers after August, 1918, contributed considerably to their general satisfaction and was continued until the discharge of a number of officers in the spring of 1919 made the further continuation of a separate mess impracticable. A survey of 9,995 drafted men, made before the departure of the 90th Division, showed that 44 per cent had teeth in a satisfactory condition, 14 per cent had minor caries, 19 per cent showed periodontal infection, and 23 per cent showed evident or suspected focal infection.²²² Of the white men examined, 22 per cent showed periodontal infection and 10 per cent focal infection. Among the colored men, 15 per cent showed periodontal infection and 30 per cent focal infection. The total work done in the main dispensary prior to March, 1919, included 36,761 individuals treated, 31,477 permanent fillings, 2,638 temporary fillings, 2,249 root canal fillings, and 21,026 extractions.

There being no veterinary organization during the early days of the camp, the veterinary officers were attached to the division trains.²²³ One of the first moves in preparing for the care of the animals of the division was the establishment of a camp veterinary hospital,²²³ which continued to function until October, 1918.²²⁴ Organization of the veterinary work was retarded by a lack of experience in Army administration until a Regular Army veterinary officer arrived in May, 1918.²²³ There was no Government supervision of animals slaughtered locally in the fall of 1917, and the methods of handling milk in San Antonio were so defective that all these supplies were barred from the camp for a period.²⁰⁰ Investigation of cold-storage plants revealed such unwholesome conditions that two firms were indicted by the Federal grand jury and large quantities of food products were confiscated as unfit for consumption.¹⁹⁶ The handling of milk in San Antonio was still unsatisfactory in the spring of 1918, and the United States Public Health Service was then taking steps to improve it.²⁰⁵ A satisfactory inspection of meats purchased locally was first inaugurated in April, 1918, when they were required to be presented at a designated point for inspection before delivery.²²⁵

The site chosen for the remount depot was unfortunate, in that it was located on low ground where mud became very deep after rains.²²⁶ The total

number of corrals was 50, each with wire-mesh fencing. One ward of the veterinary hospital consisted of 42 box stalls, the other 3 of 92 open stalls each.²²⁷ Early records of diseases are not available, but 5 cases of glanders are mentioned as occurring in the winter of 1917-18, and 96 animals were later destroyed for the same disease.²²⁷

During demobilization the physical examining board functioned in the second story of a barracks and consisted originally of 21 examiners, divided as follows: 7 tuberculosis; 1 cardiovascular; 1 genitourinary; 3 neuropsychiatric; 2 eye; 2 ear, nose, and throat; 2 orthopedic; 2 general surgery; and 1 dental.²²⁸ More than 62,500 men were examined before the end of the year 1919.

CAMP UPTON, N. Y.

Camp Upton was situated on Long Island, about 5 miles from the village of Yaphank and about 65 miles from New York City.²²⁹ The camp lay midway of the island, from north to south. Here the country is slightly rolling and slightly sandy. A tributary of the Peconic River, which is dry except after a rain, traversed the northern part of the reservation; a larger tributary has its source in the eastern part of the reservation; Carmans River runs in a broad shallow valley along the reservation's western edge. Just to the south of the camp site are extensive salt marshes, which in August, 1917, produced salt-marsh mosquitoes in such numbers as to discourage the camp laborers and thus delay the opening of the camp. The elevation of the camp site is about 100 feet, with an additional 50 feet at its highest central ridge.

This camp received its first increments of drafted men in 1917, from Greater New York.²²⁹ A few additional men were sent from other camps. The average strength for the month of December, 1917, was approximately 30,000. The 77th Division was organized here and moved overseas about April, 1918. After this division left, the camp was used, first, as an embarkation camp, and then as a debarkation camp. Large numbers of men were sent here during 1918, the greatest number being from the State of New York. Also considerable numbers were received from Connecticut, Massachusetts, Rhode Island, Virginia, and a few from New Jersey and Delaware. Many came from other camps. The maximum strength was in April, when the mean strength for the month was approximately 43,000.

The troops were quartered in frame barracks of the northern construction type. The general layout of the cantonment was in straight lines.

Water from several driven wells, 4 inches in diameter, was piped through the main portion of the camp as the main temporary supply during the early construction period.²³⁰ Several portable hand pumps were also used in 1-inch driven wells for outlying works, but these were difficult to maintain in a sanitary condition. The permanent source of supply for the camp comprised 16 drilled wells, 8 inches in diameter and 60 feet deep, located 2½ miles south of the camp near Carmans River.²³¹ Four tanks furnished a storage capacity of 800,000 gallons.

The sewerage system was completed in October, 1917, the sewage being discharged into an open ditch, where it was rapidly absorbed by the sandy soil, without odor.²³² A disposal plant was installed and was used during a

part of the following winter, but freezing of the sand filtration beds necessitated discharging the untreated sewage into a swamp three-fourths of a mile from camp.²³³ Since the water from this swamp drained into the Peconic River, which was used not only for ice-cutting purposes but also for flooding cranberry bogs, the matter was of considerable importance. When the disposal plant resumed operation in the spring of 1918, it was found that the septic tanks were acting merely as sedimentation chambers, and that the filter beds were of only about one-half the requisite area; therefore plans for an extensive addition were drawn, to include additional septic tanks, a sprinkling filter, a humus tank and sludge beds.²³⁴ Construction of this extension of the disposal plant was begun in September, 1918.²³⁴ To make it effective, it was necessary to replace the small tile grease traps, which had been placed on the kitchen lines, with larger ones, the capacity of the new ones being based on two-thirds gallon per man per day.

A contract for garbage disposal was signed shortly after the camp was started, but a lack of transportation prevented, for a time, delivery to the contractor, and each kitchen disposed of its own garbage in company incinerators.²³² These incinerators were improvised, the majority were very crude and ineffective, and fuel and means for its transportation were limited.²³⁵ Companies were forced to send men a mile or more to cut wood and bring it to camp, and hand carts were frequently used to secure coal. These conditions still obtained in December, 1917. The garbage transfer station was in use during the early part of 1918, but it burned to the ground in March, and the organizations were forced to resort again to incineration of their garbage.²³³ A new transfer station was not under construction until rather late in the fall of 1918, but the disposal of garbage by contract had been resumed and was fairly satisfactory in the preceding June.²³⁶ The new transfer station was deficient in that a concrete platform and hard-surfaced roads in its immediate vicinity were not provided.²³⁷ Organizations having means of transportation delivered their garbage at a loading platform, the Quartermaster Department collecting from the others.²³⁸ The contractor shipped the bones, meat, and grease by rail and hauled the remainder to a pig farm 3 miles from camp. The second transfer station was completed in June, 1919.²³⁹

Manure was also removed by farmers during the summer of 1917,²³⁰ and its later removal by contract was greatly limited by the shortage in transportation.²³³ Farmers were still removing a certain amount in the spring of 1918, but the formation of two large dumps was necessary and there was a large accumulation in the corrals of the auxiliary remount depot.²³⁴ Large quantities were spread in the camp area during the following summer, over the protest of the sanitary inspectors, and resulted in widespread fly breeding. Disposal was by one large compost pile at the end of the year, which was removed by the contractor as cars were available. This method was continued in 1919, and care in maintaining nearly vertical edges of the pile and spraying them with a borax solution prevented fly breeding.²³⁹

The physical examinations of drafted men were conducted in barracks in the fall of 1917 by 3 teams of 13 officers each.²³² Doubtful cases were referred to specialists. Thus, between 2,000 and 3,000 men could be examined in one day.

The organization was much the same in the summer of 1918. Each of the 3 teams then consisted of 11 officers and about 40 enlisted men, and each occupied its own one-fourth of the building. The provisional organizations to be examined were held outside, the men being admitted in groups of 10 to 20, an entire group being assigned to an examining team. Clothing was placed on the floor in the center of the room, the examining stations being arranged around its circumference. An unusual feature was a separate slip for each man on which all abnormalities found were entered, the slip being eventually pasted in his service record. Examinations averaged about 1,200 per day in June.

Influenza was prevalent in the early months of 1918, and its characteristics closely resembled those which became evident in the fall epidemic to follow.²²⁹ There were over 1,000 cases in March. The fall epidemic began September 13, and was practically over by October 22.²⁴⁰ Over 4,000 cases were reported during these two months, and the establishment of three camp hospitals in barracks was necessary in order to care for them. The efficiency of a rigid quarantine in preventing the spread of influenza was proved in the fall of 1918 by the comparison of results in two organizations, one in which there was practically no quarantine and one in which quarantine measures were enforced to the letter. Influenza very soon was widespread in the first, while the second had not a single case until toward the end of the epidemic. However, the second organization was the auxiliary remount depot, and the possible influence of its relatively isolated location was not considered.²⁴⁰

Pneumonia in 1917 and the early months of 1918, instead of bearing some indefinite relation to measles, as was the case in most of the camps, was associated with influenza,²³³ although official reports for the period classed the great majority of cases as primary.²²⁹ The majority of both influenza and pneumonia cases yielded a streptococcus as the predominating, and apparently causative, organism.²³³ The incidence of pneumonia paralleled that of influenza and was highest in March, 1918, with 110 cases.²⁰⁹ The empyema complication rate and the mortality rate were high.²⁴⁰

The United States Public Health Service did not assume supervision of the extra-cantonment zone,²³² and the local boards of health were slow in getting started, but the State health authorities were maintaining excellent conditions in this zone before the end of the year 1917.²³⁵ The military authorities assumed control of the supervision of booths for the sale of foods and drinks toward the end of 1918.²⁴¹

There was neither a detention camp nor quarantine camp for Camp Upton proper; however, the base hospital maintained a tent camp for the detention of communicable disease contacts.

Three development battalions had been formed by the middle of August, 1918, with a total strength of 6,333.²⁴² There were 14 medical officers directly on duty with the battalions, and 3 more were assigned to the orthopedic clinic and 9 to the genitourinary clinic. The number of the battalions was increased to five in October. These were divided into 20 companies, with a total strength of 7,773.²⁴³ Of these, 2,640 were venereal cases, 1,584 orthopedic, and 431 cardiovascular. One battalion was reserved for white venereal cases, one for colored venereal cases, and one for syphilis of both races. Companies in battalions

were reserved for orthopedic, cardiovascular, and convalescent conditions. Six sets of graded exercises were prescribed for cardiovascular cases, varying in duration from 15 to 60 minutes. Three courses in orthopedic training were provided, one comprising about five hours of general drill and training and one-half hour of orthopedic drill per day. The second required about one-half of the above, with fatigue duty in addition. The third was about one-half of the second with more fatigue duty. Venereal cases were divided into four classes. The first, those with open lesions, were confined in barracks or hospital and were given no prescribed exercises. The subacute cases of gonorrhoea stood reveille and retreat, and were given not more than one-half hour of drill twice a day. Cases of syphilis, without open lesions, and of chronic gonorrhoea had the drills increased to three hours daily, but were not available for any heavy duty or required to remain on their feet for long periods. Those ready for discharge performed full duty.

When the convalescent center was established, in January, 1919, two-story barracks were assigned for the purpose.²⁴⁴ Six medical and 39 line officers were in charge of 550 convalescents assigned to the 5 companies. Three additional medical officers were assigned about February 1. The first commanding officer of the center was well qualified for the position and enthusiastic, but three changes in commanding officers were made in February, and as a consequence discipline became lax and morale low, the mess deteriorated and became in debt.²⁴⁵ The strength of the training cadre was greater than that of the convalescents, and two hours' exercise per day comprised the entire training schedule. No organized effort was being made to provide occupational work or recreation, but the medical work was better organized and was well done. A proposed change in location of the center was also partially responsible for the delay in initiating necessary activities.²⁴⁶ The center was transferred intact to the base hospital prior to June, 1919.²³⁹

Dental officers were assigned to duty, in 1917, in offices in the regimental infirmaries and base hospital and as members of the physical examining board.²⁴⁷ A dental infirmary building was completed and occupied June 15, 1918. All dental officers on duty in the camp after the departure of the 77th Division were formerly enlisted dental assistants who had taken the examination for commissions and then served six months as enlisted men.²⁴⁸ The total dental work performed from September 3, 1917, to March 1, 1919, included 30,900 permanent fillings, 23,000 temporary fillings, 5,424 root canal fillings and 26,599 extractions.²⁴⁷ The number of individuals treated during the period was 38,875.

The auxiliary remount depot was situated in a low area with little natural drainage, and the stumps of the trees which were cut before building operations could be undertaken were not removed.²⁴⁹ Construction was begun about September 15, 1917. The heavy rainfall in the spring of 1918 flooded the corrals, and it was necessary to discontinue the use of two. The veterinary hospital consisted of four units, each composed of two stables, an operating room, a forage room, and a convalescent corral 305 by 400 feet in dimensions.²⁴⁹ The feed boxes originally installed in the stables were wooden, but these were later replaced with boxes of galvanized iron. Hay was fed on the floor.

During the demobilization period one 2-story barracks housed the three examining teams and the board of review.²⁴¹ The former consisted of 13 officers each and the latter of 6 officers, and their capacity was 1,000 to 1,200 men per day. The men to be examined proceeded to the team to which assigned before removing their clothes, and this caused a congestion in the three available rooms.²⁵⁰ A record was made in May when approximately 13,000 men were examined in 24 hours, without a decrease in efficiency.²⁵¹ This was accomplished by using medical personnel of the division being demobilized as additions to the examining board. About 150 officers were employed, divided into three shifts, working four hours and off duty eight hours. This feat brought an expression of appreciation from the War Department, but tended to embarrass the Surgeon General's Office as the latter office had just previously recommended that the maximum number of men examined in one day be limited to about 600.²⁵² The examining board was later reduced to 27 officers, and 2 barracks were then in use.²³⁹ The only criticism of the professional work, made by visiting inspectors, was that the neuropsychiatric and orthopedic examinations were not sufficiently complete to detect defects which a man might wish to conceal.²³⁹ The camp ceased to operate as a demobilization center September 25, 1919, after 202,329 men had been examined.²⁵³

The sanitary process station, better known as the "delousing plant," was a great convenience and aid in the rapid handling of large bodies of men. It consisted of a one-story building, 204 by 38 feet, with a concrete floor, and was divided into the following departments: Undressing room, barber shop, bath-room with 52 shower heads, drying room, and dressing room.²³⁹ The drying of the men after the shower was performed by hot air rather than by towels. Its capacity was 260 men per hour.

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- (74) Weekly strength reports, convalescent center, Camp Lewis, Wash. On file, Record Room, S. G. O., 704.2-1 (Camp Lewis) D.
- (75) History of dental service, Camp Lewis, Wash., by Capt. Benjamin F. Pound, D. C., camp dental surgeon. On file, Dental Division, S. G. O.
- (76) Report entitled "Questionnaire, Meat and Dairy Inspection," unsigned. On file, Record Room, S. G. O., 400.16 (Meat Inspection, Camp Lewis) D.
- (77) A veterinary history of Camp Lewis, Wash., by Capt. C. H. Carnahan, V. C., division veterinarian, 13th Division, Camp Lewis, Wash. On file, Record Room, S. G. O., 314.7 (Veterinary, Camp Lewis) D.
- (78) Letter from the camp surgeon, Camp Lewis, Wash., to the Surgeon General, U. S. Army, February 14, 1920. Subject: Annual report for the calendar year 1919. On file, Record Room, S. G. O., 319.1-2 (Camp Lewis) D.
- (79) 1st ind., from the office of the camp surgeon, Camp Lewis, Wash., June 11, 1919, to the Surgeon General of the Army. On file, Record Room, S. G. O., 370.01-2 (Camp Lewis) D.
- (80) Monthly reports of physical examination made prior to separation from the military service other than by certificate of discharge for disability at Camp Lewis, Wash., months of December, 1918, to October 6, 1919, inclusive. On file, Record Room, S. G. O., 319.1-4 (Camp Lewis) D, 370 (Demobilization, Camp Lewis) D, and 370.01-2 (Camp Lewis) D.
- (81) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. I, 452-465.
- (82) Letter from Maj. James T. B. Bowles to Colonel Reynolds, undated. Subject: Special sanitary inspection of Camp Meade. On file, Record Room, S. G. O., 721-1 (Camp Meade) D.
- (83) History of the Medical Department of the 79th Division, unsigned, prepared for the records of the Surgeon General's Office. On file, Historical Division, S. G. O.
- (84) Letter from Lieut. Col. H. C. Pillsbury, M. C., camp surgeon, Camp Meade, Md., to the Surgeon General, U. S. Army, March 6, 1919. Subject: Annual report for the calendar year 1918. On file, Record Room, S. G. O., 319.1 (Annual Report, 1918, Camp Meade) D.
- (85) Sanitary report for the month of September, 1918, at Camp Meade, Md., by Maj. Oramel H. Stanley, M. C., acting camp surgeon. On file, Record Room, S. G. O., 721 (Camp Meade) D.
- (86) Sanitary report for the month of June, 1919, Camp Meade, Md., by Capt. Earle L. Waterman, S. C., camp sanitary engineer. On file, Record Room, S. G. O., 671.6 (Camp Meade) D.

- (87) Letter from the division surgeon, 79th Division, Camp Meade, Md., to the Surgeon General, U. S. Army, February 23, 1918. Subject: Annual report. On file, Record Room, S. G. O., 319.1 (Camp Meade) D.
- (88) Report of sanitary inspection made at Camp Meade, Md., on January 5, 6, and 7, 1920, by Col. P. C. Hutton, M. C. On file, Record Room, S. G. O., 721-1 (Camp Meade) D.
- (89) Medical history, Camp Meade, by Lieut. Col. Philip W. Huntington, M. C. On file, Historical Division, S. G. O.
- (90) Special sanitary inspection, Camp Meade, Md., May 25, 1918, by Lieut. Col. F. W. Weed, M. C. On file, Record Room, S. G. O., 721-1 (Camp Meade) D.
- (91) Report of inspection in relation to the epidemic of influenza and pneumonia at Camp Meade, Md., October 8, 1918, by Col. A. E. Truby, M. C. On file, Record Room, S. G. O., 721-1 (Camp Meade) D.
- (92) A report on the work of the cardiovascular board at Camp Meade, Md., source unknown. On file, Record Room, S. G. O., 327.21-1 (Camp Meade) D.
- (93) Letter from Capt. Robert E. Soule, M. R. C., Camp Meade, Md., to the Surgeon General, U. S. Army, May 31, 1918. Subject: Monthly report. On file, Record Room, S. G. O., 730 (Orthopedic, Camp Meade) D.
- (94) Letter from Lieut. Col. Harry E. Mock, M. C., to the Surgeon General, U. S. Army, July 28, 1918. Subject: Development battalion at Camp Meade. On file, Record Room, S. G. O., 322.052 (Development Battalion, Camp Meade) D.
- (95) Letter from Maj. B. H. Whitbeck, supervising orthopedic surgeon, to the Surgeon General, U. S. Army, July 11, 1918. Subject: Orthopedic service at Camp Meade. On file, Record Room, S. G. O., 730 (Orthopedic, Camp Meade) D.
- (96) Report of sanitary inspection of the development battalion, Camp Meade, Admiral, Md., made by Col. Jere B. Clayton, M. C., October 31, 1918. On file, Record Room, S. G. O., 721.5 (Camp Meade) D.
- (97) Report of sanitary inspection of Camp Meade, Md., on February 6, 1919, by Col. A. E. Truby, M. C. On file, Record Room, S. G. O., 721-1 (Camp Meade) D.
- (98) Letter from Capt. William J. Hammond, M. C., to the Surgeon General of the Army, February 2, 1919. Subject: Convalescent Center, Camp Meade, Md. On file, Record Room, S. G. O., 704.2 (Camp Meade) D.
- (99) Letter from Maj. Henry James, M. C., to the Surgeon General of the Army, March 8, 1919. Subject: Convalescent center at Camp Meade, Md. On file, Record Room, S. G. O., 704.2 (Camp Meade) D.
- (100) Weekly strength reports of convalescent center, Camp Meade, Md. On file, Record Room, S. G. O., 704.2-1 (Camp Meade) D.
- (101) Letter from Capt. Page P. A. Chesser, D. C., Camp Meade, Md., to the Surgeon General, U. S. Army, March 22, 1919. Subject: History of dental service. On file, Record Room, S. G. O., 703 (Camp Meade) D.
- (102) Letter from Maj. S. V. Balderston, M. C., to the Surgeon General of the Army, January 17, 1919. Subject: Report of observation of physical examination at Camp Meade. On file, Record Room, S. G. O., 702-1 (Camp Meade) D.
- (103) 1st Ind., from office of the camp surgeon, Camp Meade, Md., June 11, 1919, to the Surgeon General of the Army. On file, Record Room, S. G. O., 370.01-2 (Camp Meade) D.
- (104) Letter from the camp surgeon, Camp Meade, Md., to the Surgeon General of the Army, March 18, 1920. Subject: Annual report for the calendar year 1919, Camp Meade, Md. On file, Historical Division, S. G. O.
- (105) Monthly reports of physical examination made prior to separation from the Military Service other than by certificate of discharge for disability at Camp Meade, Md. On file, Record Room, S. G. O., 370 (Demobilization, Camp Meade) D and 370.01-2 (Camp Meade) D.
- (106) Medical history of Camp Pike to June, 1918, by Lieut. Col. E. F. McCampbell, M. C. On file, Record Room, S. G. O., 314.7 (Medical History).
- (107) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. I, 478-491.

- (108) Report of special sanitary inspection, Camp Pike, Ark., September 7, 1917, by Col. H. C. Fisher, M. C., special sanitary inspector. On file, Record Room, S. G. O., 721-1 (Camp Pike) D.
- (109) Letter from Maj. G. R. Bascom, S. C., Camp Pike, Ark., to the Surgeon General of the Army, July 3, 1918. Subject: Report for the month of June, activities of the Sanitary Corps. On file, Record Room, S. G. O., 721 (Camp Pike) D.
- (110) Letter from the camp surgeon, Camp Pike, Ark., to the Surgeon General, U. S. Army, January 11, 1919. Subject: A brief medical history of Camp Pike, Ark., July 1, 1918, to December 31, 1918. On file, Historical Division, S. G. O.
- (111) Letter from Maj. G. R. Bascom, S. C., Camp Pike, Ark., to the Surgeon General of the Army, November 3, 1918. Subject: Report for the month of October. On file, Record Room, S. G. O., 721 (Camp Pike) D.
- (112) Letter from the camp surgeon, Camp Pike, Ark., to the Surgeon General, U. S. Army, February 8, 1920. Subject: Annual report for the calendar year 1919. On file, Record Room, S. G. O., 319.1-2 (Camp Pike) D.
- (113) Letter from the Acting Surgeon General, Bureau of the Public Health Service, to the Surgeon General, U. S. Army, September 14, 1917. On file, Record Room, S. G. O., 720.6-1 (Camp Pike) D, Storage, 1917.
- (114) Report of special sanitary inspection, Camp Pike, Ark., October 28, 1917, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Pike) D.
- (115) Letter from the Surgeon General, U. S. Army, to the Director of Purchase and Storage, Munitions Building, August 12, 1919. Subject: Report of sanitary inspection, Camp Pike. On file, Record Room, S. G. O., 721-1 (Camp Pike) D.
- (116) Letter from Maj. G. R. Bascom, S. C., to the Surgeon General, U. S. Army, May 7, 1918. Subject: Sewage disposal of Camp Pike. On file, Record Room, S. G. O., 672 (Camp Pike) D.
- (117) Letter from Maj. G. R. Bascom, camp sanitary engineer, Camp Pike, Ark., to the Surgeon General, U. S. Army, September 2, 1918. Subject: Report for the month of August, Sanitary Corps, Camp Pike, Ark. On file, Record Room, S. G. O., 721 (Camp Pike) D.
- (118) Letter from Maj. G. R. Bascom, S. C., to the Surgeon General of the Army, July 18, 1919. Subject: Sanitary inspection, Camp Pike, Ark. On file, Record Room, S. G. O., 721-1 (Camp Pike) D.
- (119) Report of special inspection of Camp Pike, Ark., December 8, 9, 10, 1917, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Pike) D.
- (120) Letter from Maj. G. R. Bascom, camp sanitary engineer, Camp Pike, Ark., to the Surgeon General, U. S. Army, July 29, 1918. Subject: Garbage disposal at Camp Pike. On file, Record Room, S. G. O., 720.7 (Camp Pike) D.
- (121) Letter from the camp surgeon, Camp Pike, Ark., to the Surgeon General, U. S. Army, January 13, 1919. Subject: Annual report for calendar year 1918. On file, Historical Division, S. G. O.
- (122) Memorandum for Col. W. P. Chamberlain in answer to questionnaire of May 25, 1918, unsigned. On file, Record Room, S. G. O., 721-1 (Camp Pike) D.
- (123) Letter from the camp epidemiologist, Camp Pike, Ark., to the camp surgeon, Camp Pike, Ark., October 12, 1918. Subject: Number of cases and deaths from influenza and pneumonia to October 12, 1918. On file, Historical Division, S. G. O.
- (124) Letter from the camp surgeon, Camp Pike, Ark., to the Surgeon General, U. S. Army, November 12, 1918. Subject: Report on the influenza and pneumonia epidemic. On file, Historical Division, S. G. O.
- (125) Letter from the camp sanitary inspector, Camp Pike, Ark., to the commanding general, Camp Pike, Ark., February 5, 1919. Subject: Monthly sanitary report. On file Record Room, S. G. O., 721 (Camp Pike) D.
- (126) Report of sanitary inspection of Camp Pike, April 15, 1919, by Col. William P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Pike) D.
- (127) Letter from the division surgeon, Camp Pike, Ark., to the Surgeon General, U. S. Army, March 5, 1918. Subject: Annual report. On file, Record Room, S. G. O., 319-1 (Camp Pike) D.

- (128) Report of sanitary inspection, Camp Pike, Ark., January 14-15, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Pike) D.
- (129) Letter from the camp epidemiologist, Camp Pike, Ark., to the Surgeon General, January 3, 1919. Subject: Special report on measles in Camp Pike during September, October, and November, 1918. On file, Historical Division, S. G. O., unnumbered.
- (130) Letter from Capt. Howard Fletcher, M. R. C., orthopedic surgeon, Camp Pike, Ark., to the Surgeon General of the Army, April 8, 1918. Subject: Semimonthly report, orthopedic conditions. On file, Record Room, S. G. O., 730 (Orthopedic, Base Hospital, Camp Pike) D.
- (131) Letter from Capt. Howard Fletcher, M. R. C., orthopedic surgeon, Camp Pike, Ark., to the Surgeon General of the Army, April 17, 1918. Subject: Semimonthly report, orthopedic conditions (April 1 to April 15, 1918). On file, Record Room, S. G. O., 730 (Orthopedic, Camp Pike) D.
- (132) Letter from Capt. Howard Fletcher, M. R. C., Camp Pike, Ark., to the Surgeon General of the Army, May 3, 1918. Subject: Semimonthly report, orthopedic conditions. On file, Record Room, S. G. O., 730 (Orthopedic, Base Hospital, Camp Pike) D.
- (133) Letter from Capt. Howard Fletcher, M. R. C., Camp Pike, Ark., to the Surgeon General of the Army, May 15, 1918. Subject: Semimonthly report, orthopedic conditions. On file, Record Room, S. G. O., 730 (Orthopedic, Base Hospital, Camp Pike) D.
- (134) Report of special sanitary inspection, Camp Pike, Ark., March 21-22, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Pike) D.
- (135) Report of special sanitary inspection of Camp Pike, Ark., by Col. A. E. Truby, M. C., July 16, 1918. On file, Record Room, S. G. O., 721-1 (Camp Pike) D.
- (136) Report of sanitary inspection of Camp Pike, Ark., on October 31 and November 1, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Pike) D.
- (137) 2d Ind., from brigade surgeon's office, 162d Depot Brigade, Camp Pike, Ark., August 17, 1918, to the camp surgeon. On file, Record Room, S. G. O., 322.052 (Development Battalion, Camp Pike) D.
- (138) Letter from Capt. Le Roy Crummer, M. C., to the Surgeon General, U. S. Army, October 25, 1918. Subject: Report on development battalion, Camp Pike, Ark. On file, Record Room, S. G. O., 322.052 (Development Battalion, Camp Pike) D.
- (139) Report of sanitary inspection of development battalion at Camp Pike, October 31, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Pike) D.
- (140) Letter from Lieut. Frank N. Potts, M. C., Camp Pike, Ark., to the Surgeon General of the Army, January 23, 1919. Subject: Convalescent work. On file, Record Room, S. G. O., 704.2-1 (Camp Pike) D.
- (141) Letter from Maj. A. S. McLean, M. C., and Capt. J. Gurney Taylor, M. C., Camp Pike, Ark., to the Surgeon General, February 8, 1919. Subject: Convalescent center. On file, Record Room, S. G. O., 704.2-1 (Camp Pike) D.
- (142) Letter from Capt. Homer M. Austin, M. C., Camp Pike, Ark., to the Surgeon General, U. S. Army, April 1, 1919. Subject: Convalescent center. On file, Record Room, S. G. O., 604.2-1 (Camp Pike) D.
- (143) Letter from the camp surgeon, Camp Pike, Ark., to the Surgeon General, U. S. Army, April 20, 1919. Subject: Convalescent center. On file, Record Room, S. G. O., 704.2-1 (Camp Pike) D.
- (144) Weekly strength report from convalescent center Camp Pike, Ark., for the week ending May 24, 1919. On file, Record Room, S. G. O., 704.2-1 (Camp Pike) D.
- (145) Dental history of Camp Pike, by Col. John H. Hess, D. C., camp dental surgeon. On file, Record Room, S. G. O., 703 (Camp Pike) D.
- (146) Veterinary history of Camp Pike, Ark., during the period of June, 1918, to October, 1919, by Capt. William H. Dean, V. C., camp veterinarian. On file, Veterinary Division, S. G. O.

- (147) Letter from the veterinarian, Auxiliary Remount Depot No. 317, Camp Pike, Ark., to the Surgeon General of the Army, August 8, 1918. Subject: Veterinary history of the war. On file, Record Room, S. G. O., 314.7-2 (Auxiliary Remount Depot No. 317) R.
- (148) Report of inspection of work of examination boards, Camp Pike, Ark., March 29, 1919, by Maj. S. V. Balderston, M. C. On file, Record Room, S. G. O., 721-1 (Camp Pike) D.
- (149) Report of sanitary inspection of Camp Pike, Ark., made on July 29, 1919, by Col. Paul C. Hutton, M. C. On file, Record Room, S. G. O., 721-1 (Camp Pike) D.
- (150) Monthly report of physical examination made prior to separation from the military service other than by certificate of discharge for disability at Camp Pike, Ark., for the month ending December 31, 1919. On file, Record Room, S. G. O., 370.01-2 (Camp Pike) D.
- (151) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. I, 520-543.
- (152) Letter from the division surgeon, 83d Division, Camp Sherman, Ohio, to the Surgeon General, U. S. Army, March 7, 1918. Subject: Annual report for year ending December 31, 1917. On file, Record Room, S. G. O., 319.1 (Camp Sherman) D.
- (153) Report on activities as nutrition officer, Camp Sherman, by Capt. Merkel H. Jacobs, S. C. On file, Record Room, S. G. O., 720.1 (Camp Sherman) D.
- (154) Letter from the nutrition officer, Camp Sherman, Ohio, to the Surgeon General of the Army, December 5, 1918. Subject: Food conditions at Camp Sherman. On file Record Room, S. G. O., 720.1 (Camp Sherman) D.
- (155) Report of sanitary inspection with especial reference to the influenza epidemic, at Camp Sherman, made October 8, 1918, by Lieut. Col. Joseph L. Miller. On file, Record Room, S. G. O., 721-1 (Camp Sherman) D.
- (156) Letter from Col. Lewis A. Conner, M. C., to the Acting Surgeon General, U. S. Army, undated. Subject: Special sanitary inspection of Camp Sherman, made October 15, 1918. On file, Record Room, S. G. O., 721-1 (Camp Sherman) D.
- (157) Report of sanitary inspection of development battalion at Camp Sherman, Ohio, on November 5, 1918, by Col. Willard F. Truby, M. C. On file, Record Room, S. G. O., 721-1 (Camp Sherman) D.
- (158) Letter from Capt. J. Gurney Taylor, M. C., Camp Sherman, Ohio, to the Surgeon General of the Army, January 23, 1919. Subject: Convalescent center. On file Record Room, S. G. O., 704.2-1 (Camp Sherman) D.
- (159) Letter from Capt. Turner Z. Cason, M. C., Camp Sherman, Ohio, to the Surgeon General of the Army, February 7, 1919. Subject: Convalescent center. On file, Record Room, S. G. O., 704.2-1 (Camp Sherman) D.
- (160) Report of sanitary inspection of Camp Sherman, Ohio, made on April 21 and 22, 1919, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Sherman) D.
- (161) Weekly strength report of convalescent center, Camp Sherman, Ohio. On file, Record Room, S. G. O., 704.2-1 (Camp Sherman) D.
- (162) History of dental department, Camp Sherman, Ohio, by Maj. Harold E. Albaugh, D. C., camp dental surgeon. On file, Record Room, S. G. O., 703 (Camp Sherman) D.
- (163) Letter from Maj. L. G. Mitchell, D. R. C., inspector to the Surgeon General of the Army, undated. Subject: Dental inspection of Camp Sherman, May 11-12-13-14, 1918. On file, Record Room, S. G. O., 333 (Dental, Camp Sherman) D.
- (164) Letter from Maj. Leonard G. Mitchell, D. R. C., inspector, to the Surgeon General, U. S. Army, May 14, 1918. Subject: Dental inspection. On file, Record Room, S. G. O., 703 (Camp Sherman) D.
- (165) Letter from Maj. J. P. Harper, D. R. C., to the Surgeon General of the Army, undated. Subject: Dental inspection at Camp Sherman, Ohio. On file, Record Room, S. G. O., 333 (Dental Inspection, Camp Sherman) D.
- (166) A medical history of Camp Sherman, Ohio, unsigned, prepared for the records of the Surgeon General's Office. On file, Historical Division, S. G. O.

- (167) An account of meat and dairy inspection at Camp Sherman, Ohio, by Capt. Ralph A. Moye, V. C. On file, Record Room, S. G. O., 400.16 (Meat and Dairy Inspection, Camp Sherman) D.
- (168) A veterinary history of the War, Auxiliary Remount Depot, No. 318, Camp Sherman, Ohio, by Capt. F. L. McCollister, V. C. On file, Veterinary Division, S. G. O.
- (169) Report of special investigation of the conduct of the physical examination of troops prior to separation from the Service at Camp Sherman, Ohio, February 26, 1919, by Maj. S. V. Balderston, M. C. On file, Record Room, S. G. O., 333 (Inspection, Camp Sherman) D.
- (170) Report of sanitary inspection of Camp Sherman, Ohio, by Col. J. B. Clayton, M. C., June 19, 1919. On file, Record Room, S. G. O., 721-1 (Camp Sherman) D.
- (171) Letter from the camp surgeon, Camp Sherman, Ohio, to the Surgeon General of the Army, June 22, 1919. Subject: Efficiency of physical examinations. On file, Record Room, S. G. O., 370.01-2 (Camp Sherman) D.
- (172) Monthly report of physical examination made prior to separation from the military service other than by certificate of discharge for disability at Camp Sherman, Ohio, month ending September 30, 1918. On file, Record Room, S. G. O., 370.01-2 (Camp Sherman) D.
- (173) Annual Report of the camp surgeon, Camp Sherman, Ohio, for the calendar year 1919. On file, Historical Division, S. G. O.
- (174) Report of sanitary inspection at Camp Taylor, Ky., by Col. H. A. Shaw, M. C., September 7, 1917. On file, Record Room, S. G. O., 721-1 (Camp Zachary Taylor) D.
- (175) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. I, 551-563.
- (176) Report of special inspection, Camp Taylor, Ky., October 14, 1917, made by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Taylor) D.
- (177) Report of sanitary inspection, Camp Taylor, Ky., September 7 and 8, 1917, by Col. Henry A. Shaw, M. C., special sanitary inspector. On file, Record Room, S. G. O., 721-1 (Camp Taylor) D.
- (178) Report of special sanitary inspection, Camp Taylor, Ky., January 16-17, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Zachary Taylor) D.
- (179) Letter from the camp surgeon, Camp Zachary Taylor, Ky., to the Surgeon General of the Army, December 31, 1918. Subject: Annual report 1918. On file, Historical Division, S. G. O.
- (180) Letter from Maj. G. R. Baseom, S. C., to the Surgeon General of the Army, July 30, 1919. Subject: Sanitary Inspection, Camp Taylor, Ky. On file, Record Room S. G. O., 721-1 (Camp Zachary Taylor) D.
- (181) Report of special sanitary inspection, Camp Zachary Taylor, Ky., May 28, 1918, by Lieut. Col. F. W. Weed, M. C. On file, Record Room, S. G. O., 721-1 (Camp Zachary Taylor) D.
- (182) Letter from the camp surgeon, Camp Zachary Taylor, Ky., to the Surgeon General, U. S. Army, January 2, 1919. Subject: Medical history of the war, July 1 to December 31, 1918. On file, Historical Division, S. G. O.
- (183) Letter from Col. Lewis A. Conner, M. C., to the Acting Surgeon General, U. S. Army, October 18, 1918. Subject: Special sanitary inspection of Camp Taylor, made October 13 and 14, 1918. On file, Record Room, S. G. O., 721-1 (Camp Zachary Taylor) D.
- (184) Report of a survey of the streptococcus epidemic at Camp Zachary Taylor, Ky., by Maj. Herbert Fox, M. R. C., and Maj. Walter W. Hamberger, M. R. C. On file, Record Room, S. G. O., 710.1 (Camp Zachary Taylor) D.
- (185) Report of sanitary inspection of Camp Zachary Taylor, Ky., November 10, 1918, by Col. W. P. Truby, M. C. On file, Record Room, S. G. O., unnumbered.
- (186) 1st ind., office of the camp surgeon, Camp Zachary Taylor, Ky., August 14, 1918, to the Surgeon General, U. S. Army. On file, Record Room, S. G. O., 322.052 (Development Battalions, Camp Zachary Taylor) D.

- (187) Letter from the camp nutrition officer, Camp Taylor, Ky., to the Surgeon General, U. S. Army, October 7, 1918. Subject: Development battalions. On file, Record Room, S. G. O., 322.052 (Development Battalions, Camp Zachary Taylor) D.
- (188) Report of special sanitary inspection, Camp Taylor, Ky., January 28, 1919, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Zachary Taylor) D.
- (189) Weekly strength reports from convalescent center, Camp Zachary Taylor, Ky. On file, Record Room, S. G. O., 704.2-1 (Camp Zachary Taylor) D.
- (190) Letter from Maj. William Mann, D. C., camp dental surgeon, Camp Zachary Taylor, Ky., to the Surgeon General of the Army, March 20, 1919. Subject: Dental history. On file, Record Room, S. G. O., 703 (Camp Zachary Taylor) D.
- (191) History of meat and dairy inspection at Camp Zachary Taylor, Ky., unsigned, prepared for the records of the Surgeon General's Office. On file, Veterinary Division, S. G. O.
- (192) Letter from the veterinarian, Auxiliary Remount Depot No. 319, Camp Zachary Taylor, Ky., to the Surgeon General, February 2, 1919. Subject: Veterinary history of Auxiliary Remount Depot No. 319. On file, Record Room, S. G. O., 314.7-2 (Remount Depot, Camp Zachary Taylor) D.
- (193) Annual report of the camp surgeon, Camp Zachary Taylor, Ky., to the Surgeon General, U. S. Army, for 1919. On file, Record Room, S. G. O., 319.1-2 (Camp Zachary Taylor) D.
- (194) Report of sanitary inspection of Camp Zachary Taylor, Ky., made on September 5, 1919, by Col. E. R. Schreiner, M. C. On file, Record Room, S. G. O., 721-1 (Camp Zachary Taylor) D.
- (195) Monthly reports of physical examination made prior to separation from the Military Service other than by certificate of discharge for disability at Camp Zachary Taylor, Ky. On file, Record Room, S. G. O., 370 (Demobilization, Camp Zachary Taylor) D, 370 (Examination, Camp Zachary Taylor) D, and 370.01-2 (Camp Zachary Taylor) D.
- (196) Annual report of the division surgeon for the year ending December 31, 1917, 90th Division, Camp Travis, Tex., by Lieut. Col. P. S. Halloran, M. C. On file, Record Room, S. G. O., 319.1 (Annual Report, Camp Travis) D.
- (197) A medical history of Camp Travis, Tex., by Maj. Eugene Buehler, M. R. C., assistant division surgeon, 90th Division. On file, Historical Division, S. G. O.
- (198) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. I, 564-577
- (199) Letter from the camp sanitary engineer, Camp Travis, Tex., to the Surgeon General, U. S. Army, December 20, 1918. Subject: Report for November. On file, Record Room, S. G. O., 721.5 (Camp Travis) D.
- (200) Letter from Col. William F. Lewis, M. C., special sanitary inspector, to the Surgeon General of the Army, October 20, 1917. Subject: Sanitary report for 90th Division, Camp Travis, Tex. On file, Record Room, S. G. O., 721-1 (Inspection, Camp Travis) D.
- (201) Sanitary report for the month of November, 1917, 90th Division, Camp Travis, Tex., by Maj. Joseph M. Heller, M. R. C., sanitary inspector. On file, Historical Division, S. G. O.
- (202) Letter from the camp surgeon, Camp Travis, Tex., to the Surgeon General, U. S. Army, January 20, 1919. Subject: Annual report for the year 1918. On file, Record Room, S. G. O., 319.1 (Camp Travis) D.
- (203) Letter from the division sanitary inspector, 18th Division, Camp Travis, Tex., to the Surgeon General, U. S. Army, January 8, 1919. Subject: Sanitary report for the month of December, 1918. On file, Record Room, S. G. O., 721 (Camp Travis) D.
- (204) Report of special sanitary inspection, Camp Travis, Tex., March 27-28, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Travis) D.
- (205) Sanitary report for the month of March, 1918, by 90th Division, Camp Travis, Tex., by Maj. Eugene Buehler, M. R. C., assistant division sanitary inspector. On file, Record Room, S. G. O., 721 (Camp Travis) D.

- (206) Sanitary report for the month of December, 1917, 90th Division, Camp Travis, Tex., by the sanitary inspector, 90th Division. On file, Record Room, S. G. O., 721-1 (Camp Travis) D.
- (207) Letter from Capt. Charles A. Haskins, S. C., to the Acting Surgeon General, U. S. Army, September 23, 1918. Subject: Sanitary inspection of Camp Travis. On file, Record Room, S. G. O., 721-1 (Camp Travis) D.
- (208) Letter from Col. W. F. Lewis, M. C., to the Surgeon General, U. S. Army, November 16, 1918. Subject: Sanitary inspection of Camp Travis, Tex. On file, Record Room, S. G. O., 721 (Camp Travis) D.
- (209) Letter from the division sanitary inspector, 18th Division, Camp Travis, Tex., to the division surgeon 18th Division, Camp Travis, Tex., October 1, 1918. Subject: Influenza. On file, Record Room, S. G. O., 710 (Influenza, Camp Travis) D.
- (210) Report on the epidemic of influenza and post-influenzal pneumonia, Camp Travis, Tex., December 9, 1918, prepared under the direction of the Camp Surgeon, Camp Travis, Tex. On file, Record Room, S. G. O., 710-1 (Camp Travis) D, Storage 1918.
- (211) Letter from Capt. Edward A. Rich, M. R. C., district inspecting orthopedic surgeon, to the Surgeon General of the Army, February 18, 1918. Subject: Orthopedic conditions at Camp Travis, and base hospital, same place. On file, Record Room, S. G. O., 730 (Orthopedic, Camp Travis) D.
- (212) Letter from Capt. Edward A. Rich, M. R. C., district orthopedic surgeon, to the Surgeon General, U. S. Army, March 14, 1918. Subject: Report of orthopedic conditions at Camp Travis. On file, Record Room, S. G. O., 730 (Orthopedic, Camp Travis) D.
- (213) Letter from Col. W. F. Lewis, M. C., to the Surgeon General, U. S. Army, February 1, 1919. Subject: Report of sanitary inspection of Camp Travis, Tex. On file, Record Room, S. G. O., 721 (Camp Travis) D.
- (214) Letter from the camp surgeon, Camp Travis, Tex., to the Surgeon General, U. S. Army, January 15, 1920. Subject: Annual report. On file Record Room S. G. O., 319.1-2 (Camp Travis) D.
- (215) Letter from Capt. William J. Hammond, M. C., to the Surgeon General, November 2, 1918. Subject: Development battalion, Camp Travis, Tex. On file, Record Room, S. G. O., 322.052 (Development Battalion, Camp Travis) D.
- (216) Letter from the camp surgeon, Camp Travis, Tex., to the Surgeon General, U. S. Army, August 18, 1918. Subject: Information concerning development battalion. On file, Record Room, S. G. O., 322.052 (Development Battalion, Camp Travis) D.
- (217) Letter from Maj. Edward A. Rich, M. C., supervising orthopedic surgeon, to the Surgeon General of the Army, September 5, 1918. Subject: Report of orthopedic conditions at Camp Travis, Tex., survey of August 27 to September 5, 1918. On file, Record Room, S. G. O., 730 (Orthopedic, Camp Travis) D.
- (218) Letter from Col. W. F. Lewis, M. C., to the Surgeon General, U. S. Army, November 17, 1918. Subject: Sanitary inspection, development battalion, Camp Travis, Tex. On file, Record Room, S. G. O., 721-1 (Camp Travis) D.
- (219) Extract from a report on the development battalions and convalescent center at Camp Travis, Tex., by John R. McDill, consultant. On file, Record Room, S. G. O., 704.2-1 (Camp Travis) D.
- (220) Weekly strength reports of convalescent center. Camp Travis, Tex. On file, Record Room, S. G. O., 704.2-1 (Camp Travis) D.
- (221) History of camp dental infirmary, Camp Travis, Tex., by Col. Alden Carpenter, D. C., camp dental surgeon. On file, Record Room, S. G. O., 703 (Dental Infirmary, Camp Travis) D.
- (222) Letter from Capt. Robert F. Miller, M. R. C., plastic and oral surgeon. Camp Travis, Tex., to the Surgeon General of the Army, May 6, 1918. Subject: Report of oral survey. On file, Record Room, S. G. O., 730 (Oral and Plastic Surgery, Camp Travis) D.
- (223) History of the Veterinary Corps, 90th Division, by Capt. John J. Roberts, V. C., acting division veterinarian. On file, Veterinary Division, S. G. O.

- (224) Letter from the camp veterinarian, Camp Travis, Tex., to the Surgeon General of the Army, undated. Subject: History of camp veterinary detachment, Camp Travis, Tex. Meat and dairy inspection. On file, Record Room, S. G. O., 314.7 (Veterinary History, Camp Travis) D.
- (225) Sanitary report for month of April, 1918, 90th Division, Camp Travis, Tex., by the sanitary inspector, 90th Division. On file, Record Room, S. G. O., 721 (Camp Travis) D.
- (226) Letter from the veterinarian, remount depot, Camp Travis, Tex., to the Surgeon General, U. S. Army, April 8, 1920. Subject: Veterinary history of remount depot, Camp Travis, Tex. (May 19, 1919, to March 31, 1920). On file, Record Room, S. G. O., 314.7-2 (Remount Depot, Camp Travis) D.
- (227) Letter from the veterinarian, Auxiliary Remount Depot, No. 329, Camp Travis, Tex. to the Surgeon General of the Army, May 16, 1919. Subject: Veterinary history of Auxiliary Remount Depot No. 329, Camp Travis, Tex. (September 1, 1918, to May 16, 1919). On file, Veterinary Division, S. G. O.
- (228) Monthly reports of physical examination made prior to separation from the military service other than by certificate of discharge for disability at Camp Travis, Tex. On file, Record Room, S. G. O., 370 (Examinations, Camp Travis) D and 370.01-2 (Camp Travis) D.
- (229) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. I, 578-591.
- (230) Letter from the sanitary officer, Camp Upton, N. Y., to the Surgeon General, U. S. Army, August 31, 1917. Subject: Sanitary report. On file, Record Room, S. G. O., 721-1 (Camp Upton) D.
- (231) Letter from the camp sanitary engineer, Camp Upton, N. Y., to the Surgeon General, U. S. Army, August 26, 1918. Subject: Report on water supply. On file, Record Room, S. G. O., 720.2-1 (Camp Upton) D, Storage 1918.
- (232) Report of sanitary inspection, Camp Upton, N. Y., October 11-12, 1917, by Col. Henry A. Shaw, M. C. On file, Record Room, S. G. O., 721-1 (Camp Upton) D.
- (233) Letter from Col. P. M. Ashburn, M. C., to the Surgeon General of the Army, March 26, 1918. Subject: Report of inspection at Camp Upton, Long Island. On file, Record Room, S. G. O., 721-1 (Camp Upton) D.
- (234) Letter from the camp sanitary engineer, Camp Upton, N. Y., to the Surgeon General, U. S. Army, November 1, 1918. Subject: Report on sewerage and sewage disposal. On file, Record Room, S. G. O., 720.6-1 (Camp Upton) D, Storage 1918.
- (235) Report of special sanitary inspection, 77th Division, Camp Upton, N. Y., December 20, 1917, by Col. F. P. Reynolds, M. C. On file, Record Room, S. G. O., 721-1 (Camp Upton) D.
- (236) Report of sanitary inspection of Camp Upton, N. Y., October 15 and 16, 1918, Col. W. F. Truby, M. C. On file, Record Room, S. G. O., 721-1 (Camp Upton) D. *Also*, Report of special sanitary inspection, Camp Upton, Long Island, June 25, 1918, by Lieut. Col. F. W. Weed, M. C. On file, Record Room, S. G. O., 721-1 (Camp Upton) D.
- (237) Letter from the camp sanitary engineer, Camp Upton, N. Y., to the Surgeon General, U. S. Army, November 15, 1918. Subject: Monthly report for October. On file, Record Room, S. G. O., 671 (Camp Upton) D.
- (238) Report of disposal of garbage and other wastes at Camp Upton, N. Y., for December, 1918, by Capt. Howard F. Bronson, S. C., camp sanitary engineer. On file, Record Room, S. G. O., 721 (Camp Upton) D.
- (239) Report of sanitary inspection of Camp Upton, N. Y., on June 5 and 6, 1919, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Upton) D.
- (240) Letter from the camp surgeon, Camp Upton, N. Y., to the Surgeon General of the Army, January 30, 1919. Subject: Annual report for calendar year 1918. On file, Record Room, S. G. O., 319.1 (Camp Upton) D.
- (241) Report of sanitary inspection of Camp Upton, Long Island, on January 11, 1919, by Col. W. F. Truby, M. C. On file, Record Room, S. G. O., 721-1 (Camp Upton) D.

- (242) Letter from the camp surgeon, Camp Upton, N. Y., to the Surgeon General of the Army, August 14, 1918. Subject: Information concerning development battalions. On file, Record Room, S. G. O., 322.171-1 (Camp Upton) D.
- (243) Report of sanitary inspection of development battalion, Camp Upton, October 16, 1918, by Col. W. F. Truby, M. C. On file, Record Room, S. G. O., 721-1 (Camp Upton) D.
- (244) Letter from Capt. F. W. Hunter, M. C., Camp Upton, N. Y., to the Surgeon General of the Army, January 25, 1919. Subject: Convalescent center, Camp Upton, N. Y. Also, attached letter from the camp surgeon, Camp Upton, N. Y., to the Surgeon General, U. S. Army, February 3, 1919. Subject: Report on convalescent center by Capt. Hunter. On file, Record Room, S. G. O., 704.2-1 (Camp Upton) D.
- (245) Letter from Maj. Henry James, M. C., to the Surgeon General of the Army, February 26, 1919. Subject: Convalescent center at Camp Upton, Long Island. On file, Record Room, S. G. O., 704.2-1 (Camp Upton) D.
- (246) Letter from Lieut. Col. Harry E. Moek, M. C., Office of the Surgeon General, March 15, 1919. Subject: Convalescent center at Camp Upton. On file, Record Room, S. G. O., 704.2-1 (Camp Upton) D.
- (247) History of the dental service at Camp Upton, N. Y., prepared under the direction of the camp dental surgeon, Camp Upton, N. Y. On file, Record Room, S. G. O., 703 (Camp Upton) D.
- (248) Letter from W. H. Richardson, D. R. C., to the Surgeon General of the Army, undated. Subject: Dental inspection at Camp Upton, Long Island. On file, Record Room, S. G. O., 333 (Dental Inspection, Camp Upton) D.
- (249) Letter from the veterinarian, Camp Upton, N. Y., to the Surgeon General of the Army, May 21, 1919. Subject: Veterinary history of the war. On file, Record Room, S. G. O., 314.7 (Veterinary, Auxiliary Remount Depot No. 302) D.
- (250) Letter from Maj. S. V. Balderston, M. C., to the Surgeon General of the Army, January 11, 1919. Subject: Report on observation made of the work of physical examination at Camp Upton, N. Y. On file, Record Room, S. G. O., 702-1 (Camp Upton) D.
- (251) Memorandum from Col. D. C. Howard, M. C., Office of the Surgeon General, for the Chief of Staff, June 12, 1919. Also, 2d ind., to above memorandum, from Brig. Gen. W. J. Nicholson, Camp Upton, N. Y., June 24, 1919, to The Adjutant General of the Army. On file, Record Room, S. G. O., 370 (Demobilization, Camp Upton) D.
- (252) Copy of telegram from Kerr, Washington, D. C., to commanding general, Camp Upton, N. Y., and informal indorsement thereon signed "Scott." Also, attached letters from Col. D. C. Howard, to Col. George H. Scott, M. C., Camp Upton, N. Y. On file, Record Room, S. G. O., 370.01-2 (Camp Upton) D.
- (253) Monthly reports of physical examination made prior to separation from the military service other than by certificate of discharge for disability at Camp Upton, N. Y. On file, Record Room, S. G. O., 370 (Examination, Camp Upton) D, and 370.01-2 (Camp Upton) D.

CHAPTER IV
NATIONAL GUARD CAMPS

CAMP BEAUREGARD, LA.

Camp Beauregard was located at the approximate geographical center of Louisiana, 6 miles from Alexandria, a city of 20,000 inhabitants, and about 125 miles from the Gulf of Mexico.¹ This section of the State is rolling country, with forests of pine and oak; many pine trees were standing on the camp site. The character of the soil—2½ feet of loam overlying many feet of red clay—was conducive to the formation of mud and high-flying dust. The Red River lay several miles south of the camp and Flaggon Bayou along its northern boundary. A number of small streams intersected the camp site and provided excellent surface drainage to the north and the south, but a number of swamps surrounded the camp in the extra-cantonment zone. There were no improved roads in the vicinity. The climate here is warm, in general, although the yearly variations are from 100° to 14° F. above zero. The humidity is uniformly high, with a heavy rainfall. High winds are common during the summer.

The first troops sent to Camp Beauregard were members of the National Guard from the States of Arkansas, Louisiana, and Mississippi, 7,000 in number.² Subsequently, during 1917, the strength of the camp was increased by increments made up from drafted men who had been sent to other camps; so that the strength gradually increased, giving a monthly average of approximately 20,000 in December. The 39th Division was organized here and moved overseas about August, 1918. After this division left, the 17th Division was organized. During 1918, large numbers of men were sent here. A large number came from the State of Louisiana. In the month of September, 670 men (Porto Ricans) were received from the Canal Zone. Increments were also received from other camps. After the 39th Division left in August, 1918, the strength for the camp was low, averaging approximately 10,000 or less. But few colored troops were in this camp at any time, the monthly average being less than 100 for any month before October, 1918, when it was less than 1,000.

As was true of the other tent camps, the base hospital and a few other buildings were of frame construction. The camp was very much overcrowded during the early months of 1917.²

The water supply of the camp was originally derived from four artesian wells for the main camp and one at the base hospital.³ Owing to the appearance of an excessive amount of salt in the water from one well and the increased demands occasioned by the onset of warm weather, this number of wells was later increased by two at the base hospital and four for the main camp.³ Except for one well, which was abandoned for drinking purposes as the result of bacteriological examinations,³ the quality of the water was uniformly good.²

The installation of a sewerage system was begun in the fall of 1917, but the plumbing was not completed at the end of the year 1918.⁴ Most of the

latrines and kitchens were connected, however, and grease traps were installed for both of these connections.⁵ The kitchen traps were placed in the consolidated regimental sewer lines rather than in those leading from individual kitchens, and this location led to the criticism that the distance from the kitchens would cause the deposition of grease in the pipes between, and the size of the traps would cause them to act as septic tanks.⁵ The general disposal work of the sewerage system consisted of a large grease trap, a distribution chamber, and a septic tank, constructed in accordance with plans sent from the War Department. The camp sanitary engineer expressed the opinion, before the disposal works were put in operation, that the grease trap was overbaffled. This overbaffling could result only in the filling of the first chamber with sludge which would have to be blown out before it had ripened; furthermore, septic action in both the grease trap and the distributing chamber was inevitable and since no method was provided for disposing of the sludge from the grease trap, this sludge would have to be blown out onto the ground.⁵ His opinion proved to be correct, although the failure of the system to function satisfactorily was due in part to the fact that the expected volume of sewage had been decreased and concentrated by the failure to connect the bathhouses with the system.^{6,7} The excellent natural drainage of the camp site made easy the disposal of waste water from bathhouses, by surface drainage, but even with this natural advantage, continuous care was required in order to prevent the formation of areas which would attract flies or furnish breeding places for mosquitoes.⁵

The liquid waste from the kitchens was evaporated in open pans of Guthrie incinerators, one for each mess hall, pending the completion of the sewerage system.¹

Originally, deep pit latrines were provided for the disposal of human excreta. These were the source of much trouble, because⁵ the clay subsoil permitted no seepage and caved in readily, thus requiring lining all pits with wood and removing liquids by pumping. A pumping detail of about 18 men from the labor battalion was constantly employed under the supervision of 2 men from the camp sanitary squad. The detail was equipped with five or six tank wagons. Each latrine required pumping about once a month and the removal of three tanks full each time, the contents of which were emptied into a running stream two miles distant.⁸ The presence of the excess amount of liquid prevented the thorough burning out of the pits with crude oil, and allowed the breeding in them of flies, and even mosquitoes.⁴ The pits were 12 to 16 feet deep, and the average period of use for each was less than four months.⁵

Garbage was removed by a contractor in the cans to a pig farm 5 miles north of the camp, where the cans were sterilized before return.¹ The system was not entirely satisfactory, because it was practically impossible to avoid spilling the garbage on the ground, and muddy roads sometimes prevented its removal from the camp.

At first the manure was scattered on near-by farms, with much resultant fly breeding, or burned at specific places.^{1 8} By the end of the year 1917, the manure was loaded into cars on the railroad and dumped in a ravine situated over a mile from the base hospital and 3 miles from the main camp.⁹ Investiga-

tion of this dump indicated fly breeding to some extent in the loose material at the edge, but the internal temperature of the dump was too high to be comfortably borne by the hand or to permit fly breeding. The railroad company was expected to dispose of the manure, but the shortage of labor led to the failure to remove cars from the camp for several days at a time, and necessitated the detail of camp personnel to do the unloading.

All kitchen waste not suitable for hog feed, and all rubbish, were burned in the incinerator.¹ The resultant refuse and ashes were hauled to two authorized dumps.

The high admission rate for communicable diseases at this camp led to investigations of conditions there, among others, by the Surgeon General, in December, 1917.² It was his opinion that the lack of woolen clothing and the overcrowding in tents were causative factors. Sufficient woolen clothing to supply all demands was not available until late in December, 1917.¹ The number of men quartered in each tent was reduced to eight on December 1, 1917, with cots so arranged that head and foot alternated.⁸ The number per tent was later reduced to five, and the men were required to sleep with the flaps of the tent turned back and two sides rolled.⁷

Measles was the first of the communicable diseases to appear in epidemic form.⁸ A few cases were present from the time the camp was organized, and arriving National Guard troops caused an increase, but it was not until after the arrival of the first draft contingent that the number of cases increased to any considerable extent. Nine thousand drafted men arrived from Camp Pike, Ark., between November 10 and 20, 1917, and the maximum number of measles cases was reported on November 19, when 1,258 were under treatment. Construction of the base hospital was not yet complete, and even its authorized maximum capacity would have been insufficient to have met the demand for beds; so field hospitals were set up to supply the deficiency, and regimental isolation camps were established to care for the milder cases. The usual measures of sanitation and segregation were adopted, but were unusually stringent, the entire camp being placed under quarantine. The incidence of this disease rapidly declined during December, 1917, 156 cases remaining at the end of the year, with a total of 2,606 cases. The incidence again slowly increased throughout the year of 1918, but did not assume epidemic proportions.⁴

Influenza was first reported in October, 1917, with 480 cases in December.² The incidence then decreased until April, 1918, when there was a marked increase which extended into May. A decrease again occurred during the summer months, but on September 28, 1918, there was a great increase of an explosive character which expended its force during the succeeding two weeks. The great majority of the 7,181 cases reported from this outbreak arose during those two weeks.⁴ Upon the outbreak of the epidemic, the regiment in which the first cases arose was quarantined against the remainder of the camp, and its companies were quarantined against each other.⁷ After the disease had spread to other regiments, the entire camp was put under close quarantine, except that individuals whose duty required their presence in Alexandria were given passes.⁷

During 1917, 296 cases of bronchopneumonia were reported, with 87 deaths, and 65 cases of lobar pneumonia, with 19 deaths.⁸ Of these, 159 cases of broncho-

pneumonia were attributed to measles.² Both types of pneumonia were present in small numbers throughout the months of 1918 prior to the epidemic of influenza, and both types increased in numbers coincident with the increase in influenza, both in the spring and fall of 1918.² The camp surgeon's statement that 1,370 cases of pneumonia developed as a result of the influenza epidemic of 1918,⁴ while the official figures are only 1,077,² would make it appear that the majority of the cases reported as primary pneumonia were considered to have had a more or less direct etiology in influenza.

Epidemic cerebrospinal meningitis first appeared in this camp on November 9, 1917.² The number of cases gradually increased until about January 1, 1918, when there was an extremely sharp rise, 28 cases occurring in one week. The incidence then steadily decreased until the last case was reported in March, 1918, with a total of 132 cases and 71 deaths.⁴ The occurrence was widespread, and in only one instance did more than one case arise in a single tent. Control of the situation was obtained by the usual methods of culture of contacts, quarantine, and the isolation of carriers in three camps surrounded by barbed wire fences and under guard.⁸ Two hundred and fifty carriers were found in 7,754 men examined, and 1 carrier developed the disease. The base hospital laboratory was neither properly equipped nor situated to handle the task of examining for carriers, so the Louisiana State Board of Health generously placed laboratory cars on the railroad siding and at the disposal of the division surgeon.

The section of Louisiana in which Camp Beauregard was located being highly malarial, 3,559 men in the camp were examined in 1918 in an effort to determine the incidence of the disease in its chronic form.⁴ Of these, 16.6 per cent were found to have enlarged spleens.¹ Daily doses of 30 grains of quinine in liquid form were administered to certain men, presumably the above noted 16 per cent, without interfering with their regular course of training. Three hundred and four cases of malaria had been admitted to sick report prior to May 16, 1918, but reports do not show the number of these which were contracted prior to arrival at the camp.

Sanitary work in the extra-cantonment zone was under the direction of an officer of the United States Public Health Service, who worked in close cooperation with the division surgeon and with the local and State health authorities.⁷ The licensing of booths selling foods and drinks, mosquito control work, and the establishment of a hospital for the treatment of infected prostitutes were the principal phases of the zone work.

No depot brigade or general quarantine camp was maintained in Camp Beauregard, the sanitary functions of these organizations being performed by a detention camp, although there was a special quarantine camp for venereal cases. The capacity of the detention camp was 2,000, but an enlargement to 6,000 was planned shortly before the armistice was signed.

The usual methods were in force for the control of venereal diseases.² Men who were receiving treatment on a duty status were quartered in a camp surrounded by barbed wire fence and under guard.⁷ In only one respect did the system for control differ from that employed at the majority of mobilization camps—the establishment of a prophylaxis station in the near-by city of Alexandria was not considered to be of sufficient value to be warranted.¹

The development battalion was originally established in March, 1918, as the "orthopedic foot-development camp," under the direction of two line officers and supervised by two orthopedic surgeons.¹⁰ This camp functioned as a distinctly military institution, the schedule comprising necessary shoe alterations, foot exercises, foot baths, and military drill. Men assigned to the organization were divided into classes, the assignments being based on the soldiers' ability to perform military duty. The advanced class was given the regular schedule of military training. Of 330 men assigned to the foot development camp in its first three months of existence, 137 were returned to either full or special duty and none was discharged for physical disability. The name of the organization had been changed to "development battalion" by the fall of 1918.¹¹ Three battalions, with 3,172 men, were in the camp early in November, one of these including the venereal cases of the venereal quarantine camp. The battalions were not well organized for their purpose: Two had arrived from other camps and had not reported to the senior battalion commander; there was no battalion surgeon; there was no instruction in English for illiterates; an insufficient number of medical officers had been assigned, and these had supervision of the physical training of the orthopedic cases only; there appears to have been no provision for the special supervision of cardiovascular cases; and men from the battalion were used for duties which interfered with the fundamental purpose of the battalions—fitting the men for military service in the shortest possible time. An orthopedic infirmary was established in connection with the development battalions, where such foot conditions as corns and abrasions were treated by chiropodists who were serving as enlisted men of the Medical Department and who had been given a special course of instruction in this duty.

The entire dental service within the confines of Camp Beauregard was under the supervision of the senior dental officer on duty in the camp, who arrived in the camp about September 1, 1917.¹ Twelve dental officers of the National Guard arrived with the troops, and 17 from the Dental Officers' Reserve Corps arrived in September, 1917. These officers were assigned mainly to the two dental infirmaries, tentage being set up in the immediate vicinity as quarters for both officers and enlisted men on duty there.¹² Bimonthly reports showing the amounts and classes of work performed by each dental officer enabled the dental surgeon to insure that the proper proportionate time was devoted to the different classes.¹²

The status of the veterinary officers was not satisfactorily determined until one was assigned as "divisional veterinarian" in April, 1918.¹ There were 19 veterinary officers on duty at that time. The veterinary personnel of the 39th Division consisted of a division veterinarian, a division meat inspector, 3 brigade units and 3 field units of 1 officer and 3 enlisted men each, and 1 mobile section of 1 officer and 21 men. The early veterinary administration of the camp naturally fell into three divisions—the camp proper, the auxiliary remount depot, and the camp quartermaster's food inspection service.¹³ This division resulted from the fact that a mile intervened between the remount depot and the camp, from the semi-independent status of the remount depot, and from the fact that the food inspection service of the camp quartermaster

was directed by a representative of the Federal Bureau of Animal Industry from whom little cooperation was received. Subsequently, the food inspection service of the camp area was performed entirely by Army personnel. Storage for fresh meats was provided by retaining the refrigerator cars on a sidetrack prior to April, 1918. During the remainder of the camp period, cold-storage warehouses in the camp were available.

The remount depot was well ditched for natural drainage, but the clay subsoil and the overcrowding of too large corrals resulted in an extremely bad condition, the deep mud preventing the proper removal of the excessive quantity of manure.¹⁴ Animals mired in corrals were sometimes unable to get to their feet without assistance, and the accumulation of mud and manure was held responsible for nearly 1,000 cases of dermatitis gangrenosa. To the crowded condition of the corrals was attributed the majority of some 550 cases of wounds and contusions. Glanders was the only disease of epidemic type which caused any particular apprehension. An outbreak in the auxiliary remount depot was eradicated in the spring of 1918. All animals left behind by the 39th Division when it left the camp were mallein tested, and over 30 of them gave a positive reaction.

The demobilization period at Camp Beauregard extended from March 1 to March 17, 1919, inclusive, during which time 2,042 officers and men were examined physically.¹⁵ Five teams were employed, each composed of the following special examiners: One cardiovascular, 1 genitourinary and orthopedic, 1 ophthalmologist, 1 otolaryngologist, and 2 for tuberculosis. Of the total examined, only 44 were found to have had a permanent disability. The camp was officially closed March 18, 1919,¹⁶ and the detachments remaining were transferred to the jurisdiction of the department commander.¹⁷

CAMP BOWIE, TEX.

Camp Bowie was located in the suburbs of the city of Fort Worth, Tex., on rolling terrain with very few trees.¹⁸ The soil soon ground to a fine powder which was easily carried by the nearly constant winds, and formed a tenacious mud in wet weather. As in other sections of the State, rapid and marked falls in temperature were common during the winter months with the onset of "northers." A small stream flowed along the eastern boundary of the camp.¹⁸

The first increment of troops sent to this camp were National Guard men from Texas and Oklahoma.¹⁹ These troops began to arrive about August 25, 1917, and by the latter part of September, 17,000 had arrived. This number was gradually increased by increments of drafted men from other camps, largely from Camp Travis, up to an average of 26,000 in November. The 36th Division was organized here and moved overseas about July, 1918. After the division left, the camp was used as an Infantry replacement training camp. During 1918 moderate numbers of drafted men were received, largely from Texas and Oklahoma. After the 36th Division moved overseas in July, the strength of the camp was relatively small, the maximum for any month averaging 10,000, which was for the month of October. No colored troops were received in this camp until September, 1918, when the strength of these troops was reported as 310. This strength increased to 2,808 in October.¹⁹

The water supply of the camp was the same as that of the city of Fort Worth. The source was an artificial lake 4 miles from the camp. The lake was formed by damming the waters of the west fork of the Trinity River. The purification system consisted of rapid sand filtration and chlorination.¹⁵ The water was coagulated with iron sulphate and hydrated lime and sedimented before filtration.

The waste of the camp was disposed of by the camp salvage department.¹⁹ Garbage was collected and disposed of by private contract, the edible portion of the garbage being fed to hogs on a farm 5 miles distant from the camp. The waste disposal was reported by the camp surgeon to be satisfactory. Originally, the camp was constructed as a deep-pit latrine camp, but during the fall of 1918 a sewer system was completed and the pit latrines were closed and filled. All bathhouses and kitchens were connected with the sewer system when installed. The sewage was not treated, but was discharged into the sewerage system of Fort Worth.¹⁹

The manure was hauled away and given to farmers in the adjacent territory during the early period of the camp.¹⁸ It was later mainly hauled to dumps outside the camp, although a portion was still given to farmers.²⁰ The long hauls and insufficient labor sometimes prevented proper cleaning of the corrals of the remount depot.

Measles was brought to Camp Bowie by the troops first to arrive, but did not become epidemic until October, 1917.²¹ The crest of the wave occurred during the week ending November 23, 1917, when 1,882 cases were in hospital. There had been a total of 3,367 cases on December 19, and only about 140 remained at the end of the year. While a differential diagnosis was not attempted, a large proportion of the cases was considered to have been German measles. No unusual sanitary methods were employed.

The first report of the presence of influenza in the camp was made by a sanitary inspector on March 25, 1918, when 16 cases were on sick report.²² The fall epidemic began about September 24, 1918, and terminated about November 5, 1918, during which period there were 4,439 cases.²⁰ There were two crests in the wave of cases, each corresponding to the arrival of some 3,000 drafted men. Three-fourths of all cases arose in the detention camp, although that camp was quarantined while the remainder of the camp was not. Sporadic cases arose in the succeeding months. All men throughout the camp were examined twice daily during the epidemic, their noses and throats were sprayed, and winter clothing was issued to those who had none. Influenza patients were kept under observation for a period of five days after discharge from the hospital. In the detention camp, the woodwork of tents and buildings was sprayed with a chlorinated lime solution and the canvas with a formalin solution.

Pneumonia was present during the early fall of 1917, some cases following measles but many having no discoverable relation to that disease.²¹ There were 500 cases in November, with 40 deaths, which brought the assistance of the Rockefeller Institute Red Cross laboratory car and a visit from an investigating committee headed by the Surgeon General of the Army. A study of 102 cases revealed 63 of the lobar type and 39 of bronchopneumonia. Of these,

30 autopsies showed only 3 cases of lobar pneumonia, the high mortality in the cases of bronchopneumonia being due to a virulent streptococcal infection which developed empyema. The greatest number of cases of pneumonia on sick report during this first epidemic was 496 in the week ending December 14, 1917. By March 25, 1918, there were 75 cases remaining, all lobar,²² and further cases arose until there had been a total of 1,009 cases of lobar pneumonia and 390 of bronchopneumonia for the period October, 1917, to May, 1918.²⁰ A second epidemic of pneumonia began about October 1, 1918, directly due to influenza, and the two crests of the pneumonia wave followed closely the two crests of the influenza wave.²⁰ The proportions of lobar pneumonia and bronchopneumonia in this second epidemic were the reverse of those occurring in the first one—141 cases of lobar pneumonia to 663 of bronchopneumonia during the last four months of 1918. In the treatment of influenza cases during this influenza-pneumonia epidemic, there was a progressive tendency to move them as little as was practicable. Eight mess halls in the detention camp were set aside for observation wards. Five hundred and sixty-nine cases were treated in these wards during the first part of the epidemic, of which 264 were eventually transferred to the base hospital; during the second period, 674 were treated and 173 of these were sent to the hospital.

Mumps assumed epidemic proportions in November, 1917, as the measles declined.²¹ The peak occurred about the middle of December, when 230 new cases were recorded for the week. There were still 210 on sick report on March 25, 1918.²² There were 1,502 cases during 1917²⁰ and 547 during 1918, only 30 of these arising after July 1, 1918.¹⁹ Mumps cases were isolated under canvas in regimental quarantine camps and contacts were examined daily.²¹

The first case of cerebrospinal meningitis occurred about the middle of October, 1917, followed by 5 cases in the week ending November 24.²¹ In the first week following this latter date there were 3 new cases, 10 in the second week, 5 in the third, and 2 in the fifth.²⁰ There were 27 cases, with 7 deaths before the end of the year;²¹ 9 more deaths occurred during January and February, 1918.²² Contacts were cultured for carriers first, and later the remainder of each company in which a case had arisen.²¹ Carriers were treated in the base hospital. The entire camp was quarantined from November 28 to December 19, 1917.

The placing of 9 men in each pyramidal tent (16 feet by 16 feet) and the scarcity of woolen clothing, especially overcoats, were considered to have had a definite bearing on the incidence of the acute infectious diseases.²¹ The greater immunity of an urban population to the acute contagious diseases as compared with a rural population was shown by the incidence of three of these diseases in the regiments of the division. One regiment was composed largely of men from cities, while the others were recruited mainly from small towns and country districts.¹⁹ The former regiment had 6 cases of mumps against 21 to 165 cases in the other regiments, 16 cases of pneumonia against 36 to 178 cases in the others, and 87 cases of measles against 202 to 817 cases in the others.²¹

As a result of the Surgeon General's visit to Camp Bowie, 1,000 tents and stoves were ordered shipped by express and no more men were sent to the camp until conditions improved.²³ The Surgeon General stated that the sanitary

conditions in Camp Bowie were more serious than those found at other camps visited, and that there was a great deal of uneasiness and criticism among the civilians with regard to conditions there.²⁴ The State health officer of Texas made an investigation and report which resulted in specific recommendations from the Governor of Texas to the commanding general of the camp as to measures which he considered necessary in order to improve conditions.²⁵ A sanitary inspector reported that the repeated recommendations of the division surgeon and sanitary inspector had accomplished little in the organizations.²⁶ Both of these officers had called the attention of the camp commander to the dangers of overcrowding in tents on September 6, 1917, and recommended its correction. Definite instructions were given to organization commanders on November 4, 1917, as to the adjusting of the metal cowls of the tents so as to give ventilation, and the instructions were repeated on November 27 in a division memorandum; yet an inspection on December 1 failed to show a single tent which was properly ventilated.²⁶ This inspector also reported that there was not a sufficient number of medical officers at the base hospital who were qualified as internists; that measles patients had been returned from the hospital when they should have been retained; that some regimental surgeons had failed to detect measles cases and send them to the hospital as soon as they should have, and to give constant and intelligent observation to convalescent cases returned from the hospital to a "quarters" status; that a lack of sufficient bedding and proper clothing had been an important factor in the epidemic of measles and pneumonia.

During 1918 a hookworm survey was made at this camp. Men from the draft to the number of 12,282 were examined for hookworm infection, and 1,135 positive cases found.²⁰

The extra-cantonment area was under the supervision of the United States Public Health Service.²² The Army medical authorities, however, assumed responsibility for the inspection of premises in immediate proximity to the camp. The engineering work of the Public Health Service was discontinued February 1, 1919, and these duties within a mile of the camp were assumed by the camp sanitary engineer.²⁷ One swampy area, largely due to the discharge of water from camp bathhouses through surface ditches, was drained, and the explosion of dynamite in holes bored in the bottoms of several quarries successfully provided "perpendicular drainage."²²

There was a detention camp here, under tentage, and with a capacity of 1,000.²² There was no fence around it. In an effort to avoid contact infection the tent groups were kept separate, messing troops were placed 10 feet apart, and every other lid of the latrine seats was nailed shut.

The development battalion was organized June 20, 1918.²⁸ Four months later, it consisted of four companies, assignment to companies being made on the following classification: Convalescents, other than orthopedic, venereal, heart, and lung conditions; those unable to read and write or to comprehend orders, and aliens unable to speak English; orthopedic cases; venereal cases. Two medical officers were on duty with the battalion, but the personnel adjutant acted only temporarily. An orthopedic surgeon, with a sergeant who was a graduate osteopath as an assistant, made daily visits. The number of line officers assigned is not known. The enlisted personnel consisted of one non-

commissioned officer and three privates. Each man in the battalion was examined at least weekly, the results were noted on the personnel cards, and a clinical record was kept. Changes in the treatment or exercises prescribed were noted on the back of the personnel cards. Cardiovascular cases having dyspnea, precordial pain, or tachycardia were not permitted to do any duty and were reported to the disability board for discharge; the others were given drill and exercises which required only moderate exertion. The camp disability board met daily at the battalion infirmary. All men were temporarily classified on admission, the permanent classification not being made until shortly before they were to be transferred from the battalion.

The convalescent center was established in January, 1919, and 160 men were accounted for on the first weekly report.²⁹ A total of 672 men had been received when the convalescent camp closed March 7, 1919, 377 of these being overseas cases.

The status of the division dental surgeon as concerned the scope of his authority and responsibility, was still undetermined in June, 1918, and was at least partially responsible for an unusual degree of inefficiency in the dental service throughout the camp.³⁰ There was one special dental infirmary building, not fully equipped, so the camp dental work was still being done in the organization infirmaries. The operative work of the dental officers was poor, with a few exceptions, and their enlisted assistants were poorly trained and not properly disciplined. There was a lack of cooperation and coordination throughout the camp—the required instruction in drill interfered with the working hours of the assistants, the only dental officer at the base hospital wished to practice his specialty to the exclusion of general dentistry, and some line officers refused to permit their men to keep dental appointments.

The remount depot was in a very undesirable location, lying too low for good drainage.³¹ Fully 10 feet of water stood on one corral after an exceptionally heavy rain,³¹ and the mud elsewhere was from 15 inches to 3 feet deep in the corrals.³² Consequently, the removal of manure from the corrals during the season of rains was out of the question. This condition of the corrals was responsible for much of the disability occurring among the animals, especially dermatitis in its various forms.³² The records for animal disease are incomplete, but the following cases of the more serious disabilities were reported as of record prior to June 10, 1919: Dermatitis gangrenosa, 136; glanders, 115; influenza, 1,122; pneumonia, 650; strangles, 640; thrush, 486; and wounds 445.³³

The most important duty of the Medical Department during the demobilization period was the physical examination of the troops.³⁴ The plant was the same as that used during the examination of the draft increments in 1918—three buildings connected by covered corridors, all well lighted and heated. The men to be examined were passed through with all clothes removed, receiving the general examination process in the first building, the chest examination in the central building, and passing the chief examiner, board of review, compensation clerk, representative of the Bureau of War Risk Insurance, and the vocational officer in the third building.³⁵ Demobilization having been completed, the camp was closed August 15, 1919.

CAMP CODY, N. MEX.

A flat, sandy mesa in New Mexico, 40 by 100 miles in extent, furnished an admirable location for the training of troops, and Camp Cody was there located, on the outskirts of the town of Deming.³⁶ The 4-foot depth of sand eliminated the interference with training that was present in the majority of camps during rainy weather, and there were only about 35 days in the year which were not sunshiny. These conditions were not an unmixed blessing, for high winds which produced sand storms were particularly consistent in daily occurrence during the winter and spring. The seasonal variation in temperature was not extreme, but the variation between that of the day and of the night ranged from 20° to 50° F. The average annual temperature was 59° above zero.³⁶

The first increments of troops sent to this camp were National Guard men from Minnesota, Iowa, Nebraska, North Dakota, and South Dakota.³⁷ About 12,000 of these National Guard troops arrived between the 1st and 30th of September, 1917. The strength of the camp gradually was increased by increments from other camps, so that the average strength for the month of December was 21,000. The 34th Division was organized here. During 1918, and especially after May, increments of troops were received from New Mexico, Texas, Colorado, Nebraska, Oklahoma, and Kansas. Some were received from other camps. The 34th Division moved overseas about August, 1918. After this time, the strength of the camp was small, the maximum strength being in November, when it was approximately 9,000.³⁷

Underground water was the source of the camp supply, three wells serving the entire area.³⁸ The geological formation of stratum of clay overlying the water-bearing sand stratum was supposed to furnish protection from surface contamination, but this did not prove to be the case.³⁹ When early examination of water specimens showed the presence of colon bacilli, the contamination was attributed to new installations in the system, although stables and a privy were within 80 yards of a well.⁴⁰

Originally, the camp was supplied with pit latrines for the disposal of excreta. At first, these latrines were burned out daily with straw and crude oil,⁴¹ but spraying of the pits with lampblack and erude oil was introduced in the fall of 1917.⁴² Bathhouse waste was conducted away by surface ditches, and the liquid waste from kitchens was evaporated at the incinerators.³⁶ A sewerage system for the entire camp was nearly completed at the time of the signing of the armistice.⁴³ That for the base hospital consisted of a separate plant and was installed during the winter of 1917-18. Both plants discharged the effluent into a dry river bed.

Garbage was removed from the camp twice daily under contract; the cans were disinfected and dried before being returned to the kitchens.⁴¹

For the most part, the manure was hauled to a dump and burned,⁴¹ though a certain amount was removed by local farmers.⁴²

The introduction of influenza into Camp Cody was definitely traced to the following outside sources:⁴⁴ A detachment of prisoners arrived from Camp Dix, N. J., on September 24, 1918, with one guard ill with influenza. One

man suffering with influenza arrived from Fort Riley, Kans., on September 26, 1918.⁴⁵ However, the epidemic which ensued attained alarming proportions only after the arrival of draft troops in October.⁴⁵ Within four days after arrival, 50 per cent of these men were in hospital. As measures of control, the camp was placed in quarantine October 3, 1918, and unusually strict and thorough regulations were imposed within the camp. All places of amusement and recreation were closed and gatherings of all kinds prohibited; only two men were allowed to each tent; tents were furled and bedding exposed to the sun from 8 a. m. to 5 p. m. daily; night inspections were made by commissioned officers to insure the proper ventilation of all sleeping quarters; meals were eaten out of doors; sick call and inspection of the entire command were held twice daily; every effort was made to detect and isolate cases as early in the disease as possible, and to prevent infection, by the wearing of masks and the sterilization of bedding and dishes. By November 9, 1918, the cases numbered 2,819. A striking peculiarity of the mortality rate was the difference between that among recruits and the men originally of the 34th Division, on the one hand, and between the two components of the original 34th Division, on the other.⁴⁴ That of the troops who were in Camp Cody prior to the arrival of draft increments in October was 0.8 per cent; that of the 34th Division in Camp Dix was 1.9 per cent; and that of the entire population of Camp Cody for the period of the epidemic was 3.3 per cent.

Lobar pneumonia in Camp Cody in 1917, as in the other camps, was in some way related to measles although quite apart from that disease.⁴⁶ Of the 213 cases of pneumonia which had occurred by the end of the year, 186 were of the lobar type and 27 were bronchopneumonia. Forty-nine of the former and 19 of the latter were secondary to measles. The epidemic of pneumonia continued to rise when that of measles was subsiding. A large number of the cases of primary pneumonia were preceded by the milder acute respiratory diseases. The incidence of pneumonia continued to rise until about the middle of February, 1918, and decreased sharply at the end of that month.⁴⁷ There had been 322 additional cases by that time. There had been 128 deaths, of which 3 were attributed to bronchopneumonia, 9 to empyema, 17 to pneumonia following measles, and 90 to lobar pneumonia. A two weeks' cessation of drills, exercises, etc., was inaugurated in the latter part of February, with the idea that the strenuous schedule was prolonging the epidemic. The almost immediate decrease in incidence of the disease appeared to justify the conclusion. A previous action supplying an additional 2,000 tents and stoves and 10,500 blankets late in December, 1917, had no immediate effect. There was a sharp rise in the incidence of pneumonia in the spring of 1918, 56 cases occurring in April, of which only 3 were bronchopneumonia.⁴⁸ The number of cases occurring among the old population of the camp then decreased rapidly until none was being reported by July 1, but 73 cases occurred in June in newly arrived draft troops. This latter high incidence was of short duration, however, only 11 cases being reported during the first 19 days of July. Contrary to the proportions existing in cases occurring among the older troops, nearly 50 per cent of cases from the recently arrived troops were bronchopneumonia. The severity of the disease was less than was the case prior to the spring of 1918—8 deaths from 122 cases in May and June, 1918, and 7 cases of empyema.

Measles and bronchitis likewise increased with the increase in pneumonia and occurred principally among the new troops.⁴⁸ Pneumonia occurred only twice as a complication of measles. The large majority of the cases of pneumonia developing in the new draft troops occurred in the first increment to arrive. This first group was given a very active drill schedule, while the group which arrived later had a lighter schedule.

In the influenza epidemic, admissions for pneumonia first appeared about a week after the onset of the epidemic, rose sharply to 38 in one day a few days later, and fell rapidly to a few daily admissions before the arrival of draft troops on October 23, 1918.⁴⁵ Within a week from that time the rate rose rapidly to 66 admissions on October 31, then decreased to 9 admissions on November 9, 1918. There were 592 cases, with 170 deaths, during this period, with many cases remaining who were still desperately ill. Pleural effusion had developed in only a few cases and only one had been operated upon for empyema prior to November 9.

An unusual feature of disease conditions at Camp Cody was the large number of cases of acute articular rheumatism, attributed largely to the very common acute respiratory conditions there.⁴⁶ Something over 100 cases were in hospital in the latter part of December, 1917.

The tuberculosis survey made by the special tuberculosis examiners disclosed only one-half of 1 per cent of cases which had not been eliminated at the time of the examination of the draft.⁴⁹ This small number was considered to indicate that such a survey was an unnecessary expense, and that the 100 or more cases discovered would have been eventually reported by the regimental surgeons.

The control of the territory surrounding Camp Cody was invested in the local health authorities.³⁶ Until the armistice was signed, their enthusiastic cooperation with the division surgeon resulted in unusually satisfactory conditions⁴⁷ regarding such places as restaurants and soft-drink parlors. The drug stores agreed to sell no patent or proprietary medicines to men in uniform except on a physician's prescription, particular emphasis being placed on drugs concerned in the self-treatment of venereal disease. Saloons were abolished in Deming within one week after the camp was established, and the town was kept clean so far as moral conditions were concerned. No houses of prostitution were operated within 50 miles of Camp Cody, but small towns outside of this radius operated "wide open" until investigated and forced to clean up.^{42 50} The excellent cooperation of the local health authorities with those of the Army changed markedly after the signing of the armistice, there being no further cooperation and supervision on their part.⁵¹

A depot brigade for the reception and preliminary training of recruits was established with the arrival of the first draft contingent.³⁶ Toward the end of the year 1917 this was replaced by a casual camp where the recruits were kept in close quarantine for three weeks, meanwhile receiving training. This camp had a capacity of 3,000 in March, 1918,⁴⁷ and was administered by a field hospital company.³²

A "contact camp" was maintained which was administered by an ambulance company.⁵² The camp was composed of tentage arranged to form eight

company streets and each street was designed to house one class of occupants, the classes consisting of recruits and contacts or carriers of the various types of communicable diseases. Tentage was furnished by the quarantine camp for individual contacts or carriers, but when a tent squad was involved the members brought their own tents. Each class went separately to the kitchen for its food and returned to its own company street to eat and to wash its dishes. Similar methods controlled bathing, drill, and attendance at an open-air theater.

One hundred and ninety-one men had been discharged at Camp Cody for various foot ailments by the end of the year 1917.⁵³ Flat-foot furnishing an excuse for the avoidance of strenuous duty, the 34th Division suffered from an epidemic of this complaint at the close of the year 1917.⁵⁴ To counteract this and in an endeavor to improve the foot conditions of those who actually had a cause for such complaint, an orthopedic casual detachment was organized for the camp on January 4, 1918. This organization represented one of the pioneer efforts in this line of the division of orthopedic surgery in the Surgeon General's Office.⁵⁵ The primary purpose of the orthopedic casual detachment was to treat only those men with foot complaints.⁵⁴ The severest cases were given foot exercises; moderate cases, and severe cases which had improved, were given drill without a pack; the slighter cases were given drill with a 40-pound pack. These men were given instruction in signaling, guard duty, etc., between drills, in a deliberate effort to make this casual detachment an undesirable place for those who were merely seeking an opportunity to avoid duty. The detachment was commanded by a line officer and the medical supervision was directed by a medical officer.⁵³ The administrative personnel of the detachment was detailed from divisional organizations.⁵⁶ Carpentry and woodwork had been added to the facilities for physical training by May 1, 1918. Convalescent empyema and pneumonia cases were admitted in order to build up their strength before they were returned to duty.⁵² In May, 1918, the old hospital buildings in Deming were altered and assigned to the orthopedic casual detachment which furnished it with barracks, drill rooms, dispensary, and workshop. When the detachment ceased to function as such, 29 men remained enrolled and only 4 per cent had been discharged for disability.⁵²

The orthopedic casual detachment was reorganized into a development battalion on June 30, 1918.⁵⁷ During the succeeding few months, 1,754 men were received in the development battalion. Of these, 168 had been discharged for disability by November 1, 1918, and 568 remained in the battalion, the remainder having been returned to duty. All venereal cases of the camp were not assigned to the battalion, as it was intended they should be, about one-half being "attached" for treatment only. The disposition of class D men was so slow that a separate disability board for the battalion was appointed. The number of class D men in the battalion was 34 per cent in October.⁵⁷ There was sometimes a difference of opinion between the battalion officers and the disability board as to the existence of conditions in individuals warranting discharge, with the result that some cases, particularly cardiac and orthopedic conditions, were held for several months when the battalion officers considered them to be entirely useless from a military standpoint.⁵⁸ Of 1,131 men who had been separated from the battalion, only 159 had been discharged from the service.⁵⁸

The dental personnel of the camp numbered approximately 30 officers and 24 enlisted assistants.³⁶ At first the dental officers were assigned to regiments; later, four dental units were organized for a corresponding number of sections of the camp. Still later, the work was concentrated in two dental infirmary buildings. A dental survey of the entire camp was made.

The remount depot comprised corrals, a veterinary hospital, and buildings for barracks, offices, storage, and other purposes.⁵⁹ The corrals were divided into eight sections by double fences which formed separating alleyways. The fences were of woven wire with a 2 by 6 inch plank at top and bottom, and their stability was satisfactory. The sandy soil absorbed all water so completely that drainage was unnecessary. The capacity of the depot was increased from 5,000 to 7,500 in 1919. There were 6 veterinary officers and 75 enlisted men on duty before the increase in capacity of the depot. These numbers were then increased to 9 officers and 100 men. One veterinary officer was in charge of the school for horseshoers, with 6 sergeants as assistants. The enrollment of the school was 206. The veterinary hospital comprised both buildings and corrals, and was located between the receiving corral at the railroad and the main corrals. Drainage in the hospital was stated to have been unnecessary. The hospital corrals were separated from other parts of the remount by a distance of 30 feet. Five cases of glanders were detected from December, 1917, to June, 1918. Seventy-five "reactors" were found among the animals turned in when the 34th Division left the camp in August, 1918. All corrals for the reception of healthy animals were freed from loose material and all structures in them scrubbed with a brush and soap or lye, followed by the application of a disinfectant solution. Controlling the disease was influenced by too-large corrals, lack of double fencing separating corrals, and a chute common to all corrals and therefore requiring disinfection after use for each corral group of animals.

On April 1, 1919, Camp Cody was transferred to departmental jurisdiction, no troops remaining except at the camp hospital, at the auxiliary remount depot, and a salvage detachment.⁵¹

CAMP DONIPHAN, OKLA.

Camp Doniphan was located on the southeastern slope of the Wichita Mountains, within the Government reservation of Fort Sill, Okla., and not far from the permanent post there.⁶⁰ The area occupied by the camp was gently rolling, with considerable flat country to the south and west. The city of Lawton, with 8,000 inhabitants, lay about 5 miles to the south. The soil was a sandy clay, impervious to water, and appeared to contain an admixture of sharp, disintegrated granite which was irritating to the respiratory passages when carried in vast clouds of dust during the frequent dust storms. Surface water drained off rapidly following the infrequent rains and penetrated the soil to such a slight depth that mud was not much in evidence. There were no streams of any size in the vicinity of the camp. Dry winds of high velocity were frequent, and ranges of temperature of from 40° to 50° F. within a few hours were not uncommon. The temperature varied from less than zero Fahrenheit in the winter to several degrees above 100 in the summer.

The first troops received were the National Guard troops from Kansas and Missouri.⁶¹ They began to arrive in September, and by the end of October the strength of the camp was approximately 22,000. Increments were received from time to time from other camps, and during the month of December the average strength was approximately 27,000. The 35th Division was organized here and moved overseas about April, 1918. After this division left, the camp was used as a Field Artillery training school, and the strength of the camp was always small, particularly after the month of June.

The troops were quartered in tents, which, during 1917, were very much overcrowded.⁶¹ Here, as in other camps, difficulty was experienced in obtaining sufficient warm clothing, and the troops suffered during the early severe weather in the fall and winter of 1917.

The water supply of the camp was obtained from an artificial lake in the Wichita Mountains, in common with that of Lawton and of Fort Sill.⁶² Algæ were present in large quantities but were removed during the early period of the camp by straining the water through cheesecloth and chlorinating in Lyster bags. Later, copper sulphate was used in the lake, with chlorination at the outlet. This method of treatment did not prove to be entirely sufficient, as visible crustacean forms were not removed, and the disagreeable taste was still present.⁶³ Before the cold weather killed the algæ the water was nauseating, and the disagreeable taste and odor did not entirely disappear when used in making coffee and tea.⁶⁴ As little of it was used for drinking purposes as possible, and it was objectionable even for bathing purposes. The available supply was reduced to 20 per cent of the capacity of the storage reservoir by May 7, 1918; and as it was being rapidly exhausted, an investigation of the ground water resources in the vicinity was conducted. The early abandonment of the camp, however, removed the necessity for further action.⁶⁵

Waste from the bathhouses was carried away by surface ditches.⁶⁰ Conley incinerators were provided for the company kitchens, but the small size used was insufficient in capacity to handle the liquid wastes from a mess until the utilization of the removable ash pan as an evaporating pan was introduced. This modified incinerator was very economical in fuel, but was not of sufficient capacity in the hands of all kitchen forces, and necessitated the disposal of excess liquids in latrines or in drainage ditches.^{60 66}

Edible garbage was at first hauled to a pig farm by the quartermaster, the contractor paying 42 cents per month per company mess. The cans were washed and steamed before return.⁶⁰ The contractor was later required to remove the garbage from the camp and clean the cans.⁶⁷

Pit latrines were used throughout the period of the camp, each latrine having a galvanized-iron box seat with wooden covers.⁶⁰ Since the sides of the pits had a tendency to cave in, their conversion into cesspools by concreting was being considered when the 35th Division left the camp. Seepage from old pits into new ones developed after the camp had been occupied for a few months.⁶⁴

Manure was at first removed by a contractor; later it was burned on a dump outside of the camp.⁶⁴

A very mild exanthematous disease was introduced into Camp Doniphan by the National Guard troops arriving in September, 1917.⁶¹ The differential diagnosis was doubtful, but the presence of Koplik's spots in a few cases led to the conclusion that it was very mild measles. In spite of the prompt quarantining of the first organization to arrive with the infection, the disease gradually spread through the camp and assumed epidemic proportions in November, 1917. The peak of the epidemic occurred on December 24, 1917, with 486 cases. There were 186 admissions in January, 1918, and 51 in February.⁶¹

Camp Doniphan had a large number of admissions in 1917 and the spring of 1918, which were attributed to influenza, the greatest number being 714 in April, 1918.⁶¹ Very few such cases were admitted during the summer of 1918, but an increase occurred in September. The main force of the epidemic in the fall of 1918 was expended in October, although several hundred cases occurred in November and an even greater number in December. There was a total of 5,088 cases of influenza admitted to sick report during the year 1918, but only 2,752 of these occurred during the fall epidemic.

The epidemic of pneumonia in 1917 and early 1918 was at its height in January, 1918, with 110 cases, but extended into May, 1918.⁶¹ The type was predominantly lobar.

Cerebrospinal meningitis was introduced into the camp by incoming troops early in November, 1917, a total of 18 cases occurring by December 31, 1917.⁶¹ Twenty cases occurred in January, 1918, 8 in February, 5 in March, and sporadic cases throughout the remainder of the year. Criticism was made in January, 1918, of the method of handling meningitis suspects, in that they were placed in the wards with actual cases.⁶⁸ In one company, in which a number of cases occurred, each case was traced to communication with one meningococcus carrier from the company.⁶⁸ This disease resulted in death in 21 instances in the years 1917 and 1918.⁶¹

Soon after the camp was organized, the local health authorities agreed to cooperate with the sanitary inspector of the division in promulgating and enforcing such sanitary regulations as he considered advisable for the control of the county and the city of Lawton.⁶⁴ A medical officer from the camp was later appointed as assistant health commissioner of Lawton and served in this capacity until supervision of the extra-cantonment work was taken over by an officer of the United States Public Health Service in March, 1918.⁶⁰

The necessity for a quarantine camp for the segregation of men who had come into contact with cases of contagious diseases and for a detention camp for new arrivals was pointed out by the Surgeon General after his inspection of the camp in December, 1917.⁶⁹ Subsequently these were established under tentage.

Camp Doniphan was discontinued as a separate camp on July 31, 1918.⁷⁰

CAMP FREMONT, CALIF.

Camp Fremont was located 30 miles south of San Francisco, Calif., lying partly within the town limits of Palo Alto and Menlo Park,⁷¹ between the Santa Cruz Mountains on the west and San Francisco Bay on the east. Extensive marshes 3 miles distant furnished a breeding ground for many mosquitoes.

The camp site was flat and dotted with groves of live oaks, the maneuver area was in the rolling country of the neighboring foothills, and an arroya which drained the foothills passed through the camp. The soil of the camp site was adobe with a clay subsoil, except on the higher ground, where it was gravel and sand. Mud and dust were troublesome. The climate was equable, with light breezes during the greater part of the year.

It was the original intention of the War Department to mobilize and train the 41st Division, a National Guard division, at this camp, and some organizations of the division were mustered into the service there, but soon were transferred to points east.⁷² On December 17, 1917, the 8th Division, Regular Army, was organized here. In August, 1918, 5,000 men of this division were transferred to the American Expeditionary Forces in Siberia. Then the division was recruited to full strength, and on October 30, 1918, began to embark for France.

Water for the camp was supplied from an existing system which extended across San Francisco Bay from a reservoir in the mountains, and was satisfactory in quality and quantity.⁷¹

It had been planned to use pit latrines for this tent camp, but the California State Board of Health urged the installation of a water-carriage sewerage system, to be connected with a proposed system for the local communities.⁷³ The lack of agreement on this proposition led to the abandonment of the camp as a National Guard mobilization camp. Subsequently, however, when it was decided to mobilize the 8th Division here, a water-borne sewerage system was installed, which, in March, 1918, covered only part of the camp; the bathhouses of two organizations were connected with the sewer, but the remainder were furnished with cesspools.⁷⁴ About half the camp was using pit latrines a month later, and all of the bathhouses had been connected with the sewers.⁷¹ No further extension of the sewerage system appears to have been made.

Garbage was removed by a contractor who paid at the rate of \$3 per month for each 100 men.⁷¹ The contractor was not required to clean the cans. They were at first burned out after being emptied,⁷⁵ but later the contractor collected the garbage in covered iron wagons and the cans were washed at the kitchens.⁷⁶

A contractor removed the manure and paid at the rate of \$9 per month for each 100 animals.⁷¹ This method of disposal was discontinued during the later period of the camp, when the manure was removed to a dump some 3 miles distant on the west shore of San Francisco Bay.⁷⁷

Each company had a Guthrie incinerator with evaporating pans, but these were used only for disposing of rubbish and for heating water.⁷⁸ Tin cans were passed through the incinerator and then hauled to a public dump 6 miles distant.⁷⁶

Since Camp Fremont was not opened, practically, until December, 1917, the effects of the epidemics of that fall as seen in other camps were missing there.⁷² Measles, mumps, meningitis, and other acute infectious diseases at no time were present in alarming numbers. The period during which communicable diseases in the early part of 1918 were more or less common was extended in this camp to include June, instead of terminating in May, as was usual in other camps. Common respiratory affections were prevalent throughout the year, with from approximately 150 to 750 cases each month until October, when there were 1,596.

Few cases were diagnosed as influenza prior to the fall of 1918, except in April, when there were 420.⁷² The first cases of the fall epidemic occurred September 28.⁷⁸ The epidemic definitely expended itself in October, with 536 cases reported during that month. Doubtless many cases classed as common respiratory diseases and as primary pneumonias in October would, in other camps, have been considered to have been influenza.⁷² There were 62 deaths, attributed to influenza, which were due to complicating pneumonia.

Pneumonia, predominantly lobar, was present from the beginning of the year 1918, and the predominance of the lobar type was maintained through the epidemic of influenza to the end of the year.⁷² There was a total of 513 cases of pneumonia in 1918, with 157 deaths. The extreme variation in the number of cases of primary pneumonia occurring in October, 1918, from that of other months of the year led to the conclusion that many of them were of influenzal origin.

Neuropsychiatric examinations during the first half of 1918 were made by one medical officer.⁷⁹ The appointment of a board of three members about the 1st of June greatly facilitated an increase in the scope and systematization of the work. In the early period, it was first necessary to interest the regimental surgeons. General lectures, conferences at the infirmaries, and practical work in examinations aroused real enthusiasm on the part of both medical and line officers. The work consisted of examinations of men evidencing peculiar or unusual conditions, of conscientious objectors, of malingerers, of court work for the Judge Advocate General's Office, of work for the personnel and disability boards, and of the examination of all recruits enlisted in the camp. Every man was retained in the service who could be fitted into some position; only those men who were incapable of being trained were classed as mental defects. Those who seemed dull on account of lack of education or of opportunity were segregated for special instruction, and many of them eventually made fairly good soldiers. The conduct of men during field training was observed as an aid in determining their individual ability.⁷⁹

The organization of the orthopedic work in Camp Fremont was completed in May, 1918.⁸⁰ By this time, instruction of medical and line officers was in progress, 3,600 men had been inspected, and an orthopedic dispensary established. Meanwhile, a number of minor orthopedic cases had been sent to the base hospital by regimental surgeons, when these cases could better have been handled by the camp orthopedic surgeon. Consequently, orders were issued by the divisional surgeon that no case would be sent there without the approval of the camp orthopedic surgeon.⁸⁰ One of the medical officers attached to each organization was detailed to supervise its orthopedic work, and an orthopedic disability board was appointed. In the summer of 1918 a school for enlisted men was established, wherein instruction in the care of the feet was given. In September, 65 were in attendance. Cobblers were assigned for work in the orthopedic dispensary, and a graduate chiropodist was placed on duty there to care for minor foot ailments.⁸¹ The foot and chiropody school completed its course in October and the students were sent back to their regiments.⁸² Pedicograms were made of every case treated and were filed with the soldier's service record. During the period September 1 to November 15, 1918, 1,407 cases

were examined at the camp orthopedic dispensary.⁸³ Of these, 887 were returned to full duty, 434 to limited service, and 23 were discharged for disability. During the same period, 1,040 cases were treated in the development battalion, and 111 returned to full duty, 730 to limited service, and 199 recommended for discharge for disability.

The function of a quarantine camp was performed by a casual camp in January, 1918.⁸⁴ This was converted into a quarantine and detention camp in February.⁷⁶ All incoming men were detained in the camp for at least two weeks, until the arrival of a large draft contingent in May necessitated their quarantine in regimental areas.⁷⁶

The development battalion was established about July 1, 1918, and contained 863 men at the end of the month.⁷⁶ An orthopedic surgeon was detailed for full-time duty with the battalion in September, and a cobbler trained in shoe alterations was assigned to the shop which had been equipped by the American Red Cross.^{81 85} There were 2,342 men in the battalion in November, 1918, about 160 being venereal cases.⁸⁶

A division dental surgeon was assigned in April, 1918, and by June 1 about 30 dental officers and their assistants were in camp, assigned to the various organizations.⁸⁷ Upon the completion of two dental infirmary buildings in July,⁸⁷ the dental service of the camp was reorganized by concentrating the work in the infirmaries directly under the supervision of the camp dental surgeon.⁸⁸ These infirmaries were close together, and tentage was pitched in the vicinity as quarters for both dental officers and their enlisted assistants. Prior to this time, dental surgeons had been permanently assigned to the various organizations and were therefore entirely under the control of their respective organization commanders. In order to retain the control in the office of the division dental surgeon when a separation of the personnel should become necessary after leaving the camp, dental officers were only temporarily assigned to organizations, which status practically amounted to an assignment for quarters and rations only. Additional administrative commissioned personnel consisted of a detachment commander, a property officer, and a personnel officer.

The auxiliary remount depot was situated almost adjacent to the base hospital, thus creating a potentially dangerous situation because of flies. Since its location was flat, proper drainage was difficult,⁷⁵ and though there were 750 men present there in the summer of 1918, to care for the 3,400 animals, and the corrals were well cared for, flies were present in great numbers.⁷⁶ Among other sanitary defects noted, no provision had been made for the supply of hot water in the veterinary hospital, there were no sewerage connections in the depot, and the waste water from the kitchen and bathhouses was collected into pits from which it was removed by tank wagons.⁷⁶ The Medical Department personnel of the depot consisted of 6 officers of the Veterinary Corps and 75 men of the Veterinary Department in June, 1918, when the detachment was first completely organized.⁸⁹ Two medical officers and 8 men of the Medical Department were attached during the same period.⁷⁶ Animals showing a poor type and conformation or indications of a lack of stamina were rejected upon receipt during the early period of the camp.⁷⁷ In order to make the best use of public animals, this practice was later discontinued and all animals which

were not actually unhealthy were retained. Influenza, colic, laminitis, and strangles were the more prevalent diseases, but glanders was the most serious.⁸⁹ In testing for glanders, the serological test proved to be more reliable than the ophthalmic.⁸⁹ Some 1,475 animals which were negative to the latter test yielded 52 positives to the serological test, and these 52 when autopsied were found to have the disease. One hundred and thirty-two animals were destroyed on account of glanders from March 18, to December 4, 1918.

The California State Board of Health very satisfactorily supervised the sanitary control of the area adjacent to the camp. Public eating houses of all kinds, markets of all varieties, barber shops, etc., within a radius of 25 miles were posted with a set of the requirements of the United States Public Health Service and of the Army, and the disposal of waste of all kinds was supervised. Three venereal prophylactic stations were established in San Francisco, one in Redwood City, and one in San Jose by this board. The local health authorities also were active and willing to cooperate with the Army.⁷⁴

Camp Fremont was turned over to the United States Public Health Service about April 1, 1919.⁹⁰

CAMP GREENE, N. C.

Camp Greene was located near the southern boundary of North Carolina, 180 miles from the sea and 100 miles from the foothills of the mountains.⁹¹ Charlotte, a railway center of 35,000 inhabitants, was 1 mile distant. The terrain here is roughly rolling and partly wooded, with a soil of red clay which is impervious to water and extremely adhesive when wet. The camp surgeon reported that the camp site was poor, owing to the character of the soil.⁹² The drainage also was poor. During the early days of the camp the excessive mud made training work impossible. As a result, the men spent most of their time inside their tents huddling around the stoves, thus enhancing the spread of communicable diseases.

Three divisions and a number of small organizations occupied the camp at various times. The 41st Division, the first to occupy the camp, was composed of National Guard troops from Washington, Oregon, Idaho, North Dakota, South Dakota, New Mexico, Wyoming, Montana, and the District of Columbia.⁷³ Although the first of these troops did not arrive until about the middle of September, 1917, the construction work of the camp was only about two-thirds completed at that time. The strength of the division when it departed in October, 1917, was approximately 15,500.⁹¹ The 3d Division, Regular Army, was organized at Camp Greene in November, 1917, and the 4th Division, Regular Army, in December, 1917.⁹³ The maximum population of the camp was reached in February, 1918, ⁹² with approximately 41,000 men.⁹⁴ The 3d Division left camp for overseas service in March, 1918, and the 4th Division followed in May, 1918.⁹¹ Various independent organizations were organized in Camp Greene after July 1, 1918, the camp population fluctuating from approximately 8,000 in July to 28,000 in October, and rapidly decreasing thereafter.^{91 92}

The camp water supply came from the Catawba River, the camp system being an extension of the city system of Charlotte. The water was purified by sedimentation, slow sand filtration, and chlorination and was satisfactory as to

potability.⁹⁵ Though colon bacilli were isolated from the water when it was muddy, no cases of typhoid fever occurring in the city could be traced to the city water supply.⁹⁶

A sewerage system was provided for the base hospital in the winter of 1917-18;⁹⁷ a small section of the camp had a sewerage system installed by July, 1918,⁹⁸ and one-half the camp was connected by November, 1918.⁹⁹ The discharge of partly treated sewage into a neighboring small stream caused complaint from a mill that the stench would force its employees to move from the neighborhood if not corrected.⁹⁷ The adoption of certain corrective measures was recommended,⁹⁷ but the recommendation was not carried out before the camp was abandoned.

Clay caused the same trouble with the pit latrine system in Camp Greene as in other areas, where it constituted the principal ingredient of the soil.¹⁰⁰ With no seepage, the pits filled rapidly, and the frequent digging of new ones had already used the greater part of the available ground by the end of the year 1917. Excavators, improperly designated as odorless, were later employed to remove the contents.⁹¹ Surface drainage disposed of the waste water from bathhouses.¹⁰¹

The troops used the type of rock-pit incinerator that had been used on the Mexican border to dispose of the liquid kitchen waste, with unsatisfactory results.⁹⁵ Incinerators of the standard Guthrie type were installed before September, 1917, and functioned satisfactorily until the fuel supply gave out when the roads became impassable in the winter of 1917-18.^{95 100} These liquid wastes were then emptied into drainage ditches for a time.

In the areas of the camp which were not provided later with sewer connections, an unusual method was used to so treat the liquid waste from the kitchens that it could be discharged into surface ditches with impunity.¹⁰² The waste was treated in "niter-cake barrels" which were so arranged that the contents were in constant contact with niter cake. This acid salt separated the emulsified grease, which was then removed from the surface periodically. The effluent was almost transparent and was repellant to flies and mosquitoes. The capacity of each barrel was 1,000 gallons per day.

Company incinerators disposed of the garbage during the early period of the camp.⁹⁵ Removal by a contractor, who removed the garbage in the cans and returned cleaned cans, was introduced about October 1, 1917.¹⁰³ The contract system failed in the winter of 1917-18 when the roads became impassable, and the garbage was piled on the ground in rear of the kitchens, or sometimes buried, as fuel for firing the incinerators was not available.¹⁰⁰

Manure was burned on a dump until about October 1, 1917, when a contract was let for its removal.¹⁰³ Weather conditions in the following winter interfered with removal, and the corrals were deep with a mixture of mud and manure.¹⁰⁴ Some of this manure still remained in the corrals in March, 1919.¹⁰⁵

A few cases of measles were brought to the camp by the troops of the 41st Division,¹⁰³ in the early fall of 1917; there was a maximum admission of 447 cases in January, 1918.⁹² The comparatively small numbers of cases occurring through the succeeding months gradually decreased until none were reported in June, 1918. A total of 1,491 cases was reported prior to June 1,

and a small number of cases occurred during the fall of 1918. German measles was not differentiated during 1917, but 18 cases were reported in 1918.

Numerous cases diagnosed as influenza were reported in 1917 and the spring of 1918.⁹² The increase in incidence was abrupt in December, 1917, when there were 565 admissions. January, 1918, showed 684 admissions, February and March each less than 300, and April, 1918, 976. The monthly admissions then dropped abruptly to small numbers. The first admissions for influenza of the type recognized in the epidemic of the fall of 1918 occurred on September 22, and September 29 marked the onset of epidemic proportions, with 30 cases.⁹¹ The height was reached on October 10 with 370 cases, after which the rate of admissions declined rapidly to 9 on October 31, with a total of 4,570 cases. To care for this great number of patients, four infirmaries with tentage were organized into a supplementary field hospital, and a convalescent camp was established under canvas, these being in addition to the facilities available at the base hospital.⁹¹ The personnel required for these temporary organizations was drawn from the Medical Department personnel of the camp, from base and evacuation hospitals which had been mobilized there for overseas service, and from the school for bakers and cooks. Patients in the supplementary field hospital were transferred to the convalescent camp after their temperature had remained normal for two days; they were retained in the convalescent camp for four days, and then were returned to a very light duty status for another four days. The supplementary field hospital treated 1,711 cases. The entire camp was placed in quarantine on October 3, roads and tent floors were oiled, tents were furled daily, and the throats of the entire command were sprayed twice daily with dichloramine-T. Only five deaths were reported as due to uncomplicated influenza.⁹²

The curve of the admission rate for pneumonia in Camp Greene during 1917 and the first half of 1918 paralleled those for measles, "other respiratory diseases" and influenza more or less closely, particularly that for influenza.⁹² Cases of pneumonia were recorded in September, 1917, increasing in number through succeeding months, with a total of 163 cases for the year 1917. Only 8 of these were reported as complicating measles and 1 as complicating influenza. Twenty were of the bronchopneumonic type. The highest admission rate for these diseases was attained in January, 1918, with 152 cases of pneumonia, and the epidemics of all had definitely run their courses before June 1, 1918. There was a total of 387 cases of pneumonia in the first five months of 1918, 20 being bronchopneumonia, 17 cases complicating measles, and 25 cases complicating influenza. Deaths from pneumonia totaled 105 prior to June 1, 1918, 16 of which were due to bronchopneumonia. Measles did not enter into the pneumonia situation in the fall of 1918, when there were 683 cases of pneumonia during the last four months of the year. Of these, 196 cases were reported as primary pneumonia. The unusual feature of this epidemic was that only 24 of these cases were reported as being of the bronchopneumonic type. There were 223 deaths from pneumonia during this period, only 11 of which were attributed to bronchopneumonia.

Mumps occurred in September, 1917,¹⁰³ and increased to the high point of 660 admissions in March, 1918.⁹² Varying numbers of cases arose during

succeeding months, with a definite small epidemic of 354 cases during the last four months of 1918.

Cerebrospinal meningitis was introduced into the camp in 1917, 5 cases occurring in October and 2 in December.⁹² Twenty-five cases developed in January, 1918, and 13 in February, after which small numbers occurred throughout the remainder of the year, with a total of 64 cases and 19 deaths. When a case of meningitis occurred in a company, the entire unit was placed in quarantine in quarters, under guard, for one week, and contacts sent to the quarantine camp.¹⁰²

Fifteen cases of typhoid fever occurred during the last seven months of 1918.¹⁰⁶ The first four cases occurred in June, and the remainder were scattered through the following months.⁹² The origin of the cases was supposed to have been the city of Charlotte, where there were about 60 cases,⁹⁸ but 2 cases arose in the base hospital.¹⁰⁶

The special boards to examine the 41st Division for cases of tuberculosis, cardiac, and nervous and mental diseases completed their work late in October, 1917.¹⁰⁷ The tuberculosis board appears to have been the basis of the organization of the work, its examiners making a brief examination of the heart and referring all cases suspected of having a cardiac defect to the cardiovascular examiner. Five hundred to six hundred men were examined each half day.

The orthopedic work in Camp Greene was established in October, 1917,¹⁰⁸ and was well organized, though not far advanced, by November.¹⁰⁹ The supply of shoes for issue was inadequate and thereby prevented proper fitting, and the only shoe alteration facility available was an agreement by the American Red Cross to provide cobbling for patients in the base hospital.¹⁰⁹ All progress in this work ceased after the departure of the 41st Division, and organization for the work was poor in January, 1918.¹¹⁰ Conditions were much improved by spring, but the main effort still was confined to the relief of foot disabilities by properly fitted and altered shoes.¹¹¹ Treatment of orthopedic cases in the casual camp proved to be entirely unsatisfactory, and was later provided for by the creation of an orthopedic section in the development battalion.¹¹² Little orthopedic work was being done in the development battalion late in August, 1918, as the time of the camp orthopedic surgeon was fully occupied in the examination of incoming drafted men.¹¹³ There were 150 men with orthopedic conditions in the development battalion by November, 1918.¹¹⁴ An orthopedic dispensary was now in operation in the battalion infirmary, and the alteration of shoes was being done in the near-by quartermaster's shoe repair shop.

A detention camp was established about the first of the year 1918, to which all who had come in contact with contagious diseases were sent.¹¹⁵ The camp became badly overcrowded about the 1st of February, and it was necessary temporarily to establish a quarantine camp in each regimental area. The detention camp was later officially designated as the quarantine camp.¹⁰²

A casual camp was established in February, 1918, to which certain orthopedic cases, among others, were sent.¹¹² There were 2,700 men in this camp in May, 1918.¹¹⁶ This camp was the predecessor of the development battalion, which contained 500 men before September 1, 1918, and over 2,000 early in November.

The veterinary service of the camp was interrupted by the frequent departure of divisional troops until a camp veterinarian was assigned in May, 1918, a camp meat and dairy inspector in June, and enlisted veterinary personnel in June.¹¹⁷ The activities of the service in the camp proper and in the auxiliary remount depot functioned more or less independently. The camp service supervised the care, feeding and shoeing of all animals except those of the depot, and the inspection of meats, slaughter houses, meat markets, dairies, in general, required considerable attention before conditions became acceptable. Cases of illness and injury of animals, other than minor ones, were sent to the veterinary hospital in the auxiliary remount depot for treatment.

Sanitary conditions in the remount depot were bad during the winter of 1917-18.¹¹⁸ Poor location of some corrals and impassable roads prevented the removal of manure. There were 6 veterinary officers, 75 enlisted men of the Veterinary Corps, and 250 enlisted men of the Quartermaster Corps on duty in January, 1918, to care for the 7,000 animals.¹⁰⁰ Barracks were overcrowded, mess halls were inadequate, kitchens and guardhouse were filthy, latrines were not policed, and no provision had been made for drainage about the watering troughs. These deplorable conditions were due largely to two factors: The medical officer on duty at this depot had allowed his recommendations to be ignored, and the camp surgeon had considered that the depot was not under his own jurisdiction. Nine hundred and thirty-six animals had died prior to March 1, 1918, principally from influenza and resulting complications.¹¹⁵ Fifty per cent of the deaths were attributed to the poor sanitary condition of the corrals. Glanders was the most serious animal disease occurring in Camp Greene.¹¹⁹ The first case was discovered in April, 1918, after departing divisions had turned in their stock, and 109 animals were destroyed during the remainder of that year.¹¹⁹ The quarantine which was established on the discovery of the first cases was maintained until January 3, 1919. Gangrenous dermatitis was continually present until measures were adopted which gave the animals dry standings and made it possible for them to obtain water and feed without wading through a deep mixture of mud and manure. In places, the animals would mire to their bodies. Relief was obtained by dividing the corrals into units of two, one being in use while the other was being drained and cleaned.

An officer of the United States Public Health Service assumed charge of the extra-cantonment zone in August, 1917.⁹⁵ A small epidemic of typhoid fever in the summer of 1918 caused the camp to be quarantined against the city, when all measures recommended by the United States Public Health Service representative were adopted.^{103 95}

Various organizations were demobilized at Camp Greene in December, 1918, totaling 8,000 men.⁹¹ The final demobilization occupied the month of March, 1919, when a team of 2 orthopedic examiners; 4 for tuberculosis; 1 for cardiovascular conditions; 3 for neuropsychiatry; 1 for ophthalmology; 1 for the ear, nose, and throat; 2 for genitourinary conditions; and 1 dental officer examined 1,350 officers and men.¹²⁰

CAMP HANCOCK, GA.

Camp Hancock was located on a rolling and wooded terrain, 3 miles from the center of Augusta, Ga., a city of 50,000 inhabitants.¹²¹ The soil was sandy, with a clay subsoil. Neither dust nor mud was very troublesome. There were marshy areas to both north and south, and the Savannah River lay about 3 miles to the north.¹²² The annual temperature varied from below zero to over 92° F., with 36 or more inches of annual rainfall.¹²³

About 27,000 National Guard men from the State of Pennsylvania were sent to the camp between October 1 and 30, 1917.¹²⁴ In addition, 5,000 men from Pennsylvania were received in December, and some from other camps. The strength during December was approximately 27,000. In 1918, 7,000 men came from New York and a few from other States. However, the camp was filled largely by drafted men sent from other camps. The 28th Division was organized here and sent overseas about May, 1918. After this division left, the camp was used as a machine-gun replacement camp.¹²⁴

The men were quartered in tents.¹²⁴ The base hospital here, as elsewhere, was a frame building.

A damming of the Savannah River above the city furnished the source of the water supply for the city of Augusta and for Camp Hancock.¹²⁵ The watershed was sparsely settled and the nearest sewered town above the dam was 150 miles upstream. The water was pumped to a sedimentation basin where it was treated with alum and retained for about five days. The outflow from the basin passed through sand filters and was chlorinated as it entered the mains. The quality was usually satisfactory, but colon bacilli could be isolated at intervals. The auxiliary remount depot had a separate water supply derived from a neighboring creek, pumped into storage tanks, and the outflow filtered.¹²⁶ During the earlier period of the camp, water used for human consumption was chlorinated in Lyster bags, as the *Bacillus coli* was present.¹²⁷ Later it was chlorinated at the source and a special line was provided for human use, the flow from which was coagulated and filtered in addition to the chlorination.¹²⁶

A sewerage system for the base hospital was completed early in the year 1918.¹²⁸ One for the camp was constructed in 1918, but the main sewer was not completed until October, and almost no utilities were then connected.¹²³ A large grease trap was installed in the sewer line leading from each regimental area, but as the kitchens were not connected, the grease recovery was small.¹²⁹

Open dug ditches conducted waste water from the bathhouses to a sloping area where it was absorbed by the sandy soil.¹²⁵ Kitchen waste water was disposed of in the same general manner, but a wider distribution was obtained either by pouring the waste into long troughs with the bottoms perforated at intervals, or filtering it through sand and gravel in deep, brick-lined pits, the effluent emptying into the ditches leading from the bathhouses. Two regiments used a subsurface irrigation system, consisting of the passage of the waste through two septic tanks into drains filled with flattened tin cans. As soon as the sewers were completed, however, waste water from the kitchens was carried to manholes and poured into the sewer, resulting usually in a foul area about each manhole.¹³⁰

Attempts were made in August, 1917, to dispose of both garbage and manure by contract, but no bids were received.¹³¹ Farmers hauled the garbage away at that time,¹³¹ but later most of it was burned in the company incinerators, both the Guthrie and improvised types being in use.¹²⁹ Garbage was disposed of mainly by battalion incinerators in the summer of 1918,¹²¹ although farmers were permitted to take a part of it.¹²⁵ Those desiring to remove garbage from the reservation were obliged to obtain a permit to do so. They were required to use clean, covered metal containers in a clean wagon, and to take the garbage only at the incinerator, not at the company kitchens. This method was quite satisfactory, but the reclamation service made an agreement for its sale in September, 1918, by which that service hauled the garbage to a pig farm.¹²³ Meat, bones, and grease-trap skimmings were boiled and the grease reclaimed by the contractor.¹³² The cans were washed at the farm by Army prisoner labor.¹²³

Manure was hauled to farms by camp personnel during the earliest period,¹³³ but later a certain amount was burned at the edge of the camp.¹³⁴ A contract was in force by the first of the year 1918, by which manure was removed in cars on the railroad.¹³⁵

Few cases of influenza were reported previous to the epidemic in the fall of 1918, except in April, 1918, when there were 298.¹²⁴ The epidemic form was introduced at about the time of the arrival of troop trains from Camp Grant on September 30, 1918, when there were 700 admissions directly from the trains.¹³⁶ The disease soon spread through the camp, and the epidemic continued until the last of October. At the height of the wave there were 3,760 cases in the base hospital and 1,600 in improvised hospitals. The disease was comparatively mild except among the troops arriving from Camp Grant.¹³⁷ The total number of cases for the period was 7,717.¹³⁶ All available space in the base hospital was used to care for cases, tentage was set up in adjacent areas, and nine provisional field hospitals were organized. One section of the tentage area was assigned to convalescents. Patients in the base hospital were placed in cubicles, but neither shelter halves, sheets, nor blankets were available for this purpose elsewhere.

A few cases of pneumonia were reported in the camp in the fall of 1917, none of which complicated other diseases.¹²⁴ Cases of primary pneumonia occurred in somewhat larger numbers throughout the year 1918, and cases complicating other diseases arose. The incidence of primary bronchopneumonia exceeded that of primary lobar pneumonia only in November and December. The great majority of secondary pneumonias occurred with the influenza epidemic, and the bronchopneumonic type then predominated. The bronchopneumonic type of pneumonia was the more fatal, particularly in cases which were secondary to other diseases.

The first case of cerebrospinal meningitis occurred in November, 1917; it was most prevalent in January and February, 1918, and sporadic cases appeared throughout the remainder of the year.¹²⁴ There was a total of 42 cases with 12 deaths.

Measles was a negligible factor in Camp Hancock until the fall of 1918, and did not then exceed 60 cases in any one month except November, when there were 162.¹²⁴ Only 8 cases were reported prior to January 1, 1918.

A few cases of German measles were reported in the fall of 1917, with a rapid increase to 416 cases in January, 1918, and 199 in February.¹²⁴ The incidence was negligible after that time.

Occasional cases of scarlet fever occurred during the year 1918, until November when the disease suddenly assumed epidemic proportions in an explosive outbreak.¹²⁴ The last case to develop during the month occurred on the 26th instant.¹³⁸ Approximately 400 cases were originally diagnosed as scarlet fever, but a visiting inspector stated that numerous cases had been so diagnosed on insufficient grounds and that cases of other diseases had been included. Only 89 cases showed a typical desquamation at that time. Three hundred and thirty-one cases appear in the official reports of the month and 388 for the entire year.¹²⁴

As was true in other mobilization camps, the early activities of the orthopedic service at Camp Hancock were concerned principally with the feet.¹³⁹ However, an orthopedic dispensary was established in November, 1917, whereby it was expected that the functions of the service would be broadened, but because of the lack of personnel and equipment the work done there was limited to consultations.¹⁴⁰ In January, 1918, the personnel of the orthopedic service was augmented by assigning to it, as assistants to the camp orthopedic surgeon, one medical officer of each regiment.¹³⁵ A foot survey now could be made of all the personnel in camp, and this was done. Gradually, the dispensary work was increased also, so that by the fall of 1918 three orthopedic dispensaries were in operation.¹⁴¹ These were located as follows: One in the main part of the camp; one in the ordnance training camp; one in the development battalion. In the first two named, cobblers were on duty to make the necessary alterations in shoes with the view of correcting foot defects.¹⁴¹

A development battalion was organized in the summer of 1918, its strength in August being 665.¹⁴² The physical training was conducted entirely by line officers, except for the following two classes of cases: Cardiovascular cases, which were referred to the camp specialist in that branch for recommendation as to suitable exercise, and orthopedic cases, over exercises for which the camp orthopedic surgeon had direct supervision. The 130 men in the latter class were mostly assigned to one company.¹⁴³ Before January 1, 1919, there were 2,332 men in the battalion, 1,281 of these being classed as medical or surgical conditions.¹⁴⁴ Of the total, 1,411 men were fit for combat duty and 78 were to be discharged.

The convalescent center, established January 28, 1919, was formed from men transferred from the development battalion and convalescents from the base hospital, to which overseas patients from other sources were added.¹⁴⁵ ¹⁴⁶ The largest number of men in the center at any one time was about 150.¹⁴⁷

At Camp Hancock the dental officers of the 28th Division were so assigned to the infirmaries that one infirmary afforded dental service to each of the three brigades of the division.¹⁴⁸ Twenty-nine dental officers thus were assigned, and three additional ones to smaller units. After the division left in the spring

of 1918, no dental officers remained in the camp proper to care for the camp personnel;¹⁴⁹ however, 16 soon were sent there, and this number was increased to 25 in June,¹⁵⁰ and 41 in October.¹⁵¹ The two-story dental infirmaries were completed in July, 1918.¹⁵²

The remount depot was located several miles from the main camp.¹⁵³ While the natural drainage was generally good, there were several swampy areas within its boundaries which required ditching. Twelve buildings and one corral constituted the veterinary hospital.¹⁵⁴ Division was made into four wards of 40 double stalls and 10 box stalls each, and the necessary dressing rooms, feed rooms, etc. Only two cases of glanders were detected. Lice infestation was common in the spring of both 1918 and 1919. Dermatitis gangrenosa caused the greatest number of disabilities, 1,321, due directly to the condition of the corrals. Influenza and its complications caused the second greatest number of disabilities, 1,122.

Until the end of 1917, the supervision of the extra-cantonment zone was done by the local Army Medical Department in cooperation with the local health authorities.¹³³ Early in January, 1918, however, the United States Public Health Service assumed charge of the sanitation of the extra-cantonment zone.¹³⁵ Though the sanitary conditions of the area immediately surrounding the camp were good, those in Augusta were reported as being poor in general; therefore the United States Public Health Service inaugurated a campaign to cover a wide range of activities. These included an improvement in hygiene and sanitary conditions, mosquito and fly extermination, supervision of the preparation and sale of food products, inspection of hotels, barber shops, and theaters, and the control of contagious diseases.¹²³

During the demobilization period 16,833 officers and men were examined prior to discharge, 4,862 of whom were found to have permanent disabilities.¹⁵⁵ About one-third of the 41 cases which were found to require immediate hospital treatment were cases of venereal disease and 7 were cases of active tuberculosis. Camp Hancock was discontinued as a demobilization camp and convalescent center on February 14, 1919, and all activities of the camp, so far as practicable, were discontinued by March 20.¹⁴⁵ The caretakers remaining numbered about 1,000.¹⁵⁶ The retention of the part of the base hospital necessary for the care of remaining troops was directed, and the remainder was turned over to the United States Public Health Service.¹⁵⁷

CAMP KEARNY, CALIF.

Camp Kearny was located in southern California, 11 miles north of San Diego and 5 miles from the Pacific Ocean.¹⁵⁸ The low plateau on which it was situated was bounded on both the north and south by deep arroyas, and was bare of all vegetation except sage brush.^{158 159} The soil of this plateau consisted of a reddish clay overlying an impervious stratum of "hardpan."¹⁶⁰ The climate was very equable, the mean annual temperature being 61° F.¹⁶¹ The highest temperature that had ever been recorded in San Diego previous to the World War was 110°, and a freezing temperature had been recorded only seven times subsequent to 1871. The average annual rainfall was about 10 inches, 90 per cent of this occurring in the rainy season between November 1 and May 1.

Dense fogs occurred occasionally, but there were only about nine days each year which were without sunshine. Gentle winds prevailed, and dusty whirlwinds of moderate size were common during the dry season.

Between September 1 and September 30, 1917, the camp received 5,000 National Guard men from the States of Arizona, New Mexico, Colorado, Utah, and California; 1,239 men were received from Utah in October, and 705 from Arizona.¹⁶² Large increments of troops, 13,680, were received from other camps in November. A few National Guard men were included in this number, but the increments largely were composed of drafted men. The mean strength of the camp for December was about 23,000. The 40th Division was organized here and moved overseas about August, 1918. After this division left the 16th Division was organized. During 1918 many men were received largely from other camps, though between August and November large numbers were received from the States of Arizona, California, and Nebraska, with a few from Utah and Colorado.

This was a tent camp with a capacity for one division.¹⁶² The base hospital was a frame structure and there were two barrack buildings utilized by the Ordnance Department. The camp was rectangular, extending east and west. The center was occupied by the parade ground, bounded on all sides by paved roads. The tents were the pyramidal type. With the exception of about six weeks prior to the departure of the 40th Division, all the troops had tents with floors.

Water from the San Diego city system was pumped into a concrete reservoir on the military reservation, and a reserve chlorination apparatus was installed for use in case of an accident to the city's apparatus.¹⁶³ The wooden pipes that were used frequently developed leaks, which necessitated digging them up, and this resulted in numerous piles of earth and mud in all parts of the camp.¹⁶⁴

During the early period of the camp, pit latrines were in general use,¹⁶⁰ and it was necessary to use latrines in some portions of the camp throughout its existence.¹⁶⁵ The attempt to prevent fly breeding by burning out the pits proved to be unsuccessful, so spraying with a mixture of crude oil and lampblack was adopted instead. Owing to the great difficulty in excavating latrines,¹⁶³ the installation of a sewerage system was determined to be necessary at an early date.¹⁶⁰ Work was under way early in October, 1917, and although blasting was required for all excavations, the work was completed before the close of the year, and included connections to bathhouses, kitchens, and latrines.¹⁶⁶ The sewage was passed through a septic tank, chlorinated, and discharged into a neighboring canyon. The base hospital had a similar but separate system.

The garbage contract required the contractor to furnish standard galvanized-iron cans, which were to be washed and steam sterilized before being returned to the kitchens.¹⁶¹ The garbage suitable for hog feed was separated from the remainder, and was sufficient to feed from 3,500 to 4,000 hogs.¹⁶⁵

A daily average of about 125 tons of manure was delivered to the contractor at a railroad siding between the camp and the auxiliary remount depot.¹⁶¹ The contractor was required to furnish nets, which were filled by the organizations and hauled to the loading point where the loading was done by a derrick.¹⁶⁵

This contract yielded \$1,200 per month to the camp. Corral sweepings from the auxiliary remount depot were spread on an adjacent garden tract where vegetables were raised for the personnel of the depot.¹⁶¹

The camp refuse was hauled to a dump in a deep canyon 2 miles from the camp and burned.¹⁶³

Because of a large demand for replacement troops for overseas service in June, 1918, 5,000 men were sent from Camp Kearny. All of these men were given a thorough physical examination before departure, and medical officers accompanied the troop trains to the ports of embarkation. This movement left the 40th Division far below its normal strength, and it soon received a draft increment preparatory to overseas service. A physical examining board, consisting of 47 officers and 76 enlisted men, and a number of traffic orderlies and personnel to administer vaccinations, examined 5,743 men in seven days.¹⁶⁷ An examination rate of 1,500 men per day was attained at times, though this was a higher rate than was necessary, since the men to be examined could not be passed through the personnel office so rapidly. Three mess halls connected by hospital ward tents were divided into "stations" for the various steps in the examination; each man examined carried his clothes in the form of a bundle in order to avoid loss. Special examinations were made in the evening of the same day, so the examination of each lot of men was completed in one day. In the fall of 1918, the same rate per day was maintained, but eight mess halls now were used as examining rooms, these being vacated by troops and field kitchens used instead during the examination period.¹⁶⁴

Cases that were diagnosed as influenza throughout the fall of 1917 were in sufficient numbers in November to have been considered as epidemic, 182 cases being reported.¹⁶² The incidence rose to 223 cases in January, 1918, decreased rapidly during the following two months, and suddenly increased to 705 cases in April. May showed a decrease of nearly 50 per cent, and only a moderate number occurred during the summer. The April increase was locally attributed to the visit of a squadron of Japanese warships to San Diego with several cases of influenza on board.¹⁵⁸ The first case of the fall epidemic of 1918 was detected on September 24.¹⁶⁸ October showed 2,162 admissions, and the total from the first case to the end of the year was 4,708.¹⁶⁸ This epidemic caused 146 deaths. As combative measures, the entire camp was quarantined from October 9 to November 12, and all personnel of the camp were required to wear gauze masks for a period of 10 days beginning November 2. There was a decided drop in the incidence of the disease four days after the beginning of the latter procedure.¹⁶⁸

Both bronchopneumonia and lobar pneumonia were reported in the camp prior to October, 1917, and were present in almost epidemic numbers throughout the following fall and winter, the lobar type predominating in both the primary and secondary forms.¹⁶² The death rate was exceptionally high in the fall of 1917 in cases which were associated with measles, amounting to approximately 44 per cent. The spring of 1918 brought a great reduction in the number of cases, the low rate continuing until October. The fall epidemic of influenza caused an abrupt increase in the incidence, with 276 cases in October and 318 in November, nearly all of them being of the bronchopneumonic type.

Measles was first reported in October, 1917, became epidemic in November, and caused 637 admissions in December.¹⁶² The incidence thereafter was negligible. Severe complications were relatively infrequent.¹⁵³ German measles was prevalent in the camp throughout the fall of 1917, showed an occurrence of 307 cases in December, and practically disappeared in January, 1918.¹⁶²

Mumps was present in the camp in moderate numbers from its earliest period, the number of cases rising rapidly in early 1918 to 504 in March.¹⁶² The number of cases after July was negligible, but there were 1,585 cases in the year 1918.

The first cases of cerebrospinal meningitis, 2 in number, occurred in October, 1917, 12 occurred in November, and 8 in December, with 12 additional cases before July 1, 1918.¹⁶² One other case occurred in December, 1918. The death rate was unusually low in 1917, less than 14 per cent. A noteworthy point in connection with this disease at Camp Kearny was that the small outbreaks invariably followed dust storms.¹⁶³

The tuberculosis board did not get its work fairly under way until about the middle of October, 1917.¹⁶⁹ It examined about 400 men per day,¹⁶⁹ and completed the examination of the division early in January, 1918.¹⁷⁰ The discharge rate for tuberculosis in this camp was unusually high. This was attributed largely to the fact that some of the States from which the men were drawn contained an abnormally large number of people who chose to reside there as a result of pulmonary trouble, and that at the preliminary examination the men with tuberculosis had not all been eliminated.¹⁶¹

One medical officer constituted the cardiovascular board when it began work about October 1, 1917, but another officer was added later.¹⁷¹ Men to be examined were referred by the tuberculosis board or by the medical officers on duty with organizations. In the early period of the work the tuberculosis board was to detect and refer to the cardiovascular board all men with abnormal hearts, for it was presumed that the great majority of existent cardiac abnormalities would be detected in this way. However, the number of men referred directly to the cardiovascular board by regimental surgeons on account of the inability of the men to perform the duty required by the strenuous training schedule, continually increased until they averaged one-third of the total number of cases examined. These men had all been passed by the tuberculosis board as fit for any duty. Of the men referred by the tuberculosis board for cardiovascular examination, all but about 12 would have been detected by the functional test of actual duty. The cardiovascular board therefore considered that its purpose would be better served by eliminating the tuberculosis board cardiac examination and depending upon organization commanders to send in all men who could not perform double-time drill to a normal degree. In the earlier work of the board, numbers of men were seen with tachycardia and slight signs of mitral stenosis which were considered to have been simple febrile conditions due to infections. Numbers of men with similar manifestations were later observed to have "broken" under the strain of the training, and 100 who had previously been accepted with the above-named conditions were reexamined. Since the majority of these were found to have a broken compensation, and many were unable to do any work, the board gradually formed the opin-

ion that, almost without exception, any pulse rate exceeding 100 per minute in the standing posture indicated a pathological condition, due to mitral stenosis or hyperthyroidism in the great majority of cases. It was the final opinion of the board that 1 examiner should make a maximum of 18 examinations in 1 day of 6 hours, as fatigue caused a loss of accuracy when more than this was attempted; that separate and quiet examining rooms were necessary; that 2 typists and 3 orderlies, 1 mounted, should be assigned to the board; and that 2 members of the board should constitute a disability board to act on all cardiovascular cases. Such a disability board for cardiovascular cases was appointed before the work was completed.

The first of the neuropsychiatric examiners reported in August, 1917, and the last member in October. The board first attempted to function in the room occupied by the tuberculosis and cardiovascular boards, but a separate room was found to be necessary.¹⁷² Three men, with experience in a hospital for the insane, and one typist were obtained as an office force, and meetings were held in tents. The work previously had consisted of the examination of such men as had been referred to the board from various sources. Nearly all of these cases had been examined by the end of October, and it was determined to further systematize the work. It was believed by the neuropsychiatrists that all abnormal individuals among the National Guard troops would eventually come to the board through reference by organization commanders but that a survey should be made of the expected 15,000 drafted men. The survey was to include the Binet or similar test for mental capacity, and men showing defects were to be given more complete examinations. During this early period of the work it was considered that a mental survey was preferable to the method of trial by duty in a company in eliminating undesirable men; later, however, the cooperation of the psychological examiner was considered to be desirable, but not essential, in eliminating those mentally deficient. It was believed that all these men should have a short period of training and that the observations of line and medical officers during this training period were of far greater value than a psychological rating in determining a man's ability and the place he should fill. Opinions were obtained from various commanding officers late in 1918 as to the value of routine psychological ratings.¹⁷³ The majority of the commanding officers thought that the ratings were of assistance in assigning men to appropriate duties, particularly when the time available was short.

Orthopedic work while Camp Kearny was occupied by the 40th Division was limited almost entirely to efforts to correct abnormal foot conditions.¹⁷⁴ Foot exercises were so arranged that they could be executed by command and "by the numbers," thus insuring proper execution as well as increasing their efficiency.¹⁷⁵ Fracture cases in the base hospital were included as orthopedic conditions after the 40th Division had departed and special instruction of enlisted chiropodists for the 16th Division was initiated.¹⁷⁴ In addition a system of six foot-and-leg exercises was evolved which was incorporated in the setting-up exercises for all organizations.¹⁷⁶ Until August, 1918, any necessary orthopedic shoe alterations were made in the quartermaster's shoe repair shop, but because the ordinary repair work became so heavy in August, other provisions

were necessary. The cobbler who had been doing this special work was transferred in order that he might work under the orthopedic surgeon, and his shop was installed in a tent.¹⁷⁶

No quarantine camp was established before the summer of 1918, each organization isolating its own contacts under guard.¹⁷⁷ A small detention camp was established in March, 1918, in which the tent groups were allowed to mingle freely at all times. A large quarantine camp was later established, and a portion of it sufficient to accommodate 5,000 men was set aside as a detention camp.¹⁷⁸

A recruit camp was established early in 1918, the primary purpose of which was to hold unassigned, newly arrived men until the examination of their records, vaccinations, etc., could be completed and assignments to organizations made.¹⁵⁹ It later became known as the casual camp and eventually became the center for the formation of the development battalion. Meanwhile, the recruit receiving camp was organized to handle the large draft increments of June, 1918. The organization here was more elaborate than that of the old recruit camp, being based on the reception of large masses of men rather than individuals.

The convalescent company was a more direct predecessor of the development battalion than was the casual camp.¹⁶¹ It was established early in April, 1918, to accomplish two purposes—the removal from the hospital of cases no longer requiring hospital care but unable to perform full duty and the building up of their physical vigor to the point where they would be able to perform full duty. The company was a camp activity but was established in connection with the base hospital, and had both line and medical officers among its personnel. Patients transferred to this company were carried on a duty status. There were over 200 men in the company one month after its formation.

The development battalion, as originally formed, consisted of three companies—one to assume the functions of the convalescent company of the base hospital, one to handle incoming and outgoing casualties, and one to deal with those who were unfit for full duty from either physical, mental, or educational defects.¹⁵⁹ Approximately 1,900 men were in the battalion by August 1, 1918, the majority of whom were considered to be unfit for duty even in the United States guards or labor battalions.¹⁷⁸ Although 21 line officers and 4 medical officers were on duty, little could be done in the way of training, owing to the great demand for the men of the battalion to perform guard or police duty. There were 11 medical officers on duty with the battalion by the middle of August.¹⁷⁹ An officer had been taken from the base hospital to act as battalion surgeon, and it was necessary for him to use as noncommissioned officers unfit men of the Medical Department who had been transferred to the battalion. Little progress was made until the battalion was reorganized on August 24.¹⁸⁰ Line officers conducted the drills and athletics, but the medical officers maintained supervision over all physical training and were constantly present during drills and physical exercises. Though no man was allowed to participate in any game without the specific approval of a medical officer, every man was required to do so unless excused by a medical officer. Competition between organizations was emphasized. Discipline was strict. The drills, exercises,

and games developed the men physically, mentally, and morally. Of the 1,124 men in the battalion since its organization, 218 were returned to full duty and ratings of about 90 were changed, owing to improved physical condition. Forty conscientious objectors were reclaimed for active duty, and of the nine who formerly had refused to wear a uniform only one persisted in this refusal late in October.¹⁸¹ Chronic venereal cases were not transferred to the battalion as a routine late in November.¹⁸² The battalion had the best reports of sanitary inspections of any unit in the camp, and the effect on its morale was amply demonstrated.¹⁸³ There were 815 men in the battalion in November. Of these 287 were orthopedic cases, 123 cardiovascular, and 42 pulmonary. Little or no results were obtained with orthopedic and heart cases, and only slight results with tuberculous cases. At the end of the year 1918 about 600 men had been returned to some class of duty, 400 had been discharged for disability, and about 700 remained, 350 being venereal cases.¹⁸⁸

The convalescent center had a cadre of 18 line officers, 4 medical officers, and 131 enlisted men at the end of February, 1919.¹⁸⁴ Drills, exercises, guard duty, policing, and games constituted the training schedule. The greatest number reported as present in the center was 245 on May 17.¹⁸⁵ The center was closed May 31, 1919.¹⁸⁶

Dental officers were first assigned only to the larger individual units, but furnished dental care for the smaller units also.¹⁸⁹ They remained attached to organizations until the two dental infirmary buildings were completed in the summer of 1918, when they and their assistants were transferred to the infirmaries and organized into the camp dental detachment.¹⁸⁷ Base dental outfits were not installed in these infirmaries until November 1. During the period August 1, 1918, to March 31, 1919, approximately 7 per cent of the military force in the camp were given dental attention monthly. In the 15,500 dental engagements filled during that period 2,822 teeth were extracted and 11,190 instances of dental caries, 1,304 of dental-alveolar abscess, and 1,317 cases of devitalized pulp were treated.

The camp veterinary service was organized October 1, 1917, with one officer and one enlisted man present.¹⁸⁸ The veterinary strength during the period of the occupancy of the camp by the 40th Division is not stated,¹⁸⁸ however, there were 38 enlisted men with the 16th Division, which was sufficient for its reduced strength.¹⁸⁹ All orders drafted by the division veterinarian of the 16th Division were approved and published by division headquarters, and this undoubtedly had an influence in producing the low sick rate among the animals.¹⁸⁹ Cooperative action with the veterinary hospital proved difficult, since all communication was required to be conducted through the commanding officer of the auxiliary remount depot, rather than directly with the veterinary officer in charge of the remount veterinary hospital.¹⁸⁹

The remount depot was opened in September, 1917.¹⁹⁰ It was situated astride a ridge, which resulted in excellent natural drainage. The corrals were scheduled to be cleaned once in six weeks, and this was satisfactory in results. Four long sheds constituted the wards of the veterinary hospital. Each shed was divided into about 20 box stalls, and 2 of these buildings could be closed in stormy weather. They were about 60 feet apart and parallel, and

the intervening spaces were inclosed as corrals. The hospital group was separated from other buildings of the depot by a considerable space. The veterinary personnel of the depot was organized as a detachment February 1, 1918, with 4 officers and 71 enlisted men.¹⁹¹ Glanders was the most serious disease encountered. When the disease was first encountered the identity of animals which showed a positive serological test was lost; therefore the entire group of suspected animals was destroyed.¹⁹⁰ A total of 130 animals was destroyed prior to June, 1918, on account of this disease. There was another outbreak of the disease later, the number of cases not being stated, but it apparently was small.

The health authorities of the city and county of San Diego were unusually active in their cooperation with the Army authorities from August, 1917, to the close of the camp.¹⁹² Sanitary supervision was maintained over all places dealing in foodstuffs and all firms desiring to sell food or beverages in the cantonment. Dealers of the last class were required to furnish a guaranty that their wares would comply with the requirements of the national pure food laws and with those of the city, county, and State. A medical officer visited the city of San Diego every 10 days to inspect food and drink establishments, barber shops, and dance halls.¹⁹³ These places were "out of bounds" for officers and men unless they displayed certificates from the camp medical authorities that their sanitary conditions were up to standard. The United States Public Health Service took no active part in the extra-cantonment zone except for its routine duties.¹⁷⁸

The 16th Division had lost the greater part of its strength before January 1, 1919, and was officially demobilized during that month.¹⁹⁴ The remainder of the year was occupied in demobilizing men sent from other places, the bulk of the work occurring during the first five months of the year, amounting to approximately 16,600 in a total of 17,000 for the year.

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- (38) Report of investigation of water supply of Camp Cody, N. Mex., prepared by Majors Anson Marston and Warren R. Thompson, 109th Engineers, August 19, 1918. On file, Record Room, S. G. O., 720.2-1 (Camp Cody) D. 1918, Storage.
- (39) Letter from the sanitary inspector, 34th Division, Camp Cody, N. Mex., to the division surgeon, 34th Division, October 29, 1917. Subject: Camp water supply.
- (40) Letter from the sanitary inspector, 34th Division, Camp Cody, N. Mex., to the Division surgeon, 34th Division, November 30, 1917. Subject: Additional data regarding water supply, Camp Cody.
- (41) Letter from Lieut. Col. Robert E. Noble, M. C., to the Surgeon General, U. S. Army, October 7, 1917. Subject: Inspection, Camp Cody, Deming, N. Mex. On file, Record Room, S. G. O., 721-7 (Camp Cody) D.
- (42) Letter from Col. W. F. Lewis, M. C., special sanitary inspector, to the Surgeon General, U. S. Army, December 24, 1917. Subject: Special sanitary report of the 34th Division, Camp Cody, Deming, N. Mex. On file, Record Room, S. G. O., 721-1 (Camp Cody) D.
- (43) Letter from Capt. Charles A. Haskins, S. C., to the Acting Surgeon General, U. S. Army, October 8, 1918. Subject: Report on investigation of water supply and sewerage systems, Camp Cody, September 13, 1918. On file, Record Room, S. G. O., 721-1 (Camp Cody) D.
- (44) Report on the influenza epidemic at Camp Cody, undated and unsigned. On file, Record Room, S. G. O., 710-1 (Camp Cody) D, Storage (undated).
- (45) Letter from the camp surgeon, Camp Cody, N. Mex., to the Surgeon General of the Army, November 14, 1918. Subject: Report on the influenza and pneumonia epidemic. On file, Record Room, S. G. O., 710 (Influenza, Camp Cody) D.
- (46) Letter from board of medical officers to the Surgeon General, U. S. Army, December 30, 1917. Subject: Epidemic diseases at Camp Cody, N. Mex. On file, Record Room, S. G. O., 710-1 (Camp Cody) D.
- (47) Letter from Lieut. Col. F. W. Weed, M. C., to the Surgeon General of the Army, March 16, 1918. Subject: Special sanitary inspection, Camp Cody, Deming, N. Mex. On file, Record Room, S. G. O., 721-1 (Camp Cody) D.

- (48) Letter from Maj. Eugene L. Opie, M. R. C., to the Surgeon General, U. S. Army, July 29, 1918. Subject: Pneumonia in Camp Cody among newly drafted men. On file, Record Room, S. G. O., 710-1 (Camp Cody) D, Storage, 1918.
- (49) Letter from Maj. Bullock, Camp Cody, N. Mex., to Maj. E. H. Bruns, Surgeon General's Office, Washington, D. C., January 26, 1918. Subject: Tuberculosis, Camp Cody. On file, Record Room, S. G. O., 702 (Tb., Camp Cody) D.
- (50) Report on prostitution and the sale of alcohol at Lordsburg, N. Mex., by 1st Lieut. Paul Popence, S. C., December 12, 1917. On file, Record Room, S. G. O., 250.1 (Camp Cody) D.
- (51) Letter from Col. W. F. Lewis, M. C., U. S. Army, to the Surgeon General, U. S. Army, March 21, 1919. Subject: Report of sanitary inspection, Camp Cody, N. Mex. On file, Record Room, S. G. O., 721-1 (Camp Cody) D.
- (52) Letter from Col. W. F. Lewis, M. C., U. S. Army to the Surgeon General, U. S. Army, June 2, 1918. Subject: Inspection 34th Division, Camp Cody, N. Mex. On file, Record Room, S. G. O., 721-1 (Camp Cody) D.
- (53) Letter from Scott D. Breckenridge, M. R. C., to the Surgeon General of the Army, January 31, 1918. Subject: Inspection of orthopedic service at Camp Cody, N. Mex. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Cody) D.
- (54) Letter from the orthopedic surgeon, 39th Division, Camp Cody, N. Mex., to the Surgeon General, U. S. Army, February 4, 1918. Subject: Orthopedic casual detachment. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Cody) D.
- (55) Memorandum from Maj. A. S. Bagg, M. R. C., for Major Brown, Hospital Division, S. G. O., June 15, 1918. On file, Record Room, S. G. O., 721-1 (Camp Cody) D, 1918.
- (56) Letter from Maj. Edward A. Rich, M. R. C., district orthopedic surgeon, to the Surgeon General, June 30, 1918. Subject: Report on condition of orthopedic service, Camp Cody. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Cody) D.
- (57) Letter from Capt. LeRoy Crummer, Camp Cody, N. Mex., to the Surgeon General, U. S. Army, November 14, 1918. Subject: Report on development battalion, Camp Cody, N. Mex. On file, Record Room, S. G. O., 322.052 (Development Bn., Camp Cody) D.
- (58) Summary of development battalion reports, Camp Cody, by Col. W. F. Lewis, M. C., undated. On file, Record Room, S. G. O., 322.171-1 (Camp Cody) D.
- (59) Letter from the veterinarian, Auxiliary Remount Depot No. 326, Camp Cody, N. Mex., to the Surgeon General of the Army, September 1, 1919. Subject: Questionnaire. On file, Record Room, S. G. O., 404.3-1 (Auxiliary Remount Depot No. 326) R.
- (60) Medical history of Camp Doniphan, by Maj. Carl Phillips, M. C., U. S. Army, division sanitary inspector, dated November 28, 1918. On file, Historical Division, S. G. O.
- (61) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. I, 226-237.
- (62) Letter from the division surgeon, 35th Division, Camp Doniphan, Okla., to the Surgeon General of the Army, March 29, 1918. Subject: Annual report. On file, Record Room, S. G. O. 319.1 (Camp Doniphan) D.
- (63) Letter from officer in charge of water supply, Camp Doniphan, Okla., to the Surgeon General, U. S. Army, May 7, 1918. Subject: Water supply conditions. On file, Record Room, S. G. O., 671 (Water supply, Camp Doniphan) D.
- (64) Letter from Col. W. F. Lewis, M. C., sanitary inspector, to the Surgeon General, November 22, 1917. Subject: Report on 35th Division, Camp Doniphan, Fort Sill, Okla. On file, Record Room, S. G. O., 721-1 (Camp Doniphan) D.
- (65) Memorandum from Capt. E. J. Tucker, S. C., for Col. D. C. Howard, May 23, 1918. Subject: Water supply at Camp Doniphan, Fort Sill, Okla. On file, Record Room, S. G. O., 671 (Camp Doniphan) D.
- (66) Letter from Maj. Phillip A. Shaffer, S. C., to the Surgeon General of the Army, February 13, 1918. Subject: Report of visit to Camp Doniphan, Fort Sill, Okla., for inspection of food conditions, January 24-25, 1918. On file, Record Room, S. G. O., 720.1 (Camp Doniphan) D.

- (67) Report of special sanitary inspection, Camp Doniphan, Fort Sill, Okla., March 23, 24 and 25, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Doniphan) D.
- (68) Letter from B. A. Seiler, base hospital, Camp Doniphan, Okla., to Maj. E. K. Kerr, Fort Riley, Kans., January 12, 1918. On file, Record Room, S. G. O., 710 (Camp Doniphan) D.
- (69) Letter from the Surgeon General to the Chief of Staff, December 17, 1917. Subject: Sanitary conditions at Camp Doniphan, Okla. On file, Record Room, S. G. O., 721-1 (Camp Doniphan) D.
- (70) G. O. No. 55, W. D., June 10, 1918.
- (71) Data for medical and surgical history of the war, by Capt. F. M. Barker, M. R. C., assistant division surgeon, dated Camp Fremont, Calif., April 30, 1918. On file, Record Room, S. G. O., 314.7 (Camp Fremont) D.
- (72) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. I, 252-263.
- (73) Medical history of the 41st Division, by Col. O. G. Brown, M. C., depot surgeon. On file, Historical Division, S. G. O.
- (74) Telegram from George E. Bright, President California State Board of Health, San Francisco, Calif., to Secretary of War Baker, Washington, D. C., August 23, 1917. Copy on file, Record Room, S. G. O., 672-2 (Camp Fremont) D.
- (75) Letter from Lieut. Col. F. W. Weed, M. C., to the Surgeon General of the Army, March 23, 1918. Subject: Special sanitary inspection, Camp Fremont, Palo Alto, Calif. On file, Record Room, S. G. O., 721-1 (Camp Fremont) D.
- (76) Report of sanitary inspection of Camp Fremont, Calif., made on July 27 and 28, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Fremont) D.
- (77) Letter from the acting camp veterinarian, Camp Fremont, Calif., to the Surgeon General of the Army, undated. Subject: Reply to questionnaire for veterinary history of the war. On file, Veterinary Division, S. G. O.
- (78) Letter from the camp surgeon, Camp Fremont, Calif., to the Surgeon General of the Army, December 31, 1918. Subject: Annual report, calendar year 1918. On file, Historical Division, S. G. O.
- (79) Letter from the division psychiatrist, 8th Division, Camp Fremont, Calif., to Col. Pearce Bailey, M. C., N. A., July 12, 1918. Subject: Neuropsychiatric work. On file, Record Room, S. G. O., 702 (Neuropsychiatric, Camp Fremont) D.
- (80) Letter from Capt. John C. Wilson, M. R. C., U. S. Army, to the Surgeon General, U. S. Army, May 25, 1918. Subject: Orthopedic inspection at Camp Fremont, Calif. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Fremont) D.
- (81) Letter from camp orthopedic surgeon, Camp Fremont, Calif., to the Surgeon General, U. S. Army, September 16, 1918. Subject: Semimonthly orthopedic report, September 1, 1918, to September 15, 1918. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Fremont) D.
- (82) Letter from the camp orthopedic surgeon, Camp Fremont, Calif., to the Surgeon General, U. S. Army, November 1, 1918. Subject: Semimonthly orthopedic report, October 15 to October 31, 1918. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Fremont) D.
- (83) Correspondence, semimonthly orthopedic reports, Camp Fremont, Calif., period September 1 to November 15, 1918. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Fremont) D.
- (84) Letter from the camp surgeon, Camp Fremont, Calif., to the Surgeon General, U. S. Army, March 17, 1919. Subject: Annual report for the calendar year 1918. On file, Historical Division, S. G. O., unnumbered.
- (85) Letter from the camp orthopedic surgeon, Camp Fremont, Calif., to the Surgeon General, U. S. Army, October 1, 1918. Subject: Semimonthly orthopedic report, September 15 to September 30, 1918. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Fremont) D.

- (86) Letter from Capt. LeRoy Crummer, M. C., U. S. Army, to the Surgeon General, U. S. Army, December 13, 1918. Subject: Report on development battalion, Camp Fremont. On file, Record Room, S. G. O., 322.171 (Camp Fremont) D.
- (87) A history of the dental service at Camp Fremont, Calif., by Lieut. Col. R. E. Ingals, D. C., camp dental surgeon, Camp Fremont, Calif. On file, Dental Division, S. G. O.
- (88) Letter from Lieut. Col. R. E. Ingals, D. C., camp dental surgeon, Camp Fremont, Calif., to Col. W. H. G. Logan, Dental Corps, Office of the Surgeon General, Washington, D. C., October 10, 1918. On file, Record Room, S. G. O., 703 (Camp Fremont) D.
- (89) Veterinary history of the war, Auxiliary Remount Depot No. 332 and attached veterinary hospital, Camp Fremont, Calif., by Capt. Willis A. Myers, V. C. On file, Record Room, S. G. O., 314.7 (Veterinary History, Auxiliary Remount Depot No. 332) R.
- (90) Office Memorandum, W. D., Surgeon General's Office, March 10, 1919, unnumbered. On file, Record Room, S. G. O., 370 (Demobilization, Camp Fremont) D.
- (91) A medical history of Camp Greene, N. C., undated and unsigned. On file, Historical Division, S. G. O.
- (92) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. I, 306-317. 2d ind. from Maj., Clarence H. Green Q. M. C., N. G., Camp Greene, N. C., February 2, 1918, to the camp surgeon. On file, Record Room, S. G. O., 720-1 (Camp Greene) D.
- (93) Brief Histories of the Divisions in the A. E. F., 41st Division, source unknown. On file, Historical Division, S. G. O., unnumbered.
- (94) Report of special sanitary inspection, Camp Greene, Charlotte, N. C., April 19, 1918, by Col. A. E. Truby, M. C. On file Record Room, S. G. O., 721 (Camp Greene) D.
- (95) Report of special sanitary inspection of Camp Greene, Charlotte, N. C., August 21, 1917, by Col. H. C. Fisher, M. C., special sanitary inspector. On file, Record Room, S. G. O., 721-1 (Camp Greene) D.
- (96) Description of water supply, made by the company supplying water to Charlotte, N. C., and Camp Greene, received in S. G. O., December 12, 1917. On file, Record Room, S. G. O., 720.2-1 (Camp Greene) D.
- (97) Letter from Capt. Chas. A. Haskins, S. C., to the Surgeon General, U. S. Army, November 4, 1918. Subject: Report on investigation of sewage disposal at Camp Greene, October 21, 1918. On file, Record Room, S. G. O., 721-1 (Camp Greene) D.
- (98) Report of special sanitary inspection, Camp Greene, Charlotte, N. C., made on July 21, 1918, by Lieut. Col. F. W. Weed, M. C. On file, Record Room, S. G. O., 721-1 (Camp Greene) D.
- (99) Report of sanitary inspection of Camp Greene, N. C., on November 6, 1918, by Col. Jere B. Clayton, M. C. On file, Historical Division, S. G. O.
- (100) Report of special sanitary inspection, Camp Greene, Charlotte, N. C., January 2-3, 1918, by Lieut. Col. C. F. Morse, M. C. On file, Record Room, S. G. O., 721-1 (Camp Greene) D.
- (101) A medical history of Camp Greene, N. C., unsigned. Prepared for the records of the Surgeon General's Office. On file, Historical Division, S. G. O.
- (102) Letter from the camp surgeon, Camp Greene, N. C., to the Surgeon General, U. S. Army, January 16, 1919. Subject: Annual report for calendar year 1918. On file, Record Room, S. G. O., 319.1-2 (Camp Greene) D.
- (103) Report of special sanitary inspection, Camp Greene, Charlotte, N. C., by Col. H. C. Fisher, M. C., September 28, 1917. On file, Record Room, S. G. O., 721-1 (Camp Greene) D, 1917.
- (104) Letter from Col. P. M. Ashburn, M. C., to the Surgeon General of the Army, February 14, 1918. Subject: Camp Greene, Charlotte, N. C. On file, Record Room, S. G. O., 721 (Camp Greene) D.
- (105) Monthly sanitary report for the month of March, 1919, from Camp Greene, N. C. On file Record Room, S. G. O., 720-1 (Camp Greene) D.
- (106) Letter from the chief of laboratory service, base hospital, Camp Greene, N. C., to the commanding officer, September 2, 1918. Subject: Typhoid fever. On file, Record Room, S. G. O., 333 (Base Hospital, Camp Greene) D.

- (107) Telegram from Major Carrol, Camp Greene, N. C., to the Surgeon General, Washington, D. C., October 27, 1917. Letter from Capt. G. Kremer, M. R. C., to Maj. E. H. Burns, Office of the Surgeon General, October 25, 1917. Report, routine procedure of tuberculosis board at Camp Greene, Charlotte, N. C. Both letter and report attached to above telegram. On file, Record Room, S. G. O., 702-5 (Tuberculosis, Camp Greene) D.
- (108) Letter from Capt. J. T. Rugh to the Surgeon General, October 11, 1917. Subject: Orthopedic surgery at Camp Greene, N. C. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Greene) D.
- (109) Letter from Capt. James T. Rugh M. R. C., to the Surgeon General, U. S. Army, November 20, 1917. Subject: Special report on orthopedic instruction and inspection in camps. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Greene) D.
- (110) Letter from the orthopedic surgeon, Camp Greene, N. C., to the Surgeon General, U. S. Army, January 20, 1918. Subject: Orthopedic surgery at Camp Greene. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Greene) D.
- (111) Letter from Maj. James T. Rugh, M. R. C., to the Surgeon General, March 6, 1918. Subject: Orthopedic surgery at Camp Greene. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Greene) D.
- (112) Letter from the orthopedic surgeon, Camp Greene, N. C., to the Surgeon General, U. S. Army, July 18, 1918. Subject: Report of orthopedic surgeon. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Greene) D.
- (113) Letter from Capt. Henry P. Mauck, M. C., to the Surgeon General, U. S. Army, August 28, 1918. Subject: Orthopedic surgery, Camp Greene, N. C. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Greene) D.
- (114) Letter from Capt. Henry P. Mauck, M. C., to the Surgeon General, November 6, 1918. Subject: Orthopedic surgery, Camp Greene, N. C. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Greene) D.
- (115) Letter from Lieut. Col. C. F. Morse to the Surgeon General, February 6, 1918. Subject: Report on special inspection at Camp Greene, N. C. On file, Record Room, S. G. O., 721-1 (Camp Greene) D.
- (116) Letter from the orthopedic surgeon, Camp Greene, N. C., to the Surgeon General, U. S. Army, May 17, 1918. Subject: Report of orthopedic surgeon. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Greene) D.
- (117) Detailed veterinary history of Camp Greene, undated and unsigned. On file, Veterinary Division, S. G. O.
- (118) Letter from the Surgeon General of the Army to The Adjutant General of the Army November 12, 1918. Subject: Special sanitary inspection, Camp Greene, N. C. On file, Record Room, S. G. O., 721 (Camp Greene) D.
- (119) A veterinary history of the war, Auxiliary Remount Depot 306, Camp Greene, N. C., by Maj. E. B. Aekerman, V. C., U. S. Army. On file, Veterinary Division, S. G. O.
- (120) Final report of physical examinations made prior to separation from the Military Service, Camp Greene, N. C., by Maj. Edgar F. Haines, M. C., camp surgeon, March 29, 1919. On file Record Room, S. G. O., 370.01-2 (Camp Greene) D.
- (121) Medical history of Camp Hancock, Augusta, Ga., for the fiscal year ended June 30, 1918, by Lieut. Col. W. M. Smart, M. C., camp surgeon. On file, Record Room, S. G. O., 314.7 (Medical History, Camp Hancock) D.
- (122) Letter from Capt. Russell W. Geiss, S. C., U. S. Army, to the Surgeon General, U. S. Army, undated. Subject: Malarial history of Camp Hancock, Ga. On file, Record Room, S. G. O., 725.11-1 (Camp Hancock) D.
- (123) Letter from the camp surgeon, Camp Hancock, Ga., to the Surgeon General, U. S. Army, February 18, 1919. Subject: Annual report for calendar year 1918. On file, Historical Division, S. G. O.
- (124) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. I, 327-339.
- (125) Letter from the camp sanitary engineer, Camp Hancock, Ga., to the Surgeon General, U. S. Army, August 8, 1918. Subject: Monthly report on camp water supply, disposal of water, etc. On file, Record Room, S. G. O., 720.2-1 (Camp Hancock) D.

- (126) Letter from the camp sanitary engineer, Camp Hancock, Ga., to the Surgeon General, U. S. Army, August 23, 1918. Subject: Report on water supply at Auxiliary Remount Depot No. 308 with recommendations. On file, Record Room, S. G. O., 730.2-1 (Camp Hancock) D.
- (127) Letter from the division sanitary inspector, 28th Division, Camp Hancock, Ga., to the Surgeon General, U. S. Army, November 15, 1917. Subject: Water supply, remount station. On file, Record Room, S. G. O., 671 (Remount Station, Camp Hancock) D.
- (128) Letter from Maj. James T. B. Bowles, S. C., N. A., to the Surgeon General of the Army, February 7, 1918. Subject: Special inspection of water supply and sewage disposal, Camp Hancock, Ga., by Capt. E. J. Tucker, S. C. On file, Record Room, S. G. O., 721-1 (Camp Hancock) D.
- (129) Letter from Maj. J. T. B. Bowles, S. C., N. A., to the Surgeon General, October 12, 1917. Subject: Special sanitary inspection of Camp Hancock, Ga., September 29, 1917. On file, Record Room, S. G. O., 721-1 (Camp Hancock) D.
- (130) Report of sanitary inspection of Camp Hancock, Augusta, Ga., on January 20 and 21, 1919, by Lieut. Col. H. B. McIntyre, M. C. On file, Record Room, S. G. O., 721-1 (Camp Hancock) D.
- (131) Letter from the camp sanitary officer, Camp Hancock, Ga., to the Surgeon General, U. S. Army, August 31, 1917. Subject: Sanitary report. On file, Record Room, S. G. O., 721.5-1 (Sanitary Report, Camp Hancock) D.
- (132) Letter from the camp sanitary engineer, Camp Hancock, Ga., to the Surgeon General, U. S. Army Division of Sanitation, December 12, 1918. Subject: Monthly report, November, 1918. On file, Record Room, S. G. O., 721-1 (Camp Hancock) D.
- (133) Report of special sanitary inspection, Camp Hancock, Augusta, Ga., August 27, 1917, by Col. H. C. Fisher, M. C. On file, Record Room, S. G. O., 721-1 (Camp Hancock) D.
- (134) Letter from the sanitary inspector, Southeastern Department, to the Surgeon General, U. S. Army, August 17, 1917. Subject: Sanitary conditions at Camp Hancock. On file, Record Room, S. G. O., 721-1 (Camp Hancock) D.
- (135) Report of special sanitary inspection, Camp Hancock, Augusta, Ga., January 9-10, 1918, by Lieut. Col. C. F. Morse, M. C. On file, Record Room, S. G. O., 721-1 (Camp Hancock) D.
- (136) Letter from the camp surgeon, Camp Hancock, Ga., to the Surgeon General of the Army, December 28, 1918. Subject: Report on influenza and pneumonia epidemic. On file, Record Room, S. G. O., 711 (Epidemics).
- (137) Report of inspection in relation to epidemic of influenza and pneumonia at Camp Hancock, Augusta, Ga., October 15, 1918, by Col. A. E. Truby, M. C. On file, Record Room, S. G. O., 721-1 (Camp Hancock) D.
- (138) Letter from Maj. W. W. Herrick, M. C., to the Surgeon General of the Army, November 29, 1918. Subject: Investigation of scarlet fever epidemic at Camp Hancock, Ga. On file, Record Room, S. G. O., 710 (Scarlet Fever, Base Hospital, Camp Hancock) D.
- (139) Letter from the acting orthopedic surgeon, Camp Hancock, Ga., to the commanding officer, 111th Infantry, December 6, 1917. Subject: Shoe and foot inspection. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Hancock) D.
- (140) Letter from Capt. James T. Rugh, M. C., to the Surgeon General, U. S. Army, Department of Military Orthopedics, November 19, 1917. Subject: Orthopedics at Camp Hancock, Ga. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Hancock) D.
- (141) Letter from Capt. Henry P. Mauck, M. C., to the Surgeon General, U. S. Army, October 15, 1918. Subject: Orthopedic surgery at Camp Hancock. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Hancock) D.
- (142) 1st Ind. from the camp surgeon, Camp Hancock, August 8, 1918, to the Surgeon General. On file, Record Room, S. G. O., 322.051 (Development Battalions, Camp Hancock) D.

- (143) Letter from First Lieut. William Moncure, jr., M. C., to the Surgeon General, U. S. Army, August 16, 1918. Subject: Semimonthly report of orthopedic work in the development battalions. On file, Record Room, S. G. O., 322.051 (Development Battalions, Camp Hancock) D.
- (144) Letter from Maj. Marcus A. Rothchild, M. C., to the Surgeon General, U. S. Army, January 4, 1919. Subject: Convalescent center, Camp Hancock, Ga. On file, Record Room, S. G. O.
- (145) Letter from the camp surgeon, Camp Hancock, Ga., to the Surgeon General, U. S. Army, March 18, 1919. Subject: Report for 1919. On file, Historical Division, S. G. O.
- (146) Letter from Capt. George H. Steele, M. C., to the Surgeon General, U. S. Army, February 4, 1919. Subject: Care of convalescents at Camp Hancock, Ga. On file, Record Room, S. G. O., 704.2-1 (Camp Hancock) D.
- (147) Weekly reports, convalescent center, Camp Hancock, Ga. On file, Record Room, S. G. O., 704.2-1 (Camp Hancock) D.
- (148) Letter from the dental surgeon, Camp Hancock, Ga., to the Surgeon General, U. S. Army November 24, 1917. Subject: Formation of dental units. On file, Record Room, S. G. O., 322.3-3 (Dental units, Camp Hancock) D.
- (149) Telegram from Gaugler, Camp Hancock, Ga., to the Surgeon General, April 24, 1918. On file, Record Room, S. G. O. 703 (Camp Hancock) D.
- (150) Letter from the camp dental surgeon, Camp Hancock, Ga., to the Surgeon General, U. S. Army, June 5, 1918. Subject: Special dental report regarding deficiency of dental surgeons. On file, Record Room, S. G. O., 211 (Dentists, Camp Hancock) D.
- (151) Telegram from Hillman, camp surgeon, Augusta, Ga., to Surgeon General, U. S. Army, October 12, 1918. On file, Record Room, S. G. O., 211 (Dentists, Camp Hancock) D.
- (152) Letter from the camp surgeon, Camp Hancock, Ga., to the Surgeon General of the Army, February 7, 1919. Subject: Medical history of the war. On file, Historical Division, S. G. O., unnumbered.
- (153) Report of special sanitary inspection, Camp Hancock, Augusta, Ga., October 4, 1917, by Col. H. G. Fisher, M. C. On file, Record Room, S. G. O., 721.5-1 (Camp Hancock) D.
- (154) A veterinary history of Auxiliary Remount Depot No. 308, Camp Hancock, Ga., undated and unsigned. On file, Veterinary Division, S. G. O.
- (155) Monthly reports of physical examination made prior to separation from the military service other than by certificate of discharge for disability, Camp Hancock, Ga., for the months of November, 1918, to February, 1919, inclusive. On file, Record Room, S. G. O., 370.01-2 (Camp Hancock) D and 702 (Physical Examination, Camp Hancock) D.
- (156) Letter from the Surgeon General, U. S. Army to the camp surgeon, Camp Hancock, Ga., March 1, 1919. Subject: Approximate date of abandonment of camp. On file, Record Room, S. G. O., 323.7 (Camp Hancock) D.
- (157) 1st ind., W. D., A. G. O., March 27, 1919, to commanding general, Camp Hancock, Ga. On file, Record Room, S. G. O., 322.15 (Camp Hancock) D.
- (158) Annual report of the camp surgeon, Camp Kearny, Calif., for the calendar year 1918. On file, Record Room, S. G. O., 319.1 (Annual Report, Camp Kearny) D.
- (159) Medical history of the 40th Division, prepared for the records of the Surgeon General's Office, U. S. Army, undated and unsigned. On file, Historical Division, S. G. O.
- (160) Letter from Lieut. Col. Robert E. Noble, M. C., to the Surgeon General, U. S. Army, October 5, 1917. Subject: Inspection of Camp Kearny, Calif. On file, Record Room, S. G. O., 333.1-1 (Camp Kearny) D.
- (161) Letter from Maj. M. P. Ravenel, M. R. C., Camp Kearny, Calif., to the Surgeon General, U. S. Army, May 29, 1918. Subject: Correction medical history Camp Kearny, Calif. On file, Historical Division, S. G. O.
- (162) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. 1, 374-385.

- (163) Report of division surgeon, 40th Division, August 25, 1917, to December 31, 1917. On file, Record Room, S. G. O., 319.1 (Annual Report, 40th Division) G.
- (164) Letter from Col. W. F. Lewis, M. C., to the Surgeon General, U. S. Army, October 9, 1918. Subject: Report of sanitary inspection of Camp Kearny, Calif. On file, Record Room, S. G. O., 721 (Camp Kearny) D.
- (165) Letter from Col. W. F. Lewis, M. C., to the Surgeon General, U. S. Army, May 21, 1918. Subject: Sanitary inspection, 40th Division, Camp Kearny, Calif. On file, Record Room, S. G. O., 721 (Camp Kearny) D.
- (166) Letter from Col. W. F. Lewis, M. C., to the Surgeon General, U. S. Army, December 31, 1917. Subject: Special sanitary report of the 40th Division, Camp Kearny, Calif. On file, Record Room, S. G. O., 721-1 (Camp Kearny) D.
- (167) Memorandum from Capt. Kenneth B. Turner, M. R. C., chief medical examiner, Camp Kearny, Calif., to the division surgeon, July 16, 1918. Subject: System used in physical examination of drafted men at Camp Kearny, Calif. On file, Record Room, S. G. O., 327.2 (Examinations, Camp Kearny) D.
- (168) Medical history of the war, Camp Kearny, Calif., July 1 to December 31, 1918, undated and unsigned. On file, Historical Division, S. G. O.
- (169) Letter from the president, board of tuberculosis examiners, Camp Kearny, Calif., to the Surgeon General, November 22, 1917. Subject: Report of tuberculosis board, Camp Kearny. On file, Record Room, S. G. O., 334.1-1 (Tuberculosis Board, Camp Kearny) D.
- (170) 1st ind., from president, board of tuberculosis examiners, Camp Kearny, December 15, 1917, to the Surgeon General, U. S. Army. Subject: Transfer of tuberculosis board. On file, Record Room, S. G. O., 334.1-1 (Tuberculosis Board, Camp Kearny) D.
- (171) Letter from Maj. Walter V. Brem, M. R. C., cardiovascular board, 40th Division, to the Surgeon General, U. S. Army, January 31, 1918. Subject: Report of the cardiovascular board, 40th Division; review of work and recommendations. On file, Record Room, S. G. O., 702-2 (Camp Kearny) D.
- (172) Letter from Contract Surg. R. L. Richards to the Surgeon General, U. S. Army, October 27, 1917. Subject: Report of consultation and advice with the board of nervous and mental diseases. On file, Record Room, S. G. O., 334.7-1 (Camp Kearny) D.
- (173) Correspondence concerning subject of psychological examinations, Camp Kearny. On file, Record Room, S. G. O., 702 (Psychological, Camp Kearny) D.
- (174) Letter from Maj. Edward A. Rieh, M. C., supervising orthopedic surgeon, to the Surgeon General of the Army, August 21, 1918. Subject: Report on orthopedic conditions and service at Camp Kearny. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Kearny) D.
- (175) Letter from the orthopedic surgeon, Camp Kearny, Calif., to the Surgeon General, U. S. Army, March 1, 1918. Subject: Semimonthly report. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Kearny) D.
- (176) Letter from the camp orthopedic surgeon, Camp Kearny, Calif., to the Surgeon General, U. S. Army, September 4, 1918. Subject: Semimonthly report of orthopedic surgeons. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Kearny) D.
- (177) Letter from Lieut. Col. F. W. Weed, M. C., to the Surgeon General of the Army, March 21, 1918. Subject: Special sanitary inspection, Camp Kearny, Calif. On file, Record Room, S. G. O., 721-1 (Camp Kearny) D, Storage 1918.
- (178) Letter from Col. W. F. Lewis, M. C., to the Surgeon General of the Army, August 6, 1918. Subject: Report of sanitary inspection at Camp Kearny. On file, Record Room, S. G. O., 721-1 (Camp Kearny) D.
- (179) 2d Ind., from camp surgeon, Camp Kearny, Calif., August 17, 1918, to the Surgeon General U. S. Army. On file, Record Room, S. G. O., 322.052 (Development Battalions, Camp Kearny) D.
- (180) Letter from Col. W. F. Lewis, M. C., to the Surgeon General, U. S. Army, October 7, 1918. Subject: Inspection development battalion, Camp Kearny, Calif., On file, Record Room, S. G. O., 721-1 (Camp Kearny) D.

- (181) Letter from Maj. Herman C. Adler, M. C., to the Acting Surgeon General, U. S. Army, October 24, 1918. Subject: Confidential report on neuropsychiatric work at Camp Kearny, Calif. On file, Record Room, S. G. O., 702-3 (Camp Kearny) D.
- (182) Letter from Capt. Le Roy Crummer, M. C., to the Surgeon General, U. S. Army, November 27, 1918. Subject: Report on development battalion, Camp Kearny, Calif. On file, Record Room, S. G. O., 322.052 (Development Battalion, Camp Kearny) D.
- (183) Letter from Col. W. F. Lewis, M. C., to the Surgeon General, U. S. Army, December 2, 1918. Subject: Report of sanitary inspection of development battalion, Camp Kearny, Calif. On file, Record Room, S. G. O., 721 (Camp Kearny) D.
- (184) Letter from Col. W. F. Lewis, M. C., to the Surgeon General, U. S. Army, February 25, 1919. Subject: Report of sanitary inspection of Camp Kearny, Calif. On file, Record Room, S. G. O., 721 (Camp Kearny) D.
- (185) Weekly reports of the convalescent center, Camp Kearny, Calif. On file, Record Room, S. G. O., 704.2-1 (Camp Kearny) D.
- (186) 1st Ind., from camp surgeon, Camp Kearny, Calif., June 2, 1919, to the Surgeon General, U. S. Army, to Report of convalescent center, Camp Kearny, Calif., week ending May 31, 1919. On file, Record Room, S. G. O., 704.2-1 (Camp Kearny) D.
- (187) History of dental service at Camp Kearny, Calif., for the period from August 1, 1918, to March 31, 1919, by Lieut. Col. R. E. Ingalls, D. C., camp dental surgeon. On file, Record Room, S. G. O., 703 (Camp Kearny) D.
- (188) Letter from the camp veterinarian, Camp Kearny, Calif., to the Surgeon General, Veterinary Division, December 27, 1918. Subject: Veterinary history of war. On file, Record Room, S. G. O., 314.7-2 (Camp Kearny) D.
- (189) Letter from the division veterinarian, 16th Division, Camp Kearny, Calif., to the Surgeon General, Veterinary Division, February 17, 1919. Subject: Answers to questionnaire, S. G. O., dated December 27, 1918. On file, Record Room, S. G. O. 314.7 (Veterinary, Camp Kearny) D.
- (190) A veterinary history of Auxiliary Remount Depot No. 330, by Maj. Walter R. Piek, U. S. Army, On file, Record Room, S. G. O., 314.7 (Veterinary, Auxiliary Remount Depot No. 330) R.
- (191) Letter from the veterinarian, Auxiliary Remount Depot No. 330, Camp Kearny, Calif., to the director of the Veterinary Corps, Office of the Surgeon General, January 27, 1919. Subject: Veterinary history of war. On file, Record Room, S. G. O., 314.7 (Veterinary, Auxiliary Remount Depot No. 330) R.
- (192) Letter from the division sanitary inspector, 40th Division, Camp Kearny, Calif., to the division surgeon, 40th Division, January 3, 1918. Subject: Sanitary inspection of restaurants, etc. On file, Record Room, S. G. O., 721.9 (Camp Kearny) D.
- (193) Letter from Col. W. F. Lewis, M. C., to the Surgeon General, U. S. Army, November 27, 1918. Subject: Report of sanitary inspection of Camp Kearny, Calif. On file, Record Room, S. G. O., 721 (Camp Kearny) D.
- (194) Report of medical activities, calendar year 1919, Camp Kearny, Calif., by Lieut. Col. G. H. McClellan, M. C., camp surgeon. On file, Record Room, S. G. O., 319.1-2 (Camp Kearny) D.

CHAPTER V
NATIONAL GUARD CAMPS (CONTINUED)

CAMP LOGAN, TEX.

A location one-half mile west of the corporate limits of Houston, Tex., was chosen for Camp Logan.¹ The mixture of black loam and clay composing the soil of this level plain was almost impervious to water and gave rise to deep mud in rainy weather and excessive amounts of dust in dry weather. Ditches, of a maximum depth of 7 feet, were required to provide surface drainage into the Buffalo Bayou lying close by on the south.² The average annual rainfall was over 46 inches. The drainage situation in the camp at the end of the year 1917 was considered to have been much improved over earlier conditions, as all storm water was then carried off within 24 hours.¹ The temperature ranged from 21° to 102° F. above zero during the year 1917. The roads through the camp were gradually metaled until all main roads were hard surfaced by the spring of 1918.³

The camp was officially organized September 1, 1917,⁴ and the first of the Illinois National Guard troops constituting the 33d Division arrived September 10.¹ The last of the more than 20,000 men in the division arrived October 15.⁵ The 5th Division was organized about December 1, 1917, from Regular Army units,⁶ with headquarters, the Artillery brigade, and the divisional trains, at Camp Logan,⁷ and the Infantry brigades at other camps.⁴ There were about 33,000 men in camp in December.⁵ The two divisions left for overseas service about May, 1918,⁶ and the first units for the 15th Division arrived July 3, 1918,⁸ although the division technically was not organized until August 28.⁹ The total strength of the camp was much reduced during the remainder of the year, although over 17,000 men were present in November.⁵

The water supply of the city of Houston was obtained from 34 artesian wells. The city furnished the main water supply for Camp Logan from one deep well, with an accessory connection with the city water mains.¹⁰ A second well was later sunk to a depth of 1,425 feet for camp use, and was connected with the camp mains in December, 1918.¹¹ Storage was provided by a covered earthen reservoir and two uncovered wooden tanks.¹⁰ The tanks were covered in the summer of 1918. An additional wooden main was laid in November, 1918.¹¹ A heavy rainfall while these pipes were lying in the trench uncovered, filled the trenches with water and floated the pipes, resulting in breaks in the line and the ingress of mud and surface water. This accident, other new installations, and defects in the coverings of storage spaces, were held to account for the occasional appearance of colon bacilli in the water. A chlorination apparatus was installed at the inlet of the storage reservoir, but the water pumped directly from the wells into the mains was not treated.

As in other tent camps, pit latrines were provided for the disposal of excreta. These were covered with fly-proof latrine boxes, and their interiors were sprayed

with lampblack and crude oil to prevent fly breeding.² Since there was sufficient available space for only one change of location of latrines in February, 1918, their liquid contents were removed by means of odorless excavators and the solid contents incinerated with the aid of crude oil.¹² The continued use of latrines by this method was not satisfactory, but was the only solution of the problem at that time.³

A sewerage system with septic tank and filtration bed was completed for the base hospital early in the spring of 1918, the effluent being discharged into a ditch leading into Buffalo Bayou.^{12 13} Construction of a sewerage system for the part of the camp occupied by the division was started in June, 1918, and completed in October.^{8 14} The sewage was emptied into the city system.¹⁵ As the bathhouses were not connected with the sewerage system, inevitably there resulted foul and unsightly deposits along the drainage ditches.¹⁵

Garbage that was suitable for hog feed was disposed of by contract, but that which was not suitable for hog feed was taken to the dump and burned with the camp rubbish and manure.^{1 15} By the change in September, 1918, which placed the disposal of general waste material under the reclamation service, this service delivered the garbage to the contractor at the hog farm 3 miles distant.¹⁶ The garbage was separated in the kitchens.

Until late in 1918, manure was disposed of both by burning it on a dump and by hauling it to distant farms.¹ Late in 1918 manure was either given to anyone who would come for it or place a car on the siding, or it was hauled to the dump, as all attempts to sell it had failed.¹⁷

The sanitary train of the 33d Division was organized before the middle of October, 1918, but was only about 67 per cent equipped late in November.^{2 18} There were 128 officers and 1,186 men in the train at the end of the year, and 24 officers and 62 enlisted men of the Medical Department in the camp with units not part of the division.¹

The enlisted men in the division surgeon's office were detailed to duty there from Medical Department organizations or detachments of the division.¹⁹ They comprised 2 noncommissioned officers, 2 privates first class, and 4 privates. As in other camps, this system of providing for personnel of the division surgeon's office was a cause of dissatisfaction not only among the men so detailed but also in the organizations from which they came.¹⁹ In the case of the noncommissioned officers, when they were transferred from an organization, vacancies in the noncommissioned grade there were created. Since there was no authority for filling these vacancies, the organization concerned suffered the loss. As regards the privates, there was little or no opportunity for their advancement in the division surgeon's office, consequently they became dissatisfied and applied for transfer to other branches of the service at about the time when they had become sufficiently trained to be of real use to the division surgeon. In addition to these faults of the system, the need for the men was felt in the organizations from which they had been transferred.

The separate office of camp surgeon was created in June, 1918, with 4 officers and 7 enlisted men assigned for duty, 1 of whom was a master hospital sergeant.²⁰

There were on duty in the camp, exclusive of the base hospital, when the 15th Division was organized, 44 medical officers, 7 dental officers, 6 veterinary

officers, 2 officers of the Sanitary Corps and 87 enlisted men.²¹ Seventy-nine medical officers were assigned from civil life about two weeks later, and 334 recruits were received for the Medical Department in September. This great preponderance of entirely untrained individuals necessitated the devotion of the greater part of the time for the ensuing few months to their instruction in basic principles.⁹ Enlisted men from the medical detachments of the two Infantry regiments which had been in camp since July were used to form nuclei for the medical detachments of the newly formed regiments, the vacancies in both classes of organizations then being filled with recruits. The initial personnel of the sanitary train of the 15th Division consisted of 175 enlisted men who arrived from the Medical Department training camp at Fort Riley, Kans., on September 5.⁹ Two hundred and fifty-five recruits were added before December.⁹

Though the sanitary squads of the 15th Division consisted of enlisted men of the Medical Department,²² the camp sanitary squads had 35 civilian laborers in September, 1918, working under the camp sanitary inspector, divided as follows: 14 to oil ditches, 6 with odorless excavators, 5 filling old latrine pits in unoccupied areas, 8 at the dump, 1 at camp headquarters, and 1 not assigned.¹⁷ A permanent detail of 50 men from the labor battalion was used instead of civilians in December.²²

The original plans of the camp called for 14 regimental infirmaries, but this number was reduced to 9 in the construction, each infirmary to care for 2 regiments.²³ The number in the camp had been increased to 11 regimental and 4 battalion infirmaries, of 24 beds each, by June, 1918.⁴

Measles was of little consequence in Camp Logan until December, 1917, when 195 cases were reported.⁵ The incidence after February, 1918, was so small that it was negligible. German measles was differentiated from true measles from the beginning, but never occurred in sufficient numbers to cause any concern.

Influenza occurred at Camp Logan in the early fall of 1917, and steadily increased to 184 cases in January, 1918.⁵ There was then a slight drop in its incidence, but a sharp rise to 2,724 cases occurred in April, with 274 cases in May. Comparatively few cases were reported during the summer. The fall epidemic of 1918 began September 10, with nine cases, reached its highest point September 23, and gradually declined through October.⁸ For the 2 months, 3,091 cases were reported and nearly 150 in each of the 2 following months.⁵ These figures probably do not include a large part of 1,098 cases which were treated in quarters and did not appear on the base hospital records.⁸ The mortality was very low, only 84 deaths being reported from influenza and its complications.⁵

Pneumonia was not as common in Camp Logan in the fall of 1917 as in many other camps, and the death rate was low.⁵ Nearly all cases were of the lobar type. Few cases complicated influenza or measles, and those associated with the latter disease were mainly of the bronchopneumonic variety. There were few cases during the summer of 1918. The fall increase of 1918 was confined to the months of September and October, with the greater occurrence of 309 cases in September. Of these, 251 were associated with influenza and only 24 were reported as being of the bronchopneumonic type. The 79 deaths in

September and the 26 in October constituted a large majority of all pneumonic deaths for the entire camp period.

The first case of cerebrospinal meningitis occurred in November, 1917, and one or more cases occurred monthly until June, 1918.⁵ No cases arose during the summer of 1918, and only four in the fall. There was a total of 17 cases during 1917 and 1918. Four cases died during the winter of 1917-18 and three in the fall of 1918.

Malaria was prevalent to an unusual degree, the majority of the cases having been contracted prior to arrival in the camp, some cases by the 33d Division troops in Illinois²⁴ and those of the 15th Division in Louisiana and Texas.²⁵ There are discrepancies in statistical reports concerning the camp, but the division surgeon of the 33d Division reported 100 cases as having arisen in 1917,¹ and 85 were reported in 1918.⁵ Of 39 cases in camp during July and August, 1918, 34 were definitely contracted elsewhere, and the remaining 4 occurred in organizations which had recently arrived from other stations.²⁵ Blood examinations for detection of carriers were made of all men in the companies which had recently arrived from stations in Louisiana and Texas. The type found was principally tertian.⁸

The tuberculosis board started its work in September, 1917, usually conducting the examinations in the regimental dispensaries.⁴ An examination of all cases of measles before discharge from the base hospital later became a part of the board's duties.¹²

The psychiatric examiners at first worked in conjunction with the tuberculosis board in a routine examination of the 33d Division.²⁶ This system was discontinued when about one-third of the troops had been examined, because the psychiatrists could not keep pace with the other examiners. Thereafter this board examined only such men as were referred by the regimental surgeons.

The division orthopedic surgeon supervised two foot surveys of the troops early in 1918, one to obtain measurements of the feet of 5,000 men and the other to ascertain existing foot disabilities in the Infantry regiments.^{27 28} The latter showed that approximately 10 per cent had flat or pronated feet, but that only 374 of these 1,171 cases were giving trouble, and that ill-fitting shoes aggravated existing conditions but were not in themselves the primary cause of foot disabilities.^{28 29} An effective system of foot and shoe inspections was used which secured the cooperation of the organization officers.³⁰ The organization furnished a roster on which the names were given serial numbers. In reporting the results of an inspection, the various conditions were grouped and all men falling in each group were so reported by their serial numbers. The report gave brief information as to the general disposition proposed for certain groups, and the organization commander received a copy. Approximately 1,500 men of the 33d Division were discharged from the service on account of flat feet.³

A detention camp was in existence in April, 1918,³ and a casual detachment, commanded by a line officer, in June, 1918.⁴ Men with correctable orthopedic conditions were sent to the latter. The detention camp was not in existence in September, 1918, but there was at that time a quarantine camp of eight

sections, surrounded by a double-wire fence, and with a capacity of 1,200.²² The quarantine camp was closed February 24, 1919, owing to the small number of troops in camp.³¹ Three hundred and eighty-six contacts were sent to the quarantine camp prior to January 1, 1919, and only 14 of these developed a communicable disease during the detention period.⁸

A development battalion was organized August 26, 1918, with two medical officers assigned.³² The enlisted personnel was obtained by detailing members of the battalion for temporary duty. An orthopedic company in the battalion was formed a week or two later.³³ There were 5 medical officers on duty the middle of October and 3 enlisted men of the Medical Department.³⁴ Four additional enlisted members of the battalion were detailed for duty in the battalion infirmary. There were 370 men in the battalion. A venereal company was formed at about this time,³⁵ and two additional battalions shortly afterwards,³⁶ one of which was for venereal cases exclusively. In addition, two companies of another battalion were reserved for syphilitics.³⁶ All men of the battalions classified A were given full military drill under line officers, as were those in class B, but the latter were released when required for medical treatment. The training of men with cardiovascular and orthopedic conditions was under the supervision of appropriate specialists.³⁶ No men in the battalions were allowed to be used for work which would interfere with the fundamental purpose of the development battalions. The strength of the three battalions early in November, 1918, was 36 officers and 3,334 enlisted men, about three-fourths of these having arrived as development battalions from Camp Grant, Ill. The numbers of men in the different classifications were approximately as follows: Venereal, 1,100; orthopedic, 450; cardiovascular, 300; neuropsychopathic, 450; eye, ear, nose, and throat, 250; pulmonary, 200; postoperative, 100; convalescent, 100; non-English speaking, 300; others, 100.

The convalescent center was organized on December 20, 1918, in a section of the quarantine camp,³⁷ but was later removed and occupied a dental infirmary building and adjacent tentage.³⁸ This center never held more than approximately 90 men, was not active or efficient,³⁹ and was closed late in February, 1919.³⁸

The supervision of sanitation in the extra-cantonment zone was a divided responsibility.⁴⁰ Inspectors from the United States Public Health Service, the Texas Department of Food and Drug Inspectors, and the 33d Division all worked in the area outside of the city limits of Houston. In the city of Houston, however, the city health officer reported to the division surgeon any places, for the sale of food and drinks, which were found to be insanitary, and a military guard was placed at such places until conditions became satisfactory. Establishments which were satisfactory were later given a certificate to that effect, and food handlers were vaccinated and examined for disease carriers.³²

Thirty-five dental officers were in camp the middle of October, 1917, and two had been assigned to duty with each regiment in order to use the available dental equipment to the best advantage.⁴¹ Thirty-one dental officers were serving with the divisional troops in December and eight at the base hospital.⁴² Most of them had office space in the regimental infirmaries, but some worked

in tents. All regimental dental offices had at least two portable dental equipments by October, 1917, and a complete base outfit for the base hospital arrived in the early part of 1918 to replace the three portable outfits then in use.⁴³ Two dental infirmary buildings were completed and base dental outfits to install in them arrived in June, 1918, and two base outfits were added to the base hospital equipment. The instrument chests of portable outfits were drawn upon to replace a shortage in the base outfits received. Twenty-six enlisted dental graduates reported in August and September to act as dental assistants. These men were given a course of instruction similar to that given to the dental officers. A dental society was maintained throughout the camp period. An instance of dental specialization here was the assignment of a dental officer to exclusive work with genitourinary patients, particularly syphilitics.

There is no record to indicate that meat and meat products purchased from local dealers were inspected prior to July 1, 1918.⁴⁴ After this date they were presented at the office of the meat and dairy inspector before delivery. The local products were not handled, in general, in a satisfactory manner, many loads being rejected on account of unclean trucks, clothing of men, and tarpaulin coverings. One local branch of a widely known packing house was particularly negligent. Canned milk was used almost exclusively in the early period of the camp.²¹ The dairies in the neighborhood were reported as "very good" and only Pasteurized milk was sold in the regimental exchanges, from one company.¹ The inspection of dairies supplying milk to establishments in the city was prevented by the lack of transportation until January, 1919.⁴⁴ The meat and dairy inspector inspected all food supplies received by the camp quartermaster after about June 1, 1918, and this officer cooperated in every way.

The drainage of the corrals of the auxiliary remount depot was not good, the inclosures remaining very muddy for days after a heavy rainfall.⁴⁵ Each corral had a shed, closed on the northwest side. The manure was at first raked into windrows by hand preparatory to removal, but later road graders were used to great advantage. Sheds of the open-frame type constituted the veterinary hospital. The wards were divided to receive four classes of cases—influenza, strangles and purpura, pneumonia, and surgical conditions. No enlisted personnel of the Veterinary Corps was assigned to the hospital during 1917, an insufficient number of men from the Quartermaster Corps detachment of the depot being assigned for veterinary hospital duty. When men were transferred to this service in January, 1918, partially disabled men were selected. Eventually the full quota of 75 men was acquired. Dermatitis gangrenosa caused more admissions to the hospital than any other condition during the period for which records are available.⁴⁶ No case of glanders occurred. The depot was closed March 15, 1919.⁴⁷

The demobilization period in Camp Logan extended from December 1, 1918, to March 15, 1918.⁴⁸ During this time 14,867 officers and enlisted men were examined, of whom 78 were found to have had disabilities. Camp Logan was transferred to the United States Public Health Service on March 12, 1919.⁴⁹

CAMP MacARTHUR, TEX.

Camp MacArthur was built on the outskirts of Waco, Tex., a mercantile city of about 40,000 inhabitants.⁵⁰ The rolling country provided excellent drainage into the Basque River on the north and the Brazos River on the south. The soil was waxy loam which overlaid limestone to a depth of 1 to 3 feet, and which formed an extremely tenacious mud and much dust. The temperature for the year varied from 5° F. below zero to 109° F., but the prevailing and constant southerly wind made the heat of summer bearable with slight discomfort. Two asphalt roads entered the camp, and the main roads inside the camp were covered with macadam.

One company of each regiment which was to form a part of the 32d Division was sent to Camp MacArthur about the middle of August, 1917.⁵¹ These organizations were from the National Guard forces of Michigan and Wisconsin, and all were in the camp by the last of the month. The period in which the camp contained the greatest number of men was October, 1917, with about 28,000.⁵² The last elements of the division left for overseas service early in February, 1918.⁵³ A part of the 7th Division, Regular Army, was in the camp before all organizations of the 32d Division had left,⁵³ but the divisional organization was not made until May, 1918.⁵⁴ All units of the division were not mobilized at Camp MacArthur, and several organizations left the camp in May.⁵⁵ The last organization of the 7th Division departed August 1, 1918, and the camp became an Infantry replacement and training camp.⁵⁶

Waco furnished Camp MacArthur with water from its city system, the supply sources being both artesian wells and the Brazos River.⁵⁷ The wells furnished excellent water at a temperature as high as 107° F., but the river water required coagulation, filtration, and chlorination. The Brazos River drained an agricultural region, was frequently muddy and received the sewage of several small towns. There was presumptive evidence of the presence of the colon bacilli in the water in December, 1917. The original water mains in the camp were of iron. Wooden mains were added to the camp water supply system in the fall of 1918. These lay on the ground for some time, were dragged along the ground scooping up dirt, and eventually lay in the trenches for a period before being connected to the existing system. Soon after the water was turned through these pipes, typhoid fever appeared in the camp. Colon bacilli were present in the water, apparently due to contamination of the wooden pipes with surface dirt, and disappeared about a week after these pipes were cut off from use.

Prior to the time when a sewerage system was installed at Camp MacArthur, waste water from the bathhouses was discharged into about 10 ditches which drained eventually into the Brazos River.⁵⁸ The effluent was therefore chlorinated. Guthrie incinerators, with evaporating pans, were provided for the kitchens.⁵³ Pit latrines also were used during this period, for the disposal of excreta. The pits were sometimes too shallow, owing to the superficial depth of the underlying limestone stratum.⁵⁹ They were burned out to prevent fly breeding, but this was not accomplished,⁶⁰ and they were spoken of as being "in a bad state" in December, 1917.⁵⁸ The liquids from old pits seeped into the new ones, so a smaller pit was dug near the latrine pit into which the liquid

seeped, and was removed by the odorless excavators.⁵³ When a new latrine pit became necessary, the old pit was filled, the seepage pit enlarged to become a latrine pit, and a new seepage pit dug. The latrine pits were being treated with the oil and lampblack mixture in January, 1918, apparently only to cover the deposits, and were still being burned out instead of sprayed in April.⁶¹ Both the care of the latrines and the system of disposal of the liquid were unsatisfactory.⁶²

A sewerage system for the base hospital was included in its original construction,⁶³ and one for the camp was begun before the summer of 1918.⁵⁰ The camp system was completed in the fall of 1918,⁶⁴ the two main outlet sewers connecting with the city system.⁶⁶ All kitchen lines were provided with grease traps, the grease collected being sold and the sludge buried in deep trenches.

The garbage was sold to a contractor, the Army delivering the cans at the feeding pens, in November, 1917.⁶⁰ The requirements for garbage removal were quite radically changed by the summer of 1918.⁵⁰ The contractor then kept 1,000 garbage cans on hand, replacing a full can by one which had been sterilized by hot water, then scrubbed with a brush in a vat of warm water containing borax and lye, and finally dried in the sun.

The manure from the camp was dumped into a ravine half a mile to leeward of the main part of the camp. This was satisfactory during the cool weather,⁶⁰ but the system of disposal of manure proved to be very unsatisfactory with the advent of warm weather in 1918.⁶² The dump was within 150 yards of the camp bakery, garbage scraps had been included with the manure, and fly breeding occurred on an extensive scale. As much of the great collection as possible was oiled and burned.

Measles appeared in Camp MacArthur in October, 1917, and became epidemic in the next month.⁵² There were 1,234 cases during November, December, and January. A few cases arose each month throughout the remainder of the year 1918, with a maximum of 132 in November. In only a small number of cases was German measles differentiated.

The diagnosis of influenza was made in a number of cases prior to September 1, 1918, the highest monthly incidence being 198 in January, 1918.⁵² The first case of the epidemic type occurred September, 23, 1918.⁶⁵ The daily incidence thereafter slowly increased until September 30, when there was a sudden rise to 262. The epidemic continued for less than one month, with more than 2,800 cases admitted to the base hospital and 3,857 of the milder cases treated in improvised field hospitals.⁶⁶ Approximately 30 per cent of the command contracted the disease and 11 per cent of the cases were complicated by pneumonia. Certain restrictions on the movements of individuals, and later, absolute quarantine of the camp, were recommended by the camp surgeon but not approved by the camp commander.

Pneumonia was prevalent in the fall of 1917 and the following winter, the great majority of the cases being of the primary lobar type.⁵² The 152 cases occurring in January were by far the highest monthly incidence during this period, but an unusual number continued to arise throughout the spring and summer of 1918, with a total occurrence of 488 cases prior to September 1. Seventy-six of these died, the higher rate, nearly 50 per cent, occurring in those

of the bronchopneumonia type. Bronchopneumonia predominated in the fall of 1918, both in the primary cases and in those secondary to influenza and measles. Nearly four-fifths of the 773 cases of pneumonia were of the bronchopneumonia type. There were 184 deaths.

Nine cases of cerebrospinal meningitis occurred in January, 1918 and a number of others in succeeding months, with a total of 23 for the year.⁵² The unusually low mortality of two is recorded.

Thirty cases of typhoid fever occurred in the fall of 1917,⁵² 14 of which occurred in one Infantry company, and were traced directly to a healthy carrier.⁶⁷ No deaths were reported.⁵²

The civilians engaged in the construction of the camp were suffering from an epidemic of intestinal trouble when the troops arrived.⁵¹ The troops became infected promptly, and a large proportion of them became involved during the succeeding six weeks. The symptoms were those of bacillary dysentery, but the results of laboratory examinations are not available.⁵⁹

A survey of 3,000 men in the casual camp after the departure of the 7th Division revealed 312 cases of tuberculosis.⁶⁸ All officers and enlisted men in the camp at this time, 26,589, were examined for nervous and mental diseases.⁶⁹ One hundred and nine men were recommended for discharge and 129 for domestic duty on account of these latter conditions.

The tuberculosis board referred to the cardiovascular board 1,274 men of the 27,000 examined in the 33d Division.⁷⁰ Of these, 166 were recommended for discharge and 67 for limited service. Hyperthyroidism was the cause of the recommendation for discharge in 96 cases, and an enlargement of the thyroid was found in three-fourths of all cases referred to the board. While very few of the men with organic heart disease broke down under the training, almost all of the hyperthyroid cases became progressively worse. Operation was not recommended for thyroid cases except for those with simple enlargement which caused pressure symptoms.

Two main classes of foot defects were found by orthopedic examiners in the early period of the camp—cases which had caused more or less trouble prior to enlistment, and acute strains.⁷¹ The latter were considered to have been due largely to a too-rapid introduction of strenuous work in the training schedule. Early in 1918, a survey of the feet of all troops in the camp and a record of defects found were made.⁷² Treatment facilities at the time included an orthopedic dispensary at the base hospital and another in the camp. An orthopedic training detachment, under line officers but supervised by orthopedic surgeons, was established about the middle of June, 1918.⁷³ The members of this detachment were assigned to sections according to their ability to perform foot work, and were not allowed to leave their own area.⁷⁴ Four hundred and twenty-two men were admitted during the first month,⁷⁵ and 720 by August 31, with 381 remaining on the latter date.⁷⁶ Of those remaining, 58 were to be returned to full duty, 188 to continue treatment, and 135 were to be recommended for discharge from the service. The orthopedic training detachment became a part of the development battalion before October 1, 1918.⁷⁷ There were 1,000 men with orthopedic conditions in the development battalion on that date.

In addition to a detention camp, with a capacity of 1,500 men, to which casual troops were sent,⁵⁶ there were two quarantine camps each of which was divided into two sections, surrounded by wire fences.⁶⁶

The development battalion was organized August 1, 1918.⁵⁵ In October it consisted of headquarters and 20 companies in 5 battalions, with 23 officers and 71 enlisted men of the Medical Department on duty.⁷⁸ Men were assigned for duty in the battalions according to their classifications as fit for full duty, fit for domestic service, to be discharged, orthopedic cases, and venereal cases, a battalion being reserved for each class. There were 4,261 men in the battalions, 482 being fit for full duty, 1,276 fit for domestic duty, 803 to be discharged, 824 orthopedic cases and 876 venereals. Three infirmaries served these battalions—one general, one orthopedic, and one genitourinary.⁵⁵ The strength of the development battalion had been reduced to 244 in January, 1919.⁷⁹

The convalescent center was organized January 9, 1919, as a battalion formation with four companies.⁸⁰ Nineteen line officers and 67 enlisted men formed the training cadre. The camp athletic officer was given charge of the physical training, under the direction of the camp surgeon. Two days later, an order was received to abandon the camp.⁷⁹ The 108 men in the convalescent center were discharged or transferred to convalescent centers in other camps.

The authorities of the city of Waco and the local military authorities entered into an agreement early in October, 1917, which was intended to insure an effective organization and cooperation on the part of city, State, military, and Federal health authorities.⁸¹ An officer of the United States Public Health Service was assigned to duty in Waco in the fall of 1917 and proceeded to perfect a board of health organization, with the cooperation of the city and military authorities.⁶⁰ A military guard was placed at places near the camp where food and drinks were sold and which were found to be insanitary. Some restaurants in Waco were treated likewise, with excellent results. The booths near the camp were closed for a period, but allowed to reopen under military supervision in October, 1918.⁶⁶

There were 39 dental officers in the camp in December, 1917, with officers in the base hospital and in regimental infirmaries.⁸² When the 32d Division left the camp, most of the dental officers, all of the portable dental outfits, and all of the instruments went with them.⁵³ One officer who remained had some instruments of his own with which all the dental work of the camp and base hospital was done for some time. In June, 1918, there were 2 dental officers at the base hospital and 22 divided between the 2 dental dispensaries; there were 31 enlisted dental assistants at that time.⁸³ There were 36 dental officers and 36 assistants a month later.⁵⁹ One dental dispensary had 13 chairs and the other 14, and both were well equipped. One infirmary was closed December 18, 1918.⁵⁵

Refrigeration facilities not being available, the deliveries of meat to organizations were made directly from the refrigerator car.⁸⁴ A representative of the Bureau of Animal Industry conducted the meat inspection of supplies received by the quartermaster during the greater part of the period of camp activities and returned to the contractor for salvage such meat as was not accepted. After the discontinuance of this Federal inspection, the camp commander per-

mitted sales in the camp only by those dealers who agreed that any meat condemned by the inspector should be destroyed under his supervision. Local dealers supplying organizations were instructed to present their wares at a designated point in the camp for inspection before delivery, but this was not done in many cases. In order to furnish a method of checking this matter, the dealer was required to furnish duplicate sales slips of all sales made to the camp, and the organizations to furnish weekly reports of all local purchases. This method was not entirely satisfactory either, as both dealer and purchaser were often remiss in their returns. The main efforts in disease prevention among animals in camp concerned the insurance of a forage supply of high grade, good stable conditions, and the control of animals entering the camp.⁸⁵ The latter was particularly necessary, as cases of clinical glanders were not uncommon in the surrounding country and public watering-troughs were the rule. Efforts to obtain action by the State veterinary authorities in one instance of a known reactor to the mallein test were unsuccessful.

The remount depot was located on rolling wooded ground, and the scattered trees were left standing, where practicable, in the construction.⁸⁶ The veterinary hospital consisted mainly of three double-fenced corrals, with a ward building in the center of each. The removal of manure from the corrals of the depot was accomplished once weekly. In dry weather, this was easily done with the assistance of a road grader, but additional labor from a labor battalion was necessary following rains. The most serious diseases encountered among the remount animals were influenza and glanders. The former caused about 200 deaths during the winter of 1917-18. The glanders infection covered the period of January 30, 1918, to January 17, 1919, and resulted in the destruction of 48 animals.⁸⁷ The entire depot was quarantined for a period, as a saddle horse which had been ridden into all corrals was found to be a reactor.⁸⁶ Dermatitis gangrenosa did not appear until November, 1918.⁸⁷ In the following five and one-half months 117 animals were afflicted, resulting in 34 deaths.

Eleven thousand and ninety-eight officers and men were examined physically during the main demobilization period of December, 1918, and January and February, 1919.⁸⁸ Of these, 306 were found to have had disabilities. The camp was officially closed February 28, 1919,⁸⁹ although about 1,300 men remained to complete the process and care for property, etc.⁹⁰ The wrecking of buildings was done mainly with civilian labor.⁹⁰ The remount infirmary was used as a camp hospital to care for the military force engaged in this work.

CAMP McCLELLAN, ALA.

Camp McClellan was situated 6 miles north of Anniston, Ala., and an equal distance from Jacksonville, Ala., in a sparsely settled, rolling section of the foothills of Blue Mountain.^{91 92} The site was so divided by small streams that one of these flowed across the rear of nearly every organization area, providing excellent natural drainage; however, several low areas required artificial drainage.⁹² The soil was clay, contained some gravel, and formed much mud in rainy weather and much dust in dry weather. Extremely hot days occurred during the summer, but the nights were relatively cool. The temperature during the winter occasionally dropped to the freezing point, or below.

The 29th Division, National Guard, was organized here. It was composed of National Guard troops from New Jersey, Maryland, Delaware, Virginia, and the District of Columbia.⁹³ Two thousand six hundred troops were in camp before September 1, 1917, and further increments increased the strength of the division to 27,000 in November. The division left camp in June, 1918, for overseas service.⁹³ The 6th Division was organized at Camp McClellan in November, 1917, from units of the Regular Army, and left the camp about June and July, 1918, for overseas service.⁹⁴ The camp became principally a Field Artillery school of fire after the departure of the two divisions.⁹⁵ The 98th Division was being organized when the armistice was signed.⁹⁶ The maximum strength of the camp was approximately 29,000 in October, 1918.⁹³

A local spring furnished water to the camp prior to about August 31, 1917, when connection with the city water-supply system of Anniston was made.⁹¹ The water used from the spring was chlorinated. The permanent supply was derived from springs 7 miles distant.⁹⁷ An area of about 1 acre had been cleared, dammed, and protected from surface drainage to form a sparkling pool of about a 4-foot depth which supplied between 20,000,000 and 30,000,000 gallons per day. This supply was at first reported to be entirely free from any contamination,⁹⁸ but later reports showed high bacterial counts and the presence of gas-producing bacteria, and chlorination was considered advisable.⁹⁹ An earthen storage reservoir of 750,000 gallons capacity was located on a hillside on the edge of the camp. This was surrounded by a wire fence, and one sentinel was constantly on duty there.⁹⁷

Until the completion of the camp sewerage system in 1918, waste water from the bathhouses was removed by surface drainage. Rock incinerators were first used for the disposal of the liquid kitchen wastes, but these were soon displaced by Guthrie incinerators.⁹² The remodeling of these so that they would burn coal instead of wood doubled their efficiency. During this period the use of pit latrines necessitated a great deal of work, for because of the level of the subsoil water there was considerable seepage into the latrine pit.⁹² This seepage was so great in one regimental area that recourse was had to dry-earth closets.¹⁰⁰ Unused latrines would sometimes fill with water, and the use of excavating tanks improvised from road sprinklers was constantly necessary.⁹² Because the discharge of this waste into the stream was objected to by the State health officer, five large crematories were constructed each of which disposed of four or five thousand gallons of liquid from the latrines daily. These crematories were enlarged models of the rock-pit incinerators first used at the kitchens.¹⁰¹ Subsequent investigation disclosed that the apparent efficiency of these crematories was due to wholesale seepage through a sandy stratum into a creek, so seepage pits were dug in the same area, which answered the purpose equally well.¹⁰² Two types of box seats were used for the latrines, both of which were unsatisfactory: The Havard boxes had been constructed with square and octagonal holes; the wooden seats of the metal type warped and cracked, the hinges broke, the metal lids became bent out of shape, and the seats were very wet in winter, owing to the collection of water of condensation.⁹² The latter objection was obviated by the use of a vent pipe extending from the box or pit through the roof of the latrine shelter.⁹² A sewerage system for the base hospital was under

construction before the end of the year 1917,⁹² and was completed about April 1, 1918.¹⁰⁰ A camp system was practically complete by the end of the year 1918.¹⁰³ The effluent from the filter beds of the camp sewerage system was discharged into a creek.⁹⁷ The discharge of raw sewage during the summer of 1918, prior to the completion of the disposal plant, resulted in numerous complaints due to the fouling of the stream.⁹⁷

The kitchen incinerators at first were used for the destruction of garbage,⁹⁹ but disposition by contract was arranged for about October 1, 1917.⁹⁸ This contract remained in force for several months, and upon its discontinuance the kitchen incinerators were again used for the disposal of garbage.¹⁰¹ A contract was again in force in September, 1918, under which the quartermaster hauled the garbage to the contractor's pig farm,¹⁰⁴ each organization being responsible for the cleaning of its cans after return.¹⁰⁵ Such classes of the garbage as were not taken by the contractor were destroyed in the kitchen incinerators.¹⁰³ However, since these were ordered dismantled in December, the garbage formerly destroyed in them was then hauled to the rubbish dump.¹⁰³ Attempts to burn this material by improvised means pending the completion of a special incinerator were unsuccessful and resulted in a very undesirable accumulation.¹⁰³

Manure was burned at first in an incinerator constructed of steel rails, but later that from the camp proper was loaded into cars on the railroad, and that from the auxiliary remount depot was removed by wagons to a point about 1 mile distant.^{91 92} In the summer of 1918 it was spread by a contractor on fields 2 miles distant.⁹⁵

The sanitary squads of the 29th Division were organized December 5, 1917, each consisting of 1 commissioned officer, 4 noncommissioned officers, 2 chauffeurs, and 20 privates first class and privates.¹⁰² The squads were attached to the division sanitary train, but functioned under the divisional sanitary inspector as supervisors of the execution of various sanitary operations about the camp. Men were stationed at the manure-loading track and the dumps, and supervised the pumping out of latrines and certain antimosquito work. Sixty civilian laborers were employed as a camp sanitary detachment after the departure of the divisions.⁹⁵

The measles situation was never serious in Camp McClellan, although there were two small epidemics, one in the winter of 1917-18 and the other in the fall of 1918.⁹³ Eight of the 363 cases in the first epidemic were complicated by pneumonia and 16 of the 312 cases in the second epidemic were likewise complicated. The preventive measures adopted in 1917 consisted in quarantining the tent group in which a case arose.¹⁰¹ If six or more tent groups in a company were involved, the company was removed to the quarantine camp. If the majority of the companies in a regiment were involved, the entire regiment was quarantined on its own area, and the companies were each quarantined against the others.

Influenza cases frequently were reported here prior to July, 1918, and there was a sharp outbreak of 1,229 cases in April.⁹³ The fall epidemic of 1918 started September 20, the early cases occurring in widely separated organizations.⁹⁶ Epidemic proportions prevailed only from October 3 to October 31,

during which time there were 4,212 cases. To care for the cases during the epidemic, in addition to the base hospital facilities, five buildings of the camp welfare organizations were converted into temporary wards for mild cases, and a tent convalescent camp was established near the base hospital. Among other measures adopted in an attempt to prevent the spread of the disease were the wearing of face masks by every member of the command, the quarantining of the camp, and the oiling of all roads.

The monthly occurrence of pneumonia during the fall of 1917 and the following winter was constant, though never very alarming, varying from 10 to 24 cases.⁹³ The great majority of cases were of the lobar type. There were occasional cases during May, June, and July, 1918, with an increase in August. In the fall increase of 1918 the lobar type maintained its predominance in the primary cases until December, but the bronchopneumonias were in the majority among the secondary cases in both November and December. Three of the 16 cases complicating measles during this four months' period were of the lobar type, and these three occurred in September. There were 23 deaths during the first period and 267 during the second.

Cerebrospinal meningitis first appeared in October, 1917, and new cases arose each month until the close of 1918, with two exceptions.⁹³ There was a total occurrence of 30 cases, with 7 deaths. Thus, though this disease was present in the camp over a prolonged period of time, it was not the cause of the great degree of apprehension experienced in some of the other camps such as Camp Jackson, S. C., and Camp Funston, Kans.

Malaria was unusually prevalent during the year 1918, particularly among colored troops during their early period in the camp.¹⁰⁶ Of 72 cases reported, in 59 the disease was contracted while the individuals were at Camp McClellan.

A quarantine camp was established here in the fall of 1917. Though its normal capacity was 1,500 men, 2,300 were present in it in January, 1918. A section was used as a detention camp for men returning from furlough and for groups of men newly arrived at the camp. There was neither a quarantine nor a detention camp in operation in July, 1919, tent groups being quarantined in the organization areas as required,⁹⁵ and none was established during the remainder of the year, with no untoward results.¹⁰⁷

A development battalion was organized in the late spring of 1918, and in August its strength was about 1,275.¹⁰⁸ Unlike the development battalions at most of the other camps, the work of the battalion here was entirely under the Medical Department until late in September.¹⁰⁹ There were 1,780 men in the battalion at that time, classified as follows: Venereal, 211; orthopedic, 335; cardiovascular, 140; neuropsychopathic, 95; eye, ear, nose, and throat, 75; pulmonary, 102; postoperative, 165; convalescent, 150; non-English speaking, 66; others, 339. The development battalion was discontinued about January 31, 1919.¹¹⁰

The convalescent center was not established until late in January, 1919, but prior to this date a convalescent detachment was in operation for facilitating the discharge of convalescents from overseas.¹¹¹ Only a small number of men passed through this center, as it was discontinued early in February, 1919, owing to the abandonment of the camp.¹¹²

Control of the immediate vicinity of the camp was early realized as necessary, and the camp commander permitted no booths except a few large concessions, the control of which he retained.⁹¹ There was a part-time health officer in Anniston, and an officer of the United States Public Health Service was present from the first. The city health officer's duties consisted almost entirely in the care of the sick. The public health service rendered was efficient throughout the period of the camp.¹⁰⁷

The remount depot was located about 2 miles southwest of the camp on a hillside which afforded excellent natural drainage.¹¹³ Although the personnel was too limited in 1917 and early 1918 to keep open the drainage ditches which had been constructed, there were usually one or more comparatively dry spots in each corral on which the animals could congregate and thus keep out of the deep mud. The sudden acquisition of a large number of animals from the departing 29th Division in June, 1918, overwhelmed the force at the depot, consequently approximately 5,000 wagon loads of manure had accumulated there by July, 1918, and fly breeding existed everywhere.⁹⁵ To assist in the removal of this, 100 men from the casual camp were placed on special duty at the auxiliary remount depot.⁹⁵

The order for the abandonment of Camp McClellan was received early in February, 1919, and the camp was closed March 16, 1919.¹¹⁴

CAMP SEVIER, S. C.

Camp Sevier was 4 miles from Greenville, S. C., in a rolling country of cultivated fields and timber.¹¹⁵ There were many small streams within the limits of the camp. The surface soil was a sandy loam and the subsoil a red clay underlain by a stratum of gravel.¹¹⁶ One concrete road led to Greenville, and some of the roads in the vicinity were surfaced with gravel. The climate and rainfall were moderate.

The 30th Division was organized at Camp Sevier from National Guard troops from North Carolina, South Carolina, and Tennessee,¹¹⁷ augmented by troops sent from other camps.¹¹⁸ Certain units arrived in the camp in August, 1917,¹¹⁹ but the division was not organized until October.¹¹⁷ It left for overseas service about May, 1918. The 81st Division arrived in the camp in May, 1918,¹²⁰ and left in July, 1918.¹²¹ The 20th Division was organized in August, 1918, and demobilized in December, 1918, and January, 1919.¹²¹ The camp contained the maximum number of men in the early spring of 1918, about 29,000.¹¹⁸

The water supply of Camp Sevier was obtained from the same source as that of the city of Greenville, a series of springs and reservoirs on Paris Mountain, 6 miles distant.¹¹⁹ The quality of the water was satisfactory until November, 1917, when colon bacilli were demonstrated.¹¹⁶ Local organizations chlorinated the water until a central chlorination plant was installed in December, 1917.¹¹⁶

Waste from the bathhouses was at first led into the subsoil by terra-cotta pipes,¹¹⁹ but this was not successful for long and the waste water was later conducted by ditches to small streams.¹¹⁶ For kitchen liquids, the improvised incinerators first used were ineffective and were replaced by the standard

type having evaporating pans.¹²² However, the amount of fuel consumed by the incinerators was so large that seepage pits were substituted for them. These proved very successful, owing to the presence of a gravel stratum below the red clay.¹²²

The latrines that were used required pumping out by the summer of 1918, because no space was available where new ones could be dug.¹²³ The liquid removed was emptied into pits for chlorination before being discharged into a watercourse.

A sewerage system was installed at the base hospital early in 1918.¹²⁴ A system for the camp was partially constructed in 1918 but never entirely completed.¹²⁵

Repeated efforts to dispose of the garbage by contract were unsuccessful, so it was given to individuals or burned in battalion incinerators.¹¹⁶ A contract was finally made in the summer of 1918 by which the organizations delivered the garbage to the contractor at the garbage transfer station, received their own cans at once, and were required to cleanse them at the kitchens.¹²⁶ Both the base hospital and auxiliary remount depot fed their garbage to their own hogs.¹²⁷

Manure was at first hauled to neighboring farms¹¹⁹ and later disposed of by contract.¹²⁸ Owing to the bad condition of the roads early in 1918, it was necessary to spread the manure on farms as close as three-fourths of a mile from camp in order to accomplish its removal.¹²⁸ This hauling was done by the Army. A change was made in the spring of 1918 by which all manure not disposed of to farmers within a radius of 2 miles of the camp was to be stacked in a pen having perpendicular sides where the edges could be treated with a larvicide.¹²³

The physical examinations of incoming increments from the draft were made by two complete examining teams working in two separate buildings.¹²⁹ The system included the mustering officer's force as an accessory, so that the reception into the service of all accepted men was completed in one process. About 14 per cent of the men received early in the summer of 1918 were rejected. The neuropsychiatric and orthopedic examiners for this work were borrowed from Camp Jackson.

Measles became epidemic with the arrival in October, 1917, of 9,000 drafted men who were largely nonimmune and had recently been exposed.¹²² The onset and the decline of the epidemic were abrupt; there were 2,242 cases in November.¹¹⁸ A few cases arose throughout the year 1918, with a maximum of 120 in July.¹¹⁸ Bronchopneumonia was the most serious complication, being particularly common in 1917.

Influenza frequently occurred prior to the outbreak in the fall of 1918, the greatest number of cases reported during any one month being 610 in April, 1918.¹¹⁸ The fall epidemic began with 5 cases on September 20, reached its maximum daily incidence on the 29th, and was practically over before the end of October.¹³⁰ There had been more than 4,600 cases during that period, requiring the use of welfare buildings, the theater, a schoolhouse, mess shacks, and tentage as accessory hospitals, and the acceptance of the services of civilian nurses.

The small epidemic of primary pneumonia in the winter of 1917-18 reached its height in January, with 95 cases.¹¹⁸ The majority of the cases were of the lobar type. The secondary cases, which were chiefly of the bronchopneumonic type, occurred principally as a complication of measles and were most prevalent in November, 1917. All varieties of cases arose throughout the succeeding spring and summer, but in small numbers. The great increase in the fall of 1918 was principally of the bronchopneumonic type. It was thought that mistakes in the differential diagnosis of types were made during this period, as the sudden, massive involvement of these bronchopneumonias could easily have been mistaken for lobar pneumonia.¹¹⁵

Mumps was present in epidemic proportions in September, 1917, but only a few cases occurred in October.¹¹⁸ There was a steady increase during the next two months and a great increase about the first of the year 1918. There were almost 4,000 cases during the first three months of 1918, and a considerable number each month during the remainder of the year. The greatest monthly occurrence during this last period was in July, coincident with the increase in measles.

Beginning with October, 1917, one or more cases of cerebrospinal meningitis were reported monthly until the close of the year 1918.¹¹⁸ The highest monthly incidence in both years occurred in October—17 cases in 1917 and 12 in 1918.

The troops of the 30th Division being drawn so largely from Southern States, a survey was made early in 1918 to determine the prevalence of infection with the uncinaria.¹¹⁶ About one-third were found to be infected and were given treatment.

There were about 3,000 men in the development battalion by the middle of August, 1918, of which about 400 were orthopedic cases.¹³¹ Approximately 37 per cent of those classified at that time were fit for fall duty.¹³² There were 7,000 men in the battalion before the middle of October, 2,500 of whom were venereal and 700 orthopedic cases, divided into 3 regiments of 27 companies, and located in four different parts of the camp.¹³³ The battalions were greatly reduced in strength before the end of 1918, and were demobilized January 5, 1919, after all members requiring treatment had been sent to the base hospital.¹³⁴

The 24 dental officers in the camp in December, 1917,¹³⁵ made a dental survey of the enlisted men of the 30th Division, examining 14,750 men.¹³⁶ This survey revealed 589 men with dental conditions which were suspected of being sources of focal infections. Dental officers first operated in tents and smaller buildings.¹³⁷ Base outfits were installed in the new dental infirmary buildings about August 1, 1918.¹³⁷ From July 1, 1918, to March 10, 1919, 27,510 dental examinations were made, 32,543 permanent fillings and 2,364 temporary fillings put in, 839 root canal fillings made, and 10,279 extractions performed.

The remount depot was located at the northeastern part of the camp area, contiguous to the Southern Railroad. The condition of the corrals was poor during the winter of 1917-18, due principally to an inadequacy of enlisted personnel to keep them clean and properly drained.¹³⁸ Consequently, enormous numbers of flies were present with the onset of warm weather. An increase

in personnel permitted such changes to be made that all corrals were cleaned and swept daily regardless of the weather.¹¹⁵ Thrush and wounds were the two chief sources of animal disabilities. Thirty-seven sporadic cases of glanders occurred, the first case discovered in August, 1918, and the last in March, 1919.

Demobilization began in November, 1918, and was completed in April, 1919.¹³⁹ Of the 12,771 men examined, 477 were found to have disabilities. Camp Sevier was practically abandoned by April 1, 1919.¹⁴⁰

CAMP SHELBY, MISS.

Camp Shelby was located on a rolling plateau, on which there were scattered pine trees, 11 miles from Hattiesburg, Miss.¹⁴¹ The many ravines traversing the camp site afforded excellent drainage in general, but there were several swamps in and near the eastern part of the camp site. The soil consisted of a layer of sand over clay, which tended to form much dust but little mud. The climate was generally favorable for a tent camp. Although the annual temperature varied from zero to 105° above, there was no interference with training from this cause. The average annual rainfall was about 56 inches. The roads through this sparsely settled country were of gravel.

The 38th Division, composed of National Guard troops from Indiana, Kentucky, and West Virginia, was organized at Camp Shelby in August, 1917,¹⁴² and departed in September, 1918.¹⁴³ The formation of the 101st Division was under way when the armistice was signed. The maximum strength of the camp was about 36,000, in August, 1918.¹⁴⁴

In the earliest period of the camp, water was obtained from a group of springs in the camp area.¹⁴⁵ This water was at first said to have been uncontaminated¹⁴⁵ and was not treated.¹⁴⁶ It was later found to be not potable, and each organization was required to chlorinate the water used.¹⁴⁷ This source of supply was connected with the permanent supply system, and as the latter was occasionally insufficient in quantity, a chlorination apparatus was installed at the outlet from the springs.¹⁴² The permanent supply was derived from three wells, each over 300 feet deep.¹⁴² The presence of colon bacilli in the water from these wells when they were first put in use required chlorination,¹⁴⁸ but the water was colon bacillus free before the end of November, 1917, and the treatment was discontinued.¹⁴⁹ The number of wells was increased to five by the summer of 1918, and later to eight,¹⁵⁰ only six of which were in use in the spring of 1919.¹⁵¹

The installation of a sewerage system for the entire camp was originally planned but was stopped before the middle of August, 1917.¹⁵² A sewerage system was installed at the base hospital in the spring of 1918,¹⁵³ and a camp system by the following fall.¹⁵⁴ Meanwhile, water from the bathhouses was carried away by surface ditches.¹⁴¹ That from the kitchens was, at first, collected in storage pits, from which it was transferred to the evaporating pans of the Guthrie incinerators.¹⁴² When the incinerators fell to pieces after a month's use, owing to poor construction, the liquid waste was passed through improvised grease traps into surface ditches.¹⁴²

Pit latrines were used for the camp. These were burned out daily until a supply of lampblack for spraying became available.¹⁴⁶ The pits soon filled

with liquids, and as filling them with earth then caused an overflow, it was necessary to use excavators.¹⁴⁷ Seepage pits were dug later in rear of the latrine line, which drained the latrines and from which the liquids were removed by the excavators, thus obviating the necessity of disturbing the latrines.¹⁴² This liquid waste was heavily chlorinated before being discharged into a neighboring stream.¹⁵³ Sixty tank loads were removed weekly.

Improvised incinerators were used for the destruction of kitchen refuse pending the construction of the standard type.¹⁴⁶ When the latter became unserviceable, battalion incinerators of the rock-pit type were built.¹⁴² In October a contract was entered into with a civilian to remove the garbage. The contractor washed and sterilized the cans before returning them. There was no central garbage transfer station, the cans being collected from the kitchens by the contractor.¹⁵³ The contractor sublet at least a portion of the business, 15 individuals removing garbage in the summer of 1918.¹⁵⁵

Manure was burned at a dump during the early camp period,¹⁴⁶ or given to farmers.¹⁴⁷ A contract for its removal was made about November 1, 1917, under which the bulk of it was removed from the camp in cars.¹⁴² When glanders appeared in the camp, removal of manure for agricultural purposes was prohibited. Attempts to burn it were not successful during the period of frequent rains, and fly breeding occurred in the burned-over material.¹⁵⁶ These conditions led to the establishment of large compost piles as an experimental method for the disposal of noninfected manure.¹⁵¹ The wagons drove onto the pile at one end and off at the other. Loads which contained the greatest proportion of straw were dumped at the edges of the pile in order to form a matted wall with a steep slope. At first, the manure was treated daily with powdered phosphorus, and the surrounding ground was oiled and burned over. While fly breeding was reported to have been absent with this method,¹⁵⁷ it was not sufficiently superior to the method used later to justify the expense.¹⁵¹ The later method was to oil the sides of the pile and surrounding ground, and the small amount of fly breeding that took place was cared for by the liberal use of flytraps.

Sanitary squads for camp work were organized in 1917, 3 foremen and 60 laborers being employed in ditching, etc., and 25 more were authorized for general sanitary work.¹⁴⁷ These civilians were replaced by 50 colored enlisted men in the summer of 1918,¹⁵⁵ who, because they were demobilized in December, 1918, were in turn replaced in the spring of 1919 by 50 civilian laborers for antimosquito work.¹⁵⁸

Measles and German measles were not consistently differentiated, but the proportion of the latter was considered to have been large, owing to the small percentage of cases which were complicated by pneumonia.¹⁵⁹ Measles was brought to the camp by the troops which first arrived for guard duty. The incidence steadily increased until the second week in November, 1917, when a very rapid spread began and continued for a month, then steadily and rapidly declined through December. There were a few cases each month until July, 1918, when an increase occurred, with a further rise to 152 cases in August and 107 in September.¹⁴⁴

Numerous cases of influenza occurred prior to April, 1918, when there was a sudden outbreak of 2,604 cases.¹⁴⁴ These were of a comparatively mild

type, but were considered to have been true cases of epidemic influenza.¹⁶⁰ The disease was present through the following three months, increased considerably in incidence in August and September, and rose to 1,481 cases in October. There were 7,500 troops in the camp who had been there in April, and some 3,000 others. Only about 8 per cent of the former were attacked, while about 33 per cent of the latter suffered from the disease. Camp Shelby had the lowest mortality of any of the large camps—0.29 per cent.

Pneumonia cases were present in quite large numbers in the fall of 1917 and January, 1918, largely of the lobar type and largely primary.¹⁴⁴ There was an increase in April and a change to predominance by the bronchopneumonic type which was maintained through the remainder of the year. The smallness of the number of cases of pneumonia occurring in the fall of 1918 was due both to the low rate of incidence as a complication of influenza and to the comparatively small number of troops present in the camp.¹⁶⁰ While the death rate for the whole period was unusually low, that for bronchopneumonia complicating measles in 1917, was approximately 60 per cent.¹⁴⁴

Only one case of malaria was reported in 1917, but 288 occurred in 1918.¹⁴⁴ All of these gave a history of malaria prior to arrival in Camp Shelby.¹⁶¹ The malaria occurring in Camp Shelby was confined practically to draft troops from the Southern States.¹⁵⁵ Nearly 14 per cent of 821 men from Mississippi who were examined proved to be carriers.

The United States Public Health Service assumed control of the extracantonment zone and was active,¹⁴⁶ but the local health authorities were inactive.¹⁴¹ There was every reason for active work here, for general sanitary conditions in the surrounding country were poor—only about 60 per cent of the population of Hattiesburg used the sewerage system, and 54 per cent of the population used water from shallow wells. The United States Public Health Service discontinued its activities about April, 1919, and the Medical Department of the camp thereafter supervised the adjacent territory.¹⁶²

No formal quarantine camp was established,¹⁵⁶ but an area was set apart, under the supervision of the camp epidemiologist, for housing contacts.¹⁵⁵ A detention camp was established in April, 1918,¹⁶³ and was well organized and efficient in August.¹⁵⁵ It was discontinued during the following fall, the recruit depot being used for this purpose.¹⁵⁶

The development battalion was formed at this camp early in June, 1918, with about 650 men.¹⁶⁴ This number was increased to 796 men in November. The real purpose of the battalion had been lost to sight and it was used largely as a sorting station.¹⁶⁵ Men were transferred to and from the battalion, and its members ordered to special duty without reference to the battalion surgeon or consideration as to their medical treatment.

The administrative organization of the convalescent center was transferred entire from the development battalion.¹⁶⁶ Though this center was in operation from January 11 to July 18, 1919, no great number of men passed through it, the maximum number in the center at any time being about 200.¹⁶⁷

The first dental officer arrived August 31, 1917, and 41 more arrived during September, 10 of these coming with National Guard troops.¹⁶⁸ Four portable dental outfits were brought by arriving dental officers, four were requisitioned,

and four were improvised from equipment purchased from arriving officers and homemade tables and chairs. With the receipt of 10 additional portable outfits in November, each dental officer was enabled to work at least one-half of each day. One base dental outfit was installed in the base hospital in December, and the eight portable outfits necessary to complete the equipment for the camp were received in February, 1918. Following a dental survey of the entire command in November, extractions were made of all teeth which were badly decayed or abscessed or which were foci of infection, before other restorative work was undertaken. The extraction of some 7,000 teeth was completed in December. The idea was stressed from the beginning that quality was desired rather than quantity in dental work performed. When the drafted men arrived in June, 1918, six dental officers were assigned to the recruit camp. These officers took care of the emergency work and performed the necessary extractions, thus enabling those with organizations to take up restorative work at once when the new men were assigned to regiments. One dental infirmary building was completed in May and another in June, 1918, but one was used by the camp personnel board and the other by the constructing quartermaster until September, in spite of repeated attempts to obtain them for dental use. Base dental equipment for these buildings arrived in September and one infirmary was opened in that month and the other early in October. Eighteen dental officers were assigned to one and 12 to the other. One of these infirmaries was closed early in January, 1919.¹⁶⁸

Meat and dairy inspection was made by the camp veterinary service.¹⁶⁹ Fresh meat furnished by the large packing companies was inspected in the refrigerator car. That slaughtered by local dealers was inspected by a camp veterinary officer, both before and after slaughtering, otherwise its sale to camp organizations was not permitted. Canned meats required close attention, as the governmental demands for immense quantities to be delivered within a short period of time led to improper packing and the use of poor tins. There was little dairying, as a primary business, in the section of the State in which Camp Shelby was located. Though numerous farmers within a radius of 50 miles of the camp each had a few cows, these were of no particular breed and they received little attention. Reliance was therefore placed upon Pasteurization in the one plant in Hattiesburg, rather than to make any attempt at dairy inspections.

Camp Shelby was conducted as a demobilization camp throughout the greater part of the year 1919.¹⁷⁰ One team of nine examiners made the physical examinations in the summer, with a daily capacity of about 330 men.¹⁷¹ The total number of men examined was about 60,000, 564 of whom were found to have disabilities which entitled them to discharge for that reason.¹⁷⁰

CAMP SHERIDAN, ALA.

Camp Sheridan was situated 4 miles north of the town of Montgomery, Ala., on an alluvial plain lying between the Tallapoosa and Alabama Rivers.¹⁷² This projection of low land measured about 6 miles each way and contained numerous swampy areas of from 1 to 20 acres in extent. Three-fourths of the area was flooded during high water, and at times the entire camp site was cov-

ered. Four creeks formed the natural drainage courses of the area. The natural drainage of the camp site toward the low-lying land was excellent.¹⁷³ The soil, containing considerable sand and gravel, did not form tenacious mud, but dust was very annoying in dry weather. Underlying the top soil was a stratum of clay over a mixture of clay and gravel, the latter being freely permeable to water.¹⁷⁴ The summers were hot and during the winters the temperature frequently fell to below freezing.¹⁷³ The annual rainfall was about 50 inches, most of which occurred during the winter months. The roads in the surrounding country were of clay-gravel construction.

The 37th Division, composed of organizations from the Ohio National Guard, later supplemented by draft troops,¹⁷⁵ arrived in Camp Sheridan during August and September, 1917.¹⁷³ The 37th Division left the camp about June, 1918. The 9th Division, Regular Army (less Artillery), was organized in July, 1918.¹⁷⁶ It was preparing for departure when the armistice was signed and was then demobilized. The maximum strength of the camp was about 24,000 in December, 1917.¹⁷⁷

Eighteen wells from 250 to 750 feet deep supplied soft and potable water for Montgomery and the camp.¹⁷⁸ No treatment of the water was indicated, except immediately after the installation of the camp water distributing system. Two additional wells were drilled in 1918. All surface wells in the immediate vicinity of the camp were closed, except two in which such action was not feasible, and a guard was placed over these two.¹⁷⁴

Until kitchens were connected with the sewerage system, waste water from them was first collected in seepage pits,¹⁷⁹ but it was later strained into cans, then pumped into tank wagons, and finally emptied into a remote creek.¹⁸⁰

During the earliest period of occupation by troops, the garbage of the camp was disposed of in several ways—some was burned, some was thrown into abandoned wells, and some was given to farmers.¹⁸¹ Improvised rock incinerators were in use until the Guthrie type was installed.¹⁸² Garbage disposal by contract began about November 1, 1917, under which the quartermaster delivered the garbage to a hog farm 4 miles distant.¹⁸³ The cleansing of the cans before return was not satisfactory to the division surgeon, although the contractor had a steam plant for that purpose which functioned in a manner which was satisfactory from a sanitary standpoint. This contract did not immediately cover the entire camp, as a portion was still depending upon incinerator disposal late in February, 1918.¹⁸⁴ Bones, fats, grease, etc., were salvaged by the contractor at the delivery point. Beginning December 1, 1918, organizations collected their own garbage and hauled it to the disposal point.¹⁸⁵

The pit latrines first dug were too shallow,¹⁷⁴ but they were later reported as being deep and dry, having penetrated into the underlying gravel stratum.¹⁸³

A camp sewerage system was begun in June, 1918, used to some extent in August, and completed before the end of the year.¹⁷³ The base hospital sewerage system, completed at a much earlier date, provided treatment in a septic tank before discharge, but this tank was by-passed upon completion of the camp system and all sewage was discharged into a creek without treatment.¹⁷⁸

Part of the manure was hauled away by civilians, during the early period,¹⁸² and the remainder was hauled by camp personnel to a dump 3 miles distant,¹⁷⁹

that containing a large amount of straw being burned. A contract was later entered into under which the manure was delivered by organizations to cars on the railroad siding.¹⁷⁸ That which contained an excess of dirt or straw was hauled to neighboring farms and plowed under immediately.

Owing to the large area of the swamps on the reservation, mosquito control at Camp Sheridan was a big problem in itself.¹⁸⁶ Drainage of these areas necessitated one 5-foot cut 200 yards long, 2 new trestles, and 3 new culverts in the railroad, miles of main ditches and laterals, and extensive clearing of brush and trees. This work was accomplished largely by the use of civilian laborers directed by personnel of the Medical Department. In the spring of 1918, the entire division was turned out for one day to clear underbrush, clean out ditches, etc., and each Friday afternoon for a period was devoted to similar work.

Cases of German measles were reported from the earliest period of the camp and reached the number of 156 for the month of December, 1917.¹⁷⁷ None was reported after March, 1918. Measles cases occurred in October, 1917, but the number of cases occurring in any calendar month did not reach the 100 mark until August, 1918, when there were 115, and 143 occurred in September. The incidence declined steadily during the remainder of the year.

Only a few cases reported as influenza occurred prior to April, 1918, when there was an increase of explosive character to 1,189 for the month, with almost as sudden a termination.¹⁷⁷ Only a few further cases occurred until September, when 211 were reported for the month. There were 3,870 cases in October, and a comparatively small number in November.

Only 56 cases of pneumonia occurred during 1917, the majority being of the lobar type.¹⁷⁷ Cases occurred through the year 1918, but there was no great increase in the incidence except in October, when there were 441 cases. The great majority of the deaths from pneumonia for the entire camp period occurred in October, 1918, when there were 142.

Eleven cases of typhoid occurred in 1917.¹⁷⁷ Six cases occurred in the auxiliary remount depot in July, 1918, all at about the same time, the source of the infection not being discovered.¹⁵⁷

The number of orthopedic conditions in Camp Sheridan was unusually small, estimated to have been less than 1 per cent of all troops affected.¹⁸⁸ This was attributed not only to careful enlistment examinations but also to the weeding out of such cases during previous service on the Mexican border.

No separate quarantine or detention camps were established.¹⁸⁹ A provisional depot brigade included the functions of a detention camp in the spring of 1918, the quarantining of contacts being provided for in organization areas. The depot brigade, organized in June, 1918, served as a detention and quarantine camp.¹⁷³

One development battalion was organized here.¹⁹⁰ Since medical supervision of the men received too little consideration in their transfer from the battalion, often being done without the knowledge or recommendation of a medical officer, its operation was reported as having been unsuccessful. There were 1,831 men in the battalion in November, 1918.¹⁹⁰

Confusion existed in February, 1918, as to the proper disposition of convalescents.¹⁹¹ Four different organizations were in existence and no one had a

very definite idea as to their purposes. There was a convalescent center for overseas cases and another for domestic cases, the base hospital conducted a convalescent detachment, and there was an overseas casual detachment. The separation of the first two was more apparent than real, and due mainly to the housing of the overseas men in barracks and the domestic cases in tents.¹⁹² The convalescent center never contained much over 30 men.

The sanitary conditions in Montgomery and its environs were not good.¹⁸¹ Though local and State health authorities at first seemed to be anxious to cooperate with the Army and the United States Public Health Service,¹⁸¹ opposition from residents of Montgomery and apathy of the local board of health soon developed, making it practically impossible to maintain sanitary standards.¹⁸³

The continuity of dental service was interrupted, as was the medical, by the departure of the 37th Division, all records then being removed from the camp.¹⁹³ A dental survey of all men in the camp was made in August, 1918, and appointments were made with the worst cases without waiting for acute trouble to develop.¹⁷³

There is not much of record concerning the veterinary service at this camp. A sudden and extreme fall of temperature in December, 1917, caused a large number of cases of influenza and pneumonia in the unacclimated animals, with a high mortality.¹⁹⁴ Only three cases of glanders were discovered during the entire camp period.

The team to conduct the physical examinations made prior to discharge consisted of 16 officers.¹⁹⁵ It examined 8,265 men prior to March 15, 1919, and found 1,129 of these with disabilities. Of this latter number, 915 were found in the first 1,616 men examined. Camp Sheridan was closed about March 15, 1919.¹⁷³

CAMP WADSWORTH, S. C.

The site of Camp Wadsworth was a rolling, windswept plateau 3 miles from Spartanburg, S. C.¹⁹⁶ This was intersected by many small streams and contained several swampy areas.¹⁹⁷ Clay formed the soil, which became extremely dusty in dry weather and muddy in wet weather.¹⁹⁸ There were no hard-surfaced roads in the vicinity, and these unimproved roads became almost impassable after heavy rains. A modern highway to Spartanburg was not constructed until November, 1918, and then was made available only by the construction by the quartermaster of a connecting road 1 mile in length. The daytime temperature was high during the summer, but the nights were cool. The short winters were severe for that latitude.

The 27th Division, composed of National Guard troops from the State of New York, arrived in Camp Wadsworth in September, 1917, to the number of about 30,000 men, and left for overseas service in May and June, 1918.¹⁷¹ Those men of the 27th Division who were not required by a new table of organization were formed into a provisional depot for corps and army troops in January, 1918.¹⁹⁹ About one-half of the 6th Division, Regular Army, arrived in the camp in May, 1918, and left for overseas service in July, 1918.¹⁹⁹ The 96th Division, National Army, was formed in October, 1918.²⁰⁰ The maximum of population of the camp, about 34,000, was attained in April, 1918.¹⁷⁷

All sources of water on the reservation except two springs were condemned for human use before the camp was occupied by troops.²⁰¹ One of these remaining springs was condemned about August 15, 1917, and the chlorination of water from the other was ordered pending the introduction of the city supply. The city of Spartanburg derived its water supply from three small streams, and in turn supplied the camp.²⁰² Three wooden tanks, with a capacity of 600,000 gallons, provided storage in the camp. The water was filtered and chlorinated before delivery, and showed only occasional gas-producing organisms.

Until the fall of 1918, when the camp sewerage system was installed, the following methods of disposing of waste water from kitchens and baths were used: Incinerators were used for the disposition of dishwater, while bath water was carried away in surface ditches.²⁰³ The disposition of water from the bathhouses was rendered unnecessarily difficult by their construction, in that the roofs and floors sloped in opposite directions, thus necessitating ditches on both sides. A change in the method of disposal of liquid kitchen waste was made in the summer of 1918, pending the completion of the sewerage system.²⁰⁴ Soakage pits were dug, 6 feet wide, 8 feet long, and 16 feet deep, with an improvised grease trap 3 by 4 by 4 feet. One of these pits proved to be large enough to dispose of the liquid from 2 companies of 250 men each. Another method used in some organizations was to place "niter cake" in a grease trap to saponify the fats.²⁰⁵ The effluent from this process was more or less unsightly, but did not attract flies and therefore could be discharged into surface ditches.

The pit latrine system was a difficult problem, as subsoil water was encountered at a depth of 4 to 6 feet in the lower parts of the camp.¹⁹⁷ Although the pits were dug to a depth of 18 feet and in an area much larger than the seat area, the excess being covered over with a roof of logs and earth, the seating capacity provided was only for 5 per cent of the command and necessitated the digging of new pits every three or four months.²⁰⁶

A sewerage system, with disposal plant, for the base hospital was completed early in the spring of 1918,²⁰³ and a system for the camp in October, 1918.²⁰⁷

Though local farmers hauled away the garbage during the early part of the camp period,²⁰⁸ a contract was awarded for its removal a month or so after the camp was established.²⁰⁹ Removal under this contract was satisfactory for a while, the collector equalizing removal by taking one can from each company on his first trips and removing the others later. This system of removal failed completely when the roads became impassable in the winter of 1917-18; so the garbage then was hauled to a farm 3½ miles distant, the owner of the farm agreeing to spread it and plow it under.²¹⁰ Some of it, however, was sometimes buried in the company streets or dumped along the road,¹⁹⁵ and being inadequately covered fly breeding resulted therefrom throughout the following summer.²¹¹ The garbage was separated into the following three classes by the organizations in the spring of 1918:²⁰³ Fats, garbage for hogs, citrus fruits, coffee and tea grounds, fish heads, etc. The first two classes were hauled to a hog farm and the third was destroyed in the incinerators. The practice of giving the garbage to various farmers was continued during the greater part of the year 1918, no responsible person being found who would contract to remove it all until late in the year.¹⁹⁵ These individuals were required to con-

form to specified rules governing the cleanliness and methods of removal. When the garbage was later removed by a contractor to a pig farm, the proceeds were such that the net cost to the Government for haulage and labor was approximately 2 cents per pound. When the messes were managed economically, it was found that 500 men produced daily one 30-gallon can of garbage suitable for hog feeding.²⁰⁴ While a garbage transfer station was maintained, it included no provision for the cleansing of the cans.²¹²

A contract was in force in the winter of 1917-18 for the removal of manure to neighboring farms, but the long hauls and the condition of the roads led to the formation of a compost pile $2\frac{1}{2}$ miles from camp.¹⁹⁸ Manure disposal from the auxiliary remount depot did not keep pace with its production, due to poor roads and the $2\frac{1}{2}$ -mile haul to the disposal point.²¹¹ In October, 1918, arrangements were made for its removal by railroad, the manure being piled in a convenient location in the depot as removed from the corrals. The edges of this pile were sprayed with a borax solution, and the heat generated within the pile was sufficient to prevent fly development. By this method the amount of manure removed from the corrals was increased 400 or 500 per cent.

The physical examination of drafted men was under the immediate control of headquarters, provisional depot for corps and army troops, and authority was given to the depot surgeon to make such changes in the personnel of the examining board as became necessary.²¹¹ The board was divided into 2 teams, each of which could examine from 700 to 800 men each day. Fifty-five thousand men were examined by these teams, using a one-story and a two-story infirmary.

During the fall of 1917 and the following winter there was an absence of any large number of cases of measles.¹⁷⁷ Small numbers of cases of German measles were reported each month with a maximum of 157 in January, but true measles was almost nonexistent. After February, 1918, very few cases of the former disease occurred and only comparatively small numbers of the latter.

A mild type of influenza was prevalent at Camp Wadsworth from the first. There were two waves of incidence, the crest of the first being 124 cases in December, 1917, that of the second being 779 cases in April.¹⁷⁷ The epidemic in the fall of 1918 began September 24 and was largely over by October 10.²¹³ In comparison with other camps, the disease was of a mild type. The epidemic type of disease affected the colored troops first. The personnel of the auxiliary remount depot was the only organization housed in barracks, and this was the first white organization affected and showed the highest rate for pneumonia. One thousand nine hundred and thirty-one cases were reported during the months of September and October, with only five deaths.¹⁷⁷ This latter figure is evidently misleading, as the deaths from primary pneumonias during the same period were inordinately high—139 against 21 for the next highest two-months' period. As general preventive measures, a rigid quarantine of the camp was effected, congregations of men were prohibited, tents were furled at night, and all arrivals were quarantined for five days.²¹³

Pneumonia, mostly lobar, was present throughout the camp period, its incidence waves corresponding rather closely to those of influenza.¹⁷⁷ The proportion of bronchopneumonia was small except in April, 1918, and after August,

1918. Beginning with October, there were few cases of the lobar type. The moderate increase in pneumonia which occurred in the spring of 1918 was considered to have been due largely to the hemolytic streptococcus, and plans were laid to culture a portion of the command in order to estimate the prevalence of carriers of this organism.¹⁹⁸ The work was not undertaken in full until September and October. Varying numbers of the different organizations were cultured, 11 per cent of these showing the streptococcus in September and 17.2 per cent in October.²¹⁴ The streptococcus isolated from pneumonia cases in the spring of 1918 appeared to be identical with the strains isolated in the fall, except in degree of virulence.¹⁹⁸ Influenza and 95 per cent of the cases of pneumonia occurring in the early fall were attributed to this streptococcus, and new arrivals who were placed in the detention camp were not released while streptococci were present in their throat cultures.^{198 213}

The situation as regards mumps was also exceptional at Camp Wadsworth, in the small incidence of this disease.¹⁷⁷ There was almost none in 1917, and the highest monthly occurrence was 112 cases in April, 1918.

The orthopedic work was conducted in a systematic manner in 1917, and results were prompt.²¹⁵ Lectures were given to medical, line, and noncommissioned officers, organizations examined, and an orthopedic dispensary was established. This prophylactic work was so successful in results accomplished that the number applying for treatment had decidedly lessened by December 1.

All men in the camp in 1918 who came from Southern States were examined for hookworm.¹⁹⁵ Of 18,786 examined, 2,844, or 15 per cent, were found positive.

No permanent quarantine or detention camps were established.²⁰³ The only time when routine use was made of such a camp was during the influenza epidemic in the fall of 1918, when all incoming men were sent from the trains directly to a detention camp.²⁰⁵

A representative of the United States Public Health Service assumed charge of the extra-cantonment zone early in September, 1917.²⁰⁸ The city health officer of Spartanburg was active at that time, but sanitary measures were difficult to enforce. The Army authorities considered that oversight of all activities should be maintained by them, although the Public Health Service felt that it was no longer necessary by January, 1918.²¹⁰ Local boards of health were then considered valueless.

The development battalion at first was composed entirely of about 500 men with physical or mental defects.²¹⁶ The strength had been increased to 832 by the middle of August, 1918,²¹⁷ and to 2,000, in two battalions, by the last of September.²¹⁸ All venereal cases were in 1 battalion, but 496 colored venereal cases were not in the development battalion at all.²¹⁸ Classification of the men was made by a board, which did not examine the men but based its conclusions on the findings recorded by the specialist examiners. The strength had been reduced to about 1,000 men by January 1, 1919.²¹⁹ There were 330 men remaining late in the month, the battalions being used as demobilization units.²²⁰

The convalescent center was officially organized January 6, 1919,²²⁰ but in reality was only a change of name for the convalescent camp of the base hospital until about February 1.²²¹ The center had its greatest number of occupants at that time, about 180, and was closed February 25, 1919.

Two portable dental outfits and an extra dental chair constituted the camp dental equipment available September 10, 1917.²²² Instruments were borrowed from the two outfits and from the personal stocks of officers and added to the spare chair to make a third set of equipment. The camp was then divided into three sections and one dental outfit was assigned to each. Rosters of all organizations in each section were obtained and a systematic dental survey was made, the men being placed in one of three classes according to conditions found. The equipment necessary in the camp was completed in December, and the major dental defects of the men were corrected before the division left for overseas service. Twenty-two dental officers and one portable outfit were available for the work in the early period of the provisional depot for corps and Army troops, so the officers were directed to attend a course of instruction given for medical officers. Dental equipment arrived after a few weeks and was set up in unfloored tents. Water was carried from the nearest spigot and heated by the Sibley stove. Two dental infirmary buildings were occupied in August, 1918, and the work conducted in them was highly specialized.

The camp veterinary service supervised the meat and dairy inspection of the extra-cantonment area, as well as that of the camp, until February 1, 1918, when the extra-cantonment work was taken over by the United States Public Health Service.¹⁹⁶ Early inspections of dairies in the vicinity showed a poor condition of both the dairies and the animals, so the entry of raw milk into the camp was prohibited. The supervision of meats purchased locally by organizations was left to the extra-cantonment activities of the United States Public Health Service until the first of the year 1919, when its inspection after delivery to the organization was inaugurated.²²³ As no system of control previously had been established, this was more or less wasted effort until a central inspection post was established in February, 1919.²²⁴

The sheds in the corrals in the remount depot were originally of the open type, but later the north sides were closed. Further inclosures were made until many of the sheds eventually became stables.²²⁵ An unusual amount of rain in the summer of 1918 emphasized the value of clean corrals.²²⁶ The adoption of the temporary disposal method of piling the manure removed in a near-by area and the detail of 100 men from a labor battalion had permitted the cleaning of half of the corrals. These were dry and in good condition, while the others were covered with semiliquid manure and mud to a depth of from 4 to 12 inches. There was a shortage of feed during the summer, a shipment of shelled corn heating and the substitution of straw for hay becoming necessary.²²⁵ The animals became weak and emaciated, sand ingestion caused the loss of many from impaction colic, and the starved animals literally ate their way through the fences in some instances.

Commissioned veterinary personnel arrived in August, 1917, for duty at the remount depot hospital, but enlisted veterinary personnel was not authorized until about three months later.²²⁵ Meanwhile civilian colored laborers were employed instead, but were very unsatisfactory in caring for the shipments of animals received. The wards consisted of open stalls, except for one closed stall. The diseases which showed the highest incidence were as follows: Influenza, 1,910 cases; wounds, 771; pododermatitis, 684; pneumonia, 445; dermatitis gangrenosa, 427; strangles, 283; glanders, 173. The influenza occurred

mostly in the winter of 1917-18. Glanders was first discovered after the departing 27th Division had turned in their animals to the depot. The corrals were overcrowded, poorly arranged, and so filthy that any attempt to disinfect them was useless. Consequently, no headway in controlling glanders could be made until conditions were changed. A new commander of the remount depot caused all corrals to be cleaned and double fenced, and obtained the use of clean sheds in the main camp. All animals not reacting to the mallein test were removed to these clean sheds, hay racks and stalls were built in the corral shelters, and the remaining animals were tied there. It was then feasible to clean and disinfect corrals as required, and the disease was eventually eliminated about the first of the year 1919.

The demobilization period extended from November 21, 1918, to March 20, 1919.²²⁷ The 96th Division was completely demobilized on January 7, 1919, and the provisional depot for corps and Army troops ceased to exist on January 15, 1919. During the demobilization period 11,431 men were examined physically. Only 163 of these were found to have a disability.²²⁸ The camp was officially closed on March 25, 1919.²²⁷

CAMP WHEELER, GA.

Camp Wheeler was located 6 miles from Macon, Ga., a city of 50,000 inhabitants, in a region of gently sloping hills.²²⁹ The natural drainage was good, except that the camp was bisected by one swampy area and nearly surrounded by others. The soil consisted of a sandy loam overlying a subsoil of sand with streaks of clay and kaolin. One road leading to Macon was partly of concrete, but most of the roads were unimproved.²³⁰ While the climate was mild, there was much cold and rainy weather during the winter.²²⁹

The 31st Division was formed here from National Guard troops from Alabama, Florida, and Georgia.²³¹ The large majority of 11,000 men arrived at Camp Wheeler from September 5 to September 20, 1917. Approximately 3,000 of them were recruits of about three months' service, the remainder having over one year's service. Drafted men to the number of 10,000 were added in October, 1917. The division left the camp in September, 1918, and the organization of the 99th Division was begun in October.²³² The maximum strength of the camp was about 35,000, in August, 1918.²³³

A local spring served as the source of the water supply of the camp during its earliest period,²³⁴ and a creek was used for another short period.²³⁵ Although water from the latter source was filtered and chlorinated, laboratory reports consistently showed the presence of gas-forming bacteria, probably from dirt in the mains, and all water used for drinking purposes was boiled.²³⁵ This supply was maintained for emergency use after connections were made with the city supply system, and the plant was operated for one hour daily to keep it in condition.²³⁶ The use of water from the city supply system began about November 1, 1917.²³⁷ This supply was drawn from the Ocmulgee River, and there was no town above the intake for a distance of 20 miles.²³⁸ Owing to the fact that the city did not have a trained man in charge of its plant, the water was again chlorinated at the camp,²³⁶ although it was reported to have been of excellent quality soon after its use was begun.²³⁷

Before the sewerage system was inaugurated, attempts to dispose of the water from bathhouses by subsoil tiling were not satisfactory,²³⁷ and its removal by surface ditches was adopted. This proved to be satisfactory.²²⁹ Kitchen liquid wastes were disposed of by incinerators.²³⁹

Pit latrines, most of them about 20 feet deep, were used.²⁴⁰ Objection to this system was made, on the grounds that they tapped the groundwater level and therefore filled rapidly after rains, and that they contaminated the water supply of neighboring farms, including a dairy. One spring on a small private reservation within the camp boundaries was used for bottling purposes, and the owners filed a suit against the Government because of its alleged contamination. As a rule, the latrines did not require frequent renewal, as the sandy soil permitted adequate seepage.²⁴¹

A sewerage system was provided for the base hospital in the early part of 1918, and the construction of a camp system was begun in the spring of that year.²²⁹ The latter was in use in some parts of the camp in September, 1918, but was not completed until December.

At first, some of the camp garbage was given to farmers and the remainder was burned in extemporized incinerators.²³³ A contract was made for its removal about October 1, 1917,²³³ but this was still operated with only one set of cans in November and was not entirely satisfactory.²³⁷ The cans were at first whitewashed, and this was approved by the division surgeon on account of the difficulty of disposing of the wash water used when they were scrubbed.²²⁹ This practice was stopped when the sewerage system was constructed. There is no apparent reason for its approval at any time, as the terms of the contract required that the cans be cleaned and sterilized by the contractor.²⁴² An excellent garbage transfer station was constructed in the summer of 1918, consisting of a wooden platform over a drained cement base, with a house at one end in which to clean the cans.²³³

The disposition of manure was neglected during the earliest days of the camp, having been gathered into trash piles and not burned.²³⁴ No farmers were found who would remove the manure, although the soil of their farms was impoverished.²²⁹ The manure was burned until a field agent of the Department of Agriculture interested a group of farmers, when a contract was made by which it was removed on the railroad. Late in 1918, when the quantity of manure produced by the camp was small, it was hauled to adjacent farms by the organizations.²⁴³

Two dumps for noninflammable rubbish were maintained in a most excellent condition in ravines.²²⁹ Tin cans and similar articles were placed at the bottom and covered with ashes and dirt, the top being leveled as the dump was extended.

The camp medical authorities were confronted by a potentially grave situation at Camp Wheeler from the time of the selection of its site for a mobilization camp.²²⁹ Traversed by one swamp and bounded on three sides by others which could be controlled only at great expense, with a large swamp to the south which could not be eliminated, and with civilian reservations within the boundaries of the camp site, the first medical inspectors to visit the camp doubted that such a place in a malarial country could ever be made healthful

for troops.²⁴⁴ While malaria did not prove to be serious, approximately \$100,000 was expended in drainage projects.²²⁹ In addition to routine drainage of the swamp area, the swamp which bisected the camp area contained two small lakes which required attention.²³³ It was not practicable to drain one of these, but the second one was drained. Unfortunately, the maintenance cost of drainage ditches in the bed of this lake proved to be so high that it was later deemed advisable to refill the lake.²⁴³

The local board of health was active when the camp opened²³⁴ and the United States Public Health Service sent a representative to Macon shortly after.²³⁵ The latter subsequently was appointed local health officer, and was very active in mosquito prevention work, the control of contagious diseases, the regulation of eating places, the improvement of dairies, and the replacement of privies by cement vaults.²⁴²

Medical infirmaries were used for the physical examination of draft increments, 4 teams of 12 officers and 24 enlisted men each functioning in 2 infirmaries.²⁴⁵ Thirteen hundred men daily was the average rate maintained and 1,500 could have been handled. The infirmaries were not sufficiently large to provide the facilities for undressing and bathing which were desirable.²³³

Measles had existed in all the regiments of the 31st Division since their Mexican border service, but there were only 22 cases in the division when the draft troops arrived.²³¹ Every trainload of these troops contained measles cases, and an epidemic was soon under way which produced approximately 3,000 cases before the 1st of December, 1917. However, at no time during the following year did measles even threaten to assume epidemic proportions.²⁴⁴ A few cases of German measles were differentiated during the fall of 1917 and the following winter.

Influenza cases were present at Camp Wheeler in large numbers during the fall of 1917 and the following winter and spring.²⁴⁴ The monthly incidence rose steadily to 508 in January, 1918, dropped to 236 in March, and suddenly increased to 1,922 in April. The figures during the summer were much less, and no cases of the endemic type occurred until October 9. Meanwhile preventive steps had been taken, and the ensuing epidemic was neither as extensive nor as severe as in most of the camps. Some 4,000 men were given prophylactic treatments with an influenza vaccine, without any appreciable result. The number of cases of influenza that occurred is problematical, as a positive laboratory culture of the Pfeiffer bacillus was required before the diagnosis of influenza was permitted. This measure was prescribed for the infirmaries to promote accuracy in diagnosis and to prevent the flooding of the base hospital with cases of a trivial nature which were not influenza, but there is no apparent reason why it should have been adopted by the hospital except through a misunderstanding as to its import. It was also apparent that many cases among arriving draft troops which showed a frank pneumonia when first seen and were classified as primary pneumonia, should have been accredited primarily to influenza.²²⁹ The epidemic spent its force in October, and the number of cases for that month was estimated to have been not over 2,000, in a population of 15,000.

Pneumonia was uncommonly prevalent in Camp Wheeler in the fall of 1917 and the following winter, and continued through the spring and summer of 1918 in unusually large numbers.²⁴⁴ The occurrence of 153 cases in August, 1918, was not unusual, as the summer incidence is usually low. Almost 91 per cent of all cases arising prior to September 1, 1918, were reported as being of the lobar type. The division surgeon required isolation of all cases of pneumonia from the time of the appearance of the first one in the field hospital in October, 1917.²²⁹ While in only about 30 per cent of cases arising in the fall of 1917 could a connection with measles be traced, the paralleling of the measles curve in graphic charts by that of pneumonia convinced him that the latter was dependent upon the former in some unexplained manner. The high incidence was attributed largely to the poor physical condition of the men from the Southern States, particularly Florida, men from this State showing a morbidity of 5.9 per cent. The relation of length of service to pneumonia in the fall of 1917 is surprising—91 per cent of the men who contracted pneumonia had had less than eight months' service.²³¹ The proportion of men in the camp with this short service is not stated, but it was approximately 18,000 of the 25,000 in camp.²⁴⁴ There were 624 cases of pneumonia among this 18,000 men.²³¹ On this basis, 7,000 men, the number with eight or more months' service, would have had 243 cases. Actually they had only 60.²³¹ With this previous record, the incidence of pneumonia was not as high in the fall of 1918 as might have been expected, the total reported for four months being 671, with an average strength of 15,000 or less.²⁴⁴ The continuing predominance of the lobar type does not correspond to the findings in the majority of the camps. The case mortality was 17.7 per cent prior to September 1, 1918, and 21.5 after that date.²⁴⁴

Camp Wheeler showed an unusual number of mumps cases (631) in September, 1917.²⁴⁴ The admissions in October were comparatively negligible, then increased rapidly to 1,923 in December and 2,236 in January, 1918. As no particular effort was made to limit the spread of this nonfatal disease, the nonimmune element in the command had largely disappeared by reason of attacks of the disease before the end of February, and mumps did not again become a factor of any considerable importance. There were 5,654 cases prior to March, 1918.

Cases of cerebrospinal meningitis occurred each month from October, 1917, to October, 1918, inclusive, with a total of 46.²⁴⁴ Twenty-eight of these occurred prior to February, 1918. The treatment of carriers consisted of a 30-second exposure to chlorine gas in a strength of about 1 to 150,000.²⁴⁶ Fifty-five per cent were freed from the bacteria in one or two treatments. As the number of treatments required extended to as much as 15, no particular advantage of this method over others was claimed except the ease of application.

Malaria did not prove to be the problem that it was feared would be the case.²⁴⁴ Only 1 case was reported in 1917 and 155 cases in 1918. In the great majority of these cases the disease was probably contracted prior to arrival in Camp Wheeler, as 4.1 per cent of 700 men examined were found to have been malaria carriers.²⁴¹

The orthopedic work at Camp Wheeler was not well advanced in the spring of 1918.²⁴⁷ There had been some confusion in the assignment of the orthopedic surgeons, some lack of support by the division surgeon, and the small orthopedic dispensary established at the base hospital was 4 miles from the quartermaster's shoe repair shop, with no transportation assigned. Conditions had improved by July, however, and visits of the orthopedic surgeons to regimental infirmaries were arranged, instead of establishing a central orthopedic dispensary.²⁴⁸ The greater part of the camp orthopedic work was centered in the development battalion after this period.²⁴⁹

A development battalion organization was formed at Camp Wheeler, May 16, 1918.²⁵⁰ There were 1,312 men in the battalion at the end of July, approximately 1,200 of whom were physically unfit. There were 483 orthopedic cases, classified as follows: Minor foot conditions, 108; old injuries, 137; loss of transverse arch of the foot, 15; pronated feet, 155; arthritis, 83. The venereal cases amounted to 314 of whom 200 were chronic cases of gonorrhea and 28 were syphilitics. The enlisted medical personnel of the training cadre were composed of men with some physical disability or who were illiterate, and consequently were ineffective. The strength of the battalion had increased to 1,642 in August,²⁵¹ with 10 medical officers and 20 line officers on duty. The strength was about 2,500 late in September, 1918.²⁴⁹ In November, the 2,370 men present were divided into 4 battalions with 18 companies.²⁵² The venereal cases were all in two companies, but there were other types in these companies also. The venereal cases each wore a red patch on the right side of their outer clothing and were restricted to their company streets. The drill schedule eliminated the medical officers from any participation in the supervision of the training, and the schedule was frequently interrupted by changes in organization and by transfers of men. The men were indiscriminately transferred from the battalion by higher authority regardless of their condition or the course of treatment which they were undergoing, thus defeating the purpose of the battalion. Many men who would have made overseas material were transferred to the United States Guards or similar organizations.²⁵²

There were 27 dental officers on duty in the camp in July, 1918, and 17 of their enlisted assistants had a dental education.²⁵³ Two new dental infirmary buildings were completed but used for other purposes, the dental surgeons still working in the regimental infirmaries. The location of the two infirmaries only 40 feet apart and in a place where they were convenient for only a small part of the camp was ill-advised.

The camp veterinary service during the period the 31st Division occupied the camp did not cooperate well with the auxiliary remount depot, retaining many operative cases in the camp until recovery could not be hoped for.²⁵⁴ This tendency may be partly accounted for by the distance, about 4 miles, intervening between the camp and the remount depot.

The remount depot was more efficiently planned than were those at many other camps.²⁵⁵ Some of the corrals were small and there was one chute that was particularly useful. This latter was 26 inches wide, 70 feet long, solidly constructed, and could be quickly divided into sections with bars. Its exit led indirectly into any one of five small corrals or pens, or into a larger corral.

The large number of corrals, their variations in size, their arrangement in blocks and double fencing between corrals all were conducive to the easy and efficient handling of communicable diseases.²⁵⁴ The four wards of the veterinary hospital were originally open sheds, but these were later inclosed, three being converted into box stalls and the fourth into an open stable. Records prior to August, 1918, are not available, but no cases of glanders were discovered after that date. One animal which gave a positive reaction to the serological test for glanders was found negative at autopsy. Pneumonia, gangrenous dermatitis, colic, and thrush were the diseases causing the greatest numbers of admissions.²⁵⁶ Pneumonia was particularly prevalent in 1917, and is estimated to have affected 850 animals and caused 187 deaths.

Demobilization at Camp Wheeler began November 29, 1918, and was largely completed before the end of the year,²⁵⁹ although not entirely discontinued until April, 1919.²⁵⁷ Of 12,534 officers and men examined, 1,528 were found to have a disability.²⁵⁷

Camp Wheeler was closed April 10, 1919, and all records, including those of the base hospital, were transferred to Camp Gordon, Ga., for storage.

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- (2) Letter from Lieut. Col. R. E. Noble, M. C., to the Surgeon General, U. S. Army, October 12, 1917. Subject: Inspection of Camp Logan, Houston, Tex. On file, Record Room, S. G. O., 721.4 (Camp Logan) D.
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- (67) Letter from the commanding officer, base hospital, Camp MacArthur, Tex., to the Surgeon General, December 30, 1917. On file, Record Room, S. G. O., 710 (Typhoid, Camp MacArthur) D.

- (68) Letter from the president, tuberculosis examining board, Camp MacArthur, Tex., to the Surgeon General, U. S. Army, August 12, 1918. Subject: Tuberculosis survey, Camp MacArthur. On file, Record Room, S. G. O., 702 (Tuberculosis, Base Hospital, Camp MacArthur) D.
- (69) Summary of work of nervous and mental board at Camp MacArthur, Tex., May 1, 1918, to July 10, 1918, by Maj. Frank E. Leslie, M. R. C., president, neuropsychiatric board. On file, Record Room, S. G. O., 702-3 (Camp MacArthur) D.
- (70) Letter from Capt. Albert Vander Veer, jr., M. R. C., to the Surgeon General, U. S. Army, January 21, 1918. Subject: Cardiovascular patients. On file, Record Room, S. G. O., 702-2 (Camp MacArthur) D.
- (71) Letter from the orthopedic surgeon, Camp MacArthur, Tex., to the Surgeon General of the Army, January 15, 1918. Subject: Semimonthly report. On file, Record Room, S. G. O., 730 (Orthopedics, Camp MacArthur) D.
- (72) Letter from Capt. Edward A. Rich, M. R. C., district orthopedic surgeon, to the Surgeon General of the Army, March 25, 1918. Subject: Orthopedic conditions at Camp MacArthur. On file, Record Room, S. G. O., 730 (Orthopedics, Camp MacArthur) D.
- (73) Letter from the chief of surgical section, Base Hospital, Camp MacArthur, Tex., to the Surgeon General, U. S. Army, June 16, 1918. Subject: Report. On file, Record Room, S. G. O., 730 (Orthopedics, Camp MacArthur) D.
- (74) Letter from the orthopedic surgeon, Camp MacArthur, Tex., to the commanding general, 7th Division, May 28, 1918. Subject: Orthopedic recommendations. On file, Record Room, S. G. O., 730 (Orthopedics, Camp MacArthur) D.
- (75) Letter from the orthopedic surgeon, Camp MacArthur, Tex., to the Surgeon General of the Army, July 16, 1918. Subject: Orthopedic report to date. On file, Record Room, S. G. O., 730 (Orthopedic, Camp MacArthur) D.
- (76) Letter from the orthopedic surgeon, Camp MacArthur, Tex., to the Surgeon General of the Army, September 30, 1918. Subject: Orthopedic report to date. On file, Record Room, S. G. O., 730 (Orthopedic, Camp MacArthur) D.
- (77) Letter from the orthopedic surgeon, Camp MacArthur, Tex., to the Surgeon General of the Army, October 1, 1918. Subject: Orthopedic report to date. On file, Record Room, S. G. O., 730 (Orthopedics, Camp MacArthur) D.
- (78) Report of inspection of development battalion, Camp MacArthur, Tex., October 27, 1918, by Col. W. F. Lewis, M. C. On file, Record Room, S. G. O., 721-1 (Camp MacArthur) D.
- (79) Report of sanitary inspection of Camp MacArthur, Tex., on January 20, 1919, by Col. W. F. Lewis, M. C. On file, Record Room, S. G. O., 721-1 (Camp MacArthur) D.
- (80) G. O. No. 3, Hdqrs. Camp MacArthur, Tex., January 9, 1919.
- (81) Descriptive and historical résumé of Camp MacArthur by Maj. Matthew Hansen, Q. M. C., Mich. N. G., constructing quartermaster. On file, Record Room, S. G. O., 721-1 (Camp MacArthur) D, Storage.
- (82) Telegram from Hutton, Camp MacArthur, Tex., to Surgeon General, December 20, 1917. On file, Record Room, S. G. O., 703-1 (Camp MacArthur) D.
- (83) Letter from Maj. Clement D. Vignes, D. R. C., to the Surgeon General of the Army, June 17, 1918. Subject: Inspection of the dental service at Camp MacArthur, Tex. On file, Record Room, S. G. O., 333 (Dental, Camp MacArthur) D.
- (84) A report on meat and dairy inspection, Camp MacArthur, Tex., July 23, 1918, to March 10, 1919, by Capt. Nathan N. Crawford, V. C., camp veterinarian. On file, Veterinary Division, S. G. O.
- (85) A veterinary history of the war, Camp MacArthur, Tex., July 23, 1918, to March 10, 1919, by Capt. Nathan N. Crawford, V. C., camp veterinarian. On file, Record Room, S. G. O., 314.7 (Camp MacArthur) D.
- (86) Veterinary history of war, Auxiliary Remount Depot No. 324, Camp MacArthur, Tex., by Capt. J. L. Hartman, V. C. On file, Veterinary Division, S. G. O.
- (87) Veterinary history of the war, data on certain diseases, May 1, 1918, to May 9, 1919, by Capt. J. L. Hartman, V. C. On file, Veterinary Division, S. G. O.

- (88) Monthly report of physical examination made prior to separation from the Military Service other than by certificate of discharge for disability at Camp MacArthur, Tex., December, 1918, to February, 1919, inclusive. On file, Record Room, S. G. O., 370.01-2 (Camp MacArthur) D.
- (89) Telegram from L. O. Vorrus, Quartermaster, Camp MacArthur, Tex., to SURGWAR, Washington, D. C., March 24, 1919. On file, Record Room, S. G. O., 323.7 (Camp MacArthur) D.
- (90) Letter from the camp surgeon, Camp MacArthur, Tex., to the Surgeon General, U. S. Army, February 7, 1919. Subject: Permanent personnel for subdepot supply office, camp utilities, constructing quartermaster and auxiliary remount depot remaining in Camp MacArthur on abandonment of camp. On file, Record Room, S. G. O., 370 (Demobilization, Camp MacArthur) D.
- (91) Report of special sanitary inspection, Camp McClellan, Ala., August 31, 1917, by Col. H. C. Fisher, M. C., special sanitary inspector. On file, Record Room S. G. O., 721-1 (Camp McClellan) D.
- (92) Report on camp sanitation from August 25 to December 31, 1917, Camp McClellan, Ala., by Lieut. Col. J. Harry Ullrich, M. C., N. G. On file, Historical Division, S. G. O.
- (93) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. I, 440-451.
- (94) Brief histories of divisions, U. S. Army, 1917-18, prepared in the Historical Branch, War Plans Division, General Staff, June, 1921, 36.
- (95) Report of special sanitary inspection, Camp McClellan, Ala., July 15, 1918, by Lieut. Col. F. W. Weed, M. C. On file, Record Room, S. G. O., 721-1 (Camp McClellan) D.
- (96) Letter from the camp surgeon, Camp McClellan, Ala., to the Surgeon General, U. S. Army, January 1, 1919. Subject: Medical history, Camp McClellan, Ala., July 1 to December 31, 1918. On file, Record Room, S. G. O., 314.7 (Camp McClellan) D.
- (97) Letter from the camp sanitary engineer, Camp McClellan, Ala., to the Surgeon General of the Army, November 9, 1918. Subject: October report on water supply, sewerage and waste disposal. On file, Record Room, S. G. O., 721 (Camp McClellan) D.
- (98) Letter from Maj. J. T. B. Bowles, S. C., to the Surgeon General, October 12, 1917. Subject: Special sanitary inspection of Camp McClellan, Ala., October 2, 1917. On file, Record Room, S. G. O., 721-1 (Camp McClellan) D.
- (99) Report of special sanitary inspection, Camp McClellan, Ala., October 26, 1917, by Col. H. C. Fisher, M. C. On file, Record Room, S. G. O., 721-1 (Camp McClellan) D.
- (100) Sanitary report for the month of March, 1918, at Camp McClellan, Ala., by Maj. Jean A. Wolfe, M. C., N. G., sanitary inspector, 29th Division. On file, Record Room, S. G. O., 721.5 (Camp McClellan) P-D.
- (101) Letter from Lieut. Col. F. W. Weed, M. C., division of field sanitation, to the Surgeon General, January 16, 1918. Subject: Special sanitary inspection, Camp McClellan. On file, Record Room, S. G. O., 721-1 (Camp McClellan) D.
- (102) Medical history of the 29th Division, undated and unsigned, compiled for the records of the Surgeon General's Office. On file, Historical Division, S. G. O.
- (103) Sanitary report for the month of December, 1918, at Camp McClellan, Ala., by Capt. John M. Lee, M. C., camp sanitary inspector. On file, Record Room, S. G. O., 721 (Camp McClellan) D.
- (104) Report of special sanitary inspection of Camp McClellan, Ala., made by Col. A. E. Truby, M. C., September 23, 1918. On file, Record Room, S. G. O., 721-1 (Camp McClellan) D.
- (105) Report of disposal of garbage and other wastes at Camp McClellan, Ala., for November, 1918, by Capt. Chester A. Smith, S. C., camp sanitary engineer. On file, Record Room, S. G. O., 720.6-1 (Camp McClellan) D, storage 1918.
- (106) History of malaria control, Camp McClellan, Ala., by Maj. G. R. Bascom, S. C. On file, Record Room, S. G. O., 725.11-1 (Camp McClellan) D.
- (107) Report of sanitary inspection, Camp McClellan, Ala., on January 16, 1919, by Lieut. Col. H. B. McIntyre, M. C. On file, Record Room, S. G. O., 721-1 (Camp McClellan) D.

- (108) 2d ind., camp surgeon's office, Camp McClellan, Ala., August 12, 1918, to the camp commander, Camp McClellan, Ala. On file, Record Room, S. G. O., 322.052 (Development Bns., Camp McClellan) D.
- (109) Special report of the sanitary inspection of the development battalion, Camp McClellan, Ala., September 23, 1918, by Col. A. E. Truby, M. C. On file, Record Room, S. G. O., 721 (Camp McClellan) D.
- (110) Letter from Maj. A. S. McClain, M. R. C., Camp McClellan, Ala., to the Surgeon General of the Army, January 23, 1919. Subject: Convalescent center, Camp McClellan. On file, Record Room, S. G. O., 704.2-1 (Camp McClellan) D.
- (111) Letter from Capt. F. K. Nichols, M. C., consultant and instructor, convalescent centers, to the Surgeon General of the Army, January 31, 1919. Subject: Convalescent center at Camp McClellan. On file, Record Room, S. G. O., 704.2-1 (Camp McClellan) D.
- (112) Letter from the Surgeon General, U. S. Army, to the camp surgeon, Camp McClellan, Ala., February 14, 1919. Subject: Convalescent center weekly report, February 8, 1919. On file, Record Room, S. G. O., 704.2-1 (Camp McClellan) D.
- (113) Letter from the department veterinarian, assistant to department surgeon, Panama Canal Department, Cristobal, Canal Zone, to the Surgeon General's Office, Veterinary Division, March 14, 1919. Subject: Questionnaire for a veterinary history of the war. On file, Veterinary Division, S. G. O.
- (114) Letter from the camp surgeon, Camp McClellan, Ala., to the Surgeon General, U. S. Army, March 16, 1919. Subject: Closure of camp surgeon's office. On file, Record Room, S. G. O., 323.7 (Base Hospital, Camp McClellan) D.
- (115) Medical history of Camp Sevier, by Maj. Baxter R. Hunter, M. C., N. G., assistant camp surgeon. On file, Record Room, S. G. O., 314.7 (Medical History, Camp Sevier) D.
- (116) Report of special sanitary inspection, Camp Sevier, S. C., April 16, 1918, by Col. A. E. Truby, M. C. On file, Record Room, S. G. O., 721-1 (Camp Sevier) D.
- (117) Brief histories of divisions, U. S. Army, 1917-18, prepared in the Historical Branch, War Plans Division, General Staff, June, 1921, 37.
- (118) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. I, 492-503.
- (119) Report of special sanitary inspection, Camp Sevier, S. C., August 23, 1917, by Col. H. C. Fisher, M. C., special sanitary inspector. On file, Record Room, S. G. O., 721-1 (Camp Sevier) D.
- (120) 4th ind., Hq. 60th Infantry Brigade, A. E. F., August 8, 1918, to the commanding general, 30th Division, A. E. F. On file, Record Room, S. G. O., 721 (Camp Sevier) D.
- (121) Letter from the camp surgeon, Camp Sevier, S. C., to the Surgeon General, U. S. Army, February 13, 1919. Subject: Medical history of Camp Sevier. On file, Historical Division, S. G. O.
- (122) Letter from the division surgeon, Camp Sevier, S. C., to the Surgeon General, U. S. Army, March 14, 1918. Subject: Annual report for 30th Division for the period from August 25, 1917, to December 31, 1917. On file, Record Room, S. G. O., 319.1 (Camp Sevier) D.
- (123) Report of special sanitary inspection, Camp Sevier, S. C., June 23-24, 1918, by Senior Surg. J. H. White, U. S. Public Health Service. On file, Record Room, S. G. O., 721-1 (Camp Sevier) D.
- (124) Letter from Capt. Charles A. Haskins, S. C., to the Surgeon General, U. S. Army, November 15, 1918. Subject: Report on investigation of sewer system and sewage disposal plants, Camp Sevier, S. C., October 18, 1918. On file, Record Room, S. G. O., 672 (Camp Sevier) D.
- (125) Report of sanitary inspection of Camp Sevier, S. C., on January 11, 1919, made by Lieut. Col. H. B. McIntyre, M. C. On file, Record Room, S. G. O., 721-1 (Camp Sevier) D.
- (126) Report of sanitary inspection, Camp Sevier, S. C., August, 31, 1918, by Col. E. R. Schreiner, M. C. On file, Record Room, S. G. O., 721-1 (Camp Sevier) D.

- (127) Letter from the camp sanitary engineer, Camp Sevier, S. C., to the Surgeon General, U. S. Army, December 9, 1918. Subject: Report for November, 1918. On file, Record Room, S. G. O., 720.2-1 (Camp Sevier) D.
- (128) Letter from Col. P. M. Ashburn, M. C., to the Surgeon General of the Army, February 25, 1918. Subject: Inspection of Camp Sevier, S. C. On file, Record Room, S. G. O., 721-1 (Camp Sevier) D.
- (129) Report of special sanitary inspection, Camp Sevier, S. C., by Lieut. Col. F. W. Weed, M. C., June 2, 1918. On file, Record Room, S. G. O., 721-1 (Camp Sevier) D.
- (130) Report of inspection in relation to the epidemic of influenza and pneumonia at Camp Sevier, S. C., by Col. A. E. Truby, M. C., October 25, 1918. On file, Record Room, S. G. O., 710 (Influenza, Camp Sevier) D.
- (131) Letter from Capt. Henry P. Mauck, M. R. C., Camp Sevier, S. C., to the Surgeon General, August 15, 1918. Subject: Orthopedic surgery at Camp Sevier, S. C. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Sevier) D.
- (132) Letter from Maj. J. C. Friedman, M. R. C., base hospital, Camp Sevier, S. C., to the commanding officer, Base Hospital, Camp Sevier, S. C., August 13, 1918. Subject: Preliminary report on the work in the development battalion. On file, Record Room, S. G. O., 322.052 (Development Bn., Base Hospital, Camp Sevier) D.
- (133) Letter from Maj. J. R. McDill, M. C., to the Surgeon General of the Army, October 11, 1918. Subject: Development battalions. On file, Record Room, S. G. O., 322.171-1 (Camp Sevier) D.
- (134) Letter from Capt. George H. Steele, M. C., Camp Sevier, S. C., to the Surgeon General of the Army, January 23, 1919. Subject: Care of convalescent cases at Camp Sevier. On file, Record Room, S. G. O., 704.2-1 (Camp Sevier) D.
- (135) Telegram from Whaley, Camp Sevier, S. C., to Surgeon General, U. S. Army, January 18, 1918. On file, Record Room, S. G. O., 703 (Camp Sevier) D.
- (136) Letter from First Lieut. R. F. Patterson, D. C., Camp Sevier, S. C., to Maj. W. H. G. Logan, M. R. C., in charge Dental Division, December 27, 1917. Subject: Result of oral examination of enlisted men of the 30th Division. On file, Record Room, S. G. O., 703-3 (Camp Sevier) D, Storage, 1917.
- (137) Letter from the camp dental surgeon, Camp Sevier, S. C., to the Surgeon General, U. S. Army, March 11, 1919. Subject: History of dental service. On file, Record Room, S. G. O., 703 (Camp Sevier) D.
- (138) Data for a veterinary history of the war for Auxiliary Remount Depot No. 310, Camp Sevier, S. C., by Capt. Howard C. Gale, V. C. On file, Record Room, S. G. O., 314.7 (Auxiliary Remount Depot No. 310) R.
- (139) Monthly reports of physical examinations made prior to separation from the Military Service other than by certificate of discharge for disability at Camp Sevier, S. C., for the months of November, 1918, to April, 1919, inclusive. On file, Record Room, S. G. O., 370 (Examinations, Camp Sevier) D.
- (140) 1st ind., office of the camp surgeon, Camp Sevier, S. C., March 5, 1919, to the Surgeon General, U. S. Army. On file, Record Room, S. G. O., 323.7 (Camp Sevier) D.
- (141) Medical history of Camp Shelby, Miss., undated and unsigned, prepared for the records of the Surgeon General's Office. On file, Historical Division, S. G. O.
- (142) Letter from the division surgeon, 38th Division, Camp Shelby, Miss., to the Surgeon General, U. S. Army, March 9, 1918. Subject: Report for the year ending December 31, 1917. On file, Record Room, S. G. O., 319.1 (Camp Shelby) D.
- (143) Letter from Maj. John H. Evans, M. C., Camp Shelby, Miss., to the Surgeon General, January 3, 1919. Subject: Medical history. On file, Historical Division, S. G. O.
- (144) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. I, 504, 515.
- (145) Letter from the sanitary inspector, Southeastern Department, to the Surgeon General of the Army, August 22, 1917. Subject: Sanitary inspection, Camp Shelby. On file, Record Room, S. G. O., 721-1 (Camp Shelby) D.
- (146) Report of special sanitary inspection, Camp Shelby, Miss., September 4, 1917, by Col. H. C. Fisher, M. C., special sanitary inspector. On file, Record Room, S. G. O., 721-1 (Camp Shelby) D.

- (147) Report of special sanitary inspection, Camp Shelby, Miss., November 2, 1917, by Col. H. C. Fisher, M. C., special sanitary inspector. On file, Record Room, S. G. O., 721-1 (Camp Shelby) D.
- (148) Memorandum from Maj. James T. B. Bowles, S. C., to Col. Howard, M. C., January 29, 1918. On file, Record Room, S. G. O., 720.21-1 (Camp Shelby) D.
- (149) Report of special sanitary inspection, Camp Shelby, Miss., November 26, 1917, by Col. H. C. Fisher, M. C., special sanitary inspector. On file, Record Room, S. G. O., 721-1 (Camp Shelby) D.
- (150) Report of Camp Shelby water supply inspection, August 1, 1918, by Capt. E. J. Tucker. On file, Record Room, S. G. O., 720.21-1 (Camp Shelby) D.
- (151) Report of water supply at Camp Shelby, Miss., for April, 1919, from the camp sanitary engineer, Camp Shelby, Miss. On file, Record Room, S. G. O., 721.5 (Camp Shelby) D.
- (152) Letter from Maj. James E. Baylis, M. C., Camp Shelby, Miss., to Maj. T. H. Johnson, Surgeon General's Office, August 16, 1917. On file, Record Room, S. G. O., 322.15-2 (Camp Shelby) D.
- (153) Report of special sanitary inspection, Camp Shelby, May 22 and 23, 1918, by Senior Surg. J. H. White, U. S. Public Health Service. On file, Record Room, S. G. O., 721-1 (Camp Shelby) D.
- (154) Letter from the camp surgeon, Camp Shelby, Miss., to the Surgeon General of the Army, March 8, 1919. Subject: Annual report for calendar year 1918. On file, Historical Division, S. G. O.
- (155) Report of sanitary inspection of Camp Shelby on August 24, 1918, by Col. E. R. Schreiner, M. C. On file, Record Room, S. G. O., 721-1 (Camp Shelby) D.
- (156) Letter from the camp surgeon, Camp Shelby, Miss., to Col. Jere B. Clayton, M. C., November 15, 1918. Subject: Sanitary inspection. On file, Record Room, S. G. O., 721-1 (Camp Shelby) D.
- (157) Letter from Maj. G. R. Bascom, S. C., to the Surgeon General of the Army, July 15, 1919. Subject: Report of inspection, Camp Shelby, Miss. On file, Record Room, S. G. O., 721-1 (Camp Shelby) D.
- (158) 2d ind., War Dept., S. G. O., April 12, 1919, to The Adjutant General of the Army. On file, Record Room, S. G. O., 725.11 (Camp Shelby) D.
- (159) Letter from board of medical officers, Camp Shelby, Miss., to the Surgeon General of the Army, January 3, 1918. Subject: Epidemic diseases and Medical Department officers at Camp Shelby. On file, Record Room, S. G. O., 710-1 (General, Camp Shelby) D.
- (160) A history of the influenza epidemic at Camp Shelby, Miss., entitled Camp Shelby, undated and unsigned. On file, Record Room, S. G. O., 710-1 (Camp Shelby) D, Storage.
- (161) History of Malaria Control, Camp Shelby, Miss., by G. R. Bascom, Maj., S. C. On file, Record Room, S. G. O., 725.11-1 (Camp Shelby) D.
- (162) Report of sanitary inspection of Camp Shelby, Miss., on April 21, 1919, by Col. J. B. Clayton, M. C. On file, Record Room, S. G. O., 721-1 (Camp Shelby) D.
- (163) Report of special sanitary inspection, Camp Shelby, Miss., April 2, 1918, by Col. W. P. Chamberlain, M. C. On file, Record Room, S. G. O., 721-1 (Camp Shelby) D.
- (164) Letter from Capt. Henry P. Mauck, M. R. C., to the Surgeon General, June 15, 1918. Subject: Orthopedic surgery at Camp Shelby. On file, Record Room, S. G. O., 730 (Orthopedies, Camp Shelby) D.
- (165) Report of sanitary inspection of development battalion at Camp Shelby, Miss., on November 14, 1918, by Col. Jere B. Clayton, M. C. On file, Record Room, S. G. O., 721-1 (Camp Shelby) D.
- (166) Letter from Capt. F. K. Nichols, M. C., to the Surgeon General of the Army, February 3, 1919. Subject: Convalescent center at Camp Shelby. On file, Record Room, S. G. O., 704.2 (Camp Shelby) D.
- (167) Weekly strength reports from the convalescent center, Camp Shelby, Miss., February 1, 1919, to July 18, 1919, inclusive. On file, Record Room, S. G. O., 704.2-1 (Camp Shelby) D

- (168) The dental history of Camp Shelby, Miss., by Maj. Wilfurth Hellman, D. C., camp dental surgeon. On file, Record Room, S. G. O., 703. (Camp Shelby) D.
- (169) A history of meat and dairy inspection at Camp Shelby, Miss., by Capt. David M. Hoyt, V. C. On file, Record Room, S. G. O., 400.16 (Camp Shelby) D.
- (170) Monthly reports of physical examination made prior to separation from the military service other than by certificate of discharge for disability at Camp Shelby, Miss., for the year 1919. On file, Record Room, S. G. O., 370 (Examinations for demobilization, Camp Shelby) D and 370.01-2 (Camp Shelby) D.
- (171) Letter from the camp surgeon, Camp Shelby, Miss., to the Surgeon General of the Army, June 9, 1919. Subject: Report on examining board, Camp Shelby, Miss. On file, Record Room, S. G. O., 334.1-1 (Camp Shelby) D.
- (172) A medical history of Camp Sheridan, Ala., undated and unsigned, prepared for the records of the Surgeon General's Office. On file, Historical Division, S. G. O.
- (173) Medical history, Camp Sheridan, by Maj William O. H. Prosser, M. C., assistant camp surgeon, Camp Sheridan, Ala. On file, Historical Division, S. G. O.
- (174) Letter from the sanitary inspector, Southeastern Department, to the Surgeon General of the Army, August 27, 1917. Subject: Sanitary inspection, Camp Sheridan. On file, Record Room, S. G. O., 721-1 (Camp Sheridan) D.
- (175) Brief histories of divisions, U. S. Army, 1917-18, prepared in the Historical Branch, War Plans Division, General Staff, June, 1921, 50.
- (176) *Ibid.*, 18.
- (177) Annual Report of the Surgeon General, U. S. Army, 1919, Vol. I, 516-529.
- (178) Letter from the camp sanitary engineer, Camp Sheridan, Ala., to the Surgeon General, U. S. Army, November 30, 1918. Subject: Report for November, 1918. On file, Record Room, S. G. O., 720-1 (Camp Sheridan) D.
- (179) Report of special sanitary inspection, Camp Sheridan, Ala., November 5, 1917, by Col. H. C. Fisher, M. C., special sanitary inspector. On file, Record Room, S. G. O., 721-1 (Camp Sheridan) D.
- (180) Letter from Capt. John H. O'Neill, S. C., Camp Sheridan, Ala., to the Surgeon General, U. S. Army, July 25, 1918. Subject: Report on water supply and waste disposal at Camp Sheridan, D, Storage, 1918.
- (181) Report of special sanitary inspection, Camp Sheridan, Ala., September 1-2, 1917, by Col. H. C. Fisher, M. C., special sanitary inspector. On file, Record Room, S. G. O., 721-1 (Inspection, Camp Sheridan) D.
- (182) Letter from Maj. J. T. B. Bowles, S. C., to the Surgeon General, October 12, 1917. Subject: Special sanitary inspection of Camp Sheridan, Ala., October 12, 1917. On file, Record Room, S. G. O., 721-1 (Camp Sheridan) D.
- (183) Report of special sanitary inspection, Camp Sheridan, Ala., April 14, 1918, by Col. A. E. Truby, M. C. On file, Record Room, S. G. O., 721-1 (Camp Sheridan) D.
- (184) Letter from Senior Surg. J. H. White, U. S. P. H. S., and Lieut. Col. Wm. D. Wrightson, S. C., to the Surgeon General of the Army, February 23, 1918. Subject: Sanitary inspection of Camp Sheridan, Ala., February 18 and 19. On file, Record Room, S. G. O., 721 (Camp Sheridan) D.
- (185) Letter from the camp sanitary engineer, Camp Sheridan, Ala., to the Surgeon General, U. S. Army, December 31, 1918. Subject: Report for December, 1918. On file, Record Room, S. G. O., 721 (Camp Sheridan) D.
- (186) Letter from the division surgeon, 37th Division, Camp Sheridan, Ala., to the Surgeon General, March 23, 1918. Subject: Report on mosquito prevention. On file, Record Room, S. G. O., 725 (Camp Sheridan) D.
- (187) A report on sanitation, Camp Sheridan, Ala., July 1 to December 31, 1918, by Col. W. M. Smart, M. C. On file, Record Room, S. G. O., 721 (Camp Sheridan) D.
- (188) Letter from Capt. Scott D. Breckenbridge, M. R. C., to the Surgeon General, U. S. Army, February 22, 1918. Subject: Inspection of orthopedic service, Camp Sheridan. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Sheridan) D.
- (189) Report of special sanitary inspection, Camp Sheridan, Ala., July 13, 1918, by Lieut. Col. F. W. Weed, M. C. On file, Record Room, S. G. O., 721-1 (Camp Sheridan) D.

- (190) Report of sanitary inspection of Camp Sheridan, Ala., on November 14, 1918, by Col. Jere B. Clayton, M. C. On file, Record Room, S. G. O., 721-1 (Camp Sheridan) D, Storage, 1918.
- (191) Letter from Capt. F. K. Nichols, M. C., to the Surgeon General of the Army, February 6, 1919. Subject: Report of convalescent center at Camp Sheridan. On file, Record Room, S. G. O., 704.2-1 (Camp Sheridan) D.
- (192) Weekly strength reports of convalescent center, Camp Sheridan, Ala. On file, Record Room, S. G. O., 704.2-1 (Camp Sheridan) D.
- (193) Letter from Maj. Clement V. Vignes, D. R. C., to the Surgeon General of the Army, May 25, 1918. Subject: Inspection of the dental service at Camp Sheridan. On file, Record Room, S. G. O., 333 (Dental Inspection, Camp Sheridan) D.
- (194) History of Auxiliary Remount Depot No. 312, Camp Sheridan, Ala., August 1917, to May, 1919, compiled by Capt. Herbert S. Chase, M. C., historical officer. On file, Veterinary Division, S. G. O.
- (195) Monthly reports of physical examination made prior to separation from the military service other than by certificate of discharge for disability at Camp Sheridan, Ala., December, 1918, to March, 1919, inclusive. On file, Record Room, S. G. O., 370.01-2 (Camp Sheridan) D.
- (196) Medical history of the 27th Division while at Camp Wadsworth, S. C., by Lieut. Col. E. R. Maloney, M. C., N. G., division surgeon. On file, Historical Division, S. G. O.
- (197) Report of special sanitary inspection, Camp Wadsworth, S. C., August 22, 1917, by Col. H. C. Fisher, M. C., special sanitary inspector. On file, Record Room, S. G. O., 721-1 (Camp Wadsworth) D.
- (198) Sanitary history of Camp Wadsworth, by Maj. G. S. Goler, M. C. Subject: Sanitary history of Camp Wadsworth. On file, Record Room, S. G. O., 314.7 (Camp Wadsworth) D.
- (199) Medical history of the units of the 6th Division, by Lieut. Col. Paul L. Freeman M. C., division surgeon. On file, Historical Division, S. G. O.
- (200) Letter from the camp surgeon, Camp Wadsworth, S. C., to the Surgeon General, U. S. Army, March 18, 1918. Subject: Medical history of Camp Wadsworth. On file, Historical Division, S. G. O.
- (201) Letter from the sanitary inspector, Southeastern Department, to the Surgeon General of the Army, August 15, 1917. Subject: Sanitary inspection of Camp Wadsworth, S. C. On file, Record Room, S. G. O., 721-1 (Camp Wadsworth) D.
- (202) Notes on Camp Wadsworth water supply, by Charles A. Haskins, undated. On file, Record Room, S. G. O., 720.2-1 (Camp Wadsworth) D.
- (203) Special sanitary report of Camp Wadsworth, S. C., April 20, 1918, by Col. A. E. Truby, M. C. On file, Record Room, S. G. O., 721-1 (Camp Wadsworth) D.
- (204) Letter from the assistant to the sanitary inspector, Camp Wadsworth, S. C., to the Surgeon General, U. S. Army, August 10, 1918. Subject: Garbage disposal. On file, Record Room, S. G. O., 720.7 (Camp Wadsworth) D.
- (205) Report of sanitary inspection, Camp Wadsworth, S. C., November 8, 1918, by Col. J. B. Clayton, M. C. On file, Record Room, S. G. O., 721-1 (Camp Wadsworth) D.
- (206) Letter from Col. P. M. Ashburn, M. C., to the Surgeon General, U. S. Army, February 25, 1918. Subject: Report of inspection of Camp Wadsworth, S. C. On file, Record Room, S. G. O., 721-1 (Camp Wadsworth) D.
- (207) Letter from Capt. Charles A. Haskins, S. C., to the Surgeon General, U. S. Army, October 29, 1918. Subject: Special report on investigation of water supply at Camp Wadsworth, October 16, 1918. On file, Record Room, S. G. O., 671 (Water supply, Camp Wadsworth) D.
- (208) Report of special sanitary inspection, Camp Wadsworth, S. C., September 29, 1917, by Col. H. C. Fisher, M. C. On file, Record Room, S. G. O., 721-1 (Camp Wadsworth) D, 1917 Storage.
- (209) Letter from Maj. J. T. B. Bowles, S. C., to the Surgeon General, October 12, 1917. Subject: Special sanitary inspection of Camp Wadsworth, S. C., September 27, 1917. On file, Record Room, S. G. O., 721-1 (Camp Wadsworth) D.

- (210) Report of special sanitary inspection, Camp Wadsworth, S. C., January 4 and 5, 1918, by Lieut. Col. C. F. Morse, M. C. On file, Record Room, S. G. O., 721-1 (Camp Wadsworth) D.
- (211) Letter from the camp sanitary engineer, Camp Wadsworth, S. C., to the Surgeon General, U. S. Army, December 30, 1918. Subject: Report of disposal of garbage and other wastes at Camp Wadsworth, S. C., for November and December, 1918. On file, Record Room, S. G. O., 720.7 (Camp Wadsworth) D.
- (212) Letter from the camp sanitary engineer, Camp Wadsworth, S. C., to the Surgeon General, U. S. Army, February 5, 1919. Subject: Monthly report, January, 1919. On file, Record Room, S. G. O., 720-1 (Camp Wadsworth) D.
- (213) Report of sanitary inspection with especial reference to the influenza epidemic at Camp Wadsworth, made October 11, 1918, by Lieut. Col. Joseph L. Miller, M. C. On file, Record Room, S. G. O., 721-1 (Camp Wadsworth) D.
- (214) Tables, *Streptococcus hemolyticus* survey, Camp Wadsworth, S. C., September, 1918, and October, 1918. On file, Historical Division, S. G. O.
- (215) Letter from Capt. James T. Rugh, M. R. C., to the Surgeon General, U. S. Army, December 1, 1917. Subject: Semimonthly report on progress of prophylactic orthopedies in camp. On file, Record Room, S. G. O., 730 (Orthopedies, Camp Wadsworth) D.
- (216) Report of special sanitary inspection, Camp Wadsworth, S. C., made July 19, 1918, by Lieut. Col. F. W. Weed, M. C. On file, Record Room, S. G. O., 721-1 (Camp Wadsworth) D.
- (217) Letter from the camp surgeon, Camp Wadsworth, S. C., to the Surgeon General, U. S. Army, August 15, 1918. Subject: Concerning development battalions. On file, Record Room, S. G. O., 322.052 (Development Battalion, Camp Wadsworth) D.
- (218) Letter from Maj. John R. McDill, M. C., to the Surgeon General of the Army, September 30, 1918. Subject: Consultation and instruction, development battalions. On file, Record Room, S. G. O., 322.171-1 (Camp Wadsworth) D, 1918.
- (219) Letter from Maj. Marcus A. Rothschild, M. C., to the Surgeon General, U. S. Army, January 9, 1919. Subject: Convalescent center at Camp Wadsworth, S. C. On file, Record Room, S. G. O., 704.2-1 (Camp Wadsworth) D.
- (220) Letter from Capt. George H. Steele, M. C., Camp Wadsworth, S. C., to the Surgeon General, U. S. Army, January 22, 1919. Subject: Care of convalescent cases in Camp Wadsworth. On file, Record Room, S. G. O., 704.2-1 (Camp Wadsworth) D.
- (221) Weekly strength reports of convalescent center, Camp Wadsworth, S. C. On file, Record Room, S. G. O., 704.2-1 (Camp Wadsworth) D.
- (222) A medical history, dental service at Camp Wadsworth, S. C., by Maj. C. D. Dayton, D. C., camp dental surgeon. On file, Dental Division, S. G. O.
- (223) Letter from the camp meat inspector, Camp Wadsworth, S. C., to the camp veterinarian, January 25, 1919. Subject: Inspection of meat food products purchased locally. On file, Veterinary Division, S. G. O.
- (224) G. O. No. 26, Hq. Camp Wadsworth, S. C., February 22, 1919.
- (225) Letter from the veterinarian, Auxiliary Remount Depot No. 307, Camp Wadsworth, S. C., to the Surgeon General, U. S. Army, January 23, 1919. Subject: Veterinary history of the War, Auxiliary Remount Depot No. 307. On file, Veterinary Division, S. G. O.
- (226) Letter from Dr. John W. Adams, contract veterinarian, to the director of the Veterinary Service, office of the Surgeon General, August 4, 1918. Subject: Veterinary service, Camp Wadsworth, auxiliary remount depot. On file, Record Room, S. G. O., 484.3 (Camp Wadsworth) D.
- (227) Letter from the camp surgeon, Camp Wadsworth, S. C., to the Surgeon General, U. S. Army, March 25, 1918. Subject: Medical history of Camp Wadsworth. On file, Record Room, S. G. O., 314.7 (Camp Wadsworth) D.

- (228) Monthly reports of physical examination made prior to separation from the military service other than by certificate of discharge for disability at Camp Wadsworth, S. C., December, 1918, to March, 1919, inclusive. On file, Record Room, S. G. O., 370 (Demobilization, Camp Wadsworth) D.
- (229) A medical history of Camp Wheeler, undated and unsigned, prepared for the records of the Surgeon General's Office. On file Historical Division, S. G. O.
- (230) A medical history of Camp Wheeler, by Lieut. Col. Louis C. Dunnean, M. C., division surgeon. On file, Record Room, S. G. O., 314.7 (Camp Wheeler) D.
- (231) Annual report of the division surgeon, 31st Division, Camp Wheeler, Ga., 1917. On file, Record Room, S. G. O., 721.5 (Camp Wheeler) D.
- (232) Letter from the camp surgeon, Camp Wheeler, Ga., to the Surgeon General of the Army, January 4, 1919. Subject: Annual report for calendar year 1918. On file, Historical Division, S. G. O.
- (233) Report of special sanitary inspection, Camp Wheeler, Ga., October 6, 1917, by Col. H. C. Fisher, M. C. On file, Record Room, S. G. O., 721-1 (Camp Wheeler) D.
- (234) Report of special sanitary inspection, Camp Wheeler, Ga., August 28, 1917, by Col. H. C. Fisher, M. C. On file, Record Room, S. G. O., 721-1 (Camp Wheeler) D.
- (235) Letter from Raymond C. Turek, M. R. C., Hq. 31st Division, to Col. H. C. Fisher, M. C., September 18, 1917. Subject: Sanitation at Camp Wheeler. On file, Record Room, S. G. O., 721.5-1, (Camp Wheeler) D.
- (236) Letter from Maj. J. T. B. Bowles, S. C., to the Surgeon General, U. S. Army, February 6, 1918. Subject: Special report, water supply and sewage disposal, Camp Wheeler, Ga. On file, Record Room, S. G. O., 721-1 (Camp Wheeler) D.
- (237) Report of special sanitary inspection, Camp Wheeler, Ga., November 18, 1917, by Col. H. C. Fisher, M. C., special sanitary inspector. On file, Record Room, S. G. O., 721-1 (Camp Wheeler) D.
- (238) Letter from the camp sanitary engineer, Camp Wheeler, Ga., to the Surgeon General, U. S. Army, September 14, 1918. Subject: Preliminary report upon water supply. On file, Record Room, S. G. O., 720.1-1 (Camp Wheeler) D.
- (239) Letter from the division surgeon, 31st Division, Camp Wheeler, Ga., to the commanding general, July 17, 1918. Subject: Report for the inspector general. On file, Record Room, S. G. O., 333 (Base Hospital, Camp Wheeler) D.
- (240) Letter from Past Assistant Surgeon C. L. Williams, U. S. P. H. S., to the Surgeon General, U. S. P. H. S., October 11, 1917. Copy on file, Record Room, S. G. O., 672-2 (Camp Wheeler) D.
- (241) Report of special sanitary inspection, Camp Wheeler, Ga., by Lieut. Col. F. W. Weed, M. C., May 10-11, 1918. On file, Record Room, S. G. O., 721-1 (Camp Wheeler) D.
- (242) Letter from Lieut. Col. F. W. Weed, M. C., Division of Field Sanitation, to the Surgeon General, January 21, 1918. Subject: Special sanitary inspection, Camp Wheeler, Ga. On file, Record Room, S. G. O., 710 (Pneumonia, Camp Wheeler) D.
- (243) Letter from First Lieut. H. J. Buneke, camp sanitary engineer, Camp Wheeler, Ga., to the Surgeon General, U. S. Army, December 31, 1918. Subject: Report for December 1, to December 31. On file, Record Room, S. G. O., 721 (Camp Wheeler) D.
- (244) Annual Report of the Surgeon General, 1919, I, 604-617.
- (245) Report of special sanitary inspection, Camp Wheeler, Ga., by Lieut. Col. F. W. Weed, M. C., on May 31, 1918. On file, Record Room, S. G. O., 721-1 (Camp Wheeler) D.
- (246) Report on the treatment of meningitis carriers with chlorine gas, Camp Wheeler, Ga., by Lieut. Col. Louis C. Dunnean, M. C. On file, Record Room, S. G. O., 710 (Meningitis, Camp Wheeler) D.
- (247) Letter from Capt. Scott D. Breckinridge, M. R. C., to the Surgeon General, U. S. Army, March 2, 1918. Subject: Inspection of the orthopedic service, Camp Wheeler. On file, Record Room, S. G. O., 333.9 (Inspection of the Orthopedic Service, Camp Wheeler) D.
- (248) Letter from Capt. Henry P. Mauck, M. R. C., to the Surgeon General, June 21, 1918. Subject: Orthopedic surgery at Camp Wheeler. On file, Record Room, S. G. O., 730 (Orthopedics, Camp Wheeler) D.

- (249) Letter from Capt. O. L. Miller, M. C., to the Surgeon General, U. S. Army, September 25, 1918. Subject: Orthopedic surgery at Camp Wheeler. On file, Record Room, S. G. O., 730 (Orthopedies, Camp Wheeler) D.
- (250) Report of the commanding officer, development battalion, Camp Wheeler, Ga., by Capt. Ralph A. Sturgeon, Inf., O. R. C., July 31, 1918. On file, Record Room, S. G. O., 322.052 (Development Bn., Camp Wheeler) D.
- (251) Letter from the division surgeon, Camp Wheeler, Ga., to the Surgeon General, U. S. Army, August 23, 1918. Subject: Information concerning development battalions. On file, Record Room, S. G. O., 322.052 (Development Bn., Camp Wheeler) D.
- (252) Report of sanitary inspection of the development battalion, Camp Wheeler, Ga., on November 11, 1918, by Col. Jere B. Clayton, M. C. On file, Record Room, S. G. O., 721-1 (Camp Wheeler) D.
- (253) Letter from Maj. Clement V. Vignes, D. R. C., to the Surgeon General of the Army, undated. Subject: Dental inspection at Camp Wheeler, Ga. On file, Record Room, S. G. O., 333 (Dental Camp Wheeler) D.
- (254) Letter from the veterinarian, Auxiliary Remount Depot No. 311, Centaur, Ga., to the Surgeon General, U. S. Army, January 28, 1919. Subject: Veterinary history of the war. On file, Record Room, S. G. O., 314.7 (Veterinary history, Auxiliary Remount Depot No. 311) R.
- (255) Letter from the veterinarian, Auxiliary Remount Depot No. 311, Centaur, Ga., to the Veterinary Division, S. G. O., February 16, 1919. Subject: Supplemental veterinary history of the war. On file, Record Room, S. G. O., 314.7 (Veterinary History, Auxiliary Remount Depot No. 311) R.
- (256) Letter from the veterinarian, Auxiliary Remount Depot No. 311, Centaur, Ga., to the Surgeon General, U. S. Army, May 15, 1919. Subject: Veterinary history of the war. On file, Record Room, S. G. O., 314.7 (Veterinary History, Auxiliary Remount Depot No. 311) R.
- (257) Monthly reports of physical examinations made prior to separation from the Military Service other than by certificate of discharge for disability at Camp Wheeler, Ga., for the months December, 1918 to April, 1919, inclusive. On file, Record Room, S. G. O., 370.01-2 (Camp Wheeler) D.

CHAPTER VI

PORT OF EMBARKATION, HOBOKEN, N. J.^a

Medical activities of the port of embarkation, Hoboken, were mainly confined to the area comprised in a circle approximately 50 miles in diameter, centering on Manhattan Island. The embarkation of troops at the ports of Baltimore, Philadelphia, New York City, Boston, and Portland, Me., was supervised by medical officers sent from Hoboken as occasion arose. Permanent medical detachments stationed at Quebec, Montreal, and Halifax, but subsidiary to Hoboken, performed similar duties at those ports. Within the main area were embarkation camps, camp, base, general, and debarkation hospitals, 13 in all; medical supply depots; concentration centers for nurses; ambulance services; inspection services for camps, hospitals, ships, and men; office of the surgeon of the port, etc.

This vast machinery was of gradual growth. The first medical officer in charge of the work was detailed temporarily from the New York Medical Supply Depot, with one commissioned assistant, and his duties were limited to supplying medical equipment and medical personnel to the few transports available. The office of surgeon of the port was created in July, 1917, and the officer assigned to that duty remained as port surgeon until the main period of activity of the port had passed and his command had grown to 1,000 officers and 6,000 enlisted men.

The main purpose of this port, from the medical point of view, was the embarkation, and later, debarkation, of troops, and this implied activities at three points—in the embarkation camp (debarkation camp during the Armistice), in the harbor, and in hospitals.

No embarkation camp was available during the summer and early fall of 1917, arriving troops being embarked more or less directly from the trains. The necessity for such a camp was realized and Camp Merritt was under construction, and was first used in October, 1917. Camp Mills also was designated as an embarkation camp in April, 1918, and a portion of Camp Upton was used for a similar purpose. Such camps became absolute necessities as the flow of troops through the port increased. Their prime function originally was to provide a place where troops could be retained until transports were available, and to furnish reliable information as to the number of troops for which transportation was necessary. While not originally intended as such, their function in completing the equipment of troops and in their preembarkation medical inspection soon became of vital importance.

Medical activities in the harbor consisted of two main parts the preparation of ships by inspection and by supplying medical personnel and equipment, and inspections of men at the gangplank in order to prevent the embarkation of those physically unfit. The latter activity was at first merely the exclusion

^a The statements of fact appearing herein are based on the History of the Office of the Surgeon, Port of Embarkation, Hoboken, N. J., prepared by the staff of that office. The history is on file in the Historical Division, Surgeon General's Office, Washington, D. C.—*Ed.*

of those whose unfitness was more or less evident. Reports from overseas led to examinations for vermin, to the exclusion of those with acute venereal disease, and finally to contacts of acute infectious diseases. These advances in the scope of the examinations necessitated the completion of the routine examinations at the embarkation camp, the dock inspections still being made in order to retain those taken sick at the last minute.

Hospitals were necessary to care for the men who became ill or who were retained before embarkation. Later, when the tide was reversed and the port became a place of debarkation, hospitalization became the most important medical activity. Evacuation was the key to successful hospitalization during the debarkation period. Had evacuation faltered even momentarily, the limited bed capacity in the port area would have been overwhelmed. Disinfestation of individuals and of their clothing and equipment largely replaced the physical inspections of the embarkation period in estimating work done.

PERSONNEL DIVISION

PERSONNEL AT THE PORT

The United States Army Transport Service was under the control of the Quartermaster Department at the outbreak of the World War, and the officer in immediate charge of the transports was the depot or the Atlantic quartermaster, New York City, who was the general superintendent. As stated above, the medical superintendent was an officer on duty in the medical supply depot in that city, and this officer made the first assignments of medical personnel to troop transports bound from New York for Europe.

Until the office of the surgeon of the port was established, the only duties of the medical superintendent were in connection with the Army Transport Service. The duties relating to personnel were then divided into two sections, one concerning permanent personnel of the office and the other concerning personnel more or less casually in the port. A commissioned officer in charge and a noncommissioned officer for each section constituted the entire personnel. Additional sections for nurses and civilian employees and for mail had been added by June, 1918, when the duties of the various sections were as follows:

Permanent personnel.—Assignment to duty and provision of a sufficient number of officers to meet the requirements of the office. Provision and detail of enlisted men for duty in the office, rendition of detachment reports, and maintenance of discipline.

Casual personnel.—Maintenance of correct lists of commissioned and enlisted personnel on transports; rendition of reports and returns of medical officers within the port area; verification and forwarding of reports and returns of enlisted personnel under the control of the office, and the registration of Medical, Dental, Veterinary, and Sanitary Corps officers passing through the port.

Nurses and civilian employees.—Supervision of mobilization stations for nurses, and the vaccination, equipment and other preparation of nurses for overseas service; preparation of reports; care of returned money, papers, and correspondence relative to nurses and civilian employees.

Mail.—Receipt and distribution of personal mail; maintenance of a correct list of forwarding addresses of officers and men who had previously been on duty in the port.

The history of the personnel division is one of expansion and contraction, as the needs of the service required; of endless, unremitting effort during the period of expansion to obtain a sufficient personnel to properly carry on the work of the Medical Department at the port, and of equally endless and unremitting effort during the period of contraction to retain a sufficient personnel in the service until the work was finished. The period of expansion continued from the organization of the port until the month of January, 1919, and the period of contraction from the latter date to the close of the war period.

For six months before the beginning of the armistice, endeavor was made to provide a personnel sufficient for the needs of the embarkation hospitals and other medical work at the port and, in addition, a surplus personnel who could be assigned to the embarkation hospitals for training, so that, on the opening of the debarkation hospitals then being prepared and equipped, there could be transferred thereto at least a nucleus of officers and men trained for the service of a military hospital. A moderate degree of success was attained so far as officers were concerned, but it was not possible to secure a sufficient number of enlisted men and, in general, the debarkation hospitals were opened with an untrained and inadequate enlisted personnel. This enlisted personnel was received, in the main, from training camps, especially Camp Greenleaf, Ga.

The following communication from the port surgeon, dated September 12, 1918, sums up the personnel situation on that date and is typical of many other communications along the same lines:

1. The port of embarkation, as far as the Medical Department pertains, is roughly divided into embarkation and debarkation service. Its organization has been built up in the handling of embarkation work, and for that purpose it is fairly satisfactory.

2. On September 4, 1918, a communication was addressed to the commanding general stating that the embarkation hospitals were filled to overflowing, that there were then between 200 and 300 patients with venereal diseases at Camp Merritt for whom there was no available hospital space, and that men with venereal disease were being detained from embarking troops at the rate of two to three hundred daily.

3. The medical units for embarkation work all have a personnel sufficient to give a fairly satisfactory service, but not a service so exacting as the War Department demands. For the men now detained at Camp Merritt who are not in hospital, and for others who may be added to them, there is no available enlisted medical personnel.

4. For the debarkation service there are now 2 hospitals having an aggregate accommodation for 3,000 patients. These hospitals have an adequate personnel. Patients upon arrival in these hospitals from abroad must be immediately transferred to reconstruction hospitals in the interior in order to maintain a sufficient number of vacant hospital beds for the reception of incoming patients. In making the transfer from transport to debarkation hospital, an enlisted medical personnel is necessary; in making the transfer from debarkation hospital to a reconstruction base hospital, of the interior, an enlisted medical personnel is necessary for the care and the feeding of patients en route. For these transfers there is no available enlisted medical personnel.

5. Recent instructions from the War Department direct that a permanent medical personnel be assigned to duty on each troop ship for the care of the sick and wounded returning from abroad. This personnel is to consist of one medical officer, one dental surgeon, and a sufficient number of enlisted men. For this service there is no enlisted medical personnel available.

The number of troop ships leaving ports under the control of these headquarters is approximately 200, and when this personnel is assigned not less than 1,000 men will be required for this work.

6. Recently there have been several places leased for use by the Medical Department for hospital purposes which, when necessary alterations are completed, will accommodate in the aggregate 7,000 patients. Two of these buildings have already been turned over to the care of the surgeon, and for them there is no medical personnel available. When put into operation they will require not less than 1,500 men.

7. It appears that it is now contemplated that men for service in this department are to be assigned from among those of whom many are malingers, some cripples, all decrepit, more or less, in body or soul, and none trained. The character of the work they are to be called upon to perform is such as requires, for the most part, highly trained men, schooled in the care and management of the sick, and for that reason the enlisted personnel required now and for the near future should be sent here with the least possible delay.

Efforts to obtain an adequate personnel for the debarkation hospitals continued during the first part of the armistice. The return movement of sick and wounded from Europe was initiated on a large scale shortly after the signing of the armistice and continued until the summer of 1919. The demobilization of officers and men began soon after the beginning of the armistice. The period following this, about six months in duration, was one of great activity for the Medical Department, and, needless to say, there was no thought of a reduction in the medical force during that period, since there had never been a time when medical personnel was in greater need. Nevertheless, many officers and men were discharged and others obtained to replace them. It was during this period that pressure from all sides, from among the highest to the lowest in the land, was brought to bear to effect the discharge of individual officers and men.

The following memorandum, dated February 9, 1919, from the officer in charge of the personnel division of the port surgeon's office to the port surgeon and the latter's indorsement thereon conveys a very fair idea of the personnel situation on that date.

I wish to call your attention to the fact that the service of the hospitals, under the control of this office, is likely to become seriously embarrassed in the immediate future as a result of the policy of discharging trained enlisted men under the provisions of Circular No. 77, War Department, 1918, and the later revisions and amendments thereto, each of which seems progressively more detrimental to the service here.

Never before have the services of trained men been so greatly needed as at present. We must maintain the service at the highest standard or meet the severest criticism, and we are not permitted to retain the services of the men on whom we depend to maintain a high standard. Trained men are being discharged everywhere, untrained men are taking their places only to be discharged in their turn before they have attained even a moderate degree of efficiency.

If all requisitions for enlisted personnel now on file were immediately filled, the reserve at Camp Merritt would be entirely exhausted and replacement wholly out of the question.

In a very short time it will be necessary to recommend the disapproval of every application for the discharge of a soldier where replacement is requested on the ground that replacement can not be made.

In my judgment the matter should be immediately brought to the attention of the higher authorities in order that ports of debarkation (this port, at any rate) may be exempted from the provisions of the circulars referred to above, so that the discharge of men of the Medical Department may be left to the discretion of the authorities at the port, who, I think, may be depended upon to act with fairness and justice to all concerned.

The period of high tension can last but a few months longer, and a prolongation of their services by a few months will jeopardize the future of but a very limited number of men now here, even though a very large percentage are able to produce affidavits in great number to the contrary.

The alternative seems to be repeated requisitions for replacements from outside sources, a constant stream of new men untrained in, and unfamiliar with, the work of the large embarkation hospitals, an enormous mass of paper work resulting from the individual application of these men for discharge, and, worst of all, the entrusting of a large part of the care of returning sick and wounded to this stream of untrained transients. The result of this policy will be to favor the well at the expense of the sick, and I am sure this result was not intended by the War Department.

The least that should be expected of soldiers who have served, however unwillingly, on this side during the war, is to remain in the service long enough to properly care for their comrades who went abroad, and it seems to me that their wives, fathers, mothers, sisters, Congressmen, and employers should be so informed.

If it were practicable to convey this information from some authoritative source through the medium of the public press, it is probable that the situation would be accepted in the proper spirit by the fair-minded and loyal. The others are not worthy of consideration

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[Indorsement]

1. Attention is invited to memorandum herewith, for which careful consideration with appropriate action is recommended.

2. The work of the Medical Department at the port is now as heavy as it has been at any time since its establishment, and the prospects for the next several months promise a continuance of this condition.

3. These prospects are somewhat as follows: Published statements from the War Department indicate that the troops from overseas will be returned by September 1, 1919, and that they will be returning at the rate of about 300,000 a month; they also indicate that there are now sick in hospital in Europe approximately 100,000 men, which will make an average of 15,000 sick returning per month.

4. The experience of the past two months would indicate that the base hospitals at Camp Mills and Camp Merritt will be kept full to overflowing by the admission of sick from the troops arriving in those camps when the return is speeded up to the figures above mentioned, leaving the hospitals at the port to take care of the sick as they return, and their dispatch to hospitals in the interior, and to take care of the sick incident to the troops on duty at the port. The work of the Medical Department in the embarkation camps will be extensive in proportion to the troops arriving, in looking after the general sanitation of the camps, the sterilization of the troops, and providing medical attendants, not otherwise provided for troops shipped to demobilization camps.

5. There are now approximately 17,000 beds in hospitals under the jurisdiction of the port. The work of clearing these hospitals by transfer of the sick to interior hospitals must be sufficiently speedy to maintain always a sufficient number of vacant beds for the reception of the sick as they arrive. This transfer involves a large personnel for the attendance of the sick on the trains, which are in reality travelling hospitals, until they reach the designated hospitals, and this number will amount to, perhaps, not less than 15,000 men monthly being moved on the train.

6. For this and all other work pertaining to the port, there are now present approximately 6,500 enlisted men of the Medical Department. Applications for discharge are being received at the rate of about 1,000 per month. When requisitions now in the office have been filled the reserve of 300 enlisted men at Camp Merritt will have disappeared.

The officers and enlisted men who finally arrived for the relief of this situation were untrained in the work. Many of the enlisted men were in the limited service class, malingers, unhealthy in body or mind, or lacking in desire as well as in training.

PERSONNEL ON TRANSPORTS

The difficulties that the medical personnel assigned to transports encountered increased as time progressed and as various factors, which will be considered in detail later, entered into consideration, so that at no time in history the of the organization could it be said that matters were satisfactory. The history of this service was similar to that of others in the opening and closing of all ports of embarkation and debarkation, both at home and abroad. It can best be considered in three periods, each of which had problems of its own.

Until April, 1918, the transports used were all United States Army chartered transports and were entirely under the control of Army authorities, while in port and at sea, except in matters of navigation and convoy.

Commissioned and enlisted personnel for transport duty were provided by the Eastern Department early in June, 1917, reporting at Hoboken, where they were assigned to their respective vessels by the acting medical superintendent of the port. The personnel of each transport consisted of a transport surgeon and 1 sergeant and 4 privates of the Medical Department. The privates were raw recruits, as a rule, with little knowledge of the Army and less of medicine. The first convoy of troops carried its quota of the original assignment. Similar personnel was assigned as fast as other transports were added to the service, so that by the end of this period the original number of 5 officers had grown to 50.

With the establishment of the port of embarkation, the assignment of personnel was placed upon a more rational basis, for the type of vessel was thereafter taken into consideration. One surgeon and an enlisted assistant were deemed sufficient for vessels sailing under the direction of the United States Army Transport Service to which an armed guard of the United States Navy had been assigned and where the total of crew, guard, and troops was about 100. Additional enlisted personnel were assigned in sufficient numbers properly to care for any emergency that might arise on vessels which carried large numbers of troops and which were known as troop transports in contradistinction to cargo transports.

The permanent enlisted personnel was divided as follows: One man was assigned to take care of the dispensary, one to the messing of patients, two as ward masters, the others acting as assistants. The sergeant in charge was held responsible for the proper execution of all orders and the preparation of all records, under the supervision of the transport surgeon.

All medical personnel with troops, including commissioned and enlisted personnel, casual medical officers, and members of the Army Nurse Corps, were available for assignment to duty. Medical attention, other than that requiring hospital care, was given to the troops by the members of their own medical organizations, but under the supervision of the transport surgeon.

There was some difficulty at first regarding the status of the enlisted men of the Medical Department in relation to guard duty while in the war zone, but later this was satisfactorily arranged by a port order which stated that they were to be used only in emergencies. The minor difficulties that arose from time to time during this period were due more to an untrained personnel, with but little understanding of the correct interpretation of transport regulations than to any defect in the regulations. Officers and men whose services were

unsatisfactory were weeded out and replaced. It was due, in all probability, to this preliminary course in transport work on Army transports that there was less friction later when large numbers of troops were carried on commercial liners under adverse circumstances.

This period was the most satisfactory of all, due to the fact that everything was under direct control of the Army and the transport surgeon was in charge of all medical affairs aboard the vessel. It resulted in a cooperation that could not have been attained otherwise, both while in the various ports of embarkation and debarkation and, what was more important, while at sea.

During the period which began about the middle of April, 1918, and continued to the signing of the armistice, troops were transported by three classes of vessels, viz, United States Army transports, United States Navy transports, and commercial vessels of the allied countries. The United States Army transports, however, were not used as such for long. The Navy commenced taking them over about the middle of April, particularly those which were most suitable for carrying troops. Since no Army personnel were assigned to Navy transports, not only were all Army personnel removed but equipment was removed also, so that toward the end of this period not more than three or four of the original vessels remained under Army control. Two of these were vessels that the Army owned prior to 1917 and the others were cargo vessels. Their administration was the same as in the first period. As regards vessels of the allied countries used as transports, the countries concerned were England, France, and Italy, each of which allotted all available shipping for this work. These vessels were divided in turn into three classes—those regularly assigned to American convoy, those sailing under the jurisdiction of the ministry of shipping or similar organizations of each country, and those in the status of war vessels of the respective countries.

ON VESSELS ASSIGNED TO AMERICAN CONVOY

This group consisted of about 12 vessels, mostly French and Italian. There was assigned to them in the majority of cases a medical personnel consisting of a transport surgeon and an enlisted assistant. On vessels carrying a civilian ship's doctor, the transport surgeon was in charge on only that portion of the vessel that was occupied by troops. On vessels without a ship's doctor, the transport surgeon took care of the crew as well, and did the work ordinarily assigned to a ship's surgeon. It was on this latter group of vessels that conditions nearly approached the state of affairs on Army transports, for the transport surgeon was in charge of all medical work on board. These vessels had a regular run, always going from the same port to one or two ports in France, so that the personnel was permanent, and excellent results were obtained. The ship's officials usually gave the transport surgeon all the backing that he needed in carrying out regulations, in so far as it could be done, while in port and at sea. In addition to this, a spirit of cooperation was soon established.

ON VESSELS SAILING UNDER THE JURISDICTION OF THE MINISTRY OF SHIPPING
OF THE VARIOUS COUNTRIES

Practically all of the vessels of this type were under the jurisdiction of the British. No definite arrangement could be made concerning the personnel, in that many had no definite home port in the United States, and the submarine activity made it necessary to change their destinations abroad quite frequently. These vessels were removed from the service from time to time, which necessitated the removal of United States Army personnel.

ON VESSELS IN THE STATUS OF WAR VESSELS OF THE RESPECTIVE COUNTRIES

There were relatively few of these during this period, but the three vessels, *H. M. S. Olympic*, *Mauretania* and *Aquitania*, each had a transport surgeon assigned to it. The crews of these vessels were of the same status as the crew of any warship, so that regulations had to be carried out with much more tact than aboard the ordinary transport. The ship's doctor on such vessels was the supreme medical authority by right of his position, and nothing could be done without his sanction.

ON CONVERTED COMMERCIAL VESSELS

Some of these converted commercial vessels had regular runs between New York and France or England; some between North American ports other than New York, but under the jurisdiction of Hoboken, and England; and others had no regular runs but were temporarily diverted from their home ports in Africa, Australia, and India to meet the demand for troop transports during this period. The medical service on this class of vessel will be described in detail, as by far the majority of transport surgeons were assigned to this class.

Difficulties were found in that regulations applicable to Army transports could not be made applicable to these commercial vessels. The relation of the United States Army medical officer to the master of the vessel and to the crew differed with the various types of captains and with the regulations and customs of the country under whose flag the vessel was sailing. There was an enormous increase at this time in the number of troops that were transported overseas, and, even though medical officers were relieved from duty on Army transports which were turned over to the Navy, the number of trained men was not great enough to meet the demand, so that it was necessary to appoint medical officers who, in many cases, did not know the first principles of ship sanitation or of the problems incident to the transportation of troops.

This class of vessel was not uniform as regards personnel or equipment. Taking the personnel into consideration first, they could be roughly divided into two classes, those without a ship's doctor and those with one.

It was found, early in May, 1918, that many of the British commercial vessels were without a surgeon. As stated above, port regulations required that, if more than 100 persons were carried, either as crew or passengers, a medical officer must be assigned. Arrangements were then made through the British Ministry of Shipping whereby any requests on the part of the shipping lines for officers would be met by the assignment of a medical officer of the

United States Army. This arrangement furnished a good solution of the problem, but unfortunately, through a misunderstanding as to the exact status of this officer and the issue of conflicting orders, proper authority was lacking for the correct administration of his work. His status on board, prior to July 15, 1918, was as follows: So far as the troops were concerned, he was guided by United States Army transport regulations, being responsible for the troop hospital and the sanitation of that portion of the vessel occupied by troops and for all matters affecting their medical welfare. In addition to this, he had all the duties of a ship's doctor, viz, caring for the crew and passengers, rendering the port medical returns, and supervising the sanitation and inspection of the food throughout the entire vessel. He was responsible only to the master of the vessel. He occupied the quarters assigned to the ship's doctor and he was subsisted free of charge. Being a part of the ship's crew, he had a complete understanding of all the petty differences among them. One who has never been in charge of this work on commercial liners can not appreciate the necessity of paying attention to these various details, but this is most important for the efficiency of the medical service.

After July 15 he had no active part in the administration of medical affairs pertaining to the troops. His status now was that of ship's doctor and not transport surgeon. The transport surgeon was thus without authority of any description so far as the troops were concerned, the senior medical officer with troops aboard becoming the responsible officer. As a result, transport surgeons were told that they had nothing to do with troops, and the opinion was current among officers and troops en route that the transport surgeon was merely a fixture of the vessel, not intended to have any jurisdiction over the troops. But the transport surgeon was the only man with whom the debarkation officials had to deal when the ship arrived in England or France, and they held him responsible for the sanitary condition of the vessel and for the care of all the records and the sick, although he may have had no real authority throughout the journey in so far as the troops were concerned. The commanding officer of troops and the senior medical officer would quit the vessel immediately after the debarking troops, leaving the transport surgeon to straighten out irregularities for which he was not to blame. Each trip brought a new set of regulations, due to the rapidly changing personnel at all ports of embarkation, knowledge of which could not be ascertained until the vessel docked or anchored. This necessitated an entirely new set of reports each trip. This difficulty might have been eliminated by having a standard form for use in the American Expeditionary Forces in both France and England, and such a form was adopted toward the end of this period.

About August 1, it was decided to assign to foreign vessels carrying troops a transport surgeon whose status would be that of passenger, all his expenses being paid by our Government, but whose relation to the troops would be that of transport surgeon in so far as it was possible to maintain that relationship on commercial liners. This promised to be the ideal arrangement, for it provided for the permanent assignment of an officer to the ship who not only could study the problems which were peculiar to each vessel but also make himself well informed as to changes in regulations on each side of the water.

The difficulties, in so far as the vessels themselves were concerned, were that the type of ship and the facilities for caring for the troops were not uniform—in some, bunks were used; in others, hammocks; some had up-to-date sanitary appliances, and others appliances that were always out of order one day from port; methods for preparing food and messing the troops depended largely on the customs of the country to which the vessel belonged. The greatest difficulty in this period was due to an untrained personnel, who entered upon a field of work without precedent in the matter of regulations and of general orders governing the same.

During the period, November 11, 1918, to September 1, 1919, the transportation facilities were, in the main, the same as those used in the period, April 15 to November 11, 1918, except that the British vessels were gradually withdrawn from the service and replaced by French, Dutch, Italian, and Spanish vessels. The main difficulty of this period arose from the fact that, because of the return movement of troops, the ports of debarkation in Europe became ports of embarkation, thus necessitating a reorganization of their personnel; furthermore, the authorities there did not always avail themselves of the experience acquired by the transport surgeons. The latter frequently were overruled, and in many cases replaced, by order of a base surgeon or of the senior medical officer with troops, although the latter usually lacked adequate knowledge of the duties of a transport surgeon. There was confusion as a result, and many transports arrived in New York in a poor sanitary condition and with incomplete records.

A medical detachment, consisting of a transport surgeon, a sergeant, and four privates, was assigned to each of the foreign vessels carrying troops. They bore the same relation to troops as on the Army transports, but had the status of passengers and were provided with tickets to and from the ports of Great Britain and France. The surgeon was given commutation of quarters and the enlisted men were quartered and rationed in a near-by camp during such times as they were in foreign ports.

Two policies were in operation during this period: (1) The personnel was permanently assigned to a vessel as long as it continued to carry American troops. Vessels were withdrawn from the service at their home ports, and, according to the British Ministry of Shipping, it was only on the day prior to sailing from a British port that it could be decided whether or not a given vessel would carry American troops from France. This resulted in many of the transport personnel being returned as casualties when, had they been held for a little longer period, their services could have been utilized on vessels without a transport surgeon. There was less of this difficulty on ships other than British. (2) The personnel assigned to the transports was later removed upon arrival in European ports and sent to some such central port as Brest for assignment to any vessel carrying troops on which their services were needed. They were then returned from the United States to this central port by the first available transportation. They assisted in debarkation and embarkation during the interim in port, thus becoming thoroughly acquainted with the rules and regulations of each port.

On commercial vessels carrying troops, it proved to be the best policy to make the civilian ship's doctor a contract surgeon, a new contract being made each voyage. He was then always available in an advisory capacity, and the Government secured the use of instruments and appliances, so that it was not necessary to supply nonexpendable articles of this nature. The Army transport surgeon had his own way as long as the ship's surgeon was being paid by the Army, for rarely did the latter interfere, but there was little cooperation on his part when not so paid. In general, the personnel was satisfactory during this period.

HOSPITAL PROCUREMENT DIVISION

This division was organized in May, 1918, for the purpose of procuring suitable buildings in this vicinity for hospital purposes. On May 23, 1918, a representative body of real-estate men, all members of the Real Estate Board of New York, met and organized for the purpose of lending their aid, and as a result there was formed an advisory committee for this division. Altogether, more than 12,000,000 square feet of floor space were surveyed, of which some 7,000,000 were recommended or secured and the balance classified as not available or as unsuitable. The work of the division, as far as concerned the provision of suitable bed space at the port, was completed on April 23, 1919, when it was consolidated with the finance division (q. v., p. 303). Statistical records were turned over to the finance division and are included in its statistical report.

DIVISION OF DOMICILIARY HOSPITALS

Many offers of homes for the use of convalescent soldiers having been made to the Surgeon General of the Army and the surgeon of the port of embarkation, it was decided to make use of these offers as far as possible. To that end, a division of the port surgeon's office was established for the purpose of organizing and supervising a system whereby these places could be used. Six homes, with a capacity for 186 patients, were in use at the beginning of the fiscal year 1918; 14 other homes, with a capacity for 1,498 patients, had been offered but not yet accepted for use. The majority of these homes, or domiciliary hospitals, were closed in the fall of 1918, for various reasons, principally because there was no further use for them, but also because they were isolated and scattered over too wide a territory to be administered efficiently. Further need of a domiciliary hospital division not being apparent, it was discontinued.

SANITARY INSPECTION DIVISION

This division was organized for the purpose of making the various sanitary inspections at the port of embarkation which were required by existing regulations. During the first few months following the organization of the port, the work of this department was carried out by officers of the transport division. It was soon evident, however, owing to the rapid growth and development of the port and the increasing amount of work, that a separate division under the surgeon's office should be organized for the purpose of making the required inspections of transports, trains, and camps. This division was organized January 29, 1918, and had a maximum personnel of about 15 officers and 35 enlisted men.

The duties of the division were as follows: Inspection of hospitals and camps; inspection of transportation facilities; supervision of delousing for the port; supervision of infectious disease cases and contacts arriving at the port, and control of venereal diseases and venereal prophylaxis.

INSPECTION OF HOSPITALS

Sanitary inspections of the hospitals under the authority of the port of embarkation were carried on daily, Sunday excepted. A list of the hospitals visited, with the date of inspection, was made of record. These inspections embraced all the activities of the hospitals—the administration, the work of the various services, the care of the patients, and the general sanitary conditions. A specified form was filled out once a month at each hospital and then filed at the office of the port sanitary inspector. Defects were noted and recommendations made in a special report which was forwarded to the port surgeon. Special investigations were made of complaints in regard to the treatment of patients. An officer at each hospital was assigned as hospital sanitary inspector, who acted in conjunction with the inspectors from the sanitary inspector's division. The inspection of hospitals under the control of the port of embarkation was started in January, 1918. By February, 1919, the work had increased to such a degree that three officers with the rank of major were added to the personnel of the division as hospital inspectors.

The inspector was usually accompanied by the commanding officer or the hospital sanitary inspector in making an inspection at a hospital, and the following points were especially noted: Construction, organization, and administration; nurses; detachment of enlisted men of the Medical Department; barracks and squad rooms; registrar's office; dispensary service; dental service; medical service; surgical service; eye, ear, nose, and throat department; main and ward laboratories; genitourinary service; psychopathic service; communicable diseases; wards and care of patients; kitchen and mess management; exchange; laundry; medical supply department; quartermaster department and its ordnance section; fire protection; disposal of wastes; delousing; and general police of buildings and grounds.

The hospitals that were under the control of the port of embarkation and which were regularly inspected were as follows: United States Army Embarkation Hospital No. 1, Hoboken, N. J.; United States Army Embarkation Hospital No. 2, Secaucus, N. J.; United States Army Embarkation Hospital No. 3, Hoffman Island, N. Y.; United States Army Embarkation Hospital No. 4, 345 West Fiftieth Street, New York City; United States Army Debarkation Hospital No. 1, Ellis Island, N. Y.; United States Army Debarkation Hospital No. 2, Fox Hills, Long Island; United States Army Debarkation Hospital No. 3, Greenhut Building, New York City; United States Army Debarkation Hospital No. 4, Long Beach, Long Island; United States Army Debarkation Hospital No. 5, Grand Central Palace, New York City; United States Army General Hospital No. 1, Williamsbridge, New York City; Base Hospital, Camp Mills, Long Island; Base Hospital, Camp Merritt, N. J.; Jersey City Contagious Hospital.

CAMP INSPECTIONS

Monthly inspections and reports were made of Camp Merritt and Camp Mills. These inspections were made by the chief of the sanitary inspection division and the reports were made of record. The following points were particularly noted in making these inspections: Organization, efficiency, and equipment of sanitary units; statistics of sickness, communicable and venereal diseases; vaccination, typhoid and paratyphoid prophylaxis; water supply, sewage disposal, and disposal of wastes; drainage; adequacy of baths; adequacy and condition of kitchens and messing facilities; food supplies, including milk products and bakeries; examination of food handlers for carriers; exchanges; clothing; mosquitos and flies; delousing; and the general police of the camp site. The files of reports made to the commanding general show that these two camps, as a rule, were found in an exceptionally good condition.

INSPECTION OF TRANSPORTS

Prior to February 1, 1918, all sanitary inspections of transports were made by a representative of the port surgeon under the direction of the transport division. A board was appointed on this date, consisting of a representative from the Inspector General's Department, one from the shipping control committee, and an officer from the sanitary inspector's office representing the port surgeon. This board made a joint incoming inspection of all troop ships. The sanitary inspector on this board inspected all troop accommodations and ascertained if there were any deficiencies. The sanitary report was embodied in the board's report, and the latter was distributed to the proper authorities from the office of the inspector general. It was soon obvious that one board could not inspect all the vessels, owing to the great increase in the volume of business at the port. Arrangements were then made whereby the sanitary inspector could make his inspections independently of the board and increase the force of inspectors in proportion to the increase in the shipping. The sanitary inspector's reports were then forwarded to the inspector general's office and embodied in the reports of the board.

Numerous deficiencies were reported during the latter part of April, 1918, on British and Italian transports under the control of the British Ministry of Shipping. The British authorities claimed that deficiencies reported did not exist, as all ships under their control were equipped according to the requirements of British transport regulations. It was very apparent that a standard should be arrived at and agreed upon in order to overcome this difficulty. The sanitary inspector's office immediately prepared a specification and submitted it to the British and French authorities, and it was accepted by them. The British Ministry of Shipping worked in unity with this division thereafter and did their utmost to comply with recommendations made by the sanitary inspector.

After May 1, 1918, inspections of incoming vessels were made immediately upon arrival, and of outgoing vessels just prior to the embarkation of troops. These inspections involved all ships except those manned by the United States Navy. The shipping had greatly increased by this time, and this new manner

of inspecting doubled the work of the inspectors. It was therefore recommended that a harbor boat be furnished to inspectors to enable them to meet the ships promptly, as many vessels would lie at anchor for several days awaiting a berth at the piers. A boat was furnished on May 15, 1918, which greatly facilitated the work.

Incoming inspections usually were made as soon as the ship arrived in port and usually with a representative of the steamship line and an inspector from the British Ministry of Shipping or French High Commission, depending on the nationality of the vessel. In making these inspections, the inspector usually obtained from the executive officer of the ship a complete list enumerating the first and second class accommodations with available toilets and bathing facilities, troop quarters, sleeping and messing capacity, galleys, cold-storage capacity, fresh-water capacity, both general and isolation hospital beds, hospital equipment, medical and surgical supplies, wash basins, toilet seats, and shower baths available for troops. The inspection was then made, usually in the order specified, and all accommodations were checked, special attention being given to ventilation in sleeping quarters and hospitals, to location of hospitals, hospital equipment and surgical supplies, to latrines, their water supply and drainage, and to the galleys and galley equipment. Sanitary deficiencies or deficiencies in accommodations according to the accepted standard specifications were immediately reported to the representatives accompanying the inspector. The sanitary report of this inspection was made on a form giving a complete list of all accommodations, the general sanitary condition of the ship and, under "Remarks," any deficiencies or any remarks pertaining to sanitary conditions would be noted and appropriate recommendations made. Twelve copies of this report were made and distributed to the proper authorities. Each inspection was also recorded on a card. This card was made in duplicate and filed in alphabetical order, giving the name, nationality and location of the vessel, date of inspection, name of inspector, troop capacity deficiencies, remarks, and recommendations.

Outgoing inspections were made on the day of embarkation a few hours before the troops came aboard. The inspector had a record of the last inspection and inquired from the executive officer of the ship if there had been any changes or alterations in the troop accommodations since the last inspection. Any changes were noted and checked while making the inspection. This inspection was made in the same manner as described for incoming inspections. Special attention was given to the crew, hospital equipment, medical supplies, and first-aid kits for the lifeboats. The report of this inspection was submitted on a form showing the deficiencies present and the date of previous inspection and existing deficiencies, if any, at that time. It also stated whether or not previous recommendations had been complied with, and if not, the same recommendations were again made.

Initial inspections of United States Navy ships were made with a representative of the port inspector, whenever this officer was notified by the naval authorities that a vessel was equipped to transport troops and was ready to be inspected. These inspections were made in the same manner as described for incoming inspections, and the same form of report was submitted. This inspection was the only one made on naval transports.

After the armistice was signed an immediate joint inspection of all Army and commercial transports arriving at this port with military passengers was made. These inspections were made with a representative of the vessel, the commanding officer of troops, an officer from the port inspector's office, and the port sanitary inspector. As regards the sanitary inspection, the transport surgeon was interviewed and inquiries were made as to the number and classification of patients, the method of isolating contagious diseases and contacts, the provisions made for the care of insane patients, and the general care of all patients. Any complaints made by the transport surgeon were noted and immediately investigated. The sanitary inspector then visited the hospitals, and the patients were asked if they had any complaints to make. Particular attention was given, in the isolation ward, to the method of sterilizing dishes and other articles handled by contagious patients. After having obtained the above information, the sanitary inspector made the regular inspection with the commanding officer of troops, an officer of the ship, and a representative of the port inspector. All troop accommodations were carefully inspected and, if the troops had left the vessel dirty, a detail of them was immediately ordered by the port inspector to return to the ship and correct this condition. If the hospital was found dirty or untidy, the sanitary inspector required the Medical Department men on duty in the hospital to correct the conditions before leaving the ship. Reports of these inspections were made on a form similar to the form used prior to this date on incoming inspections. These reports mentioned the sanitary condition of all troop accommodations and the general sanitary condition of the vessel. Under "Remarks" were noted the medical personnel, number of patients, care of patients, method of caring for insane, and any sanitary deficiencies or deficiencies in accommodations, with appropriate recommendations.

HOSPITAL TRAIN INSPECTIONS

All railroad equipment used in the transportation of the sick and wounded from the port of embarkation to the various hospitals throughout the country was inspected by a sanitary inspector from the port surgeon's office. The passenger cars used during the summer and early fall of 1918 consisted mostly of Pullman and tourist cars. Special attention was centered upon the complete equipment of these for the comfort of the patients. The cars were thoroughly cleaned and amply supplied with linen and bedding. Sanitary conveniences were provided. Analyses of the water carried were frequently made and water pollution was guarded against. All drinking-water tanks were scalded with live steam for five minutes on the day before use. Adequate medical supplies were carried on each train.

The addition of hospital trains and hospital unit cars gave greater comfort to the patients because of the trained personnel on each. This equipment was carefully inspected prior to receiving patients. Special attention was paid to the cleanliness of the kitchen and to the messing facilities. An adequate food supply was carried on each, and this was carefully inspected for its quality, quantity, and preparation.

CONTROL OF LOUSE INFESTATION

Inspection of all men prior to embarkation for the presence of vermin or contagious diseases was begun in January, 1918. In February the camp surgeons were warned that a case of typhus fever had been certified by the public health officials in Boston and that efforts for the detection of vermin on all troops should be made stronger. In April, 1918, a report from the American Expeditionary Forces indicated that from 30 to 50 per cent of all troops then landing in Europe were louse infested. Recommendation was made that all ships be fumigated prior to embarkation and that universal delousing be practiced before the men were sent to the port. The infestation with lice prior to arrival in Europe was investigated by two experts. This investigation covered the course of the troops from the time they left the training camp until after their arrival in Europe and included troop camps, embarkation camps, hospitals, port of embarkation, transports, and the rest camp in Europe into which the men were evacuated from the troop ships. It showed that one-half of 1 per cent of the men arrived at the port infested with lice and that the men were being delivered in Europe practically louse free, that the rest camps in Europe were universally infested, and that a very large per cent of the troops in Europe were infested. In the summer of 1918, a visiting sanitary inspector made recommendation to the Surgeon General that all troops returning from abroad be deloused before being admitted into the United States. This report, with recommendation, was forwarded by the Surgeon General to the port surgeon for remark. The outcome of the correspondence was a recommendation made by the Surgeon General for the installation of delousing plants in all camps and particularly in those to which troops would likely be sent upon arrival from abroad. Recommendation was made at the same time to the commanding general, port of embarkation, based upon the original report, that preparation be made at the embarkation camps for the delousing of troops returning to this port. In giving study to the situation, it was seen that, when the war ceased, the stream of travel that had been going from this country to Europe would be reversed, and that troops and all classes of civilians would then be traveling in this direction. In view of the fact that almost the whole of Europe had been engaged in the war, it was thought that no class of civilians returning could be treated as free of lice, since all would be coming from the zone of infestation, whether they were camp followers, were engaged with the Army, or had remained in the rear area and assisted in the care of the soldiers who returned sick or wounded from the front. The problem seemed to resolve itself into one of general public health and seemed to belong to the Department of Public Health, since the Army could control only people who were identified with the Army and could not exercise restraint or enforce its orders upon the various welfare workers after their arrival.

On their return from the inspection trip of the debarkation camps of France, both of the officers above referred to, reported that a considerable percentage of louse infestation was found in the various camps inspected. Along the line of possible infestation of common carriers, such as troop ships and railroad equipment, the Surgeon General, United States Public Health Service, had an investigation made, by one of his entomologists, of railroad coaches immediately

after the detrainment of troops, which were later proved to have been heavily infested with *Pediculi vestimenti*. This officer reported that in no instance were body lice or eggs found in the coaches inspected. This, together with numerous reports of inspections made of bedding on troop ships, absolutely discounted the theory that common carriers might have been a source of transmission of lice from man to man.

The disadvantages first experienced in the use of steam sterilization were expected, namely, shrinkage of the clothing and wrinkling to such an extent that it was difficult to make the uniforms again presentable. This method, however, was adopted by the Surgeon General's Office and proved to be exceedingly efficacious when carefully carried out. In this connection it is worthy of note that exhaustive experiments with the use of dry heat for delousing were carried out and the conclusion was reached that this method was imperfect and impractical.

Shortly after the armistice was signed, instructions were issued to the camp surgeons of Camp Mills and Camp Merritt to institute disinfection of railroad coaches used for transporting troops from the ships to the camps. This was accomplished by spraying the seats, floors, and walls of the cars with a 2 per cent cresol solution. This measure was instituted largely to forestall public adverse criticism, as it was considered that it was practically impossible to transmit the body louse through the intermediary of railroad coaches. This system was changed later to the use of vacuum cleaning of the cars immediately after the detrainment of the troops.

On November 19, 1918, in view of the fact that construction on the delousing plants which had been ordered installed at Camps Mills and Merritt was still pending, an officer was ordered to proceed to Washington, D. C., for a conference with the Surgeon General on the delousing plan for the port of embarkation. It was recommended to the Surgeon General and the chief of embarkation that a central delousing plant be constructed near the piers at Hoboken and that all troops pass through this plant prior to entrainment for the debarkation camps. This recommendation was disapproved. Orders were issued by the War Department to the construction quartermaster in the above mentioned camps to proceed immediately with the construction of the plants already authorized. As troops were expected to arrive from overseas at any time, it was deemed advisable to take immediate steps to install some type of temporary delousing machinery. The Surgeon General released to the surgeon, port of embarkation, Hoboken, 45 portable disinfectors which were in Hoboken awaiting shipment overseas. These machines were distributed between Camp Mills and Camp Merritt and were installed in temporary buildings for the purpose of delousing the first contingent of troops to return from France. The first temporary delousing plant was placed in operation in Camp Mills, Long Island, on December 4, 1918, and consisted of 25 portable steam disinfectors placed under a roof adjacent to an old, discarded bathhouse. The temporary plant at Camp Merritt, consisting of 15 portable steam disinfectors, was placed in operation on December 9, 1918, in approximately the same type of building. At this camp, however, a near-by barrack building was used to furnish dressing and undressing rooms, with a covered runway leading to the bathhouse. The

first permanent plant was placed in operation at Camp Merritt, N. J., February 1, 1919. The permanent plant at Camp Mills was opened on February 15, 1919.

The number of troops that passed through the port of embarkation, Hoboken, from service overseas from the opening of the port to June 30, 1919, was 1,788,785. After the institution of universal delousing of all troops returning from overseas in 1918, there were reported only 13 cases of infestation with *Pediculi vestimenti* that were found on examination of these troops in the camps of the interior. In addition to these, a very small number of patients evacuated from the debarkation hospitals of this port were later reported to have been found louse infested. Investigation, however, failed to fix the responsibility on the debarkation hospitals.

It was deemed advisable to require a careful examination of the troops passing through Camp Mills, Long Island, in order to furnish figures on which to base relative statistics as to the degree of infestation to be found in the troops returning from overseas. In view of the fact that this examination was more or less inaccurate and time consuming, it was not considered advisable to have all troops examined when the orders required universal delousing. The examination of troops was therefore not carried out at Camp Merritt. Of a total of 238,219 troops who passed through the delousing plant at Camp Mills during the months December, 1918, to May, 1919, inclusive, the following were percentages of infestation: *Pediculi vestimenti*, 1.75; *Pediculi pubis*, 1.22.

From the experience gained at the port it was the opinion that, in installing delousing machinery in the future, considerable saving to the Government might be made if the machines were fitted with suitable racks to hold coat hangers, and that all clothing to be placed in the machine be hung on these hangers. The practice in the delousing plants of this port of placing the clothing in barrack bags and packing the carriage of the machine full of these bags was found to cause such a degree of wrinkling that it was practically impossible to again press the clothing so that they would be presentable. Steps were taken on December 30, 1918, to have racks installed for coat hangers in a delousing machine in use in Hoboken.

CONTROL OF INFECTIOUS DISEASES

The control of infectious diseases at the port of embarkation was a very important factor in safeguarding the health of the troops while on board the transports. Daily inspections were required, and special emphasis was placed upon the early recognition and isolation of suspected contagious cases and the segregation of contacts. A liberal interpretation was made of the definition for a communicable disease contact so as not to interfere with the troop movement overseas. Any soldier who had been protected by a previous attack of a contagious disease was not held in detention by reason of being a contact in that particular disease. The number of cases of communicable diseases brought to the port with organizations necessitated the opening of a contagious disease hospital at Secaucus, N. J., to which were sent cases and suspects among the the embarking troops. Rigid isolation measures were instituted and carried out. The patients wore masks in ambulances, and at all other times except when they were in beds in cubicles. The attendants were constantly masked and

gowned. All fomites were carefully disinfected. Cross infection was prevented by using different ambulances and special attendants in the hospitals for the various diseases. The contacts and suspects were sent to the embarkation camps and placed in quarantine, where they were closely watched for the appearance of contagious diseases.

In the base hospital at Camp Merritt and at Camp Mills, all patients admitted had throat cultures taken for diphtheria. A great many carriers were found. These were treated with 4 per cent argyrol or 1 per cent silver nitrate twice daily, and a gargle of Dobell's solution was used. The carriers promptly cleared up under this treatment.

Measles complicated with pneumonia constituted the chief menace to troops at the port in the winter and spring of 1918. Some of the transports manned by the Navy instituted the routine measure of spraying the nose and throat in commands from which cases of measles had been detained.

The influenza epidemic in the fall of 1918 greatly overtaxed all the hospital facilities at the port. This virulent type of influenza was recognized as early as May, 1918, on the British commercial transports hailing from Liverpool, but the danger was not realized until August, when the port surgeon recommended a reduction in troop carrying capacity on the transports and more rigid physical examinations. All influenza cases and contacts were eliminated, as far as possible, at the embarkation camps. Temperatures of all men were taken and all with a temperature above normal were detained. Special precautions were taken for the isolation of cases and contacts. These wore masks constantly and patients were placed in beds in cubicles. Special hospital trains were run from the port to various base hospitals to transfer the large number of cases that accumulated. The troops in the embarkation camps were not allowed passes. Special attention was given to crowding. The minimum amount of floor space for each man was 50 square feet and men slept head-to-foot. Mess contamination was guarded against by thoroughly boiling all mess equipment after each meal. The transports were disinfected prior to the embarkation of troops. The capacity was reduced 20 per cent, while the hospital bed capacity was increased from 2 to 10 per cent. Some of the troop ships were equipped with steam inhalation rooms. These did not meet with any great success because of the tendency to chilling after treatment. The reduction of troops carried on each transport did not decrease the percentage of influenza en route, for the least crowded transports were sufficiently crowded to afford the maximum exposure. The total number of influenza cases treated at the port reached the neighborhood of 17,000. Four thousand of these developed pneumonia.

The signing of the armistice was soon followed by an influx of troops from overseas. A new problem presented itself in the reception of large numbers of diphtheria cases and carriers among the returning sick and wounded and the troops. All patients admitted to the debarkation hospitals had throat cultures taken before being admitted to the wards, thus many carriers were found who otherwise would have escaped detection. A hospital ship, the Steamship *General O'Reilly*, was used in the care of these contagious cases. In addition, wards at Debarkation Hospital No. 1, Ellis Island, accommodated the overflow.

The fumigation and disinfection of transports did not become a function of the sanitary inspector's office until April 17, 1918. It was the policy of that office to recommend fumigation for the destruction of rats, and for that purpose only, and then only in case a vessel was actually infested with rats or there was reason to believe that a vessel might have had plague-infected rats on board. The office was called upon to make numerous special inspections of vessels when fumigation had been recommended by the ship's officers. In only one instance did the office concur in their recommendations. Cyanide gas was the only fumigating agent used by this department, and it proved very satisfactory. Only three hours were required to fumigate a vessel of 8,000 or 10,000 tons by using fans for ridding the holds of the ship of gas. During the height of the influenza epidemic, all troop quarters formerly occupied by influenza patients were required to be sprayed with a 2 per cent phenol solution. After November 11, 1918, all troops quarters were similarly sprayed for the destruction of lice. All foreign ships were disinfected by the owners, United States Naval ships by the naval authorities, and United States Army transports by the sanitary inspector's office. A summary of this work from February 1, 1918, to August 1, 1919, shows 1,483 vessels inspected, 87 vessels disinfected, and 7 vessels fumigated.

CONTROL OF VENEREAL DISEASES

The importance of preventing men with venereal disease from going overseas was recognized from the first. Provision for the treatment of such cases was made, and the offer of the New York State authorities of the use of Hoffman Island as a venereal hospital was accepted. The cases sent there were the ones which had not been detected at the embarkation camps.

All troops were examined daily after receiving sailing orders, and all cases of venereal diseases were detained at the camps where the examinations were made. By September, 1918, there was a daily average of 200 to 300 such detentions. The large number of venereal cases under treatment at the base hospitals under port jurisdiction made it imperative to have a specialized, highly trained venereal service to treat this type of disease and reduce the number of days spent in the hospitals. The hospitals were being crowded with influenza cases at about that time, but the venereal cases were segregated and held until cured.

A new problem presented itself after the signing of the armistice: Though every effort was made in the American Expeditionary Forces to prevent men with venereal disease from embarking for the United States until cured, relatively large numbers of such cases did reach the port of embarkation at Hoboken. These cases, if held at the port, would soon have so overcrowded the hospitals that no beds would have been left for other sick and wounded. The troops, therefore, were examined en route, all cases of venereal disease were recorded and treated on the transports, and those who could walk accompanied their organizations to the camps, where they were segregated and held until cured. The litter cases were placed in debarkation hospitals.

HOSPITAL DIVISION

The hospital division was created on June 1, 1918, by verbal orders of the surgeon. (This should not be confused with the hospital procurement of buildings suitable for hospital and other medical purposes). In brief, the functions of the hospital division were the supervision of all hospital activities and coordination of the efforts of the directors of the various professional services. The chief of the hospital division did not maintain an office of record, the activities of his office being covered in the reports from the various hospitals.

DIRECTOR OF SURGICAL SERVICE

The order creating the office of director of surgery for the port was issued December 8, 1918. There were 13 hospitals under the jurisdiction of the port at that time, and the wounded were beginning to arrive very rapidly. It was at first the duty of the director, as the representative of the surgeon of the port, to visit the different hospitals and to consult with their commanding officers and advise their chiefs of surgical services as to the treatment of the wounded.

Surgical cases came in very rapidly for a considerable time and there were many very seriously wounded men among them. All hospitals under the port, with the exception of General Hospital No. 1, were either embarkation or debarkation hospitals and not intended to be treatment hospitals, except to give the necessary care during the few days the patients were to remain before being sent on to hospitals nearer their homes for definitive treatment. However, since many serious cases requiring special attention were received, particularly at Debarkation Hospital No. 3, it soon became evident that a treatment ward where a number of cases could be kept until they were sufficiently improved to travel was a serious need. A ward containing 63 beds was opened for this purpose. The wisdom of this move was soon apparent, and it resulted in the saving of a number of lives. The same condition was later found to exist when large numbers of patients were being sent to Debarkation Hospital No. 5, and a treatment ward was opened there with equal advantage.

Large numbers of fracture cases were returned during the early months of 1919, most of them wearing the Thomas splint, and information was sought as to whether patients wearing these splints traveled comfortably. Many transports were visited and the men were interviewed before being removed. As a result only one man was found who said he had not traveled comfortably, and but one ship's surgeon who did not think it the best apparatus for the purpose that had yet been found. This was very gratifying, as every effort had been made by the Medical Department to secure the best apparatus for this purpose and the Thomas splint had been selected after much investigation.

DIRECTOR OF MEDICAL SERVICE

The director of medical service for the hospitals under the supervision of the surgeon of the port of embarkation reported for duty on August 20, 1918. The duties of this office included general supervision of the medical service of the hospitals of the port; representing the surgeon of the port in consultation with commanding officers of the port hospitals pertaining to the conduct of the medical services of these hospitals; acting in an advisory capacity to the

chief of the medical service of each hospital in regard to the diagnosis, management, treatment, and disposition of medical cases; cooperating with the personnel officer of the office of the port surgeon in regard to the staff of the medical service of each hospital; acting as medical consultant to all of the port hospitals. Later, the director of medical service was assigned the duty of determining the disposition to be made of cases of critical illness arriving on transports from overseas. In this connection, arrangements were made with the United States Navy surgeon in charge of the Navy medical work at the port of embarkation whereby cases arriving on Navy transports in a critical condition were held on board ship and cared for by the United States Navy surgeon until their condition warranted transferring them to a port hospital. When it was found necessary to hold the critically ill on board commercial transports, medical officers, nurses, and enlisted men were provided for these cases by the port surgeon's office. Especially in connection with the care of pneumonia, it was found that this plan materially reduced the mortality rate as compared with the plan of transferring such cases to hospitals upon the arrival of the transport.

DIRECTOR OF NEUROPSYCHIATRIC SERVICE

The director of the neuropsychiatric service reported for duty on July 14, 1917, and was designated by the surgeon of the port of embarkation as his personal representative to direct all the neuropsychiatric activities at the port. The duties of the office were to advise, assist, and cooperate in the organization of a special hospital for the care and evacuation of nervous and mental cases; to organize and establish special wards in various hospitals within the port for the brief and temporary care of such cases; to make official visits and act as consultant, and to assist and advise with the commanding officers of the various hospitals in the examination, classification, and general care of nervous and mental patients; to examine and report special psychiatric cases that might arise within the port, including the mental examination of those who were charged with criminal offenses and in whom the question of mental responsibility arose; to advise the personnel officer in the office of the port surgeon in the assignment of medical officers having neuropsychiatric training to various hospitals as the necessity required.

Because of the special and technical character of the work, the relation of the director to the neuropsychiatric service in the port, and particularly to the special hospital, Ward 55 (Messiah Home), General Hospital No. 1, had, of necessity, to be very intimate.

Owing to the fact that nervous and mental patients were returned in large groups, the accommodations at the special hospital (Messiah Home) proved temporarily inadequate and, at various times, many of the milder cases had to be distributed to other hospitals until evacuated, which complicated the work of the division considerably. Notwithstanding this, in a service which is fraught with danger and where accidents, injuries, abuses, and complaints are frequent, such occurrences were happily rare. In fact, such difficulties were much less than are encountered in well-established, permanent civilian hospitals for the insane. This was largely due to the efficiency, ability, and conscientious watchfulness of the medical officers in the neuropsychiatric division.

DIRECTOR OF ROENTGENOLOGY

The director of roentgenology for the port of embarkation was designated October 17, 1918. His duties included general supervision of X-ray service at the various hospitals of the port; consultation with commanding officers of the port hospitals relative to the conduct of the X-ray service; acting in an advisory capacity to the chief of roentgenology at each hospital.

LABORATORY DIVISION

The first laboratory to be opened within the area of the port of embarkation was that of the camp hospital at Camp Mills, Long Island. Personnel and facilities were very limited. Two medical officers were sent there from the Army Medical School, Washington, D. C., when two cases of epidemic meningitis developed in September, 1917, and much of their investigative work had to be done at the Rockefeller Institute for Medical Research. When Camp Mills was closed in December, 1917, the base hospital at Camp Merritt was about ready to open. The laboratory there was likewise at first inadequate, and it was necessary to obtain assistance from the Rockefeller Institute, Cornell University, and the New York City Board of Health. This laboratory was enlarged and established an efficient service in February, 1918, sufficient to do all the work required by the camp.

Laboratories were established in the majority of the hospitals in the port area as they were opened. When Camp Mills was reopened in April, 1918, the laboratory service there was so inadequate that the Camp Merritt laboratory undertook to perform the necessary work. Not until June, 1918, was a laboratory division of the port surgeon's office established. A central laboratory for the port area was opened in the Greenhut Building, New York City, in August, 1918, and was designated United States Army laboratory, port of embarkation, Hoboken.

The functions of the laboratory division were to assist in the rapid embarkation of troops and debarkation of patients in such a manner as to minimize the danger from disease and to assist in the care of the sick. Laboratory aids to the diagnosis and treatment of communicable diseases constituted the bulk of the work. To best accomplish these functions, it was deemed essential to have all laboratories in the area well equipped and manned, to be able to shift equipment and personnel, and have a separate unit for the central laboratory. Rapidity and accuracy were necessary if the troops and patients were to be kept moving. The division gave such assistance to the port surgeon as was possible on questions that pertained to the laboratory service and in the control of communicable diseases; coordinated all the laboratory work necessary in the various hospitals, camps, and posts in these headquarters; operated a central laboratory, essentially as a department laboratory where all Wassermann tests, all microscopic section work and chemical work and such other examinations as could not be well done at the local laboratories were done; furnished officers, technicians, personnel, and emergency supplies and provided laboratory animals and therapeutic sera; cooperated with the sanitary inspector of the port, making such investigations, examinations, and reports as were necessary.

One of the early steps taken in organizing the laboratory service was to send a letter to all hospitals which prescribed that certain supplies should be kept on hand at all times, gave directions concerning certain examinations, and required a daily report concerning laboratory personnel and communicable diseases. This report was made by telephone, and the information it contained was transmitted to the sanitary inspector. Since the activities of the port sanitary inspector were often related to the laboratory work, provision was made for the necessary cooperation. A consolidated monthly report of the activities of all laboratories in the port area was made to the Surgeon General.

The Army laboratory actually began to function in a manner similar to a department laboratory about October 1, 1918. A service was initiated at this time by which all Wassermann tests, microscopical examinations of pathological specimens, chemical examinations of water, sewage, etc., for the port area, were made at the Army laboratory. It also supplied laboratory animals and culture media and sera upon occasions. Advance information was obtained from the liaison officer, after the signing of the armistice, as to the number and time of arrival of debarking troops and as to the number of accompanying sick which would be sent to the various hospitals in the port area. This information was then telephoned to the laboratories of the respective hospitals.

The laboratory was also used as an instruction center. Monthly conferences were begun early in 1919, primarily for chiefs of hospital laboratory services, and an instruction course on intestinal parasites was given to selected officers of the laboratory service, one from each hospital. The services of experts in nutritional subjects and sanitary engineering were available. This was replaced in May, 1919, by two broader courses—one consisting of the regular duties in the laboratory, and other of lectures and class work in clinical microscopy, bacteriology, parasitology, and immunology. Circular letters were sent out from time to time giving data concerning certain diseases or conditions which might be expected at any time, variations encountered in performing certain tests, etc.

While the Army laboratory was intended primarily to furnish service for the port area only, a large proportion of its work originated in outside sources.

The laboratories in the port area differed much from those at the cantonments as regards buildings, personnel, and character of work necessary. They had to be prepared for anything, for troops came from everywhere, and further modifications were necessary with the debarkation and evacuation of patients from overseas. It was usually necessary to use for laboratories such space as might be available in the buildings taken over, the personnel had to be trained, and all of the work had to be quickly and accurately done, so that neither troops nor patients would be held up and patients could be properly treated. It was necessary to keep informed on the status of communicable diseases in the cantonments in the United States and in hospitals overseas, in order to have advance warning of the possible arrival of cases of epidemic diseases.

The first laboratories were small and poorly equipped. Much versatility and much hard work were necessary in order that the laboratories could fulfill the requirements, but usually, due to the freedom with which supplies and personnel could be shifted within a very short time, adequate facilities and

personnel were available. The space, arrangement, equipment, and personnel in the laboratories was a source of great comfort, satisfaction, and assistance to the port surgeon, the camp surgeons, and commanding officers of the hospitals. The laboratory space at the Army laboratory was over 6,000 square feet; the laboratories at the base hospitals at Camp Merritt, Camp Mills, and Camp Upton, and at Debarkation Hospital No. 2, were ultimately very large and commodious.

Most of the laboratories were equipped to care for themselves, except at Embarkation Hospital No. 4 and Debarkation Hospitals Nos. 4 and 5, which obtained prepared materials from the Army laboratory. Ward laboratories were but little used, and, where tried, proved an absolute failure. Every hospital had an autopsy room and, at all but Camp Merritt, there were good refrigerating plants for the storage of cadavers. There were room incubators in most of the laboratories, heated by electric carbon bulbs. Some of these incubators were built by the laboratory staff and others by the construction department.

Practically the same system of records was kept in every laboratory. There was always a receiving clerk who received specimens and made an entry on the daybook showing the name, rank, organization, and ward of the patient, the character of the specimen, and by whom it was to be examined. The form was then put on the "unfinished" file. After the examination was completed, the examiner noted the results in his protocol and put the form on the "finished" file. The result was then recorded in the book by the receiving clerk and the daybook marked to show that the report had been completed. The form was then signed by the officer in charge and the form put on the file "ready for delivery." Messengers then delivered the reports. Only at Debarkation Hospital No. 2 was the duplicate system used, the record book giving a more permanent and workable record.

A more elaborate system of records had to be developed at the Army laboratory. Enlisted men were trained to make blood counts, urine examinations, and throat cultures, and some developed into experts even though they had previously had no laboratory experience.

The personnel consisted of medical officers, Sanitary Corps officers, contract surgeons, women technicians, and enlisted men. The medical officers first assigned had had previous experience; later, medical officers and Sanitary Corps officers who had taken courses at training schools were assigned. The contract surgeons all were experienced in laboratory work. The technicians generally had had courses before assignment. Some of the enlisted men assigned had had special courses, but there were many who had not.

While an effort was made to unify all of the work in the laboratories, this attempt pertained particularly to getting accurate and early reports, and each chief of a laboratory service was left much freedom as to the details he employed to get the results. It was the general opinion that it was an asset to have officers with at least the rudiments of military training, that special courses were not necessary to make bright and intelligent officers, women technicians, and enlisted men of the greatest value to the laboratory service. In fact, a smattering of laboratory knowledge often unfitted them for a time for doing

good and efficient work. Sanitary Corps officers proved of much value. Women technicians could not replace enlisted men, nor were they as orderly and exact as one might have expected them to be. It must be stated, however, that some were very competent and that all were very willing and faithful and lost but little time from work. Enlisted men did not do well after special laboratory courses.

SPECIAL INVESTIGATIONS

The laboratories of the port of embarkation served in most diversified manners. It was the port's first purpose to get as many individuals overseas as was possible; its second, to cure as many of the sick as was possible; later, to receive and to evacuate to the interior as fast as possible. It was therefore necessary to separate from the main body those soldiers who were a source of danger. Had dependence been placed upon the "contact system," the port would have been so tied up with detained troops in the camps that embarkation of troops would have been interfered with, for nearly all embarkation troops arriving on trains were "contacts." The actual carriers were picked out in every type of disease where it was possible; the efficiency of this will be seen later.

In the embarkation hospitals, it was essential to help in diagnosing disease, to help detect those not fit for active duty, and to keep contagion from spreading. In the debarkation period, the laboratory again had to help select out carriers of infectious disease found in the camps and hospitals, to help in the diagnosis and treatment of the sick and wounded, and to be of such assistance in the preparation for surgeon's discharge for disability as was possible. In addition, it tried to determine whether or not our troops had become carriers of the typhoid-dysentery group of bacilli and of amebæ and other intestinal parasites. All of this work had to be done promptly, completely, and with the greatest accuracy. Delay meant holding up the processes of embarkation and debarkation. Never were these processes interfered with in any way whatsoever.

EPIDEMIC MENINGITIS

The first cases of meningitis occurred at Camp Mills in September, 1917, and there were always cases among the embarkation troops from that time on, 83 in all. There were 61 cases in debarkation troops prior to July 1, 1919.

Whenever a case of meningitis occurred, all exposed persons were cultured and the carriers removed so that the others need not be held up in transit. The carriers were held until three successive negative cultures were obtained before being released. No cases of meningitis occurred in troops cultured after cases had occurred. Out of the 158 embarkation carriers detected, 3 developed clinical epidemic meningitis.

DIPHThERIA

Diphtheria was definitely an Army disease in the embarkation and debarkation days. Troops from certain camps in the interior and from the American Expeditionary Forces were heavily infected. At the base hospital, Camp Merritt, from March, 1918, to September, 1918, 2.36 per cent of the patients

admitted had diphtheria bacilli in the throat. Patients returning from overseas showed 1.26 per cent diphtheria bacillus infection up to May 15, 1919. The frequency of the occurrence of the disease in the port hospitals was a grave factor, for 5.76 per cent of the medical personnel in February, 1919, were carriers. It was necessary to culture the hospital personnel frequently to limit the spread of the infection. As a result of the frequency of clinical cases, deaths, and carriers, the plan was adopted to take cultures at the receiving offices of all patients admitted to the hospitals. With this precaution the disease remained under good control.

ANTHRAX

The first case of anthrax occurred at Camp Merritt, on April 10, 1918. The lesion was on the face. Another case occurred on May 4, 1918. This soldier had anthrax bacilli in the spinal fluid, which was bloody. He died. It was not decided whether or not it was a meningitis. There were 15 cases in men from the 91st Division in July. In addition, a number of soldiers from the 91st Division had what appeared clinically to be anthrax pustules, but no anthrax bacilli were found on examination, and it was deemed inadvisable to produce further trauma by persistence of the search for the organisms.

All of the pustules were on the face or neck where shaving was done, and nearly all gave a history of having cut themselves while shaving. Only one patient died. He walked into the hospital, had convulsions that night, and, when a lumbar puncture was done, a dark bloody fluid containing many anthrax bacilli, some in the spore stage, was found. Blood cultures were made in every case, using 2, 3, and 5 c. c. of blood per 100 c. c. of broth. In only one case were the organisms recovered from the blood. All of the patients had local cauterization, either by injection of phenol or by the actual cautery, and, in addition, a large intravenous injection of antianthrax serum. The actual cautery was preferred to phenol injections, the local condition clearing up more quickly under its use.

While shaving brushes, soap, and talcum powder were all regarded with suspicion, it seemed evident from the cases in the 91st Division that shaving brushes were responsible. Brushes had been issued at Camp Lewis about June 22 and the troops left there about June 24, and it was assumed that the issued brushes were used from the former date. The sanitary inspector of the division reported that one case of anthrax occurred prior to the departure of the division from Camp Lewis. That the face powder was not the source of the infection seemed evident from the fact that some 40 different varieties were used by the men of one company of the 361st Infantry, and at least one man affected had not used any powder at any time.

Shaving brushes, soaps, and talcum powder used by the patients from the time of the occurrence of the first case of anthrax at the port and those obtained from the quartermaster were examined both in culture media and by animal inoculation, but no anthrax bacilli were found. Obtaining anthrax from these sources was difficult because of the occurrence of the hay bacillus.

Cases of anthrax pustules on the face developed at Camp Mills. No new cases occurred following the general order to sterilize all shaving brushes before

issuing, except one at Camp Mills, in May, 1919. This soldier had been issued a brush in December, 1917, at Camp Upton, had been overseas, but had not used his issue brush until again in the United States, and then he contracted anthrax infection.

As some shaving brushes of certain makes were found to be infected with anthrax bacilli, no brushes except those from designated manufacturers were later issued. For sterilization, 10 per cent formalin at 110° F. was used for 4 hours. Over 80,000 shaving brushes were sterilized.

There were 2 deaths due to the disease in over 50 infections.

PNEUMONIA AND EMPYEMA

The types of pneumonia and empyema that prevailed at the port hospitals represented those found at the various camps, as troops came from practically all of the camps. Particular attention was paid to the two chief varieties of the disease, namely, lobar and bronchopneumonia. While there were many contributing factors, the chief exciting causes appeared to have been pneumococci and hemolytic streptococci. Other organisms were present, such as nonhemolytic streptococcus, influenza bacillus, and a Gram-negative bacillus. The chief concern was with the *Diplococcus pneumoniae* and the *Streptococcus hemolyticus*, for it was believed that the former produced most of the acute lobar pneumonias, such as were seen in civil life, and the latter produced a special variety of bronchopneumonia, sometimes called interstitial bronchopneumonia. A few cases were found at necropsy where a combination of the two types of the disease occurred with a mixed infection of pneumococcus and streptococcus. It was more than likely that one or the other of the diseases was primary, producing its type, followed later by a secondary infection and subsequently developing another variety. The clinical features of these combined pneumonias seemed to bear out this contention, and probably this was the only means whereby an early diagnosis as to which variety was primary could have been determined.

INFLUENZA

Though the epidemic of influenza began September 15, 1918, work on the etiology of the disease had been done before this. On October 8, 1918, the following report was made to the Surgeon General, United States Army:

OFFICE OF THE SURGEON, PORT OF EMBARKATION,
Hoboken, N. J., October 8, 1918.

Results of laboratory investigations on epidemic influenza in the various stations of the port of embarkation:

Since July, ships returning from European ports have had epidemics of influenza on the voyage. From the first these were investigated, but usually all the men had recovered by the time New York was reached. Cultures were made from the nasopharynx, tonsils, and sputum, and influenzalike bacilli were found in about 50 per cent of the cases. In addition, streptococci, hemolytic and nonhemolytic, and *Micrococcus catarrhalis* were found at times.

Investigations in the camps and hospitals in the port of embarkation were begun as soon as cases appeared. The methods and technique had first to be developed and the amount of material that required examination was so large that some time was required to evolve reliable and suitable methods to get all the information desired. With a fairly uniform technique in the various laboratories in these headquarters our results have still varied consider-

ably, largely due to the fact that our troops are only transient and come from all the cantonments and camps of training. Our investigations have been concentrated on (1) nose and throat cultures of influenza patients so that those patients with similar infection might be segregated; (2) study of the cultures from pneumonia sputa; (3) blood cultures; (4) investigations at autopsy; (5) white blood cell and differential counts.

(1) *Nose and throat cultures.*—During the winter and spring when many nasopharyngeal cultures were made for the detection of meningococcus carriers, influenza bacilli were so frequently found that surprise was often expressed that the disease influenza did not exist. In this epidemic, however, influenza bacilli have been less frequently found in the nasopharyngeal cultures. In all over 5,000 cultures were examined.

The results vary markedly, influenza bacilli being found in from 4 per cent to 90 per cent of the cases, hemolytic streptococci in from 1 per cent to 90 per cent of the cases, and pneumococci in from 3.3 per cent to 24 per cent of the cultures taken at the various hospitals and camps. This difference in results may, however, be more apparent than real. Opportunity was presented at one hospital to get good data on nasopharyngeal and tonsil cultures; influenza bacilli were found only 6 times in the nasopharynx as compared to 78 times when the tonsil cultures were taken. Hemolytic streptococci occur frequently and so do pneumococci, but not as frequently as influenza bacilli. The taking of throat cultures is advocated so cases can be segregated. In a series of influenza contact studies, hemolytic streptococci were found in 7.8 per cent of the cases as compared to 10 per cent in the influenza patients in the hospital.

(2) *Examination of sputa in pneumonia.*—A large number of sputa have been examined, about 1,000 to date. In these, influenza bacilli are found in a large percentage, especially when mice or rats are used. Pneumococci are very frequently found, the relative occurrence of the types at different hospitals being shown in the following tabulation:

Hospital	A	B	C	D
Type I.....	3	7	69	1
Type II.....	16	13	0	2
Atypical type II.....	0	8	0	0
Type III.....	5	29	0	2
Type IV.....	33	102	16	14

Hemolytic streptococci are being found in about 10 per cent of the pneumonia sputa.

(3) *Blood cultures.*—About 200 blood cultures have been made. The blood is generally sterile and so far influenza bacilli have not been found. Hemolytic streptococci have been found a few times and pneumococci about 10 times as frequently.

(4) *Autopsies.*—A considerable number of autopsies have been performed. Generally the trachea is congested and red and frequently contains seropurulent and blood-stained exudate. The lungs may show either complete consolidation or bronchopneumonia, but always intense engorgement and frequently solution of the red blood cells. Adhesions and empyema have seldom been found, probably because death has occurred too early for their development. The bacteriological findings at autopsy show that influenza bacilli occur in the tracheal exudate and the consolidated areas, but that hemolytic streptococci and pneumococci occur in the lungs in at least one-half of the pneumonic lungs.

(5) *White blood counts.*—White blood counts have shown generally but little increase in the total number of white cells, even when pneumonia existed. The differential counts frequently have shown an increase in the percentage of lymphocytes.

(6) There can be no doubt that the epidemic is due to the influenza bacillus but that the pneumococcus and hemolytic streptococcus are responsible for some of the severe complications. The particular type of the complicating organism is probably determined by the type already prevailing at the camp or cantonment.

On September 20, 1918, the following memorandum was made to the port surgeon by the director of the laboratory division:

The present status of cases is as follows: United States Army Embarkation Hospital No. 1 (St. Mary's), 100 cases; pneumonia, 7 (1 will probably die). Base hospital, Camp Mills, 24 cases; pneumonia 6; of these 1 probably streptococcus meningitis; 2 will probably die. Base hospital, Camp Upton, 400 cases, pneumonia, 21.

2. *Bacteriology*.—At Embarkation Hospital No. 1, no influenzalike bacilli in the sputum smears. Cultures on Avery medium in pneumonia cases in 6 (all examined) showed hemolytic streptococci and no influenza bacilli. Nose and throat cultures on blood agar plate were taken from 34 cases and will be reported on later.

At the base hospital at Camp Mills nose and throat cultures have been taken on all cases, and hemolytic streptococci but no influenza bacilli were found. Cultures on Avery medium in pneumonia cases showed hemolytic streptococci. A culture has been obtained from the spinal fluid of one patient and will be reported on later; it looks like a short-chained streptococcus at this time.

At Camp Upton no streptococci or pneumococci have been isolated, and the chief of the laboratory service so far has found only influenza bacilli. Whether this condition prevails will be determined.

3. Blood cultures so far have been negative. White blood cell counts so far in influenza and influenza pneumonia have seldom exceeded 11,000, with no increase in the percentage of polynuclear cells.

4. Major Winders, director of the medical division, port of embarkation, has observed that there is a marked difference between the cases at Embarkation Hospital No. 1 and those at the hospital at Camp Mills.

5. In going over the situation with Colonel Edwards at Camp Mills to-day, the following was developed for consideration at the port of embarkation:

a. The conditions in our camp and hospitals differ from those of the permanent cantonments in that we have troops coming in and going out at all times. If the epidemic is to start in the East and travel westward we will have new cases coming in for a long time.

b. Quarantine will probably not change the actual number of cases very much, but reasonable quarantine will probably prevent the cases from coming up faster than they can be taken care of. For this reason big gatherings as in moving-picture shows, meetings, and so forth, are discontinued.

c. The contacts will be put in the detention camp, but released to accompany organizations ordered for oversea duty. This will not tie up troops and will still give some protection against the rapid spread of the epidemic.

* * * * *

7. All chiefs of the laboratory service have been instructed on the intensive work that is to be done in connection with influenza and as soon as facts are established will report on them. We are cooperating with Doctor Park of the research laboratory, New York City, and with physicians at the Rockefeller Institute.

Influenza bacillus vaccine was sent out by the Army Medical School, and from September 25, 1918, to January 7, 1919, the permanent troops at Camp Mills were actively immunized, apparently with some good results when comparisons were made with the unvaccinated permanent troops of the same regiment at Camp Merritt. Mixed vaccine of influenza bacilli, streptococci, pneumococci, and staphylococci was used in treatment at General Hospital No. 1 and good results from it were claimed.

An intensive study as to the causal organism was begun in February, 1919, and attempts to get uniformity in methods were made. The influenza bacillus was found in 91.5 per cent of cases of acute uncomplicated influenza with leucocyte counts of 10,000 or less on the first, third, and sixth days of the diseases, and in 77.3 per cent of convalescent influenza patients. Influenza bacilli were found in 82.2 per cent of pneumonias.

TYPHOID FEVER AND TYPHOID CARRIERS

Typhoid fever occurred from time to time. Five cases were found in troops embarking from January, 1918, to May, 1919. A considerable number of cases occurred in the American Expeditionary Forces, and six cases of clinical typhoid occurred in returning troops prior to July 1, 1919. Because of the occurrence of the disease in the American Expeditionary Forces, it was thought worth while to determine to what extent soldiers returning from overseas would prove a menace to the home population. Stools from 1,000 patients were examined. A dysentery bacillus of Hiss-Russell "Y" type and one of the Flexner-Harris type were isolated, but no typhoid bacilli were found. Twenty-eight strains of a nonlactose fermenter not agglutinated by diagnostic sera and 11 "slow colon" bacilli were isolated. These cultures were verified at the Army Medical School, Washington, D. C., and the nonlactose fermenter was classed as belonging to the Graham-Smith groups, which were frequently found in the American Expeditionary Forces.

CATGUT EXAMINATIONS

The medical supply depot requested samples from all lots of catgut supplies to the Army through the depot and the United States appraiser's office, in order to make tests of tensile strength, elasticity, and sterility. Examinations for sterility were made in the Army laboratory. A satisfactory technique was developed for aerobic and anaerobic cultures. Four hundred and ninety-eight samples were tested in duplicate, and 99, or 2.31 per cent, were found infected. The tetanus bacillus was found once.

COMPLEMENT FIXATION TESTS

Complement fixation tests for the diagnosis of syphilis, gonorrhoea, and tuberculosis were at first made at the Army Medical School, Washington, D. C. In July, August, and September, 1918, the tests were made at the base hospital in Camp Merritt, but with the establishment of the Army laboratory, port of embarkation, all of these tests were made there. Many tests were made for organizations and stations outside the port of embarkation. The human system was used entirely. The acetone insoluble antigen was used in the routine Wassermann test, but on request the cholesterinized antigen was also used. For the spinal fluid tests, 0.2 and 0.5 c. c. of the specimen were taken. The system was controlled by the interchange of specimens with various hospitals in New York City. The gonococcus antigen and old tuberculin were supplied by the Army Medical School.

WATER ON HOSPITAL AND TROOP TRAINS

With the return of overseas troops and sick and wounded, samples from the sources of supply of water and ice for troop trains and hospital trains leaving this port of embarkation were collected weekly, and examined bacteriologically once a week and chemically once a month. The sources of supply were always found to be good. Water from the drinking and storage tanks in troop trains was frequently tested. Colon bacilli were found in a few instances. The water supply of the hospital trains was carefully controlled and no car left the yards

without having the water examined. The tanks were flushed and steamed when the bacterial count was over 200 per cubic centimeter or there were many liquefiers of gelatin.

The water supply on the hospital cars improved as time went on. This was probably due to the fact that there had been much accumulation of sediment in the storage tanks and that many cleanings were necessary to remove all of the sediment. The whole problem was carefully studied, and it was evident that the water at the inland stations varied as to quality. It was not deemed advisable to chlorinate this water, as it had already been chlorinated and the addition of further chlorine would have made it unpalatable.

PATHOLOGICAL EXAMINATIONS

Autopsies were made when it was believed the findings would be of value in the diagnosis and treatment of soldiers in the hospitals. These were always carefully controlled. With the establishment of the central laboratory, all pathological examinations in the port of embarkation were done there by a competent pathologist. This officer was sent to hospitals when requested. Sections and gross specimens were provided, reports were made to the hospitals from which the specimens had come, and all good specimens and sections were sent to the Army Medical Museum, Washington, D. C.

CHEMICAL EXAMINATIONS

The principal chemical examinations for the port of embarkation were made in the central laboratory, where two chemists were on duty. These included testing the efficiency of sewage disposal plants and examinations of water from the camp and from troop and hospital trains. Food examinations, medicolegal examinations and diagnostic examinations were made. Of the last there were relatively few, as patients were retained in our hospitals for a short period only.

DISCONTINUANCE OF ARMY LABORATORY

The Army laboratory was transferred to General Hospital No. 1 when the Greenhut Building was returned to its owners in the summer of 1919. When this hospital was transferred from the jurisdiction of the port of embarkation to that of the Surgeon General, the Army laboratory continued to function only to complete the history of the work done on intestinal parasites.

SICK AND WOUNDED DIVISION

This division was established in October, 1917, for the sole purpose of checking, correcting, and forwarding to the Surgeon General the sick and wounded reports of the various organizations under the control of the port surgeon. This work was placed in charge of a noncommissioned officer under the supervision of the chief clerk.

The division was reorganized in December, 1917, in anticipation of the growth of the port of embarkation and of the large number of sick to be cared for from the troops passing through the port on their way overseas and the probable return of large numbers of sick and wounded from overseas. The division

then consisted of four sections—administrative, record, genitourinary diseases, and psychiatry. The last two were responsible for the supervision of the respective types of cases in hospitals within the port area, and were transferred to the newly organized hospital division in the summer of 1918.

Fluctuations in the number of the personnel on duty are shown in the following table:

Month	Com- missioned officers	Noncom- missioned officers	Privates	Civilian employ- ees
1917				
October.....	0	1	0	0
December.....	2	1	0	0
1918				
August.....	3	1	4	0
September.....	3	2	8	0
November.....	5	4	20	0
1919				
February.....	4	2	12	2
June.....	3	2	10	4
July.....	3	1	4	2

ACTIVITIES

The following brief outline illustrates the principal activities of the sick and wounded division during its final period:

ADMINISTRATIVE

(a) Daily port bed situation, a consolidation of bed and evacuation data to show available bed reserves.

(b) Checkerboard control of infectious and venereal patients in port hospitals as information and transfer guide.

(c) Dispositions of embarkation patients with infectious diseases, prisoners, insane, etc.

(d) Necessary action on miscellaneous official papers, leaves of absence, furloughs, special injuries, transfers, orders, etc.

(e) Collection, organization, and dissemination of advance information of incoming sick and wounded, based on advance reports by cable.

(f) Tentative assignments of patients to appropriate hospitals prior to arrival of transports.

(g) Receiving, verifying, recording for statistical purposes, and forwarding corrected classification lists for the action of the transport division.

(h) Advisory function in classification of patients for transfer from hospital.

(i) Transmitting tentative classification lists to Surgeon General's Office by telephone and confirming same by detailed wire.

(j) Relaying corrections and instructions from Surgeon General's Office to hospital by telephone.

(k) Turning over to evacuation division revised and verified nominal lists of patients for preparation of the necessary travel orders.

RECORD

(a) Compiling a card index of all embarkation patients in the port and all debarkation patients received from overseas, both at this port and Newport News, Boston, and Philadelphia, with complete information as to admission, diagnosis, and disposition.

(b) Checking, correcting, and forwarding all sick and wounded reports of all hospitals and commands under the port of embarkation, together with those of all organizations temporarily at Camp Merritt, Camp Mills, and Camp Upton, enroute overseas.

(c) Compiling and rendering daily reports of patients, classified diseases, and vacant beds in each hospital of the port.

(d) Rendering all reports of sick and wounded required by the Surgeon General's Office.

(e) Formulation of statistical records and reports of diseases and injuries in addition to sick and wounded report.

(f) Checking all recommendations for discharge on surgeon's certificate of disability.

CARD-INDEX SYSTEMS

A brief description of the sick and wounded card-index system is given below. Attention is drawn to the fact that more or less duplication was unavoidable in a system which numbered upward of 200,000 cards. This in no way lessened the value of the system, though it was apt to convey an exaggerated idea of the number of patients actually admitted to hospitals.

A card index was compiled of all embarkation patients who were sent to hospitals under the jurisdiction of the port surgeon. Of the 1,630,534 men who actually went overseas from this port (May, 1917, to the signing of the armistice), there were card records of approximately 87,900 patients who were taken sick prior to embarkation or were selected out at preembarkation inspections, either at the camp or on board transports. These cards showed the hospital record of each soldier to the time he was released from Medical Department control.

A card index was made also of all patients who returned from overseas as sick or wounded and arrived at this port, Philadelphia, Charleston, Boston, or Newport News. There were approximately 180,000 card records of men who had been overseas and were returned as sick or wounded or who were admitted to one of the hospitals after arrival. The data on each card included, in addition to the man's name and organization, the date of arrival; the transport; the date of admission to the port hospital; designation of the port hospital; date of final disposition.

In addition to the above, any information that was received in reference to the soldier's service record was also noted on the card. This card-index system proved valuable in locating patients promptly. Service records and correspondence relative to patients (500 to 1,600 weekly) were checked and forwarded to the proper hospitals without delay.

TRANSPORT DIVISION

The title of this division is somewhat misleading, as its activities were concerned chiefly with preembarkation inspections of troops and debarkation of sick and wounded. The medical supervision of the transport service proper was handled by the port surgeon and, under him, the chief of the personnel division.

The transport division of the port surgeon's office was one of the largest in scope and in its ramifications in connection with the various divisions of the surgeon's office. Its work was not limited by any means to this port, but extended to camps and ports as distant as Montreal and Quebec in the North, Portland in the East, Camp Lee in the South, and Buffalo in the West, with many intermediate stations and camps. Unlike the other divisions in this office, it had no fixed office hours.

The various departments of the transport division as finally evolved were as follows: Chief of division, executive officer, assignments, inspectors in chief at Camp Merritt, Camp Mills, Camp Upton, and Camp Dix, branch office in Hoboken, inspection of casual officers, transfer officers in charge of debarkation of sick and wounded, statistical and boarding inspector's office at quarantine station, Staten Island.

Starting as a combined transport, inspection, and sanitary division, with a personnel of 2 or 3 officers, it eventually grew into a division requiring the services of over 300 medical officers. It is not to be inferred, however, that these officers were all permanent personnel, as about 50 per cent were officers on temporary duty. This percentage was of a constantly shifting nature, made up from men awaiting overseas base hospitals, evacuation hospitals, and sanitary trains, and from men temporarily relieved from duty as transport surgeons on one ship and awaiting assignment to another. With the necessity of using such a loose organization, the work of this division, especially in the preembarkation physical inspections, entailed much unnecessary labor in constantly educating new men in this work and losing them almost as soon as they became really efficient.

DUTIES

The general duties of this division were as follows:

1. Transports were to be inspected upon arrival and the day before departure, and at such other times as would insure proper compliance with the provisions of United States Army transport regulations; reports of deficiencies were to be promptly rendered with recommendations for correction. Inspection upon arrival was to be made in company with other inspectors authorized.
2. Equipment of a transport hospital was to be verified upon arrival of the transport and timely requisition was to be made for its completion.
3. The transport surgeon was to be provided with requisite copies of general orders and regulations pertaining to them.
4. In connection with the embarkation of troops: (a) The preembarkation venereal inspection was to be conducted. (b) Disposal of venereal cases detained was to be made. (c) Escort (guard or other form) for these cases to the designated hospitals was to be provided. (d) Report was to be made

of the detachment and its number as early as possible to the property division for transportation. (e) A medical officer was to be provided to be present at each embarkation of troops with instructions as to his duties in removing sick that should not proceed overseas.

5. In connection with debarkation of the sick: (a) A medical officer was to proceed to vessel as soon as its arrival was reported and be present, if practicable, at the lowering of the gangplank. (b) This officer was to obtain from the transport surgeon a transfer card and a service record for each patient, both indorsed to hospital, port of embarkation, together with a list of the sick, in duplicate, showing for each patient the full name, rank, organization, and regiment or corps, and a brief diagnosis. (c) He was to turn these records over to the sick and wounded division of the port surgeon's office; was to designate the hospital or hospitals to receive them; arrange the records in groups pertaining to each hospital and return them to the transport division. (d) He was then to arrange with the property division for necessary transportation and to deliver the patients to the designated hospitals.

6. Sanitary inspections of the surgeon's office were to be made at such intervals as to insure proper police and sanitation. Reports were to be submitted, together with sanitary reports of transports, to the sick and wounded division for action.

With the outbreak of the epidemic of influenza in September, 1918, the inspection of troops took much longer per man by reason of the necessity for eliminating from commands every man who might show the slightest signs of having contracted the disease. The temperature of every man was taken and, if any elevation above the normal was noted, he was at once isolated. He was transferred to a hospital if the elevation continued. The great increase in the amount of work required by these extra precautions may be readily visualized when it is recalled that during the month of September, 1918, 206,052 men sailed from this port. Many of these were inspected several times before sailing, due to the fact that ships to which they had been assigned were not available at the expected time because repairs had not been completed, coaling was unfinished, or other similar conditions existed. Ships occasionally broke down when one or two days from port and returned, causing another increase in the work of this office. At Camp Mills, the same 21,000 men were inspected on three successive days (a total of 63,000 inspections), all of whom had their temperatures taken, thus making actually three times the number of inspections to the number of sailings. A similar condition existed at Camp Merritt, and more than 26,000 troops were inspected each day for six consecutive days before they embarked, a total of 156,000 inspections. These two instances were the extremes of a situation which pertained to a lesser degree on a great many occasions. In an effort to control the spread of the epidemic, a reinspection was held on the piers just prior to embarkation.

PREEMBARKATION INSPECTION

The necessity for having permanent personnel from this division placed in certain camps which were under the jurisdiction of this port to take charge of the preembarkation medical inspection of troops became obvious in December, 1917. One medical officer was at that time assigned for the purpose at Camp Merritt, N. J. Later on, when Camp Mills, Long Island, was opened in the spring of 1918, another was assigned to similar duty there. Camp Upton, Long Island, was likewise cared for. In addition to these, medical officers were sent to Camp Devens, Mass., where one complete division and large numbers of auxiliary troops were inspected; to Camp Dix, N. J., with its two complete divisions and many auxiliary troops; to Camp Meade, Md., Camp American University, Washington, D. C.; Camp Lee, Va.; Camp Humphries, Va.; Camp Crane, Allentown, Pa.; Camp Colt, Pa.; Camp Vail, N. J.; Fort Myer, Va.; Fort Wright, Long Island; and Fort Wood, Liberty Island. Many other smaller stations were handled in a similar manner. The officers in charge of these medical inspections held station in the office of the surgeon, port of embarkation, Hoboken, N. J., and proceeded to these camps in accordance with instructions. The medical officers assisting in these inspections were at times taken from the permanent personnel of the surgeon's office and at other times partly or in whole from the medical officers on duty, either permanent or temporary, at the camp where the inspections were to be held. At Camp Merritt, Camp Mills, and Camp Upton, where inspections were conducted almost daily, the arrangements for inspection, with the necessary orders and assignments, were almost invariably completed on the day preceding the inspection. This prevented loss of time. At other camps, however, the entire corps of inspectors had to be taken from the surgeon's office, as the camps in question did not come under the jurisdiction of this port.

The following method of procedure was adopted and carefully followed in all these inspections, and each inspector was thoroughly instructed in his duties. The men to be inspected were stripped to the waist and their breeches dropped to the knees. The inspection included an examination of the hair for lice and nits; the eyes for inflammation; the nose and throat for exudates, membranes, and patches; the chest, back, and abdomen for rashes and eruptions; and the genitals for venereal lesions and discharges.

Each man was checked on the sailing list of his organization and the names of absentees were taken, with their rank, serial number, and organization. These absentees were inspected later at the gangplank before they were permitted to board the transport. A list of those to be detained was given to each company commander, with instructions as to the disposition to be made of each case. A duplicate list was given to the camp surgeon, and a third list was filed with the report of the inspection in order that a check could be obtained at the time of embarking. Inspections at railroad stations and places other than the camps were frequently necessary, owing to the rush of troops overseas. After each inspection, a complete report of the day's duty was written, typed, and delivered at the division office in Hoboken.

Following is a summary of the examinations conducted during the existence of the transport division:

Month	Total examined	Total detained	Month	Total examined	Total detained
1917			1918—Continued		
October.....	31, 805	311	October.....	158, 552	2, 224
November.....	24, 837	203	November.....	47, 719	283
December.....	50, 460	816		1, 757, 807	9, 735
1918			OVERSEAS REPLACEMENTS		
January.....	41, 301	204	1919		
February.....	48, 418	123	May.....	3, 822	-----
March.....	78, 793	174	June.....	4, 102	-----
April.....	98, 304	244	July.....	1, 893	-----
May.....	202, 395	287		9, 817	-----
June.....	236, 914	1, 589		1, 767, 624	9, 812
July.....	272, 022	579			
August.....	260, 235	803			
September.....	206, 052	1, 895	Grand total.....		

INSPECTION OF TRANSPORTS

During the embarkation days inspection of all United States Army transports was made by a board, consisting of one officer from the Inspector General's Department, one officer from the Quartermaster Corps, and one medical officer, which met on board each incoming transport as soon as it docked or as soon thereafter as practicable, and made the necessary inspections and recommendations. The transport division also transmitted to the senior medical officer of the troops on board a transport all necessary orders, special emphasis being placed on General Order No. 20, headquarters port of embarkation, 1917, which put upon the commanding officer of troops the necessity for seeing that all men had received smallpox vaccination and typhoid prophylaxis before debarking on the other side.

OTHER DUTIES AT THE PIERS

On board each transport, about to embark troops, were medical officers, representatives of the surgeon, in numbers varying as occasion demanded, from 1 to 30. It was the duty of these medical officers to see that no cases previously ordered to be detained were permitted to go on board; that all absentees from the preembarkation inspection were inspected; that any cases of illness developing after leaving the embarkation camp, with communicable disease contacts, were removed to properly designated hospitals; that any cases developing during the stay of the transport at the pier were removed; and that all service records and transfer cards were correctly indorsed and accompanied the patients. These officers remained on duty until the transport left her dock. A full report was then made of the duty performed.

DEBARKATION INSPECTIONS

The method of procedure in debarkation inspections was as follows: A corps of medical officers, known as boarding inspectors, was stationed at quarantine. One of these officers boarded each incoming transport, ascertained the number of sick and wounded on board, the number of ambulatory and litter cases, the types of the cases, and the number of dead. This infor-

mation was at once telephoned to division headquarters at Hoboken. The boarding officer proceeded with the transport to her docking place, seeing that all records of the sick and wounded were properly indorsed, and then took charge of these records. He received correct lists of the sick and wounded and saw that the preparations for debarking these cases were complete.

Upon arrival of the transport at her dock, a medical officer, known as the transfer officer, who was in entire charge of the debarkation of the sick and wounded, boarded the transport and received the lists and records of all patients. These patients were then transferred by him, in accordance with a previously arranged disposition received from the sick and wounded division, to the proper hospitals. The means employed for this transfer were Army and Red Cross ambulances, receiving ships and transfer boats of the port surgeon's office, and trains. This work became enormous, as the task fell upon the transfer division of anticipating all transport arrivals, notifying all the other interested departments of the port surgeon's office of expected dockings, handling the actual debarkation of the sick and wounded, and seeing that the patients were cared for en route to the hospitals as well as moved as expeditiously as possible. On more than one occasion, 1,000 sick and wounded were removed from a transport to ambulances or to transfer boats in less than one hour's time, and yet with no evidence of haste. This work exceeded that of any other of the transport division's activities from December 1, 1918, to August, 1919. In addition to the officers mentioned above, one medical officer was assigned to accompany the sick and wounded to each one of the hospitals to which patients were transferred. Reports were made by each officer of the exact duties performed, and check lists, with receipts attached, were placed on file at the port surgeon's office. Great care was needed at all times in transferring communicable cases in order not to expose others to the infection, and no two types of contagious disease were permitted to occupy the same ambulance or the same compartment on a transfer boat.

The following is a monthly record of sick and wounded debarkations:

Month (1918)	Number	Month (1919)	Number
February.....	169	January.....	13,270
July.....	539	February.....	14,032
August.....	706	March.....	17,981
September.....	1,883	April.....	17,421
October.....	2,666	May.....	13,659
November.....	3,474	June.....	8,212
December.....	18,443	July.....	4,287
Total.....	27,880	Total.....	88,862
		Grand total.....	116,742

CORRESPONDENCE

Owing to the enormous amount of paper work connected with the numerous reports of the division, it became necessary, in June, 1918, to establish a subdivision to properly coordinate, correct, and file this correspondence. The duties of this subdivision were the compilation, classification, and filing of the statistics gathered from the combined reports of all the activities of the transport division.

OTHER ACTIVITIES

In addition to the above, this division maintained a 24-hour service for the dissemination of information concerning the arrival and departure of transports and the disposition of sick and wounded to all other divisions of the port surgeon's office and to other departments of the port. It also inspected for communicable diseases nearly 30,000 casual officers returning from overseas. An office for this purpose was established in Hoboken. Another function performed by this division was the transportation of all nurses and female civilian employees returning from overseas to the Polyclinic Hospital, New York City, for physical inspection and, after inspection, to the Hotel Albert, over 9,000 having been thus transported.

TRANSPORT SUPPLY DIVISION

This division was organized in February, 1918, to provide for a systematic supply for transports. Transports had been furnished with medical supplies through the transportation and property division prior to that time, little attention having been required to provide the supplies demanded by the small number of ships engaged in the transportation of troops. It became necessary to have an efficient organization for this purpose when the number of ships was increased. No system of supply being in effect when the division was organized and assumed control of the medical supply of transports, some time and study were allotted to standardizing the amount and variety of supplies and equipment required on transports according to the number of troops carried. This plan, as accepted and later modified by the action of a board, was placed in operation in February, 1918, and proved satisfactory.^b

In April, 1918, the Surgeon General authorized the employment of civilian ship's surgeons of commercial vessels carrying troops to perform certain services which would be paid for from Medical Department appropriations. The duties connected with the procurement of such services, the preparation of vouchers, etc., were assigned to the transport supply division, it being in direct contact with the persons concerned.

The personnel of the division ultimately increased from a force of 1 commissioned officer and 1 enlisted man to 2 officers and 14 enlisted men.

The duties assigned to the division were as follows, on June 30, 1918: Equipment of hospitals on board transports; placing adequate medical and surgical supplies, vaccines, and Medical Department blank forms aboard the same; arranging for the shipment of vaccines and sera overseas for the use of the American Expeditionary Forces; contracting with ship's surgeons of commercial vessels carrying troops for their services and certifying vouchers for the payment of the same; and arranging for the medical supply of troop ships which sailed from Montreal, Halifax, Portland, Boston, Baltimore, and Philadelphia.

This division was consolidated with the finance division on November 20, 1918.

^b Board met Sept. 2, 1918. See account of the transport supply section of the finance division (p. 305) for record of the board proceedings.—*Ed.*

TRANSPORTATION DIVISION

From August 8, 1917, when an ambulance from Governors Island was assigned to the surgeon, port of embarkation, until December 25, 1918, when the evacuation division was organized for the transfer of the returning sick and wounded to hospitals of the interior, and assumed the functions of the transportation division, changes in methods, policy, and personnel were a frequent occurrence, and had, of necessity, to keep pace with the general growth and development of port activities.

Beginning with the ambulance section, transportation, which then consisted entirely of ambulances, was directly under the Medical Department; later, when hospital trains and harbor boats were obtained, all the Medical Department transportation was placed in charge of an officer of the Quartermaster Corps who was assigned to duty in the office of the port surgeon, August 15, 1918. With the advent of the Motor Transport Corps (September 5, 1918), the control of ambulances passed to that branch of the service, although the actual operation of equipment remained under the Quartermaster Corps officer. On October 2, 1918, when the port utilities office was established, it assumed control of the transportation, among other activities then being performed by the Quartermaster Corps, and held the control until May 15, 1919, when all transportation, whether water, rail, or ambulance, was placed in charge of the port transportation officer. On March 8, 1919, the port surgeon assumed control of Medical Department harbor boats, through a medical officer placed in direct charge to represent him, and on May 2, 1919, he took over the ambulances and placed them under an officer of the Sanitary Corps assigned to duty in his office. At first glance, it would seem that such frequent administrative changes would have resulted in endless confusion, and, no doubt, such a state would have obtained had not the port surgeon, either directly (as he actually did during the early days), or through a medical officer assigned to represent him for the purpose, maintained the most intimate supervision.

Soon after the receipt of an ambulance from Governors Island the *New York World* donated an ambulance to the Medical Department. This was followed by the donation of an ambulance from the sheriff's panel of the grand jury, New York City. Shortly afterwards, a number of Medical Department ambulances were assigned to the port from General Hospital No. 1, New York City. A noncommissioned officer was placed in charge of ambulances and ambulance transportation August 28, 1917. On November 13, 1917, ambulances were placed under the officer in charge of the property division.

The first step was taken for the provision of rail transportation for the Medical Department on December 23, 1917. Hospital train No. 1, consisting of 10 cars and a personnel of 2 officers and 25 enlisted men, reported for duty at Hoboken on the above mentioned date. A school of instruction for officers and enlisted men was inaugurated January 22, 1918, in order to have trained personnel available for the purpose of manning additional hospital trains in the United States. When the organization of this school had sufficiently progressed, the officer conducting it was relieved from duty with the train and sent to Chicago, Ill., where he supervised the construction of hospital trains Nos. 2, 3, and

4. Hospital train No. 4 was sent to Hoboken on June 29, 1918, and hospital train No. 2 reported on October 11.

The transportation division in the office of the surgeon was officially established on January 16, 1918, with the following duties: Operation and maintenance of motor ambulances; enforcement of instructions from the War Department regarding the same; transportation of sick and supplies; procurement and insurance of transportation (street car and ferry tickets) used in the port surgeon's office, and accounting for same.

OFFICE OF TRANSPORTATION OF SICK AND WOUNDED

This office was created on August 9, 1918, after the assignment to the Medical Department of certain harbor boats for the transportation of sick and wounded. It was placed in charge of an officer of the Quartermaster Corps. All transportation, land and water, whether Government owned, Red Cross, or commercial, assigned for the use of the Medical Department at the port was placed under the control of this office, in so far as movements of that transportation were concerned. This officer was also charged with the responsibility of procuring such additional transportation as might be necessary for the use of the Medical Department. Liaison was maintained by him between the port surgeon's office and the United States Railroad Administration for the procurement of rolling stock, issuance of rail transportation and requests for sleeping-car accommodations, and the routing of sick-and-wounded movements. In addition, this office handled the disbursing of money for commutation of rations on the hospital trains and unit cars. The maximum personnel on duty in the office was 8 officers and 13 civilians. Orders from headquarters, port of embarkation, on October 11, 1918, directed that, on request of the port surgeon, transportation should be furnished by the port utilities officer and the Motor Transport Corps for conveying enlisted sick men to their respective organizations when fit for duty. This function was carried out through the officer in charge of transportation of sick and wounded.

ESCORT DETACHMENT

Perhaps the first important step looking to an organization for the evacuation of sick and wounded from overseas was the creation of the escort detachment, on October 15, 1918. This organization, established with headquarters at the Greenhut Hospital, was later moved to the adjoining Cluett Building. The commanding officer of the detachment was responsible for the transfer of all patients from the debarkation hospital to the railhead at which entrainment took place. From this point, the commanding officer of the unit car or hospital train took charge of the transfer, unless the movement was without hospital train or unit car but made on equipment attached to a regular train, in which case the senior escort officer was responsible from the debarkation hospital to destination. An officer of this organization was detailed to make daily trips to every debarkation hospital in the port for the purpose of investigating the condition of patients scheduled for transfer. The size of the escort and the quantity of medical supplies necessary for each trip were determined from the report of the liaison officer. The commanding officer of the escort

detachment maintained a course of instruction for officers and enlisted men in the routine duties which they were expected to perform while on the road, and, when called upon by the officer in charge of the transport service, he furnished personnel to assist in the debarkation of sick and wounded received from overseas. The maximum personnel of the escort detachment was 93 officers and 491 enlisted men.

DIRECTOR OF HOSPITAL TRAINS

Prior to November 23, 1918, the hospital trains functioned independently, but their activities had been most limited. On November 23, 1918, however, the office of the director of hospital trains was established.

ORDERS SECTION

It was the invariable practice to list the name of every patient transferred from this port in the order directing the movement. These orders were written at headquarters, port of embarkation, upon request from the office of the port surgeon, but the work increased to such an extent that it became advisable on August 9, 1918, to detach five field clerks from headquarters for duty in the office of the port surgeon, where their work was supervised by the evacuation officer.

EVACUATION DIVISION

One of the most important and difficult problems arising during the war was the change to be effected at the port of embarkation from a function as a port of delivery of soldiers for shipment overseas to that of a receiving port for their return to their homes. The problem of evacuating the sick and wounded from the debarkation hospitals in which they were entered upon return from overseas to hospitals in the interior was successfully solved by thoroughly organizing and building up a system sufficiently elastic to meet the most exacting and unexpected requirements, for it may be readily understood that any system, to be successful, must be prepared to evacuate patients as rapidly as they are received from overseas.

The return of sick and wounded from overseas was so small numerically, prior to the signing of the armistice, that little effort had been made to systematize or coordinate the activities of the various organizations described above, all of which were engaged in the transfer of patients. It was deemed expedient to create a separate division under the surgeon, port of embarkation, for this purpose, when increased demands were made upon the transportation machinery. Accordingly, on December 25, 1918, the surgeon created the evacuation division as a separate department by consolidating the above-mentioned units. The officer in charge of this division was made responsible for the supervision and coordination of the efforts of all individuals and organizations concerned in the transportation of sick and wounded between the various hospitals at the port, and from these hospitals to those of the interior. This organization carried on its work to a successful conclusion without material change in the system as outlined.

The evacuation division consisted of seven separate organizations: Three hospital trains, the unit car group, the escort detachment, the office of trans-

portation of sick and wounded, and a detachment of field clerks, comprising a maximum personnel of 155 officers, 865 enlisted men, 71 civilian employees, and 6 field clerks.

The bed capacity at the port of embarkation during the most active period of the return of sick and wounded soldiers was 18,000, and this was not too large, for on several occasions the margin of safety was reduced to 2,500 beds. The arrival of several of the larger transports carrying patients at these times might easily have filled all hospitals to full capacity.

In accordance with cabled estimates from the American Expeditionary Forces, the evacuation division was organized to handle a maximum of 10,000 patients a month; however, this estimate was exceeded in the months of December, 1918, and January, February, March, April, and May, 1919, and in the month of March it was nearly doubled.

Fundamentally, the purpose of the evacuation division was to keep the sick and wounded moving through the port to interior hospitals at the same rate at which they were received from overseas. In order to perform this function, it was necessary to provide rolling stock—that is, hospital trains and hospital unit cars—suitable for the transportation of both ambulant and litter patients, and to train medical personnel in the correct conditions governing the safety, care, and subsistence of these patients while en route.

HOSPITAL TRAINS AND UNIT CARS

On January 21, 1919, 10 hospital unit cars were sent to this port. Each car was built to accommodate approximately 28 litter patients, and the beds were of such a type as might be used for any kind of medical or surgical case. They could be converted into several positions by a single adjustment, depending upon the type of accommodation desired. A kitchen with a capacity for feeding approximately 250 persons was installed at one end of each car. The plan proposed was to use each of these cars as a nucleus upon which to assemble a hospital train, thus Pullman or tourist cars could be attached to the unit car up to the feeding capacity of the kitchen. The unit car carried the administrative personnel and the more seriously sick and wounded. When it became apparent that even this amount of equipment would not be sufficient, an arrangement was made with the Pullman Co. whereby 10 more cars—tourist, kitchen, hotel, and private car types—were leased to the Government for the purpose of transporting our sick and wounded. This brought the total equipment up to 3 hospital trains and 20 unit cars, and with this number it was found possible to evacuate 20,000 patients a month to interior hospitals and to feed most of them to destination.

Each hospital train carried a personnel of 3 officers and 25 enlisted men and functioned as an independent organization. Its personnel were quartered and rationed on the train at all times. When, as rarely happened, it became necessary to increase the personnel, an additional escort was drawn from the escort detachment. The unit cars were placed in a separate organization, known as Hospital Unit Car Group No. 1, on January 26, 1919. Each car carried a personnel of 1 officer, 1 noncommissioned officer, 2 cooks, and 2 privates or privates first class. When a hospital unit car was extended into a hospital

train by the addition of tourist or Pullman cars, the necessary increase in the complement of commissioned and enlisted personnel required for a trip was drawn from the escort detachment. The escort personnel returned to the mother organization at the conclusion of a trip. All hospital trains and unit cars of this port were located at the Pennsylvania Railroad yards, Waldo Avenue, Jersey City, N. J., and were under the direct control of the director of hospital trains. This officer had general supervision of the equipment and personnel, and he was held responsible that these units were kept in a state of efficiency and readiness for service at all times. He also supervised the work of the entrainment officers, six in number, and had charge of the entrainment of patients at the various railheads in the city of New York and vicinity.

FEEDING

The problem of feeding patients on hospital trains and unit cars was by far the most difficult one that this division had to solve. There were several reasons for this. In the first place, enlisted cooks were extremely hard to get and those that were obtained were lacking in training. The ranges and other kitchen paraphernalia on kitchen cars and hospital trains offered many difficulties to the uninitiated which would not be met in stationary hospitals. It is obvious that individuals traveling on trains, owing to the lack of exercise, monotony of travel, and the tendency to car sickness, required an unusually attractive and appetizing diet. Before the Red Cross canteen service had perfected its organization, many well-meaning but misguided citizens were a bit overzealous, and proffered all sorts of delicacies, fruits, candy, etc., to the patients en route, and these at unseasonable hours. The soldiers thus indiscriminately fed naturally did not relish the wholesome food served by the Medical Department at regular hours.

Movements of patients by railroad were of three types, from the feeding point of view: By hospital train, by unit-car combinations, and by nonfeeding combinations. A hospital train provided a complete feeding equipment for the entire trip. In a unit-car movement, the unit car was attached to a train of sleeping cars. These latter movements consisted of patients destined for several hospitals which were so located that the various detachments of patients could travel a considerable distance as a unit before it was necessary to divide the train for its several destinations. Feeding in the third type, if of more than a few hour's duration, was provided for by sending cooked rations with the men, by purchasing meals en route, or by a combination of the two. The cooked ration method was not satisfactory, particularly when cooked rations were supplied for more than one meal. The patients preferred hot and more appetizing food and a large proportion of the food provided was wasted. The expense of preparation was greater than the ration allowance, thereby forcing an unwarranted necessity for economy upon the remaining patients in the hospital of origin. The purchase of meals en route was equally unsatisfactory, owing to the irregularity of stops where such purchases could be made.

Feeding difficulties were largely overcome through the efforts of the mess officer, who made special investigations of this problem for a period covering

approximately six weeks and whose recommendations were found most helpful. The first step was to standardize the menus so that even a mediocre cook could learn to prepare well a few simple diets. Somewhat later, on request of the Surgeon General, the commutation rate for patients traveling on hospital trains was increased to \$1 per diem for each patient. Twelve colored cooks were obtained from the Pullman Co. early in 1919 and employed on the trains, as an experiment. The experiment worked so well that, subsequently, all enlisted cooks were replaced by colored Pullman chefs, most of whom were men who had had many years experience in cooking on railroad trains. After adjustment of the difficulties enumerated, the hospital train cuisine was generally conceded to be highly satisfactory.

DISH WASHING

The problem of dish washing on hospital trains originally seemed almost insurmountable. This can be understood when one considers the lack of space and facilities necessary for proper sterilization of kitchen and mess equipment. This difficulty was overcome, however, by the use of paper cups and dishes. These were used for but one meal and were then discarded, thus obviating the necessity for washing anything but silverware.

EVACUATION OF OFFICERS

A number of complaints were received from officer patients traveling with the enlisted sick on hospital trains during the early part of the work. It was difficult to provide separate accommodations for officers and, obviously, a special officers' mess was not practicable. This situation was met by sending all officers who were physically able to travel without medical attendance on regular trains with ordinary commercial transportation. These constituted about 90 per cent of the entire number, and the scheme expedited the evacuation of officers.

RAILROAD SERVICE

Due to the splendid system of railroads under the control of the United States Railroad Administration, transporting sick and wounded from the port of embarkation was done, on the whole, in a highly satisfactory manner. This feature of the work offered many problems, due, however, to the fact that the railroads at first were very slow to appreciate the difference between an ordinary troop movement and a movement of sick and wounded soldiers. The port surgeon insisted from the very beginning that trains carrying patients be given the very best service available and right of way over all other classes of transportation and every delinquency on the part of the railroads affecting the evacuation of sick and wounded was investigated by an officer familiar with railroad transportation. His reports were brought to the attention of the local representative of the United States Railroad Administration.

COORDINATION OF TRANSFER

Another phase of the work requiring very careful study was the coordination of transfers from the various hospitals in and about New York to the railhead or point of entrainment. Transportation facilities in New York were excellent, but the 13 hospitals were scattered over an area approximately 35

miles in diameter. Five of these hospitals were located on islands; 3 were on the island of Manhattan itself; 2 were in the Bronx; and 4 were on the west side of the Hudson. It will be seen that every movement had to be initiated by a rather complicated system of local rail, ambulance, and water transportation. It was only by a study of the requirements for each particular movement and the preparation of a detailed itinerary for the information of all concerned that this complicated situation could be met.

MEDICAL ATTENDANCE EN ROUTE

The problem of medical attendance en route was at first very simple because the large majority of cases were healed or convalescent surgical patients who required little attention in the way of medical treatment or diet. Later, however, the medical cases predominated, so that more attention had to be given to treatment and to diet. It was found necessary to send female nurses on hospital trains for the first time on June 6, 1919, and after that date this practice was employed wherever there was any indication for such care. The requirements in the way of medical attendance and diet were carefully studied for each individual before entrainment, and the interest of the patient was at all times a matter of first importance, all other issues having been subordinated to this. As one example of what could be and was accomplished wherever the need arose, the following case is cited:

On August 20, 1919, private John Doe, a patient in General Hospital No. 1, New York, was transferred to the Letterman General Hospital, San Francisco, Calif.; this patient was suffering from a broken back, and was in a very hazardous condition. In fact, the risk of transporting him was so great that it was not deemed advisable by the surgeon, but upon written request from the man's relatives and a statement signed by them in which they assumed all responsibility for the transfer, arrangements were made to bring it about in such a manner as to provide the greatest comfort with the least risk to the patient. Accordingly, a bed (which was so constructed that it could be removed from the car and used as a litter) was removed from a section on unit car No. 16 and taken to the hospital in New York, where the patient was received and transported to destination at Letterman General Hospital, San Francisco, Calif., without change from this bed. In addition to the regular personnel of this car, consisting of 1 medical officer and 5 enlisted men, 2 female nurses were ordered to accompany this patient, so that a 24-hour attendance was provided throughout. The patient reached his destination safely, apparently in as good condition as when he left New York.

HOSPITAL TRAIN NO. 1

Hospital train No. 1 was assigned to the port of embarkation in December, 1917, but up to June 30, 1918, little use was made of the train. Several transfers only were effected during this period. During July, August, and September, 1918, the train was undergoing repairs at the Waldo Avenue yards, Jersey City, N. J., and at the Pullman car shops at Pullman, Ill. On October 11, 1918, the train returned to this port and was then active in the transportation of the sick and wounded. The first movement of patients was accomplished on October

19, 1918. First-class colored cooks, former Pullman employees, were used on this train and, after the ration allowance of hospital trains and unit cars was raised to \$1 a day for each patient, excellent meals were served, consisting of several varieties of meat, fowl, fish, and vegetables. Ice cream was served to patients once daily, and they apparently were satisfied with both cuisine and treatment. The personnel of the train consisted of 3 officers and 25 enlisted men. Didactic lectures and practical instructions were given to the personnel as opportunity offered, between trips, and they were kept in good physical condition by foot and litter drills.

Following is a statistical table showing the activities of this train:

Statistical report, hospital train No. 1

Month	Trips made	Mileage	Patients carried	Meals served
1918				
March.....	1	480	101	202
April.....	1	60	45	45
October.....	1	2,700	104	566
November.....	2	5,400	312	2,053
December.....	4	9,300	579	3,089
1919				
January.....	3	2,500	421	1,077
February.....	4	8,200	648	3,101
March.....	6	8,900	824	3,357
April.....	2	6,700	573	2,284
May.....	4	15,000	698	5,003
June.....	5	9,900	802	3,130
July.....	6	11,700	825	3,769
Total.....	39	80,840	5,932	27,676

HOSPITAL TRAIN NO. 2

Hospital train No. 2 was assigned to duty at the port of embarkation on October 11, 1918, and made its first trip with patients on October 16, 1918, carrying 91 patients to General Hospital No. 26, Fort Des Moines, Iowa. The statistical report immediately following gives the statement by months of the activities of this train.

Statistical report, hospital train No. 2

Month	Trips made	Mileage	Patients carried	Meals served
1918				
June.....	3	1,250	124	523
October.....	3	6,280	213	1,163
November.....	1	320	134	268
December.....	5	8,720	598	2,500
1919				
January.....	3	6,260	442	2,387
February.....	4	5,300	643	2,844
March.....	5	11,780	752	3,806
April.....	4	8,300	699	2,810
May.....	5	8,680	961	4,200
June.....	4	6,760	257	2,286
July.....	2	800	172	350
Total.....	39	64,450	4,995	23,137

HOSPITAL TRAIN NO. 4

This train generally was used for the transportation of patients from the port hospitals to various interior hospitals. The majority of the patients transported were ambulatory, approximately 9 per cent being litter cases. Appended is a statistical report of the activities of this train.

Statistical report, hospital train No. 4

Month	Trips made	Mileage	Meals served	Patients carried
1918				
August.....	3	2,100	152	58
September.....	2	104	0	265
October.....	5	4,770	984	494
November.....	3	804	242	361
December.....	4	8,020	2,430	627
1919				
January.....	3	6,420	2,068	547
February.....	3	5,500	1,537	435
March.....	5	12,840	3,415	938
April.....	2	5,020	1,545	331
May.....	4	7,020	2,350	736
June.....	5	7,020	3,138	797
July.....	2	2,030	1,137	441
Total.....	41	61,648	18,998	6,030

HOSPITAL UNIT CAR GROUP NO. 1

This organization was created on January 26, 1919. Ten new unit cars designed by the Medical Department, United States Army, for the transportation and the feeding of sick and wounded were then lying in the Waldo Avenue yards, Jersey City, N. J., without equipment of any kind and with no personnel assigned. Car No. 12 was fully equipped, an officer was placed in charge, and it departed on its first trip for Camp Grant, Ill., in 12 hours, with 187 patients. All 10 cars were fully equipped and personnel assigned within four days and they were ready for active service. During the next two weeks, it was decided to assign the leased cars which were already in operation at the port to the unit car group, and nine more cars with personnel were added to the organization. Three more kitchen tourist cars of the "1300" series were added early in March when the work became so heavy it was seen that the 19 cars in service could not handle the enormous numbers of sick and wounded returning from overseas. One car was removed from service because of age, but the remaining 21 cars were in active service until June 30, 1919.

Patients with wounds of every kind were transported, and the condition of the patient was such as to require special diet in a large number of cases. Many were absolutely helpless and had to be bathed and fed and every personal want attended to. Many were gassed cases or were suffering from advanced tuberculosis. Extreme care was necessary with every change of altitude and temperature when transporting these cases. Others were mental cases, some being so violent as to require restraint. Yet, in spite of all of the seemingly hopeless conditions of many of the patients, this enormous amount of work was accomplished without the loss of a single case en route, either by accident or from natural causes.

The statistical table immediately following gives an idea of the number of patients carried, distance travelled and meals served en route.

Statistical report, hospital unit car group No. 1

Months	Trips made	Mileage	Patients carried	Meals served
1919				
February.....	33	75,800	4,825	11,259
March.....	73	151,850	10,548	16,020
April.....	127	331,590	7,933	77,464
May.....	62	178,960	7,540	60,422
June.....	34	89,850	4,693	22,800
July.....	17	41,200	2,708	11,748
Total.....	346	869,250	38,247	199,713

DIRECTOR OF AMBULANCES

In this office the ambulance transportation was handled as follows: (1) Local transfers; (2) debarkation (transport to debarkation hospital); (3) evacuation (debarkation hospital to railhead).

A garage was maintained at 512 West Fifty-sixth Street, New York City, which accommodated about 85 ambulances. The evacuations from hospitals in New York were taken care of by ambulances from this garage, as well as the debarkation of sick and wounded returned from overseas destined to hospitals in New York. A garage accommodating about 20 ambulances was maintained at 208 River Street, Hoboken, N. J., for the evacuation of patients from hospitals on the New Jersey side, and the transporting of sick and wounded returned from overseas from the transports to the hospitals of New Jersey. This latter garage was the only one operating under the Medical Department at the end of June, 1919.

The American Red Cross and the Motor Corps of America cooperated with the Medical Department in the transporting of nurses and sick and wounded when the Government service was congested by the simultaneous arrival of any considerable number of transports.

The maximum number of personnel on duty was 3 officers and 130 enlisted men. The following table shows the activities of this service.

Statistical report, director of ambulances

Month	Ambulances	Unserviceable	In operation	Patients transferred	Nurses transferred	Trips made	Calls received
1918							
March.....	(a)	(a)	(a)	1,297	0	336	276
April.....	(a)	(a)	(a)	1,386	0	428	342
May.....	(a)	(a)	(a)	691	0	356	219
June.....	(a)	(a)	(a)	1,061	0	414	321
July.....	39	14	25	1,157	0	316	264
August.....	39	4	35	1,767	0	341	312
September.....	39	4	35	2,444	0	686	581
October.....	43	6	37	3,285	1	964	821
November.....	45	5	40	1,311	77	564	416
December.....	91	11	80	8,657	34	2,621	1,289
1919							
January.....	85	12	73	11,350	169	1,627	736
February.....	71	11	60	12,475	249	1,710	739
March.....	112	19	93	24,825	421	2,874	1,012
April.....	112	29	83	24,069	89	2,755	769
May.....	114	21	93	21,849	423	2,374	874
June.....	137	30	107	10,534	1,532	1,987	667
July.....	29	0	29	5,752	1,421	1,404	671
Total.....				133,910	4,416	21,757	10,309

^a No record.

FINANCE DIVISION

This division was organized in August, 1917, and placed under the charge of a noncommissioned officer. Its principal duty was the purchase of supplies and the preparation of the proper vouchers in payment therefor. In September, 1917, this division was incorporated with the property division. In the latter part of November, 1917, the Finance Division was again instituted as a separate division under the control of the executive officer, and in December, 1917, the finance division was entirely reorganized, with duties as follows: Checking, modification, or approval of requisitions for medical, dental, or veterinary supplies for all organizations under the control of these headquarters; checking of all money papers for the Medical Department—i. e., vouchers for supplies purchased, services rendered, pay rolls for nurses and civilian employees; and all matters and papers pertaining to the hire, discharge, resignation, etc., of civilian employees of the Medical Department at this port. In January, 1918, the medical supply depot, Camp Merritt, was reorganized and also placed under this division.

All matters relating to the medical supplies and equipment of hospitals organized at the port of embarkation were under the immediate jurisdiction of the chief of this division; also medical supplies for organizations proceeding overseas.

From January, 1918, until the signing of the armistice, November 11, 1918, all troops embarked from this port were completely supplied with such medical equipment as they required, this equipment often being a complete combat equipment, camp infirmary, of full authorized equipment. Other shortages in authorized equipment were made up prior to their embarking. To make this feasible, it was necessary that these supplies should be promptly furnished the medical supply depots at Camp Merritt and Camp Mills by the supply division of the Surgeon General's Office. It frequently happened that when there was an insufficient amount of equipment to meet requirements on hand at these depots, the chief of this division could telephone or telegraph to the supply division, Surgeon General's Office, and these supplies would immediately be rushed from one of the large medical supply depots and would reach the destination within three days, therefore very little difficulty was experienced in supplying troops en route overseas.

On November 20, 1918, the division known as the transport supply division of the port surgeon's office was transferred to the finance division, all personnel and duties of that division being assumed by the chief of the finance division. On January 1, 1919, pursuant to War Department instructions, all matters pertaining to requisitions, supplies and medical supply depots were removed from the jurisdiction of the Medical Department. On April 23, 1919, the division known as the hospital division, office of the surgeon, was transferred to the finance division.

The organization of the finance division at the end of the fiscal year, 1918, was as follows:

FINANCE SECTION

Personnel on duty: Commissioned, 1; enlisted, 1; civilian employee, 1.

The duties of this section were as follows: (a) Checking all money papers for hospitals and medical organizations at this port. (b) Charge of all matters

relating to civilian employees of the Medical Department at the port. (c) The checking of hospital fund statements. (d) Charge of all matters relating to supplies or equipment pertaining to the Medical Department.

From the date on which this division was organized (August, 1917) until July 1, 1918, vouchers amounting to approximately \$1,913,139 were checked and verified by this section.

TRANSPORT SUPPLY SECTION

Personnel on duty: Commissioned, none; enlisted, four.

The duties of this section were as follows: (a) To enter into contract with the ships' surgeons of commercial vessels carrying troops, for their services, and to certify vouchers for the payment of same. (b) Upon the arrival of any vessel at this port, which had carried troops from Europe or that was to carry troops from the United States to Europe, to verify the medical supplies and hospital equipment aboard, and to determine what supplies would be required for the next voyage of the vessel, and to submit requisitions to the supply division for the supplies required. (c) To direct the removal of medical supplies on vessels arriving at this port which were not to be used for transporting troops.

The transport supply section was organized as a division in January, 1918, to supply and place aboard transports of all classes sufficient medical supplies for the needs of the American troops carried overseas. The division became a part of the finance division on November 20, 1918. Much difficulty was encountered in determining what medical supplies would be necessary to provide adequate medicines and equipment on these vessels. A medical unit was finally determined upon by the officer in charge of the division. A unit was placed on each vessel leaving this port; in case adequate hospital supplies or equipment were not already installed on the vessel, the supply of such articles as were necessary was also placed aboard the vessel.

Supplies were furnished the four general classes of vessels used in the transportation of troops, as follows: Army transports: All medical and hospital supplies and equipment were provided by this division. Navy transports: The Navy provided medical and hospital supplies on these vessels. Vaccines, sera, and U. S. Army Medical Department blank forms were provided by this division. Commercial transports: It was necessary that a survey be made on each vessel to determine what equipment, instruments, etc., would be needed to provide adequate hospital and surgical facilities aboard the vessel, inasmuch as such equipment as was aboard the vessel would be available for the use of the Army. A requisition was then submitted covering the deficiencies noted. All medicines, dressings, and other expendable items were supplied and put aboard these vessels at this port prior to their departure. Animal transports: It was necessary that each vessel be surveyed to determine the amount of supplies and equipment necessary to provide for the troops assigned to the vessel and to supply such deficiencies as were noted. It was also necessary to provide veterinary medicines, instruments, and equipment for the care of the animals en route.

A board of officers was appointed early in September, 1918, in an endeavor to standardize this demand for transport supplies. The recommendations of this board, as given below, were adopted and utilized in the supply of all transports.

PROCEEDINGS OF A BOARD OF OFFICERS CONVENED AT PORT OF EMBARKATION, HOBOKEN, N. J., TO INVESTIGATE AND REPORT UPON THE ALLOWANCE OF MEDICAL AND HOSPITAL SUPPLIES WHICH SHOULD BE PROVIDED ABOARD TRANS-ATLANTIC TRANSPORTS

Orders, No. 170

OFFICE OF THE SURGEON, PORT OF EMBARKATION,
Hoboken, N. J., September 2, 1918.

1. A board of officers, consisting of: * * * is hereby appointed for the purpose of submitting recommendations as to the medical supplies to be furnished troopships of the several classes—(1) Army, (2) Navy, (3) allied, assigned to American convoy, and to (4) animal transports, sailing between ports under the jurisdiction of these headquarters and European ports.

SEPTEMBER 2, 1918.

Pursuant to foregoing order, the board met on September 2, 1918, and thereafter daily until their work was completed, all members being present at each meeting. After due consideration as to the requirements of the various classes of transports carrying troops to Europe and at the same time the probabilities of each of the several classes carrying sick and wounded from Europe to this port, it is recommended:

1. That a unit to be known as a "surgical unit" be put aboard all vessels carrying troops to Europe when an Army medical officer is assigned to duty as transport surgeon, regardless of the class of vessel or number of troops carried. It is further recommended that, on vessels having adequate hospitals and operating-room equipment, which would be available for use by the transport surgeon, the officer in charge of the transport supply division of the office of the surgeon, port of embarkation, Hoboken, N. J., be authorized to reduce this equipment as may be required in order to prevent duplications. List of articles selected for the unit to be known as a "surgical unit" attached * * *

2. That a unit to be known as a "medial unit" be put on transports of every class leaving this port en route to Europe. List of articles selected for the unit attached * * *. This unit is based on the allowance of 1,000 men for the trip, and it is further recommended that one of these units be placed aboard for each 1,000 or fraction of 1,000 troops carried.

3. That a unit to be known as "dental emergency outfit, B" be put aboard each transport carrying troops, this unit to be as per list attached * * *.

4. That a unit to be known as a "sera and vaccine unit" be put on transports of every class leaving this port en route to Europe. List of sera and vaccine and amounts selected for this unit attached * * *. This unit based on allowance for 1,000 men for the trip and it is further recommended that one of these units be placed aboard for every 1,000 troops carried, and that, in cases where fractional parts of 1,000 troops are carried, it be reduced in proportion.

5. That blank forms be placed aboard ships according to the class of vessel. Lists of forms selected for the various classes of vessels attached * * *. This unit is based on the allowance of 5,000 men for the trip, and it is further recommended that one of these units be placed aboard for every 5,000 or fraction of 5,000 troops carried.

6. It is recommended that all medical supplies and equipment placed on transports be provided by the property officer, office of the surgeon, port of embarkation, and that, in order to reduce the paper work in connection with reports and returns, he be authorized to drop from his return all articles of expendable property called for in these units, but that he invoice to the transport surgeon all nonexpendable articles, invoices, and receipts to be accomplished in accordance with existing regulations.

7. That the transport surgeon be furnished with a copy of each of these units, and that he be instructed that, upon his return to the port on each trip, he put in a requisition to the transport supply officer, office of the surgeon, port of embarkation, Hoboken, N. J., requesting such articles as he may need to bring his supply up to the authorized allowance.

* * * * *

MEDICAL UNIT

Acidum boricum, powder, $\frac{1}{2}$ pound in bottle.....	bottle..	1
Adrenalin chloride, 1-milligram tablets, 25 in tube.....	tube..	1
Æther, $\frac{1}{4}$ pound in tin.....	tins..	8
Alcohol, 1-quart bottle.....	bottles..	2
Apomorphinæ hydrochloridum, 6-milligram hypodermic tablets, 20 in tube.....	tube..	1
Argyrol, 1 ounce in bottle.....	bottle..	1
Aspirin, 324-milligram tablets in bottle, 500 in bottle.....	bottles..	2
Argentii nitras fusus, 1 ounce in bottle.....	bottle..	1
Atropinæ sulphas, 0.65-milligram hypodermic tablets, 20 in tube.....	tubes..	2
Bismuthi subnitras, 324-milligram tablets, 500 in bottle.....	bottle..	1
Chloralum hydratatum, 324-milligram tablets, 500 in bottle.....	do..	1
Chloroform, $\frac{1}{4}$ pound in tin.....	tins..	2
Cocainæ hydrochloridum, 10-milligram hypodermic tablets, 20 in tube.....	tubes..	2
Codeina, 32-milligram tablets, 500 in bottle.....	bottle..	1
Collodium, 1 ounce in bottle.....	bottles..	2
Digitalinum, 1-milligram hypodermic tablets, 20 in tube.....	tube..	1
Glycerinum, 1 pound in bottle.....	bottle..	1
Hexamethylenamina, 324-milligram tablets, 500 in bottle.....	do..	1
Hydrargyri chloridum corrosivum, tablets, 500 in bottle.....	do..	1
Hydrargyri chloridum mite, 32-milligram tablets, 500 in bottle.....	do..	1
Hyoseinæ hydrobromidum, 0.65-milligram hypodermic tablets, 20 in tube.....	tube..	1
Iodum-potassi iodidum, in tube, 10 tubes in box.....	box..	1
Liquor formaldehydi (37 $\frac{1}{2}$ per cent), 1 quart in bottle.....	bottle..	1
Magnesii sulphas, 4 pounds in tin.....	tins..	4
Misturæ glycyrrhizæ compositæ, tablets, 1,000 in bottle.....	bottle..	1
Morphinæ sulphas, 8-milligram hypodermic tablets, 20 in tube.....	tubes..	4
Nitroglycerin, 0.65-milligram hypodermic tablets, 20 in tube.....	tube..	1
Normal saline solution tablets, 100 in bottle.....	bottle..	1
Oleum carophylli, 1 ounce in bottle.....	do..	1
Phenylis salicylis, 324-milligram tablets, 500 in bottle.....	do..	1
Pilulæ catharticæ compositæ tablets, 500 in bottle.....	bottles..	4
Pilule camphoræ et opii, 25 in box.....	box..	1
Potassii bromidum, 324-milligram tablets, 500 in bottle.....	bottle..	1
Potassii iodidum, 324-milligram tablets, 500 in bottle.....	do..	1
Protargol or equivalent, 1 ounce in bottle.....	bottles..	2
Pulvis ipeacacuanhæ et opii, 324 milligram tablets, 500 in bottle.....	bottle..	1
Quininæ sulphas, 200-milligram tablets, 1,000 in bottle.....	do..	1
Sodii bicarbonas, 324-milligram tablets, 1,000 in bottle.....	do..	1
Sodii salicylas, 324-milligram tablets, 500 in bottle.....	do..	1
Spiritus ammoniæ aromaticus, $\frac{1}{2}$ pound in bottle.....	do..	1
Strychninæ sulphas, 1-milligram hypodermic tablets, 20 in tube.....	tubes..	4
Trochisci ammonii chloridi, 100 in bottle.....	bottles..	2
Unguentum hydrargyri, $\frac{1}{2}$ pound in bottle.....	do..	2
Unguentum hydrargyri chloridi mitis, 30 per cent, $\frac{1}{2}$ pound in bottle.....	do..	2
<i>Stationery</i>		
Envelopes, official, letter.....	number..	25
Paper, letter:		
Typewriter.....	quire..	1
Manifolding.....	do..	1
Paper, carbon, letter.....	sheets..	4
<i>Miscellaneous</i>		
Medicine droppers.....	dozen..	$\frac{1}{2}$
Pins, safety.....	do..	1
Sutures, catgut, plain, sterile, 3 sizes in package.....	packages..	6

Syringes, penis, glass, in wooden box.....	number.....	12
Thermometers, clinical.....	do.....	2
Needles, curved, surgical.....	do.....	4
Brushes, hand, fiber.....	do.....	1
Plaster, adhesive, zinc oxide, 2½ inch by 6 yards, on spool.....	spools.....	4
Cotton, absorbent, 1 pound in roll.....	rolls.....	3
Gauze, plain, 25 yards in roll.....	do.....	2
Bandages, gauze, roller, 6 dozen in box.....	boxes.....	2
Tongue depressors, wooden.....	number.....	100
Tags, diagnosis, in book.....	book.....	1
Applicators for throat, wood.....	number.....	50

DENTAL EMERGENCY OUTFIT "B"

Medicines

Adrenalin chlorid, 1-milligram tablets, 20 in tube.....	tube.....	1
Cocainæ hydrochloridum, ¼ ounce, in wide-mouth bottle.....	bottle.....	1
Cresol, 1 pound in bottle.....	do.....	1
Eugenol, 1 ounce in bottle.....	do.....	1
Phenol, camphorated, ½ pound in bottle.....	do.....	1
Tinctura aconiti, 1 ounce in bottle.....	do.....	1
Tinctura iodi, 4 ounce in glass-stoppered bottle.....	do.....	1
Novocain, 50-milligram hypodermic tablets (or equivalent).....	number.....	10

Blank forms

Register of dental patients card, Form 79.....	number.....	150
Report of dental work, Form 57.....	do.....	12

Instruments and appliances

Cases, office, preparation, extra ½-ounce glass-stoppered bottles for.....	number.....	6
Chisels, 3, 48, of each.....	do.....	1
Cleaners, root-canal, Donaldson's or S. S. W., No. 5, all fine, in package.....	packages.....	4
Elevators:		
Knott's type, right and left, metal handles, of each.....	number.....	1
No. 3, metal handle.....	do.....	1
Engine instruments for hand piece No. 7:		
Burs, round, 4, 6, 8, 9, of each.....	do.....	1
Drills, 100, 103, of each.....	do.....	1
Excavators, Black's cutting instruments, No. 57, 58, 63, 64, 81, 83, of each.....	do.....	1
Explorers, L. H., 11, 12, 18, of each.....	do.....	1
Forceps, tooth-extracting, 15, 18R, 18L, 65, 150, 151, of each.....	do.....	1
Holder:		
For cotton, Metho's type.....	do.....	1
For nerve broach, No. 2.....	do.....	1
Hones, oil, Arkansas stone, in wooden box.....	do.....	1
Lancets, abscess, metal handles, octagon, No. 2.....	do.....	1
Mirrors, mouth:		
Aluminum handles, No. 4.....	do.....	2
Extra glasses for, size No. 4, plain.....	do.....	2
Pliers, dressing, No. 17.....	do.....	2
Pluggers, amalgam, Woodson's, 1, 2, 3, of each.....	do.....	1
Scalers, L. H., No. 3.....	do.....	1
Scissors, gum, curved on flat, No. 22.....	do.....	1
Slabs, mixing, glass, No. 6.....	do.....	1
Spatulas, No. 24.....	do.....	1

Syringes:

Hypodermic—

All metal—

Dental, 172A.....	number	1
Extra needles for, straight and curved, of each.....	do	12
Extra needles for conductive anaesthesia (Fisher's type).....	do	12
Extra hubs for, of each.....	do	1
Water, 21A.....	do	1
Extra bulbs for.....	do	1

Miscellaneous

Brushes, hand, fiber.....	number	1
Cotton, absorbent, 1 ounce in package.....	package	1
Floss, silk, waxed, 24 yards in spool.....	spool	1
Napkins, dental, aseptic, 50 in box.....	box	1
Sandarac, gum, varnish, 2 ounces in bottle.....	bottle	1
Soap, Ivory.....	cakes	12
Towels, hand.....		

Additional articles

Bit (bur) holder, revolving head.....	number	1
Case, dental, emergency, "B".....	do	1
Cement, temporary, calxine or equivalent.....	box	1
Tray, w. e., sterilizing, 9 by 6 by 3, with cover.....	number	1

SURGICAL UNIT

Acidum boricum, 324-milligram tablets, 500 in bottle.....	bottle	1
Acidum nitricum, ½ pound in bottle.....	do	1
Adrenalin chlorid, 1-milligram tablets, 20 in tube.....	tubes	5
Æther, ¼ pound in tin.....	tins	10
Æthylis chloridum, 3 ounces in metal tube.....	tubes	2
Alcohol, 1 quart in bottle.....	bottles	3
Amylis nitris, 5 drop spirets, 12 in box.....	box	1
Aquæ hydrogenii dioxidi, 1 pound in bottle.....	bottles	2
Argenti nitras fusus, 1 ounce in bottle.....	bottle	1
Argyrol, 1 ounce in bottle.....	do	1
Balsamum Peruvianum, ¼ pound in bottle.....	do	1
Chloroformum, ¼ pound in tin.....	tins	5
Cocainæ hydrochloridum, 10-milligram hypodermic tablets, 20 in tube.....	tubes	5
Collodium, 1 ounce in bottle.....	bottles	3
Emplastrum belladonnæ, 2 yards by 6 inches, in tin.....	tin	1
Foot powder (par. 902), ¼ pound in tin.....	tins	3
Glycerinum, 1 pound in bottle.....	bottles	2
Hydrargyri chloridum corrosivum, tablets, 250 in bottle.....	do	2
Hydrargyri chloridum mite, 2 ounces in bottle.....	bottle	1
Iodum potassii iodidum, in tube.....	tubes	20
Liquor cresolis compositus, 1 quart in bottle.....	bottle	1
Liquor formaldehydi (37½ per cent), 1 quart in bottle.....	do	1
Normal saline solution tablets, 100 in bottle.....	bottles	2
Petrolatum, 3 pounds in tin.....	tin	1
Petrolarum liquidum, 1 pound in bottle.....	bottle	1
Phenol, ½ pound in bottle.....	do	1
Sapo mollis (green soap), 1 pound in jar.....	jars	2
Sodii carbonas monohydratus, for surgical use, 1 pound in bottle.....	bottle	1
Spiritus ammoniæ aromaticus, ½ pound in bottle.....	do	1

Spiritus frumenti, 1 quart in bottle.....	bottle.....	1
Sulphur lotum, ½ pound in bottle.....	do.....	1
Taleum, 2 pounds in tin.....	tin.....	1
Unguentum hydrargyri chloridi mitis, 2 pounds in jar.....	jar.....	1
Zinci oxidum, ¼ pound in bottle.....	bottle.....	1

Stationery

Bands, elastic.....	dozen.....	2
Books, blank:		
Crown (cap), 250 pages.....	number.....	1
8vo, 150 pages.....	do.....	100
Envelopes, official, letter.....	do.....	100
Ink, blaek (powder or tablets), sufficient in box for 1 quart of fluid.....	box.....	1
Pads, prescription.....	number.....	1
Paper:		
Blotting, for desk.....	sheets.....	2
Writing, letter.....	quires.....	2
Penholders.....	number.....	2
Pens, steel.....	do.....	12

Miscellaneous

Applicators, for throat, wood.....	gross.....	1
Atomizers, hand.....	number.....	1
Bags, rubber, hot water.....	do.....	2
Bandages:		
Gauze, roller, assorted, 6 dozen in box.....	boxes.....	2
Plaster of Paris.....	number.....	12
Suspensory.....	dozen.....	1
Basins, white enamel, for operating room.....	number.....	2
Bath robes (gowns, convalescent).....	do.....	25
Bedpans, white enamel.....	do.....	1
Boilers, instrument.....	do.....	1
Brushes, hand, fiber.....	do.....	3
Cases, general operating (par. 916, M. M. D.).....	do.....	1
Cotton:		
Absorbent, in roll.....	pounds.....	10
Bat.....	do.....	1
Crinolin (stenta-book), 6 yards in piece.....	piece.....	1
Crutches, rubber tips for, size No. 18 (¾ inch).....	number.....	4
Cups:		
Feeding.....	do.....	1
Spit, paper.....	do.....	100
Metal frames for.....	do.....	6
Cushions, surgical, Kelly's.....	do.....	1
Gauze, plain.....	yards.....	250
Gloves, plain, rubber.....	pairs.....	4
Gowns, operating.....	number.....	6
Graduates, glass, 250 cubic centimeters.....	do.....	1
Inhalers, ether.....	do.....	1
Litters, with slings.....	do.....	2
Medicine droppers.....	dozen.....	1
Medicine glasses.....	number.....	1

Pajamas:		
Coats.....	number	25
Trousers.....	do	25
Pillow cases, cotton.....	do	12
Pins, safety.....	dozen	3
Pitchers, white enamel.....	number	1
Plaster, adhesive, zinc oxide, 5 yards by 2½ inches.....	spools	13
Plaster of Paris, 4 pounds in tin.....	tin	1
Pus basins.....	number	1
Sheets, cotton.....	do	12
Shirts, cotton.....	do	6
Slippers.....	pairs	25
Soap, Ivory.....	cakes	6
Sterilizer, for dressings.....	number	1
Stethoscope, double.....	do	1
Stove, coal oil.....	do	1
Extra wicks for.....	do	1
Sutures, catgut, chromicized, 1 suture in tube.....	tubes	24
Syringes, glass, Luer type, 10 cubic centimeters.....	number	1
Tables, operating, field, folding.....	do	1
Tongue depressors, wood.....	gross	2
Towels, hand.....	number	36
Trays, instrument, white enamel.....	do	1
Tubes:		
Drainage, rubber, in yard lengths, 3 sizes.....	yards	3
Stomach.....	number	1
Urinals, glass, graduated.....	do	1
Paper, litmus:		
Blue, 100 strips in vial.....	vial	1
Red, 100 strips in vial.....	do	1
Test tubes.....	dozen	1
Urinometers.....	number	1

Additional (field)

Chest, medical and surgical (par. 932, M. M. D.) less case, operating, small; case, forceps, hemostatic.....	number	1
Head mirror in case (par. 933, M. M. D.).....	do	1
Speculum, ear, 3 in set.....	set	1

SERA AND VACCINE UNIT

Smallpox vaccine.....	units	1, 000
Lipo typhoid vaccine.....	cubic centimeters	100
Antimeningitis serum.....	do	480
Diphtheria antitoxin.....	units	100, 000
Tetanus antitoxin.....	do	15, 000

BLANK FORMS

<i>Commercial troop transports</i>			<i>Army cargo transports</i>		
No.			No.		
47a, M. D.	number	4	17, M. D.	number	4
50, M. D.	do	2	17a, M. D.	do	50
51, M. D.	do	4	17b, M. D.	do	50
51a, M. D.	do	4	17c, M. D.	do	4
51b, M. D.	do	4	28, M. D.	do	12
52, M. D.	do	200	35, M. D.	do	6
55a, M. D.	do	50	50, M. D.	do	6
55c, M. D.	do	50	48, Q. M.	do	24
55d, M. D.	do	50			
55e, M. D.	do	50	<i>Army troop transports</i>		
55g, M. D.	do	50	No.		
55h, M. D.	do	50	17, M. D.	number	10
55j, M. D.	do	50	17a, M. D.	do	100
55m, M. D.	do	10	17b, M. D.	do	100
56, M. D.	do	10	17c, M. D.	do	10
57, M. D.	do	50	28, M. D.	do	10
71, M. D.	do	4	35, M. D.	do	6
75, M. D.	do	50	47a, M. D.	do	4
76, M. D.	do	50	50, M. D.	do	6
77, M. D.	do	50	51, M. D.	do	4
78, M. D.	do	10	51a, M. D.	do	4
79, M. D.	do	50	52, M. D.	do	200
81, M. D.	do	100	55a, M. D.	do	10
48, Q. M.	do	50	55b, M. D.	do	10
			55c, M. D.	do	10
			55d, M. D.	do	10
			55e, M. D.	do	10
			55g, M. D.	do	10
			55h, M. D.	do	10
			55j, M. D.	do	10
			55m, M. D.	do	10
			56, M. D.	do	10
			71, M. D.	do	4
			75, M. D.	do	100
			76, M. D.	do	50
			77, M. D.	do	50
			78, M. D.	do	10
			81, M. D.	do	100
			48, Q. M.	do	24

Naval troop transports

No.		
47a, M. D.	number	4
51, M. D.	do	4
51a, M. D.	do	4
51b, M. D.	do	4
52, M. D.	do	200
56, M. D.	do	10
71, M. D.	do	2
75, M. D.	do	50
76, M. D.	do	50
77, M. D.	do	50
78, M. D.	do	10
81, M. D.	do	100
48, Q. M.	do	24

The debarkation of troops at this port was not materially different from embarkation. While it was determined that the medical supply of vessels carrying troops from Europe would be accomplished at the port in Europe from which the vessels sailed, experience proved that it was more satisfactory to provide these supplies at Hoboken for the returning voyage, and this method was followed throughout the debarkation period.

REAL ESTATE SECTION

This section assumed the duties of what was formerly the hospital procurement division, the duties of which were to survey suitable buildings in the vicinity of this port for hospital purposes. The later duties of this section were

all matters pertaining to leases, renewal of leases terminating or expiring, for the Medical Department at this port, and all matters relating to the construction or repairs of hospitals or property under the jurisdiction of the Medical Department at the port.

The later organization of the finance division and the duties of the various sections as above specified were considered to have been an excellent arrangement. The personnel required for its operation consisted of 2 commissioned officers, 7 enlisted men, and 2 civilian stenographers.

PROPERTY DIVISION

This division was organized with the opening of the port of embarkation. The personnel consisted of 1 officer and 3 enlisted men in November, 1917, of 1 officer and 19 enlisted men in June, 1918, and 1 officer and 20 civilian employees in July, 1919.

The functions of the division at the time of its origin were to supply the office of the attending surgeon with medical and surgical supplies, the port surgeon's office with stationery and office supplies, the dental surgeons of the port with dental supplies, and the transports then in operation with sera and vaccines. It later verified and receipted for Quartermaster, Medical, and Ordnance Department property and prepared and forwarded the prescribed returns; maintained in proper mechanical condition the wheel transportation of the Medical Department; and prepared and shipped medical supplies to the various other embarkation points under the jurisdiction of this port.

On November 5, 1917, pursuant to Order No. 24, surgeon's office, a board of medical officers was appointed to compile a list of supplies and equipment for use on transports, at which time each transport was supplied with a medical and surgical chest as part of its equipment. During the year 1918, 115 chests, medical and surgical, were issued.

Large quantities of medical supplies for use in the port and on transports were obtained with difficulty during 1918, owing to the large number of medical units being equipped for overseas service and the amount of supplies being shipped to our Army in France. This office was also charged with and maintained motor ambulances for the transportation of sick and wounded to the various embarkation hospitals of the port. Ambulances and their equipment were turned over to the Motor Transport Corps on November 29, 1918.

A second board of medical officers was ordered on September 2, 1918, per orders, No. 170, surgeon's office, to investigate and report upon the allowance of medical and hospital supplies which should be placed on board all transports. This board submitted a report as to the allowance of sera and vaccines to be placed on board for each 1,000 troops. They also submitted a list of medical supplies which were to be consolidated and packed as a medical unit, each unit to care for 1,000 troops en route from overseas. Two hundred and ten of these units were packed in boxes according to the list submitted.

The use of hospital boats in removing sick and wounded patients from transports was inaugurated in the fall of 1918. These boats were supplied with medical and surgical chests, litters, blankets, pillows, and various other supplies.

Ten hospital unit cars arrived at this port in December, 1918, and were here equipped with the necessary mess equipment, linen, blankets, pillows, medical and surgical chests, office equipment, etc., to take care of the patients carried. These cars then continued to draw supplies and equipment as occasion arose. Fifteen additional hospital unit cars were supplied with hospital, medical, and mess equipment in February, 1919, making a total of 25 hospital unit cars and 3 hospital trains which were drawing supplies from this office in addition to the many other separate units.

This office took a complete physical inventory of all property on hand pursuant to Circular No. 131, War Department, December 10, 1918, and a new system of property accounting as outlined in the above mentioned circular was instituted. Much difficulty was experienced at this time in obtaining supplies, due to the change in property accounting. Requisitions submitted to the zone supply office for supplies were often not filled for many months, thereby causing depletion of stock and necessitating many unnecessary efforts in trying to replenish it.

Transports carrying returning troops were supplied with medical units, sterilizers, operating tables, and all necessary supplies for use in the care and treatment of sick and wounded returning to the United States. From January to June, 1919, 140 medical units were placed on board. Beginning in January, 1919, chartered transports were taken out of the service to carry on the commercial work which they had been doing before the war, thus necessitating the removal of all supplies from them. Medical and surgical chests and about 5,400 blankets were removed, from January until July, 1919, not including various other supplies which had to be handled.

Though the chief work of this office during the years 1917 and 1918 was to obtain and issue supplies, in 1919 it was also charged with the receiving of all property from transports taken out of the Government service. Supplies in excess of the required amount for the return trip would be placed on board in England and France. Upon arrival at Hoboken, N. J., this property had to be taken from the boats and stored in warehouses. Since transport surgeons very seldom made more than one or two trips on the same transport, some of his property would be found missing, in practically every case, and it was necessary not only to instruct the transport surgeon in regard to the preparation of his survey but in most instances, also, to prepare it for him, inasmuch as he had no clerk who could do this work. The division was also called upon to straighten out transport surgeons' property accountability and, upon their release from the service, to audit all their accounts.

The work was increased further in May, 1919, by the return of dental surgeons from the American Expeditionary Force. Each dentist was ordered to bring with him a portable dental outfit. These outfits were carried to Brest or St. Nazaire, France, and there loaded in transports for the United States. This property was often not placed on the same transport with the officer, and his property was short upon his arrival at this port. It was then necessary to prepare property accounts for this property and surveys for the lost property, thereby increasing the clerical work to a very great extent.

The division supplied clothing and equipage for 1,000 men, and medical and hospital supplies, dental supplies, general supplies, and blank forms to the following organizations: Surgeon's office, including all subdivisions; medical detachments at 200 Washington Street and Scheutzen Park, North Bergen N. J.; medical detachments on hospital unit cars, hospital trains, hospital harbor boats; attending surgeons at Bush Terminal and at 209 River Street, Hoboken, N. J.; the dental surgeons at Bush Terminal; at 209 River Street, Hoboken, N. J.; at 54 Dey Street, New York City; at the Whitehall Building, New York City; at the Army base; at the Holley Hotel and the Hotel Albert; at the Rest House in Red Bank N. J.; and several rest rooms in the various big offices where female employees were at work.

Storage space was inadequate to handle all these supplies, and storerooms were usually filled to capacity. Every effort was made to dispose of all excess property by turning the same in to general supply depots as it accumulated.

CORRESPONDENCE DIVISION

A department, in operation from the establishment of the office of the surgeon of the port, under several different designations, was concerned with the preparation for signature, filing, and forwarding of official correspondence. This department was ordinarily the office of the chief clerk, but in December, 1917, it was placed directly under the executive officer. Known at first as the correspondence division, and later as the mail and files division, it retained the same status as regards functions, but owing to an increase in the volume of work and for purposes of better administration it was divided into two separate sections and known as the mail and files division. The two sections were consolidated with the finance division in December, 1917, not because of any similarity of duties but for convenience of administration. It was later necessary, on account of the increase of business, to separate the correspondence division from the finance division. The entire method of operation was revised, correspondence was reclassified, and the methods of distributing orders, circulars, etc., were changed. The organization and duties remained practically the same throughout the period of activity of the port, except for a large increase in the amount of correspondence handled. The duties were as follows: Receiving, recording, forwarding, and filing of official correspondence; distribution of orders, circulars, memoranda, etc., to all persons concerned; and the preparation for signature of letters, indorsements, reports, and office orders.

There were approximately 5,000,000 pieces of correspondence in the files at the end of the fiscal year 1919. The War Department system of filing was used and maintained in a high state of efficiency. Numerous cross references were made, and the suspended file was closely checked and kept up to date.

ATTENDING SURGEON'S DIVISION

A place for the medical and surgical treatment of military persons on duty in the port of embarkation became necessary shortly after its establishment, and a dispensary was opened at 209 River Street, Hoboken, N. J., with an attending surgeon in charge. The personnel of the office at that time consisted of one medical officer and three enlisted men. As the activities of the port

increased, so the demands upon this office increased. The office became a division of the office of the port surgeon for convenience of administration, and branch offices were established in Bush Terminal, Brooklyn; on West Fifty-seventh Street in New York City; in Kearny, N. J.; and in Jersey City.

The duties of the attending surgeon of the port of embarkation, Hoboken, N. J., differed somewhat from those of the usual attending surgeon, whose duties are to render medical attention to those entitled to such in the territory. In addition to rendering medical attention to Army personnel at this port, and to their families, this office made preembarkation examinations of all casuals and gave typhoid and smallpox vaccinations to all persons going overseas not with organizations, which included officers, Army field clerks, welfare workers, and civilian employees.

This office also made physical examinations for promotion. A dispensary was operated in connection with the office, where night and day service was maintained and first aid was administered to all persons on duty at the piers, both military and civilian.

During the demobilization period a board of medical officers was created for the physical examination of officers and enlisted men prior to their separation from the service. Ten thousand five hundred and ninety physical examinations were made by this board up to July 31, 1919.

The activities of the office steadily increased, reaching their maximum during July, 1919, when the personnel was composed of 32 officers and 45 enlisted men, the office occupying two floors of the main building at 209 River Street, Hoboken, N. J.

DIVISION OF DENTAL SERVICE

The first dental service for the care and treatment of officers and enlisted men attached to the port of embarkation was established in August, 1917, one dental officer being assigned to duty with the guard at the piers. This guard consisted of approximately 600 men. The dental surgeon's equipment consisted of a portable field outfit, and his office was a small room which served as both operating and waiting room. This office was maintained until May, 1918, when larger quarters were secured in the office of the attending surgeon wherein a base dental equipment was installed.

Five dental officers reported on October 16, 1917, for duty at Camp Merritt, N. J., where approximately 5,000 troops were quartered without the services of a dental surgeon. Three were assigned to the base hospital and two to the camp surgeon's office. One dental officer reported for duty on December 10, 1917, and was assigned to Army hospital, Hoffman Island, N. Y. The increasing arrival of troops at the camps for embarkation and the assigning of additional personnel to the port of embarkation caused the port surgeon to request the assignment of dental officers to meet the increased requirements of the dental service. Three dental officers reported for duty in May, 1918, and were assigned to Camp Mills, Long Island. Additional dental officers were assigned for duty during June, 1918, and 66 officers were equipped with portable field equipment upon their arrival at this port for duty overseas. This constituted the dental service at the port of embarkation prior to the summer of 1918.

The dental service for the port of embarkation was placed upon an organized base July 1, 1918, when the port surgeon designated an officer then on duty in his office as director of dental service. This officer directed the organization and supervision of all dental work at hospitals and camps under the jurisdiction of the port surgeon and cooperated with the personnel officer, office of the port surgeon, in recommending the assignment of dental officers where their need became apparent.

A survey of hospitals and the two embarkation camps revealed that no facilities for the functioning of the dental service were provided at the embarkation camps except a small outbuilding at Camp Mills, Long Island, and two small rooms at Camp Merritt, N. J. The space in both places was totally inadequate. Recommendations were made for a dental unit building and the necessary base dental equipment for each camp. Hospitals acquired and those in course of construction were equipped with base dental equipment and bedside X-ray units.

A dental society was organized in August, 1918, with the object of promoting closer relations between the officers in their professional work, free discussions of the dental work as a whole, individual suggestions for the betterment of the service, and of holding clinics at which papers were to be read and discussed. These meetings occurred monthly and had a great influence upon the morale of all officers concerned.

The increasing arrivals of troops for embarkation in August and September, 1918, and the opening of debarkation hospitals for the reception of the sick and wounded from overseas, so increased the demands for dental service that additional officers were requested to properly supply this service. This demand was later relieved when the War Department authorized the increase of dental personnel at hospitals from 1 dental officer per 1,000 beds to 3 dental officers per 1,000 beds, and 47 dental officers accompanied by their dental assistants arrived.

Authority for the construction of a building for the exclusive use of the dental service was granted for Camp Merritt, N. J., on October 22, 1918. Work was immediately begun, and requisitions were made for a complete base dental equipment laboratory outfit and X-ray unit to properly furnish this building.

Heretofore, due to lack of adequate dental equipment, almost all dental work done was of an emergency character. The increasing arrivals of sick and wounded presented so many cases of Vincent's angina, trench mouth, fracture of the maxillaries, facial wounds, restorations with artificial dentures, and many affections of the soft tissues that it was necessary to classify and assign the dental officers best adapted for the work, as many cases required the attention of those skilled in oral dental surgery.

Meanwhile, the two embarkation camps under the jurisdiction of the port surgeon were urgently in need of better dental facilities. At Camp Merritt, N. J., a dental infirmary had been authorized and the building was under construction. At Camp Mills, Long Island, following considerable delay, authority was granted for the erection of a similar building. Thus the dental service was prepared for the approaching return of sick and wounded troops needing the attention of the dental surgeon.

With the signing of the armistice and the return of wounded and sick from overseas, many cases required special skill on the part of the dental surgeons. Since no existent Medical Department form included space to record the oral conditions of patients in hospital, the chief of dental service at the base hospital, Camp Merritt, N. J., utilized Form 55-g with the result that the dental service was greatly benefited. With the approval of the port surgeon, Form 55, as modified for dental progress, was given a trial at all hospitals under his jurisdiction, resulting in thousands of oral focal infections being detected and eliminated. The addition of the emergency dental equipment "B" to hospital dental equipment made it possible to give treatment to patients confined in bed. The completion of the dental infirmaries at Camp Merritt and Camp Mills had now placed the dental service on an efficient basis, in so far as quarters were concerned. Delays experienced in securing the proper base dental equipment necessitated the installation of the portable field equipments until such times as requisitions were filled. With the exception of the two camps, all stations and hospitals were equipped for adequate dental service in time to meet the rush of the homeward-bound troops, beginning in December, 1918, and continuing until May, 1919.

LIAISON OFFICER

It was very difficult, prior to March, 1918, to procure information concerning the movement of troops and transports at a time sufficiently far in advance to enable the various divisions of the port surgeon's office properly to perform their duties. Advance information as to the departure of troops from the embarkation camps and arrival at the different railroad centers and at the docks was almost unobtainable. Such information was strictly confidential and was delivered by messenger, the messenger starting at about the same time as the troop movement and often not arriving until after the movement was completed. The boarding of transports by troops, therefore, often was delayed while the medical personnel were being collected and inspections made. To correct this condition a liaison officer was appointed, whose duty it was to obtain such information in advance from port headquarters. Thus, information of prospective movements often was obtained 48 hours before the movement order was published. The value of this work was particularly appreciated during the influenza epidemic in the fall of 1918, when the assignment of organizations to transports was changed as often as three times in one day.

He also obtained information to assist the personnel division in the assignment of transport surgeons and surgeons of troops on transports. Usually, the senior medical officer on board was appointed surgeon of troops. As he might be sailing either as a casual or with an organization, his identification necessitated an almost endless search through the passenger lists. Passenger lists frequently failed to show the branch of the service to which an officer belonged, and it was then necessary to telephone to the various camps for the required data.

MISCELLANEOUS ORGANIZATIONS

RECEIVING SHIPS

Prior to November, 1918, the debarkation of sick and wounded was carried on by various officers assigned from the office of the surgeon, transport division, 316 River Street, Hoboken, N. J., to the incoming transports. The number of sick and wounded was usually very small, probably an average of five cases, some of which would make the transfer directly from the transport to various hospitals which had been designated by the port surgeon. The small number of men to be transferred were taken care of by one officer, without medical enlisted men, as it was always possible to obtain assistance from the transport in carrying out litters, baggage, etc. Such patients were loaded directly into ambulances on the piers.

With an increased number of sick and wounded, it was found impracticable to have patients carried long distances by ambulance. This was overcome by putting into commission small steamers that could go alongside vessels and make fast. Gangplanks were rigged from the deck of the incoming transport to the transfer steamer, thereby making transfers much easier. Patients were taken to a point near the hospital where ambulances were waiting. Hoboken debarkations were sent directly by ambulances to hospitals. Bush Terminal and New York debarkations were usually carried by small steamers to the Hoboken side.

In November, 1918, it was deemed practical to establish a receiving ship whose sole purpose would be debarkation. For this purpose the steamship *Shinnecock* was commissioned, with a medical officer in command, also carrying a large number of enlisted men as litter bearers. The receiving ship was then operated as an independent unit under the direction of the surgeon, port of embarkation. Quarters and mess were furnished the enlisted men on board. Crews and men were available for any transfer, either day or night, on a few minutes' notice. Debarkations were made from transports, the piers, in mid-stream, and in the lower bay. Transfers were necessarily more or less routine, with slight changes needed at times to overcome difficulties presented by tides, winds, fog, etc., but in general there was never experienced any great difficulty in any debarkation.

It was necessary to increase the number of officers, enlisted men, and boats during months of heavy debarkations. The greatest number of officers (seven) were on duty in April, 1919; also, at this time, the largest number of small steamers (six). Beginning with May, 1919, owing to the decrease in the number of sick and wounded, it was recommended that the *Montauk*, a smaller steamer replace the *Shinnecock*. The organization of the *Shinnecock* was placed upon the *Montauk*, which then became the receiving ship.

There was a gradual decrease in the number of sick and wounded after May. Many of these were in such condition that they needed no special attention and had been formed into casual companies on board ship. These were taken directly to near-by camps.

The following tabulation shows the harbor boats assigned to the Medical Department, and the dates upon which they were obtained and released. It will be seen that at one time the surgeon had nine of these boats at his disposal.

Name of vessel	Date assigned	Date released
Princess	Aug. 22, 1918	
Gonnold	Aug. 22, 1919	
Montauk	May 14, 1919	Aug. 16, 1919
Columbia	Aug. 22, 1918	
Gardner	Jan. 10, 1918	July 1, 1918
Lexington	Aug. 22, 1918	Oct. 1, 1918
Islesboro	do	July 18, 1919
Bronx	do	July 1, 1919
Shinnecock	Nov. 1, 1918	May 14, 1919
Joseph E. Johnston	Aug. 22, 1918	Do.
Casining	Oct. 1, 1918	July 10, 1919

HOSPITAL SHIP

In the latter part of 1918, anticipating the arrival of large numbers of sick and wounded from overseas, steps were taken to provide sufficient water transportation at this port to handle them. Among the vessels surveyed for this purpose was the steamship *Crosby*, which had been plying the Great Lakes for several years. The length of this vessel was 202 feet, beam 40 feet, with a gross tonnage of 1,920. This ship seemed to be suited for the above-mentioned purpose, particularly that of making coastwise transfers from this port to Boston, Baltimore, Philadelphia, and other seaports of the Atlantic coast. The vessel was considered entirely seaworthy, and accordingly was procured for the Medical Department and fitted as the hospital ship *General Robert M. O'Reilly*.

There was no occasion to use this boat as a hospital ship in making coastwise transfers under the debarkation system as organized at this port. The boat, accordingly was tied up at Pier 45, North River, and designated as a hospital for the treatment of contagious diseases. As a hospital ship, she had a capacity of 274, in 9 wards. A total of 606 patients were treated in the hospital before it was discontinued on April 15.

The maximum personnel on duty consisted of 11 commissioned officers, 84 enlisted men, 20 Army nurses, and a crew of 43.

NURSES' MOBILIZATION STATION

The nurses' mobilization station was opened on June 15, 1917, with headquarters at United States Quarantine Hospital, Ellis Island, N. Y., with a personnel of 4 Army nurses and 3 enlisted men of the Medical Department. The first detachment transferred overseas left the station June 30, 1917, and consisted of 54 nurses belonging to 5 separate units. A substation was opened on December 17, 1917, at 120 Madison Avenue, New York City, with a personnel of 5 nurses and 2 civilian employees. This station was used to take the overflow from Ellis Island and, later, the overflow from the Hotels Holley and Albert, New York City.

The main station was operated at Ellis Island until April 1, 1918; subsistence and quarters were furnished in kind. Headquarters was then transferred to the Holley Hotel, and a medical officer assumed charge. Another change was made to the Hotel Albert, on September 1, 1918. This station was made an independent organization on April 1, 1919. On the transfer from Ellis Island, subsistence and quarters for nurses and civilian employees of the Medical Department were furnished by the Holley Hotel Co. under contract,

and later it was frequently necessary to have nurses quartered in from 15 to 20 different hotels when large numbers were present at one time.

The work of the mobilization station was aimed toward completely preparing individuals for overseas duty and comprised the preparation of expense accounts, pay accounts, identification certificates, allotment and insurance applications, and the completion of inoculations and equipage. The work progressed in a methodical fashion and without confusion, as units were mainly dealt with prior to the signing of the armistice and these remained at the port for considerable periods. The routine was disturbed early in October, 1918, by the transfer of many nurses to hospitals at embarkation camps in this vicinity for temporary duty during the influenza epidemic. The nurses later were returned to this station and the work of forwarding was again taken up during the latter part of the month.

Nurses continued to be sent overseas for about one month after the signing of the armistice, the last one leaving this station on December 8, 1918. The designation of the station was then changed from mobilization station to demobilization station. During January, 1919, the first nurses were received from overseas for transfer to their homes for discharge or relief from active service or to other stations for duty. Nurses and civilian employees of the Medical Department continued to return in increasing numbers, and all accounts of those who requested discharge or relief from active service were completed in the Office of the Surgeon General. This work had assumed such proportions by the latter part of March, 1919, that instructions were issued by the Surgeon General that all such accounts should be completed at this station, and this was put into effect on April 14, 1919.

Prior to April 1, 1919, the station had functioned as a part of the office of the surgeon, port of embarkation, and the necessary medical officers to make the physical examinations of such as were leaving the service were sent over from the office of the attending surgeon, port of embarkation, as needed. Four officers were assigned for duty at the station, shortly after this date, and an agent of the disbursing officer, port of embarkation, New York City, opened an office at the station for the purpose of expediting payments.

The personnel of the station consisted of the following, as of July 31, 1919: Five medical officers, 1 Sanitary Corps officer, 12 enlisted men, 18 nurses, and 17 civilian employees. Eight thousand two hundred and ninety-one nurses and civilian employees passed through the station en route overseas, and 8,343 were debarked prior to September, 1919.

EMBARKATION CAMPS

In the plans for the utilization of the port of New York for embarkation purposes, it was necessary to include locations of rest camps in which to receive troops prior to their embarking on transports. The medical service at an embarkation camp differed from that at a demobilization camp in that there was little field training to consider, its place in the schedule being taken by pre-embarkation physical examinations, completion of equipment, etc. The camp personnel was very largely casual and was changed frequently.

CAMP MERRITT, N. J.

CAMP SITE

A board of officers appointed by the War Department inspected several locations in the vicinity of New York in June, 1917, principally sites in New Jersey and Long Island within easy access to the water front. Several sites were inspected in New Jersey, the two which offered the greatest advantages being one on the Phelps estate between Englewood and Teaneck, the other being near Cresskill. The board's recommendation in favor of the latter site, submitted on July 12, was approved. This selection was made "for the reason that the geological substructure and location afforded the speedier and less expensive construction for sewer and water systems, and because the land could be obtained with less expense to the Government." This site was designated as Camp Merritt, and actual construction was begun August 20, 1917.

Camp Merritt was located in Bergen County, N. J. Its borders overlapped the towns of Cresskill, Dumont, Bergenfield, and Tenafly, and it was about 3 miles from the suburban town of Englewood and about 15 miles from New York City. The terrain was rolling, the main portion of the camp being located on a north and south ridge, 2 miles distant from the palisades of the Hudson. The land consisted mostly of small cultivated estates with considerable wooded areas. Both on the ridge and at the foot of its slopes were found some rather marshy areas. The soil for the most part was a sandy clay. The underlying stratum of red shale was a continuation of the Hudson palisades formation. The soil was more sandy in the lower ground leading toward the Hackensack River bed, and even quicksands were encountered at certain points during sewer construction. The natural drainage was excellent, due to the rolling character of the terrain, and the ground dried quite rapidly after rains. Considerable dust developed on ground exposed to much traffic during dry weather. The planting of grass over extensive areas in the camp served to eliminate much of this difficulty.

The climate was generally similar to that of New York City and vicinity, sharing in the humidity produced by the waters of the river and bay and being subject to frequent mist and fog during the night and early morning. Winds were not common in these parts. Rainfall was of the average for this locality.

Flies were quite prevalent in the surrounding towns. Mosquitoes bred freely in the numbers of small marshes and wet areas in the wooded lands of the vicinity. Anopheles breeding occurred to a small extent in three or four scattered localities within a mile of the camp; however, cases of malarial fever were infrequent among the civilian population.

The two main approaches to the camp site were macadam roads. One of them was of asphalted surface. The other roads in the vicinity were country roads productive of considerable dust. Much improvement was made in the roads after occupation of the camp. The two main intersecting highways were rebuilt of concrete within the camp limits; other roads were resurfaced with crushed stone, gravel, or cinders, and several of these were further treated with asphalt.

Two small brooks arose within the camp and were of little importance. Near the borders of the camp were Dumont brook on the west and Tenafly

drainage brook on the east. Two and one-half miles west was the Hackensack River, a narrow creek at this point, showing daily tidal influence. The two brooks mentioned and others called for the attention of the sanitary engineer in measures for the control of mosquito breeding.

CAMP BUILDINGS

Camp Merritt was more closely built up than the average cantonment. The camp was subdivided into 21 blocks or areas. Eighteen of these were used as quarters for soldiers, one as a warehouse and stable area, and another exclusively for base hospital purposes. Block XII, located in the most central portion of the camp, contained most of the administrative buildings, the Young Men's Christian Association, Knights of Columbus buildings, Merritt Hall, and officers' club. Each block was divided into two divisions containing 16 two-story barrack buildings (quarters for four companies), each 30 by 60 feet in size, and 4 mess halls with kitchens, 20 by 98 feet, each consisting of two separate units. Speaking generally, the camp was in the form of a quadrangle, the barrack buildings occupying the west, north, and east sides, the hospital group the south side, with administration buildings, theater, Young Men's Christian Association building, auditorium, Red Cross headquarters, officers' club, and enlisted men's club (Merritt Hall) occupying the center. The warehouses, bakery, refrigerating plant, and garbage transfer station were located to the north of the quadrangle. The barracks were two-story buildings separated from each other by a distance of 40 feet. Company streets were 80 feet in width. One hundred-foot fire breaks had been left in the center of each block. Four barrack buildings with officers' quarters, one mess hall, and lavatory, formed a company group. The barracks were designed to accommodate 33 men to each floor, giving approximately 600 cubic feet of air space, or 52 square feet of floor space, per man. There was one orderly room in each group of barracks. There was an orderly room in each of the more recently constructed barracks. The lower floors of the barracks were ventilated by galvanized-iron ducts taking off from the ceilings and exhausting above the roof, draft being induced by room heaters. All camp buildings were equipped with sliding windows. One-story buildings and upper floors of the two-story barracks were equipped with ridge ventilators, opened and closed by board flaps extending along the entire length of the lavatory building.

Lavatory buildings were placed adjacent to the troop barracks. The buildings were divided into two equal sections each intended for use by one company. The equipment comprised 11 shower baths and hot and cold running water, a galvanized trough with several faucets for washing hands, 4 urinal troughs, and 12 standard porcelain toilet bowls. One hot-water heater was provided in each section of the lavatory building.

LAUNDRY FACILITIES

No laundry was operated at this camp. All laundry work for organizations, individual enlisted men, and the base hospital was sent to a laundry operated by the Quartermaster Department in Hoboken. This was formerly a commercial plant and was taken over under a contract of operation by the Government.

HEAT AND LIGHT

Heating of barracks, mess halls, lavatories, and administration buildings was provided by stoves or large heaters; officers' quarters were heated by steam, supplied by a boiler installed in each building. Hot water and steam heat for the base hospital were supplied by two large central heating plants. Electric lighting was furnished to all buildings and streets of the camp by a commercial company.

WATER SUPPLY

Water was supplied to the camp by the Hackensack Water Co. The source of the supply was the head waters of the Hackensack River and its adjacent watershed. The company operated a modern plant on the Hackensack River about 3 miles from Camp Merritt. The works included a large storage basin, settling basins, filter beds, purification tanks, and pumping plant. The water was treated by the alum sedimentation process and purified by chlorine bleach. Samples of water were examined weekly by the Army laboratory, Hoboken. The quality of water supplied was at all times of high grade. The supply was delivered through iron mains and wood-stave pipes which were capable of furnishing 75 gallons per capita daily.

ICE

Ice was supplied on contract. Manufactured ice was supplied during almost the entire time and was of satisfactory quality. Natural ice was purchased during a short period early in 1919. This came from mountain lakes and the quality was very good.

DISPOSAL OF WASTES

Sewage.—Pit latrines with Havid box seats were used throughout during the period that the camp was under construction and before the sewer was available for use. The pits were well fly-proofed and burned out in the usual manner with straw and oil, or their interiors sprayed with a mixture of lampblack and oil. These temporary toilets were surrounded by substantially constructed screens. The decision to locate Camp Merritt at this site contemplated the construction of a sewer running $2\frac{1}{2}$ miles westward to discharge into the Hackensack River at the town of New Milford. Work on the sewer system was commenced in August, 1917. The system included a purification plant located at New Milford. The effluent from the septic tanks flowed through an iron pipe line about 500 feet to the river. The discharge was effected below the surface of the river by means of a curved section of pipe having three top outlets, 10 inches in diameter, with trap covers. A more even distribution into midstream was thus effected.

The original sewage treatment plant comprised a screen chamber, septic tank compartments with a capacity of 362,600 gallons, liquid chlorine treatment apparatus, and sludge drying beds. Each unit had a detention period of $4\frac{1}{2}$ hours when the sewage flow was at a rate of 1,000,000 gallons per day. As the average rate of flow for the year ending July, 1919, was $1\frac{2}{3}$ million gallons per day, the average detention time for digestion of sewage was 2.8 hours. The sludge drying beds were designed upon a basis of one-half square foot per capita.

The 8 original beds had a total area of 12,960 square feet. Excess fluid was carried away by a small drain to the river; the remaining liquid filtered through this gravel bed. Liquid chlorine was employed in the treatment of the effluent as it flowed from the last tank. The amount of chlorine was originally regulated automatically but was later set by hand, the quantity being determined by hourly reading.

The plant was put in operation November 24, 1917, but good septic action was not obtained owing to the immediate onset of cold weather. The fat of sewage was high, causing excessive formation of crust in the tanks. This became especially bad in April, 1918, and was mainly due to the inadequate grease traps originally installed. The conditions grew rapidly worse following the large increase in the shipment of troops which had commenced about that time. It was evident that the tanks were much overtaxed when the average camp population exceeded 15,000. The conditions were the result of poor digestion, with the formation of fatty acids hindering septic action and with the presence of excessive grease. The heavy accumulation of crust—8 feet in the first two chambers—necessitated its removal by scoops and pails and required several months of labor. Disposal of this material offered the problem of avoiding the formation of a sanitary nuisance by constituting a place for fly breeding. It was removed in cans, some to pits for burial and some hauled to a farm a mile distant and plowed under. An experiment was made of breaking up the crust with a water stream and pumping the mass into two large pits. This method was abandoned owing to fly breeding in the mass before it was dry enough to cover with earth. Sludge accumulated rapidly as a result of the poor digestive action in the tanks and had to be removed at frequent intervals. It also had to be spread too thickly on the sludge beds and removed therefrom before it was thoroughly dried. The quality of the sludge obtained was indicative of the poor operation of the tanks, being very fecal in character and the grease content much above the normal average.

Steps were taken late in the fiscal year 1918 to remedy these defects by doubling the capacity of the sewage disposal plant through the construction of an additional set of tanks. These were completed and put in operation January 10, 1919. The original plan of construction was changed by the installation of a single large screen chamber connecting with both sets of tanks. An arrangement of sluices and gates permitted the operation of one or more units as required. A retention or mixing chamber of 33,000-gallon capacity was added on the distal side of the system, wherein the chlorine dosing then took place. The detention period for chlorination averaged 47 minutes. The area of sludge drying beds was increased 50 per cent by the construction of four new beds. All of the old, small grease traps were replaced by traps of much larger capacity and improved design. The first sludge of the 1919 season was drawn from compartments of the old tank on May 16. This was greatly improved in character, being dark in color, fine grained, and with practically no odor. This was the result even after a period of great activity in camp. The accumulation of crust and sludge was decreased during the season of 1919.

Bacteriological examination of the sewage was made weekly. The examinations during 1918 indicated a general reduction of about one-third of the count in the effluent from the septic tanks over that of the raw sewage. This reduction was still further reduced after the construction of additional tanks and improved operations.

Complaint was made during the summer of 1918 by the boroughs situated along the Hackensack River, into which the effluent sewage was discharged, that this practice was a nuisance and menace to the health of the neighborhood. Careful observations of this condition were frequently made, including chemical and bacteriological tests of the sewage effluent and of the river water in the vicinity of the outfall. These inspections demonstrated that the cause of the complaint was not all chargeable to this camp, but largely to primitive systems of disposal used by boroughs bordering upon the river. The completion of new septic tanks and improvement in the operation of the disposal plant, effected by the substitution of larger grease traps throughout the camp, further lessened any possible grounds for complaint.

Garbage.—The removal of all garbage and kitchen waste was under the supervision of the salvage department. In accordance with Special Regulations, No. 77, War Department, garbage and wastes were separated as follows: (a) Bones; (b) meats, fats; (c) other garbage. It was collected by motor and wagon transportation and delivered to a garbage transfer station situated at the north end of camp, whence it was removed by a rendering company under contract with the Government, until July 1, 1919. Removal was made after that date by parties who fed the garbage to pigs. Collections were first made by prisoners and later by civilian employees of the quartermaster. Garbage cans were washed in large wooden vats in boiling water containing strong washing soda and then rinsed before they were reissued to the kitchens. The covers were wired to the cans after washing in order to insure fitting.

The wooden platform of the original garbage transfer station was replaced by a concrete floor, and the road around the platform was also concreted so that the entire stand and roadway could be thoroughly washed down by a hose, drainage being effected by means of a sewer with which the plant was connected. The platform and surroundings were washed down twice daily with hot water. Garbage was at all times kept protected from flies. Plenty of fly-paper coils were hung about and large pyramid-shaped (21 by 18 inches) flytraps were used.

Other wastes.—Tin cans were first disposed of by being loaded, unwashed, into freight cars, but were later washed at the various kitchens, punctured at both ends, and the label removed before being brought to the collecting station. Grease was collected separately and sold as such to a contractor. There were 149 grease traps in camp, 1 for every 2 kitchens. They were cleaned out about every 10 days. Two modified Williamson incinerators were adequate for the destruction of all the paper mixed with garbage, rubbish, hospital dressings, and other waste which came to the transfer station. Stable refuse was collected daily, removed and disposed of at a point sufficiently distant from the camp to prevent its becoming a nuisance.

PROVISIONS FOR FEEDING

Kitchens and mess halls.—Buildings for use as kitchens and mess halls were located adjacent to each company group of four barracks, and were designed to cook for and mess 250 men. Each building was divided into a kitchen, mess hall, and two storerooms. The portion used as a mess hall had two long rows of mess tables. The tops of the tables were so changed as to provide loose boards to facilitate cleaning. The kitchen was separated from the dining hall by a large serving shelf extending entirely across the building. Two Army ranges, which used hard coal, were provided. These also served to heat water for the ample water tank. Two refrigerators were furnished. These were originally installed in the kitchen too close to the ranges, but were later removed to the storeroom. The troops were rationed by issues in kind from the opening of the camp until March, 1918. This ration, which was very liberal, contributed much unnecessary waste of food supplies, particularly among the transient troops, as troops arriving in this camp received a certain number of days' rations and frequently were ordered to embark before the supplies were consumed. Furthermore, the method favored a feeling of prodigality among the cooks and there was no inducement to be economical with a view of obtaining ration savings. The most noticeable waste occurred in the items of bread and meat. There was no effort to utilize beef bones for the making of soups, chiefly because of lack of time and the uncertainty as to time of departure.

The camp was visited by a nutritional survey party late in January, 1918, which conducted some investigations among the various messes and made some useful recommendations in regard to the rationing, preparation of foods, and conduct of the messes. The ration savings privilege was put in operation soon after this and a commissioned officer was required to be present and supervise each meal. The benefits accruing from these changes were soon apparent. Wastage ceased almost entirely, the preparation of food improved, and much better satisfaction was obtained in the messes. The transient troops, during the early period, always furnished their own cooks and helpers and much of their cooking equipment.

Bakers' and cooks' school.—A system which had been under discussion for a short time was put in practice in August, 1918. A school for bakers and cooks was established at this camp. A considerable personnel was ordered here and was further increased by detaching others to this duty. Mess sergeants and cooks were assigned to permanent duty in the kitchens throughout the camp. An officer of the school was detailed to supervise the kitchens of each district. Supplies of staple articles were stored in the kitchens and storerooms of each district. Upon notice that troops were expected to occupy a certain area, the kitchens therein were started in full operation and meals were prepared for the number of troops expected. Upon the arrival of the organizations, their own cooks proceeded to duty in the kitchens and had the assistance of supervisors of the permanent school organization. This plan was highly successful. It provided efficiency and effected economy in the handling of the ration, promoted satisfaction among the men, and increased the morale of troops by relieving men, weary from travel, of much of the arduous task of preparing food, and avoided waiting indefinitely for a meal. It placed this camp somewhat in the position of furnishing satisfactory hotel accommodations.

The matter of cleansing mess kits in a thoroughly satisfactory manner always presented some difficulties. There was always more or less of a disposition on the part of the organizations to furnish a mere semblance of washing facilities in the form of a boiler or two of warm, soapy water. These had to be placed outside near the door of the mess hall as, on account of lack of space in the kitchen, it was impracticable for a company of men to pass through the building in order to wash their mess equipment. The water in these boilers soon became cold and dirty. Much stress was laid upon the necessity for cleaning and sterilizing mess equipment in water actually boiling, especially during the occurrence of epidemic diseases. Instructions of the War Department in this regard were observed as closely as conditions would permit. Most of the permanent organizations in camp used crockery or pooled their mess gear and were able to boil their dishes or to rinse them in boiling water. For transient troops, larger vessels of wash water were provided and the hot water was changed frequently during the washing of the company's dishes. A field range was set up in the kitchen to furnish boiling water in one or two instances. This method was not practical, however, because of the increased fire risk involved and the need of wood for fuel.

Bread.—The bread for this camp was made in the camp bakery, which was located in a low frame building in the northwest part of camp. The building was divided into a dough-mixing room, oven room with 3 sets of ovens (1 Marshall and 2 Hubbard), proof room, storerooms for supplies, a large storeroom for bread in racks, and a toilet and dressing room. The plant was operated by Bakery Company No. 332 until their departure for overseas duty. The bakers of the School for Bakers and Cooks took charge in July, 1918. The equipment included an electric dough mixer and, more recently, a mechanical flour sifter. The bakery had a capacity of 22,000 pounds per day. Delivery of bread in camp was made by means of covered trucks having a removable flat floor. Bread was of excellent quality, with rare exceptions. Various flour substitutes were used until the end of 1918, and some of these occasionally produced abnormally heavy bread. Ropey bread was encountered only once, in August, 1918. The trouble was discovered promptly, radical measures were resorted to, and the fault was corrected.

Meats.—The meat supply of the camp was furnished by several of the well-known packing firms under monthly contracts, and was delivered in refrigerating cars. It was at first handled directly from the cars to the organizations, the cars sometimes being held on the sidings several days at a time before disposal of the contents, especially when the population was low. The doors of the cars had to be opened too frequently and this was the cause of much sweating and spoiling of meat during the summer months. A large refrigerating plant was constructed in order to overcome this difficulty. It was operated in a very satisfactory manner. All shipments of meat were inspected by the camp veterinarian. Meat was delivered to the various kitchens by means of covered trucks provided with a removable slat bottom. The meat, in general, was of good quality. Care was taken to prevent access of flies in the cutting room and on the platform outside. Inspection of all meat handlers was frequently made.

Milk.—Canned milk was used by company messes. Fresh milk was used only in the officers' messes and was supplied by large dealers. Weekly examinations were made of all milk and ice cream. Dairies were inspected at various times. The milk was always of good average quality as to fats and bacterial content. All food handlers in camp were examined every six months. The number of examinations of food handlers for typhoid, paratyphoid, and intestinal parasites was 1,756. No typhoid or paratyphoid was found. The following parasites were found: *Necator Americanus*, 52; *Strongyloides stercoralis*, 1; *Ascaris lumbricoides*, 14; *Trichuris trichiura*, 9; total, 76. The men in whom the parasites were found were immediately removed to the base hospital for treatment. One case of dog tapeworm was found in a member of the bakery company, and here the dog was located and the parasite found.

MEDICAL PERSONNEL

A medical officer was assigned in September, 1917, as sanitary officer on duty with the constructing quartermaster, and seven medical officers arrived later in the month with a regiment of Infantry. A camp surgeon was designated about November 1, 1917, and the sanitary officer was transferred to duty as commanding officer of the base hospital, which was then under construction.

The 14 medical Department officers on duty with the camp proper by April 1, 1918, were grouped into five divisions—administrative, sanitary, attending surgeon, dental, and overseas' casual service.

Necessary changes in duties and personnel were made, from time to time, during the history of this camp. Only slight modifications of the duties were required after the signing of the armistice, such as the following: In connection with medical attendance, a variable number of officers, often as many as 25 or 30, were on duty accompanying troops to their demobilization camps; also from December 1, 1918, to March 15, 1919, the Medical Department was in charge of and operated the delousing plant; a medical examining board was formed at various times for the examination of officers as to fitness for duty or promotion, of enlisted men for duty or for discharge at close of their service for the emergency, and for the physical examination of recruits subsequent to March 1, 1919.

MEDICAL INFIRMARIES

Dispensaries were maintained from the beginning in various parts of the camp for holding sick call and for emergency treatments. The first infirmaries were located in a plain barrack building, with improvised furniture and equipment and with no water supply. Three new infirmary buildings, built on a standard design, were completed in the early part of 1918. One was centrally located. It contained the central dispensary and the office of the camp surgeon. Another was assigned for use of the guard regiment (then the 49th Infantry), and the third for the overseas casual service. Each building served the troops quartered in its vicinity. No beds for the sick were maintained in these infirmaries, all sick men being conveyed at once to the base hospital. The organized units, accompanied by medical officers with some of their field equipment, frequently held their own sick call at a barrack in their own camp area. The permanent guard regiment had a complete combat equipment which was kept intact while in garrison.

MEDICAL SUPPLY DEPOT

A medical supply depot was established at this camp in January, 1918, as a branch depot under the direction of the surgeon, port of embarkation. The depot occupied three warehouses on the main highway running through the camp, near the base hospital. Supplies were promptly furnished for all organizations, both permanent and transient. After January 1, 1919, the camp medical supply depot was included in the consolidation of supply departments under direction of the purchase, storage, and traffic division of the General Staff Corps.

OVERSEAS CASUALS SERVICE

A casual company was organized by camp headquarters in November, 1917, to dispose of the casualties then accumulating in camp. This organization grew rapidly to such proportions as to require a large administrative personnel. The overseas casual service was later formed to take charge of these duties. It included medical personnel, for which seven medical officers were assigned, and occupied an infirmary building.

Numbers of enlisted men were received here late in the summer of 1918 as casualties, who had been returned to duty from absence without leave, sick in hospital, or otherwise detached from their units. These men were organized into casual companies for service in the American Expeditionary Forces. A board consisting of five medical examiners was formed in order to determine their fitness for duty overseas. There were 12,013 examined, of whom 1,857 were found disqualified for overseas duty. Medical attendance was rendered to large numbers of men by means of the several infirmaries. Those belonging to organizations were recorded on the sick and wounded reports of those units. Other transients and the personnel of the permanent garrison were carried on the records of this office or on those of the overseas casualties detachment. The medical records of the overseas casualties detachment, known after November 11, 1918, as the casual battalion, were consolidated with records of the camp surgeon's office on February 1, 1919.

CONTROL OF COMMUNICABLE DISEASE

The great importance of the control of communicable diseases among the troops was recognized from the first and precautions were taken with that end in view. Hence one of the most important functions of this department was the medical inspection of troops. The earliest orders emanating from the War Department dealing with the subject (in September, 1917) required inspection of embarking troops for the elimination of active cases of venereal diseases. It was at once apparent that the attention of medical officers should be directed to measures for the early detection of infectious diseases. Rules for their guidance were accordingly formulated and were published in the following general order:

General Orders, No. 9.

HEADQUARTERS CAMP MERRITT, N. J.,

November 19, 1917.

Upon recommendation of the camp surgeon, the following regulations for guidance of medical officers will obtain until further orders.

1. *Report of arrival.*—The senior medical officer will report to the camp surgeon as soon as practicable after arrival in camp, submitting at that time a list of the medical personnel with the organization.

2. *Infectious diseases.*—Report will be made immediately of the infectious diseases to which the organization has been exposed at their previous station or en route.

3. *Field report of sick* (Form 83) and of *personnel* (Form 82) will be rendered to the camp surgeon daily at 9 a. m.

4. *Sanitation.*—The senior medical officer with each organization is charged with the supervision of the sanitary conditions in and around the quarters of his organization, and with close observation of the health of the members of that command.

5. *Sick call.*—Sick call will be held at the hour designated in camp orders, and will be conducted by a medical officer.

6. *Contagious diseases.*—The surgeon will keep himself informed by personal inspections as to the existence and nature of any diseases, being especially alert to detect in their earliest stages cases of measles, scarlet fever, mumps, pneumonia, diphtheria, cerebrospinal meningitis, or other epidemic or contagious diseases, and body lice or vermin. The clothing of contagious cases will be promptly disinfected, underclothing by means of formalin, if practicable, or by exposure to sunlight and free ventilation for four hours. On the occurrence of measles, scarlet fever, or mumps in a command, the surgeon thereof will make daily inspection of every "contact" with a view to the early detection of new cases. (General Order No. 45, War Department, 1916.)

7. *Epidemic diseases.*—Every case of epidemic disease will be at once reported in writing to the camp surgeon.

8. *Ventilation.*—Ample ventilation of barracks must be maintained at all times to limit the spread of respiratory infections. Inspections at night should be made frequently by medical officers to see that sufficient windows are kept open in dormitories.

9. *Prophylactic station.*—A venereal prophylactic station will be maintained by each organization having a medical personnel. It will be open for use day and night, with a competent attendant of the Medical Department on duty at all times, who will supervise the treatment and prepare necessary register. Organizations without a medical detachment will have a dispensary designated for their use.

10. *Prophylaxis.*—In compliance with War Department orders, prophylaxis against typhoid and paratyphoid fevers must be completed before embarking. Materials and facilities are available. (General Order No. 20, port of embarkation, October 16, 1917.)

11. *Disposal of the sick.*—Until the completion of the hospital at this camp, the sick will be transferred, after approval of camp surgeon, to the hospital, port of embarkation, Hoboken, N. J., in accordance with Circular No. 2, Headquarters, Camp Merritt, November 11, 1917.

12. *Transfer cards.*—A transfer card (see par. 215, M. M. D.) will accompany each patient sent to the hospital.

13. *Other regulations.*—Attention is directed to General Order No. 11, General Order No. 21, port of embarkation, Hoboken; General Order No. 45, War Department, 1916, and Special Sanitary Regulations No. 28, War Department, 1917.

By order of Colonel Bennett:

F. J. PEARSON,

Second Lieutenant, 49th Infantry, Camp Adjutant.

It became necessary later to issue more detailed instructions, describing exactly the method to be observed in conducting the physical inspections. After January 1, 1918, orders of the port of embarkation prescribed a careful inspection of all troops daily over a period prior to embarkation for the detection of all cases of communicable diseases and the detention of the contacts of such cases. Thereupon an organization of medical inspectors was gradually built up and a system perfected by which every command or detachment of troops was inspected daily, either by their own medical officer or by a representative of the camp surgeon, and a special final inspection was made (on the day prior to embarkation) under the direction of an inspector detailed from port headquarters. All cases of infectious and contagious diseases immediately were isolated. These had to be transferred to hospitals in Hoboken and Englewood

during the early period of the camp, pending completion of the base hospital. Transportation was at first effected by ambulances; later, from the middle of December, 1917, to early in January, 1918, by means of a hospital car of the Erie Railroad to Jersey City, where the patients were transferred to hospitals of Hoboken or Jersey City.

Contacts.—Contacts, at first, were quarantined in their own barracks. This resulted in groups of contacts scattered in various portions of the camp. In order to keep the contacts together and more easily hold them in strict quarantine, a detention camp was organized in January, 1918, under the supervision of a line officer. This camp was located in one corner of the reservation and consisted of a group of troop barracks, several mess halls, and lavatories. The contacts of different diseases were grouped and messed separately. The camp surgeon's office assigned a medical officer to duty in the camp who inspected every man twice daily for the presence of secondary contagious cases. Sick men promptly were removed to hospitals and the quarantine of the contacts in the same room was extended from the last date of exposure. The quarantine period for measles and German measles was 14 days and for scarlet fever 8 days. Carriers of meningitis and diphtheria were held and treated in the detention camp at various times. The contacts of these latter diseases were always subjected to laboratory culture and held until negative results were obtained. A guard was maintained about the detention camp and its several subdivisions. This duty was performed by the permanent garrison whenever practicable. At other times, the guard was drawn from among the contacts themselves and was under the direction of the officers and noncommissioned officers assigned to the detention camp. Increasing numbers of venereal cases were held in the detention camp while undergoing treatment after the middle of 1918.

In the selection of contacts of contagious cases it was attempted to follow a reasonable method to secure those who were the most frequent associates of the actual case; hence, during the first eight months it was the rule to detain all men occupying the same floor of the barrack with the sick man. Observation of the secondary cases which developed further justified this practice, as most secondary cases occurred among men who lived and slept in the same room (30 to 35 men were quartered on one floor of a barrack). This, of course, at times, resulted in the quarantine of a large number of contacts. The number of contacts detained was sometimes reduced by careful investigation of the epidemiological history of each case, only a few contacts being held if the organization had a good health record, usually the 8 or 10 men sleeping nearest the patient, nonimmunes, and his intimate associates. This procedure obviated extensive depletion of organizations so urgently needed overseas. An organization was quarantined as a whole when it was involved in an epidemic, and, with a spreading infection, was withheld from embarkation until quite free from the appearance of new cases after the lapse of the period of quarantine. This was the case with certain organizations quarantined for scarlet fever and measles late in 1917, and for influenza in 1918. The number of contacts held in the detention camp itself, from July 1, 1918, to July 1, 1919, was as follows: Influenza, 504; scarlet fever, 689; measles, 3,282; meningitis, 67; diphtheria, 115. This does not include the contacts held within their own area, especially in the instances when whole organizations were detained.

Influenza.—A few cases of epidemic influenza made their appearance in this camp about the middle of September, 1918. Instructions were given to all medical officers to be on the lookout for cases suggestive of this disease and to remove them at once to the hospitals. Daily temperatures were taken and intimate contacts were segregated for five days. Attendants and patients in dispensaries, visiting infirmaries, or removed in ambulances wore masks of gauze or a handkerchief. Special orders were published by camp headquarters placing the camp in quarantine and directing the attention of all concerned to the necessity for constant ventilation, avoidance of overcrowding in barracks, early treatment of any ailment, and the use of individual toilet articles and mess equipment. Auditoriums and the theater were closed and the troops were segregated within their own barrack areas. Careful, detailed inspection of troops was instituted for the removal of early cases and their contacts. But few troops arrived from other camps after influenza became pandemic. Organizations in this camp were not prevented from embarking so long as their sick rate was low and not increasing. Between September 15 and November 15, 1918, there was a total of 5,025 cases of influenza; of these, 396 died, a mortality of 7.7 per cent.

Typhoid fever.—Only 6 cases of typhoid fever were admitted to the base hospital, none of which was attributable to this camp. The first 2 cases occurred in 1918; the remaining 4 cases were men just returned from overseas in the summer of 1919.

Venereal disease.—As was stated previously, preembarkation inspections were made for the detection of active cases of venereal disease. The numbers found and detained rapidly increased during the first months of the embarkation period. This was almost wholly attributable to the influx of the draft troops.

Venereal patients were sent from this camp to a special hospital for the treatment of venereals, located on Hoffman Island in the old quarantine station of the port of New York. It was not long before the capacity of that hospital was overtaxed and cases had to be retained in the camp hospital. Many cases held in this camp in the early summer of 1918 were restricted and treated in a section of the detention camp. A urologist, with an assistant, was assigned to duty for the treatment of these cases. These diseases were found in a higher rate among the negro troops than among the white, and gonorrhœa was almost always of the chronic type. In September, 1918, the port had accumulated so many venereal cases that measures were urged to evacuate them to other camps in order to relieve the congestion of hospital and barrack facilities in the embarkation service. Over 1,000 cases were transferred to a development battalion at another camp late in September. The majority of these men, after the subsidence of the acute signs, were able-bodied and capable of manual labor, drill, and other duties. The special conditions prevailing in the port made it difficult to utilize the labor of these convalescents except in a few instances.

Five venereal prophylaxis stations were located in various parts of the camp early in 1918, with attendants on duty at all times. The reports pertaining to men of this camp were forwarded to the port surgeon's office. The number of prophylactic treatments taken was 2,623. This is an insignificant number,

notwithstanding the fact that practically all transient troops had received instructions in venereal prevention and hygiene at their mobilization camps and by moving pictures and lectures while at this camp. The permanent garrison received special instruction at various times through talks given by medical officers. All organizations were notified of the location of early treatment stations and they were plainly marked. Semimonthly physical inspections were made of the permanent garrison, and included all civilian employees handling food supplies. There were reported only 47 new cases of venereal disease among the permanent garrison.

INSECT CONTROL

Fly prevention.—Measures for fly prevention were adopted early in the seasons of 1918 and 1919. In addition to the thorough policing of stables and the daily removal of all refuse, 4,000 flytraps were distributed throughout the camp, together with large quantities of fly paper and "swatters," for use in kitchens and mess halls.

Mosquito control.—When the site of Camp Merritt was officially sanctioned, the Bergen County Mosquito Extermination Commission immediately prepared a survey of the camp and surrounding territory, showing all swamps, ponds, streams, and other possible mosquito breeding places. This survey showed an unusually large number of such places. The records of the county commission also showed that anopheles had frequently been found breeding in this part of the country. This map was presented to the camp sanitary inspector, and at his request the work of draining the worst of the swamp lands shown was started in September of 1917. This drainage was done by civilians in the employ of the constructing quartermaster and under the supervision of the Bergen County Mosquito Extermination Commission. The work to the west of the camp followed three main drainage lines, the Dumont brook, the Bergen Fields brook, and the hospital brook. The main streams were cleaned and regraded, culverts rebuilt, and laterals cut. A large swamp to the east of the camp in the borough of Demarest was drained. A force of 30 civilian laborers was employed for 26 working days, 38,519 feet of old ditching were cleaned, 6,738 feet of new ditching cut, and 412 cubic yards of filling done. The cost was about \$3,500.

The work was resumed early in the spring of 1918. The maintenance of the ditching done in 1917 and the necessary oiling were taken care of by the detachment of the Sanitary Corps, consisting of 50 enlisted men under 2 experienced white sergeants. These men also enlarged the drainage system established by cleaning 22,560 feet of old ditching and cutting 3,825 feet of new ditching in the Haworth area to the north of camp. On the outside of the camp, the work of expanding the systems installed in 1917 was conducted by the United States Public Health Service and the Bergen County Mosquito Extermination Commission, working in close cooperation. They cleaned out the Tenakill drainage brook on the east of camp, a wide, sluggish stream, and completely drained the many swamps lying on either side of it. The swamps around Dumont railroad station on the west were drained and the Bergman brook, Bergman's Pond and Gilpin's Pond were thoroughly cleaned. The extra-cantonment work embraced a zone averaging about a mile from the outside

perimeter of camp, and included approximately $11\frac{1}{2}$ square miles of territory. The estimated population of the area controlled was 10,500. The work was done with a gang of 12 laborers under a competent foreman. Work was started April 15 and completed on September 30. In addition to the 45,787 feet of Tenakill drainage brook trimmed and cleaned, these men cleaned and cut 73,326 feet of old ditching, cut 12,670 feet of new ditching, cleaned 5,146 feet of pond edges, and filled in 40 cubic yards of lowland. The average cost of cleaning ditches and streams, including the Tenakill, which in some places was badly congested, was $3\frac{1}{2}$ cents per linear foot. The total cost of this work was \$5,920.27, of which the mosquito commission paid \$2,888.39 and the United States Public Health Service the balance.

The ground in the vicinity of camp was wet in the early spring of 1918, and it was necessary to oil quite generally to suppress the first brood. The effect of the drainage was noticeable after that, and oiling in most areas was necessary only in occasional deep depressions or in small, scattered pools. Thirty barrels of oil, or 1,500 gallons, was enough to check the breeding during the 1918 season. Night collections of mosquitoes were made every week from June 1 to September 30. Stations were made at various spots in camp, at each picket line, and at selected places in the near-by towns. These collections showed that mosquitoes had been reduced to a marked degree. The average catch at the stations in camp and at the picket lines was about 1 mosquito every 10 minutes. The stations outside of camp, many of which were at the edges of swamps, showed a catch of about 1 every 3 minutes. During the summer there was never a complaint of mosquitoes in the men's sleeping quarters. Less than 2 per cent of the mosquitoes caught were *Anopheles* and the base hospital did not record a single case of malaria attributable to Camp Merritt.

Delousing plants.—Cases of lice infestation were treated in an improvised delousing station until December, 1918, using a lavatory building for the purpose. All clothing of infested men was steam sterilized by a portable disinfecter at the base hospital. The men were shaved and received a cleansing bath. General delousing assumed greater importance after the armistice was signed. To prevent the introduction into this country of typhus fever, plans for a large delousing plant for use in camps at the port had been pending for a number of months. Actual construction of a large plant at this camp was begun in October, 1918. Pending completion of this building, an extemporized delousing plant was arranged for in November and was ready for operation on December 9, 1918. This plant consisted of four barracks, one mess hall, and a lavatory building. The disinfestation of clothing and blankets was effected by the use of 10 portable steam sterilizers which were obtained for the purpose. The capacity was 200 men per hour. A new "sanitary process plant" was put in service on February 4, 1919, with a capacity of 190 men per hour. This building was constructed in accordance with standard plans prepared by the War Department, and comprised a receiving and disrobing room, bathroom equipped with 50 showers, a barber's room, drying and dressing room, a sterilizing room equipped with a large autoclave sterilizer, and accessory rooms for office and storage of valuables.

The operation of both of these plants was conducted by the Medical Department until the middle of March, 1919, when it was turned over to the camp utilities. The personnel required for duty at both of these plants was as follows: One captain, Medical Corps, in charge, with 12 commissioned assistants and 84 enlisted men. These worked in three shifts of 2 medical officers and 28 enlisted men. One engineer and one fireman were furnished for each shift to run the boilers and sterilizer in the new plant. In the extemporized plant, a detachment of 25 men, Sanitary Corps (colored) operated the portable sterilizers. After the utilities branch took charge of this work, the post surgeon's office continued to furnish medical officers for duty as inspectors of the men undergoing the sanitary process. There were treated from December 9, 1918, to July 31, 1919, 275,551 men.

The following table shows the infestation detected during an active period of this work:

Month	Number In-spected	Pediculi capitis	Pediculi corporis	Pediculi pubis	Scabies
1919					
March.....	52,857	2	11	1,610	9
April.....	47,623	-----	7	1,433	3
May.....	48,268	-----	3	537	8
June.....	44,357	2	8	96	20
July.....	82,646	50	73	3,445	88
Total.....	275,551	54	92	7,151	128

Routine examination of the clothing of the men for the presence of lice was not made a part of the process at this camp. The physical examinations conducted as the men passed into the shower-bath room were mainly for the purpose of detecting head and pubic lice and skin and venereal diseases, and for a general observation of the physical condition of the soldier. The latter was especially observed during the winter months and when examining convalescent casuals, in order to prevent men physically unfit from being exposed to the possibility of contracting respiratory ailments while undergoing the process. The medical authorities proceeded on the policy that infestation with body lice was well eradicated in the universal sterilization of all clothing. The infestation therefore detected almost exclusively infestation with *Pediculi pubis*.

A number of modifications in the details of the process had to be made from time to time. The method originally in use of packing the clothing into barrack bags for sterilization resulted in very unsightly wrinkling of uniforms, sufficient to necessitate the issue of new equipment in many instances. A method suggested by the salvage officer was adopted in order to diminish this fault, using baskets having dimensions of 24 by 18 by 8 inches. The articles of clothing were packed into these, the uniform being carefully folded to avoid creasing. The result was a marked improvement in the appearance of the uniforms.

The formula for the liquid-soap mixture, furnished for the baths as an insecticidal soap, required a number of modifications. The original mixture, made with soft soap and kerosene or gasoline, was entirely too thick to flow through the faucets with which the soap dispensing cans were equipped. The

product was unsatisfactory even after several changes in the proportions of the ingredients. It was believed that the small proportion of gasoline content usable in the mixture was of very questionable value as a disinfectant and it was omitted after a thorough trial. Liquid soap, or at times Ivory soap, was thereafter furnished.

A large clothing room was maintained in connection with the plant, where clothing exchanges were liberally made after inspection of the soldier, in order that he would have clean and serviceable equipment. Careful inspections were made of bedding in barracks and quarters and of troop trains used by infested troops at various times during the summer of 1918 and later, for evidence of lice infestation, but with constantly negative results. The interior of the cars of all troop trains arriving at the camp with overseas troops was subjected to a disinfecting spray consisting of 2½ per cent compound solution of cresol. This disinfection was performed by enlisted men of the Medical Department.

TROOP TRAINS

Medical attendance was furnished on all troop trains departing from this camp for demobilization camps. It was the duty of the medical officers on these trains to treat minor ailments and to dispose of all cases of acute illness occurring en route by transfer to the nearest hospital. Daily inspection of troops and of the sanitary condition of train equipment was required. There were made, during the first eight months of 1919, 785 troop movements accompanied by officers attached to this office. This figure does not include casual officers similarly employed and demonstrates the necessity for having retained a considerable personnel.

MEDICAL BOARDS

The duties of the camp surgeon's office included the assignment on many occasions of medical officers to serve on boards to conduct physical examinations for various purposes. There was not at any time a board of specialists such as were constituted at mobilization camps for the drafted forces.

EXTRA-CANTONMENT ZONE

The United States Public Health Service sent an officer in February, 1918, to take under his immediate charge the sanitation of the extra-cantonment zone. This zone supervision was maintained by frequent inspection of restaurants, cafés, barber shops, and systems for waste disposal. All sources of food supply of the camp were investigated by a sanitary inspector from the camp surgeon's office. This necessitated the making of trips to all near-by towns as far as New York and vicinity. Special attention was paid to the barber shops and various restaurants. Regulations governing sanitary requirements for such establishments were drawn up after consultation between the camp surgeon and the public health officer, and permits were issued to approved places. Soldiers were not permitted to visit places not showing both camp and Public Health Service permit. Weekly inspections were made by a civilian inspector of the Public Health Service. Inspections were frequently made by one of our own sanitary officers, and he was accompanied by the public health officer at least once a month. Places found insanitary were temporarily closed in a num-

ber of instances by combined action of the military and Public Health Service authorities. A high standard was required of all eating places and, in general, was well maintained. Reports of contagious diseases in the vicinity of the camp were furnished.

Material help was given, as noted, in mosquito-extermination work, an assistant public health officer supervising this work with the aid of civilian help. The funds to carry on such work were furnished by the Treasury Department. Extensive work was done in the marshes located in the vicinity of the near-by towns. There were frequent consultations with our own officer in charge of the camp mosquito work.

Valuable aid was given to prevent fly breeding. All stables, privies, and other fly-breeding places were sought out and defects remedied by such means as the construction of new and replacement or repair of old privies. The total number of such improvements was as follows: Concrete vault privies, 277; new fly-proof buildings, 439; all others repaired, 423; total improvements, 1,139.

DENTAL SERVICE

The first dental surgeon reported for duty on October 23, 1917. The original dental service was established at the regimental infirmary of the 49th Infantry. The dental officers were without equipment until about the 15th of November, except for that which was available at the infirmary. The dental office was moved into the casual infirmary building upon the arrival of equipment, where the work was carried on until the completion of the building occupied by the camp surgeon. This building contained a dental office with space for two chairs. The camp was then divided into two sections on account of the increasing dental service required. Five officers reported for duty before the end of the year 1917, and as only two portable outfits were available they worked in alternate shifts. It became evident that it would be necessary, as the personnel increased, to have a chief of the service. On October 22, 1918, the foundation was laid for a camp dental infirmary, of the unit type that was being constructed throughout the mobilization camps, to house the dental service. Requisitions were put in at the same time through proper channels to equip the building to accommodate 20 operating dental surgeons. Anticipating the completion and the equipping of the camp dental infirmary, request was made for an increase in the dental personnel. Ten officers reported for duty on November 8, 1918.

The new building was opened in January, 1919, with 18 dental officers on duty. It was complete and well organized, with its various operating rooms, laboratory, and X-ray service, and with different officers having their special work, such as oral surgery, prophylaxis, orthodontia, and general operating.

VETERINARY SERVICE

The Veterinary Corps was represented at this camp by 1 first lieutenant, Veterinary Corps, 1 sergeant, first class, and 1 private, first class. This personnel was at first under the direction of the camp surgeon's office, but early in 1918, it was placed in a separate status and the senior veterinary officer was designated as camp veterinarian. This officer had under his jurisdiction the care of animals, the stabling conditions, and the inspection of meat products received by the subsistence department. There were 10 stables and 3 large and 1 small corral situated in a group in the northwest part of the camp.

Stables were of frame construction, located on sloping ground well ditched and drained. No flooring was provided, but one concrete floor was installed in a portion of the stable used as a hospital. There were about 250 animals in this camp. Great care was taken to prevent fly breeding. The manure was removed before 10 a. m.; all droppings were gathered frequently, especially around the picket lines, and placed in tightly covered galvanized-iron cans. The general sanitary conditions of stables were satisfactory. Very little fly breeding was found.

CAMP MILLS, LONG ISLAND

Camp Mills was originally a tent camp, intended for the mobilization and embarkation of the 42d Division, but was also occupied by the 41st Division after the departure of the former. It was situated near Mineola, Long Island, about 10 miles from the eastern boundary of New York City. The flat terrain was composed of a sandy loam containing a small proportion of gravel. The drainage problem was particularly difficult because some areas had no natural spill, but sumps accomplished the desired results until a system of ditches could be completed.

Because this was a tent camp, it was impossible to use it during the winter of 1917-18. During 1918 construction was started to provide barrack space for 50,000 troops; however, during the last week of November, the barrack plans were changed to accommodate 25,000, since it was estimated that, as a debarkation camp there would be about 25,000 troops to be quartered.

While Camp Mills was not taken over by the port of embarkation as an embarkation camp until April 4, 1918, supervisory control of its camp hospital previously had been assumed by the surgeon of the port, in order to make available to this tent hospital the facilities afforded by civilian hospitals in the port area.

WATER SUPPLY

The water supply was obtained from the public supply of Garden City village until June 5, 1919, with a subsidiary supply from the village of Hempstead, after which date the whole supply was from drilled wells on the edge of the camp. Its quality was satisfactory, the bacterial count was always very low, but, like most Long Island ground water, it had a high organic content.

DISPOSAL OF WASTES

Garbage.—During the tent camp period, April 4 to September 30, 1918, solid garbage was burned in individual rock-pit type incinerators modified to suit the material available and the conditions to be met. These were all constructed and kept in repair by sanitary squads detailed from permanent labor companies and each under the charge of a noncommissioned officer of the medical detachment. After September 30, 1918, garbage was collected and transported to a pig farm operated under the direction of the camp quartermaster. Liquid kitchen wastes, during the tent period and following this when the tent portion of the camp was occupied, were disposed of through grease traps leading into deep absorption pits. The grease traps were built by the camp quartermaster and the pits were constructed by labor details working under the direction of the camp surgeon. This method of disposal was satisfactory. They were maintained and kept in order by the sanitary details previously mentioned.

Excreta.—Latrine pits, with boxes of the Havard type and inclosed by a screened shelter, were used until the occupancy of the barracks. The pits were sprayed daily with oil-lampblack mixture, and on account of the large amount of waste thrown in by transient troops were burned out weekly. This work was done by sanitary details, as it was found that only matters of general police could be left to troops passing through. Urinal troughs coated with tar were eventually replaced by galvanized-iron troughs. Disposal by sewerage system, except in occupied tent areas, was in effect after September 30, 1918.

BATHING FACILITIES

These were unsatisfactory at first. The showers, being in open pavilions, were not provided with heat or hot water. Early in May, 1918, however, the camp quartermaster built a bathhouse and used waste steam from a near-by plant to heat water for 60 showers. Another bathhouse was improvised out of an old detention ward building a little later. This was provided with showers of hot and cold water. These, together with the company showers which were utilizable when the weather became warm, provided satisfactory bathing facilities until the barracks, with their lavatories, were completed. Bath water was disposed of in absorption pits. Much trouble was experienced from these overflowing when the camp was fully occupied. This was met by digging large drainage ditches in the low-lying areas and conducting the water to a system of shallow, large area pits near the edge of the camp.

MOSQUITO PREVENTION

As mosquitos were prevalent in this vicinity, prevention was vigorously carried on from the beginning of the camp. Outside areas were controlled by the Nassau County Extermination Commission, acting with the local Hempstead authorities and with the camp surgeon. Drainage pits and other breeding places within the camp were regularly inspected and oiled under the direction of the camp sanitary inspector.

EXTRA-CANTONMENT SANITATION

The immediately adjacent restaurants and barber shops were controlled directly by regulations drawn up by the camp surgeon, and these regulations were carried into effect by frequent inspections. At the request of the camp surgeon, the adjacent village of Hempstead, largely visited by men from this camp, adopted the same rules and regulations, which also were enforced by a sanitary inspector detailed from the camp surgeon's office.

PREVENTION OF INFECTIOUS DISEASE

The orders that contacts with cases of infectious diseases were not to be taken to embarkation camps failed to prevent many cases from developing en route or during their short stay here. The measures employed here were to physically examine all troops on arrival, and to institute daily physical inspections of troops in order to remove the sick at the earliest possible moment. Men actually suffering from a contagious disease were sent to a hospital, while contacts were sent to the detention camp.

The detention camp, at first, was only an area in the tent camp which was set aside for the purpose. A standard detention camp was completed in November, 1918, with a capacity of 500, in separate buildings holding 8 men each.

All nonimmune contacts were sent to this camp except those in which cultural methods could prove that they were not carriers, and except those of smallpox, chicken-pox, and mumps. Smallpox contacts were revaccinated and returned to their organizations. Meningitis and diphtheria contacts were isolated until the actual carriers could be detected by culturing. The following tables show the numbers of cases and of carriers of the different diseases encountered. They also show the fluctuations in occurrence and the varieties for which accommodations must be provided.

Cases of infectious diseases, by months

Month	Anthrax	Diphtheria	Measles	Mumps	Meningitis	Meningitis carriers	Diphtheria carriers	Pneumonia	Scarlet fever	Typhoid fever	Smallpox	Malaria	Influenza	Trachoma	German measles	Chicken-pox	Tonsillitis	Empyema
1918																		
April.....	0	93	17	40	0	0	0	17	3	0	2	1	12	1	6	0	10	0
May.....	0	27	52	78	6	9	0	10	11	0	1	7	12	2	15	0	24	0
June.....	2	5	61	37	15	6	0	5	5	1	3	13	3	2	0	0	30	0
July.....	1	8	95	80	10	5	0	5	8	0	0	9	0	6	0	6	8	0
August.....	1	6	112	83	2	28	5	2	2	0	0	7	0	1	0	0	16	0
September.....	0	0	182	49	3	3	1	26	0	0	0	6	545	1	0	1	21	0
October.....	0	1	48	31	4	0	0	915	0	0	0	1	5,070	1	0	0	3	0
November.....	0	2	54	84	1	0	0	0	1	0	0	1	505	1	0	0	15	0
December.....	1	0	8	72	2	8	0	0	0	0	1	0	309	0	0	0	30	0
1919																		
January.....	0	1	1	176	0	15	0	34	2	0	0	0	249	58	0	0	58	2
February.....	0	0	0	143	0	0	0	40	1	0	0	0	174	0	0	1	105	10
March.....	0	0	3	69	1	1	0	29	8	0	1	0	116	0	0	1	137	3
April.....	1	0	8	23	4	3	0	29	3	0	3	0	90	0	0	0	70	6
May.....	1	0	9	9	0	0	0	19	3	0	0	0	55	0	0	0	29	2
June.....	0	0	0	5	0	6	0	2	0	0	1	0	0	0	0	1	29	1
July.....	0	0	0	3	1	0	0	15	0	0	0	0	0	0	0	0	10	0
Total.....	7	143	651	982	49	79	6	1,148	47	1	12	45	7,140	73	21	10	596	24

Contacts and carriers sent to the detention camp

Month	Measles		Diphtheria				Scarlet fever			Meningitis			Smallpox			Total contacts and carriers
	Contacts	Cases developing		Contacts	Cases developing		Contacts	Cases developing		Contacts	Cases developing		Contacts	Cases developing		
		Number	Per cent		Number	Per cent		Number	Per cent		Number	Per cent		Number	Per cent	
1918																
April.....	275	9	3.02	133	3	2.02	11	0	0	0	0	0	0	0	0	419
May.....	637	3	.47	86	0	0	56	0	0	0	0	0	0	0	0	779
June.....	686	11	1.60	0	0	0	54	0	0	0	0	0	0	0	0	740
July.....	775	4	.51	0	0	0	37	0	0	5	0	0	0	0	0	817
August.....	1,265	13	1.02	0	0	0	12	1	.83	0	0	0	0	0	0	1,277
September.....	265	6	2.26	0	0	0	0	0	0	0	0	0	0	0	0	265
October.....	45	2	4.44	0	0	0	0	0	0	0	0	0	0	0	0	45
November.....	129	4	3.10	0	0	0	0	0	0	0	0	0	0	0	0	129
December.....	20	1	.5	0	0	0	0	0	0	0	0	0	0	0	0	20
1919																
January.....	3	0	0	0	0	0	2	0	0	7	0	0	0	0	0	12
February.....	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
March.....	2	0	0	0	0	0	9	0	0	0	0	0	0	0	0	11
April.....	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	4
May.....	18	0	0	.30	0	0	9	0	0	0	0	0	0	0	0	57
June.....	0	0	0	0	0	0	0	0	0	0	0	0	0	66	0	66
July.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total.....	4,122	53	1.28	249	3	1.20	194	1	.81	12	0	0	66	0	0	4,643

* Diphtheria contacts.
 † Smallpox contacts ordered in quarantine by the surgeon.
 • Average.

VENEREAL DISEASE PREVENTION

Cases of venereal disease were not to be brought to this camp, but many cases escaped former inspection and were detected here. Efforts were directed chiefly to the prevention of infection while here, by the use of prophylactic stations, and, in cooperation with a representative of the law-enforcement division of the Commission for Training Camp Activities, by reducing prostitution in the vicinity of the camp. A social hygiene division was established as an educational measure, and an effort was made to reach all troops passing through by means of company lectures and by films in the various social welfare tents of the camp. During the debarkation period lectures were given by officers especially detailed for this purpose. Attendance was made compulsory and special efforts were made to reach every man by educational propaganda before his return to civil life.

LOUSE INFESTATION

This was early given attention to prevent the embarkation of infested men. Careful search for infested men was made at the time of the initial physical inspection of arriving troops. Any necessary delousing was done by the organization concerned prior to June 1, 1918. An improvised plant at the detention camp handled all such work during the ensuing six weeks, when it was taken over by a small plant of local design. As no sterilizer was then available, clothing was taken to Field Hospital No. 2 for sterilization. This sufficed during the embarkation period. Universal delousing of returning troops was instituted during the debarkation period. A larger plant was improvised in November, 1918, by using one of the bathhouses as a nucleus, adding additional buildings and supplying additional heating and hot-water facilities. Twenty portable field sterilizers were installed for the sterilization of clothing. This plant, constructed largely from plans and specifications furnished by the Surgeon General's Office, was ready for operation December 4, 1918, upon the arrival of the first contingent of overseas troops.

The sanitary process plants were operated entirely by the commissioned officers and enlisted personnel of the camp surgeon's office from December 4, 1918, to April 28, 1919. Both plants were operated by the camp utilities division after April 28, the camp surgeon's office furnishing officers and men for inspection service and for scheduling troops. All troops were inspected, upon arrival, at the plants, after which they passed into the bathroom where they were painted with a kerosene-soap emulsion and passed to the showers. Men found to be infested had the hairy parts shaved, and while this was being done their clothes were sterilized and returned to them in the dressing room. Each man was furnished with a bath robe while waiting. The ultimate total capacity of the plants was about 8,500 men daily if three operating shifts were run. The plants were operated with two shifts after April, 1919, a total of 18 hours daily, and, except in a few instances, were able to handle troops within 24 hours of their arrival.

MEDICAL SUPPLIES

Unit surgeons arriving during the embarkation period were required to submit lists of medical supplies and equipment on hand. Where found deficient, these were completed by the medical supply officer on duty at this camp. The shipment of combat equipment with medical detachments was discontinued after September 30, 1918, this being supplied overseas.

CARE OF THE SICK

Medical attendance of permanent troops and of those without their own medical officers was given by the office of the attending surgeon. Medical attendance of transient troops was given by their own medical officers.

All but minor cases of sickness or injury and all infectious cases were transferred to the base hospital of the camp for treatment. A receiving station of the base hospital was operated in the camp proper during April, 1918, and patients were transferred through it to the hospital; this was found to be unnecessary, as the base hospital was within $1\frac{1}{2}$ miles of camp and patients could be transported there quickly. Ambulance service in the beginning was supplied by the Women's Motor Corps. This organization did excellent service and their services were indispensable until sufficient ambulances could be secured by the base hospital. Regulation Medical Department ambulances in sufficient numbers were available after June, 1918. One ambulance was always on duty at the camp infirmary for emergency use, direct request being made on the base hospital for routine calls.

DENTAL SERVICE

There were three dental officers on duty previous to July 1, 1918, and the dental infirmary was supplied with three portable outfits. The dental work done was mostly emergency, as there was an average of 30,000 troops in camp at this time. The number of dental officers on duty was increased to five during the months of July, August, September, and October, 1918, and the work done was still largely of an emergent nature. Sixteen dental officers were assigned to this camp on November 1, 1918. There were only 5 portable outfits available, but 10 more were soon procured. Only 9 outfits could be put up owing to the lack of room, so each officer worked one-half of each day. This arrangement continued until the medical infirmary building was completed, when the second floor of this building was turned over to the camp dental surgeon and 15 portable outfits were installed. This enabled 15 operators to work daily, thereby greatly increasing the dental work accomplished.

The camp changed from an embarkation to a debarkation camp during January, 1919, and an effort was then made to do a larger proportion of permanent work, as the men returning needed a great amount of dental work.

The dental infirmary building was completed in February, and the outfits were installed. The building was arranged for 20 base outfits, but owing to difficulties in getting base outfits at this time, portable outfits were installed until the proper equipment could be obtained. Most of the base equipment was installed in March, 1918, including a complete laboratory equipment, X-ray outfit, and base chairs. The service was then able to still further increase its output of permanent work.

Bridge and plate work was not generally done, owing to the brief stay of transient troops at this camp, but every effort was made to have returning troops looked over and such work as could be completed was done. It was considered especially important to give the soldiers final instructions as to the care of the teeth before returning them to civil life.

CHAPTER VII

PORT OF EMBARKATION, NEWPORT NEWS, VA.^a

INTRODUCTORY

The choice of Newport News as a port of embarkation was obviously made on account of its geographical location, sheltered roadstead, extensive rail and water connections, and open climate. The facilities for docking and coaling ships, loading troops, animals, and supplies, and repairing and dry-docking vessels combined to make it a logical port from which to conduct military embarkation and debarkation. Its contiguity to the Norfolk Navy Yard and naval base made cooperation with the naval forces easier of accomplishment. Above all, the large areas of open country afforded building sites for the various camps and warehouses which were necessary for the men, animals, and supplies which were destined overseas.

Investigations made it evident that the port activities could not properly be confined to either Newport News or Norfolk. Therefore, Norfolk, the adjoining municipalities of Portsmouth and Berkley, and the coast-line section due north to Sewall's Point and westerly to Pig Point, all on the south side of the James River, were included. On the northern bank of the James, the port included the territory beginning at the soldiers' home and ending about 2 miles north of Lee Hall. Later, the Richmond and West Hampton College, at Richmond, Va., was taken over as Debarkation Hospital No. 52.

In this large area it was necessary to construct roads, to lay railway tracks, to build vast warehouses, corrals, barracks, kitchens, hospitals, laundries, officers' quarters, and office buildings, to run telephone, telegraph, and electric light wires, and to provide water supplies, the instrumentalities for police and fire protection and the disposal of wastes.

The many activities ultimately included in the port of embarkation and with which the port surgeon was concerned are listed here not only to facilitate orientation but also to show the territorial scope of the port surgeon's responsibilities. The first 12 activities were located on the Newport News side of Hampton Roads; the remainder were on the Norfolk side.

1. Debarkation Hospital No. 52 (near Richmond, Va.).
2. Camp Alexander (stevedore and labor battalions).
3. Camp Morrison (aviation camp).
4. Animal Embarkation Depot No. 301.
5. Camp Hill.
6. Motor Truck Corps.
7. Quartermaster General supply depot (brewery units).
8. Camp Stuart.

^a The statements of fact appearing herein are based on the History of the Office of the Surgeon, Port of Embarkation, Newport News, Va., prepared by the staff of that office. The history is on file in the Historical Division, Surgeon General's Office, Washington, D. C.—*Ed.*

9. Embarkation hospital.
10. Port administration headquarters.
11. Debarkation Hospital No. 51 (near Hampton, Va.).
12. Miscellaneous activities: Skiff's Creek water project (near Lee Hall); fire and guard (near Lee Hall); pipe-line water project (near Harwood Mills); Harwood Mills water project; Big Bethel water project; military police (Newport News and Hampton); fire and guard (Newport News).
13. Army supply base (near Tanner's Point).
14. Norfolk Engineers' depot (near Lambert's Point).
15. General Ordnance supply depot (Pig Point).
16. Miscellaneous activities: Portlock classification yards; Gilmerton lumber yards.

Headquarters and accommodations for staff officers were secured in 15 rooms in a building in Newport News, a study was made of the developments necessary for the creation of docks, storehouses, railroads and switching facilities, wagon roads, water supplies, drainage, sites for depots, corrals, warehouses, hospitals, and camps; plans were drawn; contracts were let; and ground was broken for the first building on July 30, just 19 days after the commanding general's arrival.

It was necessary that construction operations be carried on at high speed in order that completed projects be occupied as rapidly as possible. The work was accomplished under most unfavorable conditions by reason of scarcity of material, transportation difficulties, shipping embargoes, and labor shortage. The housing facilities of Newport News speedily reached their limit of expansion, and many civilian employees could secure neither board nor lodging. Temporary barracks for workmen were rapidly erected; roads were constructed; sewer and water mains were laid; spur tracks were run from the main line and, after a series of exasperating delays and several necessary changes of plans, the first shipment of lumber was received on the evening of September 1 and the actual work of constructing Camp Stuart, at Newport News, began. In the meantime, detachments of stevedores arrived and were placed under canvas at Camp Alexander, and several detachments of Cavalry and Artillery were simily quartered at Camp Stuart.

The function, from the military point of view, of the collection of activities which constituted the port of embarkation was the shipment of supplies and and the embarkation of men and animals for service abroad, together with storage, protection, and housing of the same prior to actual shipment; the inspection of men and animals so that no defectives be sent forward; the reception, classification, and shipment of men returning from overseas; and all the multitude of details which the collection and shipment of men, animals, and military stores entail. From the viewpoint of the Medical Department, it embraced everything which had to do with the prevention, detection, diagnosis, cure, and amelioration of wounds and sickness; the sanitation of the environment, the safeguarding of food and water supplies, the maintenance of cleanliness, the destruction and prevention of dangerous insects, the isolation of the infected, the disinfection of clothing and buildings; the administration of hospitals and dispensaries; the elimination of the physically and mentally unfit;

the sanitation of ships and trains; the transportation of the sick and wounded; and the physical examination of officers and men prior to discharge. To accomplish this, a well conceived, carefully organized and well administered agency was necessary.

THE PORT SURGEON

FUNCTIONS

The functions of the surgeon of the port of embarkation, in a measure, combined those of the surgeon of a territorial department and of a division. He was responsible to the commanding general for the planning and proper administration of all the medical, surgical, and sanitary activities of a series of camps and hospitals; the physical examination of embarkation troops; the sanitation of transports; the medical and surgical care of troops en voyage; the reception, treatment, classification, entrainment, and care of returning sick and wounded; the discipline and training of medical and sanitary personnel; the maintenance of records, and the making of inspections and reports of various sorts. He was the medical, surgical, and sanitary advisor of the commanding general, and the outpost of the Surgeon General's Office. He was the advisor and coordinating focus of a large number of civilian activities having a direct relation to the mental, moral, and physical health of troops. He was called upon to solve all of the detail problems which confront a division surgeon, multiplied many times; he was vested with all of the responsibilities of a department surgeon.

ORGANIZATION OF PORT SURGEON'S OFFICE

The organization of the office of the surgeon was a matter of gradual growth and expansion. It began in two small rooms having a total floor space of 550 square feet. It finally occupied about seven times that area. At one time, the entire medical personnel of the port did not exceed 10; at the close of 1918, it was more than 5,000.

The basic thought in the organization plan was the creation of an elastic but well coordinated machinery which would efficiently meet emergencies as they arose with due economy of personnel and matériel. Thus the needs of the situation were met promptly and without undue expenditure of funds or effort, while at the same time there was no idleness on the part of medical personnel or equipment.

THE EXECUTIVE OFFICER

The functions of the executive officer were to act as an understudy to the surgeon, to discharge his duties during his absence, and to relieve him of routine work and minor details. Theoretically, he was the liaison between the surgeon and the heads of the various divisions in the surgeon's office. Practically, many administrative perplexities found their way directly to the surgeon's desk, and, in the interest of prompt, aggressive business methods, it was better that the surgeon receive this knowledge at first hand. Nevertheless, the executive officer discharged many duties which left the surgeon time and strength to attack special problems or decide matters of policy. In a measure, he performed many of the functions which, according to the Manual for the Medical

Department, vest in the sanitary inspector. This proved a valuable change, since it permitted the sanitary inspector to devote his entire attention to the protection of the troops against disease.

The first executive officer of the surgeon's office was detailed on January 15, 1919. Prior to this time the functions assigned to this office were performed either by the surgeon himself or by the sanitary inspector. The creation of this office in the organization scheme proved a valuable change. On account of the general character of his duties, however, it is impossible to render any adequate report on what he accomplished.

THE ADJUTANT

The adjutant performed all of the duties which ordinarily appertained to that office. He conducted all correspondence, was in charge of the files, prepared and issued orders under the direction of the surgeon, and attended to the details of assignments, promotions, etc. In addition, he commanded the headquarters medical detachment and was in charge of the civilian employees of the surgeon's office. He was assisted by two medical officers, one of whom was responsible for the property of the surgeon's office and the other conducted the transmission of telegraphic and telephonic communications.

In the early days of the port the operations of the surgeon's office were not large enough to require the appointment of an adjutant. By September, 1917, however, they had grown to such a size that the proper administration of the clerical work demanded the services of such an assistant. During the period from September 1 to November 1, 1917, the office force consisted of 2 civilian employees as stenographers and typists, and 2 noncommissioned officers and 4 privates of the Medical Department for handling the general office routine. Two additional civilians were employed as typists during the month of November, 1917, and one enlisted man was added to the office staff and placed in charge of the filing system. These additions were made necessary by the increased correspondence and clerical work incident to the growth of the port of embarkation, which was then assuming large proportions and becoming definitely established.

The office was moved to the newly completed administration building on River Road, Newport News, Va., on December 12, 1917, one room being assigned to the port surgeon and a portion of another being allotted to the enlisted personnel and civilian staff. The office was then reorganized and a more systematic program put in force. Prior to this time, the clerical duties of the adjutant's office and of the medical supply office had practically been combined and were discharged by the entire office staff, but 1 civilian employee, 1 noncommissioned officer, and 2 privates were then assigned exclusively to the medical supply officer. Incidentally, an addition of three enlisted men was made to the adjutant's office staff, and the office routine was arranged so that separate and distinct divisions were established to achieve specialization and greater efficiency. The position of chief clerk was created and a noncommissioned officer so assigned. Through him passed all incoming and outgoing correspondence for distribution as required, the incoming mail passing to the adjutant for action and the outgoing mail returning to the chief clerk for disposition.

The chief clerk, furthermore, assumed direction, under the command of the adjutant, of the entire clerical force.

Three divisions were organized, namely, a sick and wounded division, a personnel division, and a filing division, each with a competent noncommissioned officer at the head who, together with the three civilian typists and three enlisted men as utility clerks, comprised the office force.

The sick and wounded division handled all monthly reports from the various infirmaries and hospitals throughout the port. These were thoroughly checked and corrected before transmission to the Surgeon General. A complete record of all surgeons' certificates of disability and other data pertaining thereto was also compiled by this division. The officer on duty as hospital inspector acted as supervisor of this branch.

The personnel division kept an accurate record of all officers and enlisted men of the Medical Department on duty at the port, a directory being opened and all changes promptly recorded. This division likewise prepared and was responsible for the rendition of all personnel reports and returns to the office of the Surgeon General.

The filing division had by this time grown to large proportions and this important cog in the office machine was conducted in a most efficient manner.

Thus organized, the office routine moved with precision and expedition. The period between December, 1917, and April, 1918, gave evidence of continuous development throughout the port, and a coincident increase in the operations of the Medical Department.

A preembarkation medical examining board having been established, a noncommissioned officer was assigned to it for duty. It was found necessary to assign another enlisted man to the sick and wounded division. He took over the records of surgeons' certificates of disability and inaugurated an index of all port and War Department general orders, bulletins, etc., a system being devised whereby each circular was brought to the attention of all officers on duty in the office of the surgeon, each officer being required to initial the order after reading.

The month of April, 1918, revealed the need of further clerical assistance, the work fast outgrowing the office force. New infirmaries were opened from time to time in the port and adjacent camps and the several hospitals were constantly enlarging, coupled with which was the increased movement of troops overseas. An officer joined at this time as personnel officer and assistant to the adjutant. Several additions were made in the enlisted force, 4 men joining, 1 being assigned to the filing division, 1 to the personnel division, and 2 as typists and utility clerks. The volume of work handled by the office continued to increase rapidly and three further additions were made to the enlisted force during May, 1918. A system for recording the names of all sick and wounded returning from France through both ports of embarkation was devised during this month. Duplicate lists of all men arriving at Newport News were forwarded to the office of the surgeon, port of embarkation, Hoboken, N. J., and in return, duplicate lists were received of all men reaching the latter port. A card was instituted for every sick or wounded man debarking in this country. On

this card appeared all data concerning him and showing his final disposition. The preparation of these cards was included as a part of the duties of the filing division.

A fourth civilian stenographer was engaged in June, 1918, the steadily increasing movement of troops through the port entailing a corresponding increase in the reports, records, correspondence, and other data handled by the adjutant. A noncommissioned officer was appointed assistant chief clerk; and additional floor space being required for desk room for officers and enlisted men, permission was granted to take over a further portion of the second room in use. From time to time during the months of June, July, and August, 1918, additional enlisted personnel was detailed to meet the greater office needs and to replace several enlisted men who were commissioned or transferred. The month of September found the numbers of returning sick and wounded increasing to such an extent that a separate division was established to meet the situation. All questions relating to service records and other matters in connection with returning men were referred to this division.

The latter part of September and the first half of October saw the adjutant's office taxed to its utmost. This was due to the influenza epidemic then prevailing in the port, at one time more than half of the enlisted and civilian personnel being absent from duty.

The end of October, 1918, found the office force augmented and divided as follows: Chief clerk and assistant chief clerk; sick and wounded division—noncommissioned officer and assistant; filing division—noncommissioned officer and two assistants; property and supplies division—noncommissioned officer and assistant; personnel division—noncommissioned officer and assistant; transport and returning sick and wounded division—noncommissioned officer and two assistants; Surgeon's Certificate Disability and orders division—one noncommissioned officer; four utility clerks and orderlies, and four civilian typists.

The signing of the armistice, and the ensuing demobilization plans, applications for discharge, and still greater number of returning sick and wounded from overseas, brought a further increase in correspondence and clerical operations, calling for the employment of an additional civilian typist and several enlisted men to assist in the filing and returning sick and wounded division. The medical supply offices having been consolidated with the port storage division, more office space was available. This was much needed to meet the expansion of the adjutant's office force, which was greatly handicapped by crowded conditions. At the same time, a third room was vacated by the ordnance officer and assigned to the statistical and historical division.

The following table, which was compiled from the consolidated morning report of the first day of each month, shows the gradual increase in the commissioned and enlisted personnel of the port.

Month	Officers			Enlisted men	Nurse Corps	Total
	Medical	Dental	Sanitary			
1918						
May.....	314	10	39	2,219		2,582
June.....	361	11	42	2,317		2,731
July.....	419	12	47	2,401		2,879
August.....	433	14	47	2,582		3,076
September.....	442	27	46	2,692		3,207
October.....	448	30	45	2,992	164	3,679
November.....	460	44	45	3,391	165	4,105
December.....	585	46	41	3,942	236	4,849
1919						
January.....	541	39	33	3,486	310	4,409
February.....	402	34	28	3,306	239	4,009
March.....	349	26	24	3,128	368	3,895
April.....	341	31	23	2,837	307	3,539
May.....	278	21	21	2,528	293	3,141
June.....	218	17	13	1,602	120	1,968
July.....	157	18	19	1,257	112	1,562
August.....	115	13	27	938	102	1,195
September.....	77	6	27	523	68	701
October.....	19	3	17	129	0	168

These figures do not include the detachments of enlisted men of the Quartermaster Corps, labor companies, fire and guard, etc., and civilians, which were on duty at the hospitals.

MEDICAL SUPPLY OFFICER

The first organization for medical supply issues and overseas shipping at Newport News was planned by the medical officers who supervised the installation of the medical supply organizations at camps and ports throughout the country during July and August, 1917. Regular Army officers of the Medical Corps were chosen to start the work and were to have assistants to be commissioned in the Sanitary Corps, either from noncommissioned officers of the Medical Department or from men in civil life who were qualified in certain lines. An officer, after a short period of instruction at the New York Medical Supply Depot, was sent to Newport News about August 1, 1917, as medical supply officer, under the direction of the port surgeon. A civilian was shortly afterwards commissioned first lieutenant in the Sanitary Corps and detailed as assistant. A retired noncommissioned officer of the Hospital Corps was detailed as chief clerk. He was soon commissioned in the Sanitary Corps and retained in charge of records.

The port of embarkation was still in its infancy. Camp Stuart and Camp Hill existed only as blue prints in the office of the constructing quartermaster. Requisitions were immediately made for a quantity of office furniture and for the equipment of the attending surgeon's office. This was followed by a requisition for medical equipment to outfit 24 troop transports. These supplies were never used for that purpose, but formed the nucleus for the medical supply depot that was started on the upper floor of a warehouse.

The first supplies for overseas shipment were veterinary medicines, which arrived the first week in September, 1917, and were stored at Pier 5 awaiting the arrival of the first transport. They were assigned in the cargo of the steamship *Panaman*, which loaded on September 26, 1917. Due to a breakdown, she was put into the shipyard and held for a month after loading.

The medical supply depot was moved during October, 1917, to the upper floor of the brewery building, later known as warehouse 1, group 1, where active issuing was begun in order to supply the organizations beginning to occupy the new camps. The operations at the depot and supervision of the medical supplies handled at the piers had both been assigned to one officer, but with the rapidly increasing quantity of supplies arriving at the piers it was found necessary to request the detail of another officer who could devote his entire time to that work. Since the Army transport service checking had been found to be very unreliable, the port commander directed that each corps put details of their own men on the piers to check all shipments.

The medical supply depot had outgrown its quarters and was moved to warehouse 3, group 1, about December 1, 1917, where better facilities were installed and a much larger stock was carried. The piers and railroad yards had become so badly congested with overseas freight at about this time, due to the unusually severe winter, the shortage of ships, and the lack of a proper system for releasing shipments consigned to Atlantic ports, that a complete embargo was put on the port, and the months of January and February, 1918, were spent in clearing out the supplies on hand. The medical supply depot was forced out of warehouse 3 during the first week in February by the growing need for space by the clothing section of the depot quartermaster's office, and was moved to more permanent quarters in the warehouse group at the west side of Camp Stuart.

The overseas warehouse groups near Camp Hill were nearing completion and space was assigned to the different supply branches, requiring another officer to take charge there. Warehouses 9, 10, and 11, were first assigned to the use of overseas medical supplies. The assignment was later changed to warehouses 22, 23, and 24. An office to supervise this work was established in the new warehouse administration building. The congestion of freight became much relieved by spring and the tonnage shipped per month increased rapidly. The commissioned and enlisted personnel increased in proportion to handle the growing work.

The medical supply organization was authorized to induct suitable men for training in medical supply work, and approximately 400 men were obtained in this manner during April and May, 1918. Some of these men were trained only a short time before being sent to other camps. A regular course of instruction was followed, supplemented by lectures five evenings a week for the men who desired to take the examinations for commissions. The instructors were officers of the medical supply organization who were assigned to this work in addition to their own duties. This school was continued, with several different classes, until August, 1918. The first examination for commissions among the candidates in the medical supply school was held in May. Thirteen men qualified and were commissioned as second lieutenants in the Sanitary Corps, being the first men to be commissioned in this branch with that rank. They were called into active service as needed from June 15 to July 15. Other examinations were held during the following months and a total of 35 men commissioned as second lieutenants from this school.

The field medical supply depot company, having been authorized by the War Department, the medical supply organization at Newport News was directed to assemble and equip these units. The commanding officers for the units were ordered to Newport News by the Surgeon General, but the details of organization were left to the medical supply officer. Field Medical Supply Company No. 1 was organized about April 15, 1918, but did not leave Newport News until June. Units Nos. 2 and 3 were organized shortly after No. 1 and they were all sent overseas about the same time. Other companies were organized as these were sent out, so that at least two units were in training at all times. Thirteen companies were organized, but the last four did not get overseas.

The shipping of motor ambulances was turned over to the newly organized Motor Transport Corps in August, 1918. This item had been a large one, and it was believed that the loss would reduce the medical tonnage considerably, but this proved to be incorrect. The lost tonnage was made up the first month by the increased quantity of other medical supplies, and the following months showed an increase. The peak of the shipping was reached in October, 1918, when 5,380 tons were shipped.

A consolidation of all the supply branches took place in October, 1918, to be operated under one central organization. Previous to this time, each branch of the Army had handled its supply work independently under the supervision of the commanding general of the port. The medical supply organization had received all medical shipments, checked and stored them, secured cargo allocation from the shipping control committee, and made the shipments to the piers. Under the new plan, this work was pooled with the similar work of other supply branches. The first step was the organization called for under General Order No. 54, War Department, under which port supply officers were to be appointed for each corps, with a port storage officer to supervise the entire organization.

No further consolidation was undertaken for a time. Active consolidation started in October. This reorganization took considerable time and was not put into actual operation until after the armistice was signed.

The medical supply officer and his office organization moved from the port of embarkation headquarters building on November 16 and consolidated with the medical warehouse office, where the port storage office was opened. The medical supply depot remained a separate unit for local issues until January 1, 1919, when it was taken into the port supply depot organization as part of the division of purchase, storage, and traffic, of the General Staff.

The medical supply depot, as a local issue organization, had furnished medical supplies to all the camps under the port of Newport News for the period of the war. This not only involved the permanent personnel but also all organizations sent through the port. It also furnished the necessary medical supplies for troop and animal transports. The veterinary medicines and disinfectants for the animal embarkation depot were large items in themselves. For several months all organizations going overseas were required to take their entire impedimenta. Inspection was made here and shortages in equipment had to be secured before embarking. This made it necessary for the medical supply depot to carry a large stock to meet emergencies.

Since the organization of the port storage office was not effected until after the close of hostilities, to the medical supply organization, as part of the port surgeon's office, was alone due the credit for the handling of all overseas medical supplies at Newport News during the period of the war. The total quantity for the 15 months of active operations amounted to nearly 30,000 tons. A conservative estimate of the value of medical items handled is \$25,000,000. The largest individual item was 112 evacuation hospitals which were valued at approximately \$5,000,000. The 856 motor ambulances cost nearly \$1,500,000. Another large item was 12,370,000 packets, each containing 2½-yard lengths of sublimated gauze, and each packet costing 10 cents. Over 150,000 folding hospital beds were shipped, and a corresponding quantity of cotton felt mattresses or pads.

One hundred and seventy-five different shipments were made on transports. Only two of the ships with medical cargo were sunk, to wit, the steamship *Dora* and the steamship *Ticonderoga*. The largest medical item on the *Dora* was the complete equipment for Base Hospital No. 41, valued at approximately \$80,000.

Red Cross dressings and hospital supplies which were invoiced to the Army were shipped through the medical supply organization at this port. The total Red Cross shipments, exclusive of base hospitals, amounted to 437 tons. The principal items were: 1,278,000 unsterile dressing pads, 1,633,800 gauze rolls, 564,200 gauze sponges, 3,881,540 gauze wipes, 155,206 pajama suits and 79,600 operating gowns.

The following tabulations on total shipments of medical supplies are noteworthy:

		<i>Tonnage per month</i>				
		1917	Short tons	1918		
					Short tons	
September	-----		153	May	-----	2, 164
October	-----		102	June	-----	2, 020
November	-----		91	July	-----	3, 624
December	-----		557	August	-----	3, 637
				September	-----	4, 780
		1918		October	-----	5, 380
January	-----		476	November	-----	3, 932
February	-----		36	December	-----	1, 201
March	-----		587			
April	-----		572	Total	-----	29, 312

*Large items of medical supplies handled through port of embarkation. Newport News, Va.**

Commodity	Quantity	Tons	Value (approximate)	Commodity	Quantity	Tons	Value (approximate)
Beds, steel folding	151, 739	4, 855	\$493, 151	Motor ambulances	856	1, 712	\$1, 450, 715
Mattresses, cotton felt	67, 545	1, 047	672, 748	Base hospitals	10	1, 000	800, 000
Pads, cotton felt	56, 460	664	172, 767	Field hospitals	160	480	809, 668
First-aid packets	4, 898, 000	821	940, 800	Ambulance companies	210	420	249, 328
Individual-dressing packets	3, 560, 000	430	374, 500	Regimental hospitals	130	260	63, 879
Cotton, absorbent, 1 ounce	8, 960, 000	296	383, 040	Camp infirmary	520	520	463, 678
Gauze, sublimated, 2½ yards	12, 369, 000	585	1, 237, 000	Camp infirmary reserve	370	370	155, 647
Surgical dressings, boxes of	48, 859	672	73, 350	Evacuation hospitals	112	1, 120	5, 136, 629
				Total	-----	15, 252	13, 476, 900

* Other items are chiefly drugs or replenishments of different kinds whose value may be assumed to be higher than that of the items listed, due to the large percentage of expensive medicines.

American Red cross supplies shipped by medical supply organization, Newport News, Va.

Commodity	Quantity	Tons	Commodity	Quantity	Tons
Unsterile dressing pads.....	1,278,468	86.4	Bandages, many tailed.....	264,165	31.6
Shirts, bed.....	61,176	10.6	Slings.....	151,675	24.6
Pajama suits, winter.....	155,206	32.8	Gowns, operating.....	79,600	11.6
Robes, convalescent.....	18,624	11.9	Jackets, pneumonia.....	24,275	9.2
Sponges.....	564,200	64.1			
Gauze, wipes.....	3,881,540	92.3	Total.....		437.5
Gauze, rolls, 1 yard.....	1,633,870	62.4			

THE SANITARY INSPECTOR

An officer was detailed as sanitary inspector of the port on August 21, 1917. The sanitary inspector was responsible to the port surgeon for the preparation and execution of all general sanitary orders; for the health of both the permanent garrison and the transient troops. The discharge of these functions comprehended the sanitation of the entire environment—the inspection of foods, beverages, mess halls, bakeries, exchanges, and other places where articles of diet or drink were stored, prepared, served or sold; the control of insects and vermin; the sanitation of laundries; the prevention, control, and eradication of the communicable infections, including isolation, quarantine, and disinfection; the collection and tabulation of morbidity and mortality data; the search for chronic carriers of disease, and the study of problems related to fatigue, exposure, and other debilitating influences.

The sanitary inspector directed the work of the nutrition officer, whose functions covered an important field in the proper rationing of troops and were both advisory and administrative.

Under direction of the sanitary inspector was the epidemiologist, who collected the statistical data bearing on mortality and morbidity and prepared graphs and charts therefrom, conducted intensive studies relative to the occurrence of communicable diseases, and made special sanitary inspections when necessary. He was assisted by an officer of the Sanitary Corps and a sergeant.

The sanitary engineer was detailed by the Surgeon General for special duty in connection with the water-supply developments which were undertaken by the Army on account of the inadequacy of the local supply. He acted as a general advisor on sanitary questions involving a knowledge of sanitary engineering.

The chief of the division of insect control reported to the sanitary inspector. Under his direction were the malarial detachments at Camp Stuart, Camp Hill, Camp Morrison, Camp Lee Hall, Camp Pig Point, and the Army supply base, and the fly-control detachment of the animal embarkation depot, and special inspectors of garbage, latrines, and mess halls. He was also responsible for louse-control operations at Camp Stuart, Camp Hill, and Camp Alexander for well troops, and at the embarkation hospital and debarkation Hospitals Nos. 51 and 52. In addition, he directed miscellaneous insect-control operations for the prevention and destruction of cockroaches and bedbugs.

The administration of the sanitation of the port was extremely difficult, particularly during the construction period. To properly safeguard the health of the military forces, it was necessary to maintain the strictly military areas

in a sanitary condition and to secure the same hygienic results in the civilian locale. This latter function vested in the Public Health Service and the Newport News Health Department. The situation would have been greatly simplified had there been a sharp geographical line between the civilian and the military jurisdictions, but there were various small detachments located in camps and buildings throughout the city while the larger camps were located in the outskirts of the city. The city health authorities were overwhelmed by the magnitude of the problem which confronted them. The pre-war sanitation of Newport News was never good—the city abounded with insanitary privies; the garbage collection and disposal service was archaic; the terrain was low, with many mosquito-breeding, swampy areas; the streets were filthy and poorly drained; and the restaurants were grossly insanitary. The city health authorities were reduced to the apathy of despair when such a defective sanitary organization was subjected to the stress of increased population. The surgeon, early realizing the importance of placing and maintaining the civilian area in a safe sanitary condition, wrote the following letter on July 19, 1917:

From: Surgeon, port of embarkation, Newport News, Va.

To: Surgeon General, United States Army.

Subject: Sanitation.

1. In view of the prospect of a large military institution being established at this place, I request that the Public Health Service be asked to furnish me with such information as is on file concerning the health and sanitation of this city and vicinity.

2. It is believed that a sanitary expert from the Public Health Service should be sent to this city with a view of suggesting to the city authorities measures for improving the sanitation of the city and the surrounding territories.

The Public Health Service undertook a sanitary survey of the situation and later detailed officers for the conduct of an active sanitary campaign in cooperation with the Army, State, and local health authorities. Lack of funds and absolute authority on the part of the Public Health Service made the speedy accomplishment of the desired results exceedingly difficult and slow, and a visiting medical officer, after a thorough inspection of the situation (June 11–13, 1918), recommended that the sanitation of the peninsula, including the city of Newport News, be placed under the surgeon of the port. This was not done, but, by the constant labors of the Public Health Service, the majority of the insanitary privies were abolished and the general sanitation of the city was greatly improved. There was harmonious cooperation between the surgeon and the Public Health Service, and the military authorities were able to lend great assistance in the sanitation of restaurants and the abolition of the fly-breeding garbage dumps.

The part of the city drained by the west branch of Newport News Creek was frequently inundated and constituted a serious menace because it favored the breeding of malaria-carrying mosquitoes. This condition resulted from the failure to keep the creek and the culverts free from refuse. This danger was abolished after this material had been removed and free drainage established. Similarly, the sewer catch basins were clogged with street detritus, but were incompletely cleaned after a number of protests from the sanitary inspector and the Public Health Service. The streets were never satisfactorily

clean except immediately after a heavy shower, but they had improved markedly toward the end of the occupation of the port by the Army. Cans for the reception of waste paper and trash were installed by the city authorities on each street corner and in the center of the long blocks, and this aided very much in improving the sanitary condition of the streets. This resulted, in part, from the psychological fact that the public will unconsciously aid in keeping a street clean but will just as unconsciously make a dirty street dirtier. The city abounded in pigpens at one time. A few of these were gradually removed, with a resultant decrease in the number of flies.

The sanitation of restaurants in the civilian locale was under the jurisdiction of the Public Health Service. This organization inspected all places handling or preparing food for public sale and issued orders for the rectification of insanitary conditions. Copies of these orders were furnished the sanitary inspector and, in case of failure to comply therewith, a military policeman was stationed in front of the restaurant and soldiers were forbidden to enter. This resulted in a very satisfactory clean-up of these places and was an aid in protecting the health of the troops.

The control of the manufactories of soft drinks was not a problem of great magnitude since the bulk of the bottling works supplying the port was situated elsewhere. Places located in the immediate vicinity were carefully inspected and all insanitary conditions noted and brought to the forceful attention of the management. Exchanges were forbidden to purchase the products of any bottling works which failed to comply with the recommendations of the sanitary inspector. Bacteriological examinations of imported soft drinks were made at frequent intervals.

The most vexatious problem during the earlier days of the port was connected with the sanitation of the stevedore regiments, then stationed at Camp Hill, Va. These men were overcrowded in insanitary, floorless tents, without cots or mattresses. There were no bathhouses, there was much lousiness and measles; cerebrospinal meningitis and pneumonia were prevalent. Recruits were often received without advance notice in lots of 5 to 35, wearing worn-out civilian clothing, the men having been instructed to wear such clothes as the Government would issue uniforms at once. At other times, 100 to 500, and in one case 1,000, recruits were received at one time on 24 to 36 hours' notice. Recruits were received who apparently had not received a physical examination. In some instances these men had fractured limbs, defective joints, flat feet, or were suffering from contagious diseases such as pneumonia, tuberculosis, cerebrospinal meningitis in advanced stages. Blankets and clothing were seldom on hand in sufficient quantity to properly equip these men. Frequently men were in camp from four to six weeks without receiving an issue of clothing. Only a few additional cases of communicable diseases occurred so long as the weather remained mild, but, with the first severe days of winter, the condition became so acute that on November 24, 1917, a letter was addressed by the surgeon to the commanding general, inviting his attention to the large amount of respiratory diseases in the stevedore regiments and requesting that additional tentage be provided to correct the great overcrowding which then existed. A report was made on January 9, 1918, after about a week of investigation by the sanitary

inspector, showing that the tents of the stevedore regiments were greatly overcrowded, that many men had no cots, and that they were not sufficiently provided with bedding. There occurred in these organizations during the months of November and December, 1917, and January, 1918, 222 cases of measles, with no deaths; 18 cases of bronchopneumonia, with 7 deaths; 139 cases of lobar pneumonia, 25 deaths; 46 cases of cerebrospinal meningitis, with 16 deaths; and 57 cases of bronchitis, with no deaths; a total of 482 cases, with 42 deaths.

The sanitary situation was attacked with vigor late in January, 1918, and on February 11 a general inspector made the following report of his investigation of February 4-8:

The present condition of the camp, while evidently improved, is still quite unsatisfactory. * * * The tents in which the members of the command are housed have all received makeshift floors of extra lumber and other materials picked up in various places, and the mess shacks have been constructed of odds and ends, including tin cans and old canvas. The present commanding officer of the camp has been making strenuous efforts to obtain bathing facilities for the men. After the time of inspection he completed a building with about 24 showers, with hot-water connections, and was hoping to be able to provide a bath for all members of the command within the next few days. They have had no opportunity to bathe during the freezing weather which has been prevalent of late, none having bathed for at least a month. He stated that request had been made for the immediate provision of more showers, and for tubs in which the men could wash their clothes, a thing which most of them had been unable to do since their arrival in camp. All the men are now provided with three blankets, cot, bed sack, uniform, heavy underwear, socks, two pairs of shoes, and overcoat. Most of them have also received Red Cross sweaters, gloves, and helmets. * * * The commanding general, port of embarkation, has finally assumed complete control of this camp. * * * It was understood, when this camp was first established that it would be entirely independent of the port of embarkation, excepting that the latter should furnish subsistence. The commander of the stevedore and labor organizations was to have charge of all other matters relating to this camp and was responsible for proper housing and equipment. He reported directly to the chief of embarkation service.

From that time forward there was a steady improvement in the sanitary condition of the stevedore camp, and later, when a new camp was constructed on the bank of the James River to the north of the village of North Newport News, it was one of the most sightly and sanitary camps in the entire port.

NUTRITION OFFICER

A nutrition officer reported December 1, 1918. The work of his office was conducted under the direction of the sanitary inspector, and began with a detailed study of the mess system of the embarkation hospital. The procedures of investigation and assistance in mess improvement which were followed in his subsequent work were formulated during the period of this study. Since the results accomplished depended largely upon the methods put in force, these are described in detail.

With a few exceptions, the nutrition officer followed the practice of working successively with groups of three or four messes. One or two weeks were spent with each group, the length of time depending upon the conditions found. The first two or three days of each study were devoted entirely to the group. Thereafter, three or four routine inspections were made daily of messes which had previously been studied in detail. Fifteen to 30 minutes were required for each of these routing inspections.

The necessary arrangements were made with the commanding officer of the group and the individual organization commanders before beginning work with a group of messes. The function of the nutrition officer was explained and any special authority which the commanding officer wished to confer was arranged. With few exceptions, all suggestions for improvement of the messes were welcomed by organization commanders, and mess sergeants were instructed to follow the directions of the nutrition officer.

It was possible to obtain detailed and reliable information concerning all phases of management and operation by keeping in close touch with a limited number of messes for one or two weeks, and thus to discover the fundamental difficulties. This made possible more effective recommendations and gave an opportunity to assist in carrying them out. These recommendations were made verbally and by memoranda to organization commanders and mess officers and to the surgeon through reports. The nutrition officer was able to bring about many improvements in mess organizations after gaining familiarity with the problem. The activities of the nutrition officer in relation to individual messes were entirely investigative and advisory, and dealt particularly with the matters which follow.

MESS ORGANIZATION AND PERSONNEL

A lack of organization of the mess force was frequently found to be the cause of insanitary conditions and excessive waste. Recommendations looking to a more definite correlation of administration, assignment of routine duties, and more systematic methods of work were made in such cases. The manner in which the mess officer and the mess sergeant performed their duties was noted, and when either of these was found lacking in interest, the most suitable means of correction were adopted. Reference handbooks were suggested and specific instructions were given when sergeants or cooks were found to be lacking in knowledge or experience.

PURCHASING AND ACCOUNTS

The nutrition officer was able to assist in coordinating the purchase of supplies with dietary requirements and the available mess funds by keeping in touch with the subsistence division and the outside markets. To stimulate economical purchasing, mess sergeants were informed of commissary contract prices with local dealers, and were put in touch with the 12th Infantry regimental store, from which they were able to secure many items of selected produce at a reduced price.

The failure to keep systematic current accounts and properly to correlate these with menus and purchases was found to be a contributing factor to an unsatisfactory diet in a number of organizations. Marked improvement was noted in such instances when accounts were kept up to date and purchases were more carefully planned. Less experienced mess sergeants utilized the ration more uniformly and satisfactorily after they were required to calculate the cost of each meal and the ration saving or deficit for each day. The practice of accumulating large funds at the expense of the regular mess, to be spent lavishly on special affairs, was discouraged.

SUPPLIES AND STORAGE

The food supplies in the hands of organizations were inspected with reference to their nutritive value and deterioration from spoilage or other causes, the source of any difficulties on this score being determined and adequate corrective measures instituted. Misunderstandings as to the quality of supplies purchased from the subsistence quartermaster were prevented by cooperation with the Subsistence Division. This applied particularly to good coffee improperly made, frozen meats not properly handled, and sound canned goods in cans which had an unsatisfactory appearance. Mess sergeants and cooks were instructed in the detection of questionable canned goods and were informed of the ruling of the Quartermaster General relative to their disposition.

The nutrition officer visited most of the establishments selling foods to the messes, and also consulted with the local food division of the United States Public Health Service concerning the sanitary condition of these places. No serious objections on this score were found.

In spite of the vital importance of storing food under the best possible conditions, this phase of mess management was found to be the one most often neglected and was the most frequent reason for the presence of unsatisfactory supplies. An additional reason was the attempt to keep meats and produce for too long a time and the failure to keep fruits and vegetables properly culled. Recommendations were made for improved conditions of storage in nearly every mess visited. The relation of the care of supplies to proper feeding and mess economy was repeatedly emphasized. The condition, use, and care of refrigerators was closely observed in connection with the storage of meats and dairy products. Neglect of minor repairs to hasps, hinges, doors, inner drain pipes, and metal linings was frequently found to interfere seriously with the maintenance of proper temperature and sanitary condition of the box.

The storerooms of mess halls in Camp Stuart and Camp Hill were originally constructed without bins, platforms, or shelving. Plans were suggested which would make it possible to keep all food supplies off the floor in messes where such facilities were still lacking or unsatisfactory makeshifts were in use. New bread boxes were recommended and plans were furnished for these where merely screened-in spaces or airtight bins were used for storing bread. On account of excessive temperatures and high humidity in the summer months, the most satisfactory type of bread box for the vicinity of Newport News was one furnishing complete protection from flies and maximum ventilation compatible with adequate protection from dust. The ventilation was best secured by means of screened openings in the sides and doors. The shelving was slatted, loose, and spaced to accommodate the loaves on end, and the box was raised about 30 inches from the floor.

SANITARY CONDITIONS OF MESSES

Messes were studied to detect and correct habitual insanitary practices rather than to determine the state of affairs at any particular time. Improvements were brought about in methods of washing dishes and mess kits, particularly in the matter of providing sufficient boiling water to sterilize them. Where company dishes were used or the mess kits were washed by a special

detail, the most satisfactory method was to wash the dishes thoroughly in hot, soapy water frequently changed, then to pile them loosely in a galvanized-iron can of boiling water on the stove or fire trench and to boil them 5 or 10 minutes. This process was greatly facilitated by the use of wire baskets with handles. While one basket of dishes was being sterilized, another was filled. The use of towels for drying plates was discontinued, since it was found that, when the dishes were properly washed, rinsed, and sterilized, the water quickly evaporated when they were spread on tables. Meat blocks, tables, and shelves with insanitary cracks or spaces were reconstructed or discarded. Particular attention was paid to the care of refrigerators, bread boxes, meat blocks, and kitchen utensils, especially knives and meat saws.

Other sanitary matters which were improved were: Practices with respect to the care of shelves, tables, and floors, particularly methods and frequency of cleaning; elimination of rodents, cockroaches, and flies; general cleanliness of storerooms, and precautions for keeping all foods properly covered.

DIETARY

With few exceptions, the nutrition officer found that the mess sergeants were almost entirely responsible for the feeding of the men. Many of these sergeants had never been cooks and were lacking in experience in the proper knowledge of nutritional requirements and of the composition and function of the various types of food materials. These deficiencies were evidenced by poorly planned menus and lack of balance in the diet over extended periods. Whenever menus were kept on file, the nutrition officer tabulated these for the two or three weeks preceding his visit to the mess, making a careful, qualitative study of the diet for the period with respect to a balance of carbohydrate, fat, protein (complete and incomplete), salts, acid and base producing components, antiscorbutic properties, crude fiber and other laxative properties, variety in methods or preparation, and of condiments, flavors, and food materials used and the agreeability of combinations for individual meals. The results of these studies were used as a basis for the instruction of mess sergeants.

Many dietary errors were corrected by increasing the amounts of fruits, vegetables, and milk used. It was found that the different factors of the diet could be satisfactorily controlled by careful planning of menus and purchases, in spite of the fact that prices in the local market were very high and the choice of produce somewhat limited during the winter months. Money was saved for the purchase of fresh fruit by partially replacing fresh beef, pork, and mutton with a reasonable portion of cheaper substitutes, such as liver, frankfurters, link sausage, lima beans, split peas, macaroni and cheese, etc. Sweet potatoes, cabbage, spinach, carrots, beets, turnips, and parsnips could be obtained in the local market all winter and usually could be purchased at a lower price than canned vegetables. The successful use of these vegetables required special attention as to variety and methods of preparation. Excessive fat, protein, and acid residues were reduced by these additions and substitutions, essential vitamins and crude fiber were increased, and the diet was made more satisfactory to the men. Some of the most poorly balanced diets were encountered in certain negro labor battalions where the men were fed according to their own

notions of a satisfactory diet. These diets were exceedingly high in protein and fat. Vegetables were limited almost entirely to navy beans, potatoes, canned corn, peas, and tomatoes, and even these were served only at intervals. Potatoes were omitted from as many as five successive meals in one mess. It was noted that in these organizations the men were very lazy and had little resistance to cold and minor throat infections, and it was believed that their diet was a contributing factor to these conditions.

Monotony of diet was found to be a frequent source of complaint in messes when the food was really well prepared and properly balanced. It was easy for mess sergeants to get into the habit of repeating a limited list of menus with only slight variations. The nutrition officer corrected such mistakes in many instances by recommending certain variations in food material, methods of preparation, and seasonings used. Menus were planned in periods of one or two weeks in a tabulated form, showing each type of food in a single column, under such headings as meat dishes, potatoes, canned vegetables, cereals, fruits, soups, etc. Printed blank forms of this type were furnished to mess sergeants for this purpose.

Soups were served in only a few messes, the excuse being offered that the men would not eat soup. With few exceptions, this was found to be due to the manner in which they were prepared, and that they were usually relished if made thick and well seasoned. Soup reduced the amount of coffee consumed and was quite nutritious when thick. It was therefore an important economic factor in the diet and its inclusion in menus was frequently recommended.

The use of too many fried dishes and too many soupy dishes was discouraged. It was recommended that certain foods which had become distasteful to the men of casual companies, such as canned salmon, canned corned beef, and corned-beef hash, be eliminated.

The palatability and other properties of food as determined by the methods of cooking, seasoning, and serving were important factors in its wholesomeness and were closely observed. While no pretense was made of training cooks, the lack of well-trained and experienced cooks in the various organizations of the port was so frequently encountered that instructions often were given in some of the elementary principles of cooking, particularly in relation to the preparation of tea, coffee, and cocoa, the cooking and most efficient utilization of meats, the preparation and cooking of vegetables, the use of seasonings, the preparation of sauces and gravies, palatable soups, salads, and special desserts, and the manner of preparing many types of dishes with reference to their appearance.

Food which was otherwise wholesome and properly cooked was often found to be rendered unpalatable by allowing it to stand too long a time after cooking (especially certain meats and most fried dishes), or by allowing it to become cold before serving. By explaining and emphasizing the importance of esthetic factors in feeding, much was done to improve the appearance of the food and the manner in which it was served by cooks and kitchen police. Bread, water, and sugar were placed on the tables, and line service in some instances was replaced by table service.

FOOD WASTE

In reducing the waste of edible food, the nutrition officer determined the sources of such waste in each mess studied and instituted corrective measures by means of suggestions and reports.

Table waste.—Excessive table waste was corrected usually by improved cooking, improved menus, and closer attention to the size of portions served. Disciplinary measures to correct carelessness or indifference of the men in serving themselves to excessive quantities of food were sometimes necessary. Waste of bread was materially reduced by cutting thinner slices and by cutting these into half slices; also by placing bread so cut on the tables rather than by serving it in line. The amount of sugar wasted in discarded tea and coffee was materially reduced by placing the containers on the tables. It was found that the plate waste was much less with table service than with line service, with few exceptions.

Kitchen waste.—This was reduced by directing closer attention to the proper quantities of food to be cooked, the methods of preparing vegetables for cooking, the efficient and early use of left-overs, bones, and fat, and the use of the stock pot. The nutrition officer observed that waste involved in the preparation of food was usually higher where kitchen police duty was assigned as a form of punishment or as a one or two day detail. Sanitary conditions were also found to be less satisfactory under this arrangement, and the nutrition officer advised against the practice. The proper care of supplies and the correlation of menus and purchases were found to bear a close relation to the contents of garbage cans.

EQUIPMENT

In addition to furnishing plans and making recommendations for better provisions for storage, the nutrition officer assisted in improving the adequacy and condition of all equipment used in the preparation of food. Stoves were examined with respect to the condition of grates, linings, stacks, and general heating efficiency, and necessary repairs were made. The nutrition officer cooperated with the port utilities division in these matters and arranged for the instruction of mess sergeants in the proper care of their stoves. The recommendations of the nutrition officer as to the most convenient kitchen, storeroom, and mess hall arrangements, and as to the selection and arrangement of certain equipment, were formulated in a mess hall and kitchen plan and submitted to the sanitary inspector.

WATER SUPPLY

It became evident early in the occupation of the port that, unless every effort was made to conserve water and to expand the existing water plant, an acute water famine would result. This water shortage was so grave as to excite the fear of fire from incendiary and other causes, since the pressure was sometimes nil and fire engines had to be used to pump fresh water aboard ships so that they could make their voyage.

The original plant of the Newport News Water Co. consisted of a dam, filter plant, and pumping station. This plant supplied Newport News, Hampton, Phoebus, and Fortress Monroe with water previous to the war. The

supply was surface water which ran off from a catchment area of about 10,000 acres near Lee Hall, Va. The impounded water was pumped into a sedimentation basin, alum being added before entering. Next the water ran into gravity rapid sand filters, after which it was sterilized with liquid chlorine.

The filtered and chlorinated water was then pumped to Morrison through two cast-iron pipes, one 24-inch and one 18-inch; from Morrison to Newport News by a 20-inch wood-stave line and an 18-inch cast-iron pipe line. A booster station at Newport News repumped the water to Hampton and Phoebus. Fortress Monroe maintained a pumping station at Hampton which again pumped the water into that military reservation, and Langley Field maintained still another pumping station at Hampton which pumped the supply over to the field. There were equalization tanks at three points along the line; one high tank at the reservoir, two wells or tanks at Newport News, and one at Hampton. All of these were open except one of the wells at Newport News.

The watershed was near Lee Hall, Va., and was about 10,000 acres in extent. It was almost entirely owned by the Newport News Light & Water Co. It was uninhabited but had several sources of contamination. The Chesapeake & Ohio Railroad passed through the area and did not always take care to close the toilets of trains as they went through; the main road to Richmond crossed the dam and bordered the drainage area on the west, surface wash from parts of this road entering the reservoir; the village of Lee Hall lay on the edge of the area and it was possible for the surface wash from it to enter the reservoir at times. However, all of these sources of contamination were of small consequence, inasmuch as the water was sedimented, filtered, and sterilized before using. The watershed was almost entirely covered with a dense forest of pines and hardwoods, thus retarding and equalizing the run-off; the soil was sandy clay and had a very small area of swamp land.

The reservoir lay along the valley of the Warwick River, and was formed by a dam 17½ feet high to the crest of the spillway. It was a shallow pond not over 18 feet deep, and 440 acres in extent when full. There was little weed growth, but microscopic organisms grew in large numbers, at times. The water was soft and clear. It was not subjected to violent changes, thus making the filter operations comparatively easy.

In April, 1917, the filter plant consisted of a set of pressure sand filters. Alum was added and the water was settled before filtration. The chlorine was added in the form of hypochlorite of lime. The pressure filters were done away with entirely on January 13, 1918, and the alum feed was discontinued the same day. The chlorine dose was continued at much the same rate. On May 5, 1918, the alum feed was started again, but only a small dose was added and this was again stopped on June 28. A modern gravity rapid sand filter plant of 8,000,000 gallons daily capacity was put in operation on July 27, and a liquid chlorine plant was started the same day.

In general, the water was excellent in quality. It was very muddy and contained considerable anabæna for a time during the summer of 1918. Copper sulphate was added to the reservoir to correct this. The chief difficulty, however, resulted from the paucity of the supply. This became so serious that the following general order was issued:

HEADQUARTERS PORT OF EMBARKATION,
Newport News, Va., June 23, 1918.

General Orders, No. 183.

1. The matter of water supply for this command is one of gravest concern. Of equal gravity is the waste of water. Provision has been made to give each part of the command an ample and good water supply. Carelessness or neglect on the part of those entrusted with its care, upkeep, and use will not only result in loss to the Government, but will seriously affect the training, health, comfort, and discipline of the command, as well as add to the fire hazards.

2. The supply of water is ample for every legitimate use.

3. The waste of water through leaks and misuses is already excessive and will increase as the weather grows warmer. The present consumption is enormous, and unless prompt steps are taken to economize, the supply during the coming summer may prove insufficient.

4. Commanding officers are hereby directed to take every precaution to stop waste and misuse, and to this end the following instructions will be carried out:

(a) All plumbing will be inspected daily, leaks stopped as fast as they are discovered, and repairs made immediately. The arrangement of the plumbing fixtures in the lavatories makes it possible to inspect 60 or 70 outlets, including showers, faucets, and closets, in four or five minutes, so that these inspections can be conducted in the minimum of time.

(b) Placards urging the men to economize water will be kept posted in conspicuous places in every lavatory.

(c) It is absolutely necessary that the men be trained never to leave a faucet or shower running except when it is actually needed. Faces and hands will not be washed in water running from a faucet, but from water in a basin. All fixtures will be shut off when not in actual use. The washing of clothes at the showers or at the lavatory faucets is prohibited.

(d) In the case of fire, every fixture except those from which water may be drawn for the purpose of fighting fire will, as soon as the fire alarm is sounded, be shut off except those necessary for cooking purposes.

(e) The use of water for sprinkling roadways, grounds, and for animals will be so timed as not to coincide with the heavy load on the water system resulting from the use of the showers. Sprinkling of roadways will be done from water wagons only.

(f) The peak of the load on the water system occurs from 7 a. m. to 12 noon, and from 1 p. m. to 6 p. m. If practicable, bathing, sprinkling, and filling of water wagons should be done before or after these hours.

(g) Sentries will be instructed to see that all fixtures on their beats are shut off when not in use.

5. Prompt disciplinary measures will be taken in the case of any member of this command—officer, enlisted man, or civilian—who may be found responsible for wasting water.

6. The purport of this order will be conveyed orally to each unit by its commanding officer at one formation weekly until October 1.

7. Camp commanders will report to these headquarters on June 28, 1918, the action taken by them to carry out the provisions of this order, and will report on the last day of each month, July to September, inclusive, the actual results accomplished.

By command of Brigadier General Hutcheson:

DANIEL VAN VOORHIS,
Lieutenant Colonel, Chief of Staff.

In spite of the water conservation which resulted, the long dry summer so increased evaporation from the reservoir and the draft on the supply was so heavy that a second near shortage occurred in November, 1918. The water company used all of its pumps, all of its filter plant, and the entire capacity of its pipe line for 24 hours a day in an endeavor to supply Newport News and vicinity. Thus, the margin of safety was reduced to zero.

The following report was made in January, 1919:

More water is going into the Lee Hall Reservoir daily than is being pumped out. The water company stopped the pumping of deep well water from Skiff's Creek into the reservoir on or about January 3, 1919, due to the fact that the chlorine content of reservoir water has

been raised about 10 parts per million since the beginning of pumping well water. The iron content has increased also. In addition to this, it has cost the water company about 6 cents per 1,000 gallons to pump this water, which makes the cost of water to the water company when delivered to Newport News considerably more than the rate at which it is sold. The pumping of water from Harwood's mill by means of the steam pump was also costly, due to the difficulty of transporting coal to the pumping station over the bad roads, hence the water company has discontinued the use of the steam pump. One of the new engines and pumps, however, is being operated at Harwood's mill, pumping $2\frac{1}{2}$ or 3 millions of gallons daily into the Lee Hall Reservoir.

Some agitation is on foot to pump all possible water into the Lee Hall Reservoir now. It is the opinion of the writer that most of the water which is being pumped over now will be wasted over the Lee Hall spillway before summer. However, if the Lee Hall Reservoir should not fill before summer and another shortage should be imminent, 3,000,000 gallons daily can be pumped from Harwood's mill under present conditions for a period of at least three months; 2,000,000 gallons daily can in all probability be pumped from Skiffs Creek for an indefinite period beginning next spring; and as the Lee Hall watershed can produce easily 3,000,000 gallons daily, there will be all of the water that the filter plant can filter, or that the pipe lines can carry, or that the pumps can pump to Newport News.

Considerable danger of the pollution of the water supply by the town of Lee Hall became apparent in July, 1918. The following file of correspondence shows the conditions which existed and the way in which they were corrected:

OFFICE OF THE SURGEON,
Camp Eustis, Va., July 6, 1918.

From: Maj. D. W. McENERY, M. C.
To: Commanding officer, Camp Eustis, Va.
Subject: Unsanitary conditions at Lee Hall, Va.

1. As outlined in the sanitary report for June, I think that the sanitary conditions at Lee Hall should be remedied at once in order to protect the water supply of the port of embarkation and Camps Stuart, Hill, and Morrison. This camp is in such close relation to Lee Hall and the reservoir, it is imperative that immediate measures be taken to remedy these defects. There is no doubt in my mind that a great majority of the nuisances committed are performed by the employees of this camp. Later on we may expect the same defects from the soldiers. Toilet facilities at Lee Hall are extremely poor, and the men go to the outskirts of the town, practically on the watershed, to defecate. As the Army is the main offender in committing these nuisances, we should attempt to remedy them. There is an 8-inch sewer and small septic tank put in by the constructing quartermaster to care for some houses occupied by employees. This sewer will be large enough to accommodate toilets from the station. Mr. Curtis, a resident of Lee Hall, has offered the use of his water tank, provided the Government has the water pumped from the wells to the tank, so that he will not suffer from lack of water. Mr. Curtis also has a sewer system on his property. The sewer flows into Skiff's Creek and on into the James River.

2. In my opinion this is of such an emergency that the constructing quartermaster should be authorized to put in modern toilets and connect them with the sewer. The location should be the same as the public toilets at present; that is, in the rear of the railway station. It should consist of two buildings; 20 seats for men, and 8 for women. These should be constructed so that it will divide the colored from the white; that is, 10 seats for white men and 10 for colored men. The women's toilet should be divided similarly. They should be cared for by the sanitary squad of this camp. When these toilets are installed, a sanitary guard should police the watershed.

3. I urgently recommend that this work be done by the constructing quartermaster as an emergency. It is not a question of who should do it, as delay is dangerous. The water from the reservoir is very heavily contaminated, and every means to make it pure should be taken at once.

D. W. McENERY,
Major, M. C., Surgeon.

[First indorsement]

COAST ARTILLERY SCHOOL,

Fort Monroe, Va., July 7, 1918.

TO COMMANDING GENERAL, PORT OF EMBARKATION,

Newport News, Va.:

1. The conditions reported as unsatisfactory exist on areas outside the Camp Eustis reservation, on an area under control (it is understood) of the commanding general, port of embarkation. The undersigned wishes to cooperate in the fullest extent in any measures which may be necessary or desirable to correct the conditions complained of in the foregoing report.

F. K. FERGUSSON,

Colonel, C. A. C., Commandant.

[Second indorsement]

HEADQUARTERS, PORT OF EMBARKATION,

Newport News, Va., July 10, 1918.

TO THE SURGEON, PORT OF EMBARKATION:

Referred.

By command of Brigadier General Hutcheson:

O. W. BELL,

*Colonel, Adjutant General,**Adjutant.*

[Third indorsement]

SURGEON'S OFFICE, PORT OF EMBARKATION,

Newport News, Va., July 18, 1918.

TO COMMANDING GENERAL, PORT OF EMBARKATION:

1. Returned. Additional men have been provided to guard that portion of the watershed in the neighborhood of Lee Hall, and measures have been instituted through both the United States Public Health Service and the State board of health to immediately provide adequate toilet facilities at Lee Hall station and a modern sewage system for the village.

2. How quickly this can be accomplished is problematical, however. This being the case, it is believed the Camp Eustis authorities should make provision in the way of toilets for their own men to prevent fouling the water supply. The Navy also is concerned, and if practicable it is suggested that an arrangement be made by the Camp Eustis authorities with the Navy people at Yorktown so both commands may provide the toilet facilities needed.

CHARLES LYNCH,

Colonel, M. C., United States Army.

SURGEON'S OFFICE,

GUARD AND FIRE COMPANY, NO. 327, Q. M. C.,

Reservoir, Lee Hall, Va., October 28, 1918.

1. The following rules and regulations governing sanitation and police are recommended by the camp surgeon.

2. The camp will be inspected between 9 a. m. and 9.30 a. m.

3. *General police.*—Company streets and parade ground will be free from litter, papers, match sticks, and cigarette stumps at all times. All packing cases and boxes will be in neat, orderly piles. The interior of barracks buildings will be free from litter at all times. The beds will be in order and equipment disposed of properly. Screens will not be allowed out of windows. Screen doors will be kept closed.

4. *Kitchens.*—The kitchen will be kept clean and in order at all times. Screens will be kept in the windows, and in case the wire has been loosened this defect will be repaired. Screen doors will be kept closed. Kitchen floors will be scrubbed, as well as meat blocks and serving tables. The tops of tables will be scrubbed after each meal, the center boards removed and thoroughly cleaned. Refrigerators will be cleaned and scalded with boiling water daily. They will be kept clean and covered. Particles of bread, meat, and other food must not be scattered around. Areas around the mess hall and kitchen must present a neat and orderly appearance

at all times. All dishes used at mess must be washed and boiled after each meal. Soapy water must not be thrown on the ground.

5. *Latrines*.—These will be clean and properly policed at all times. Paper will not be thrown nor scattered about the building. Soap will be gathered and placed in proper receptacles. Urinals will be cleaned daily, or oftener if necessary. Cigarettes, paper, and other articles will not be thrown in either stools or urinals. Newspaper will not be used for toilet purposes. Shower baths will be kept clean and particles of soap will be kept off the floor.

6. *Corral*.—This will be kept clean and swept daily. Accumulation of manure will not be tolerated. Low places where water accumulates will be filled with dirt. Picket line will be burned over weekly. All hay and grain will be kept in a neat and orderly manner at all times.

7. *Flies*.—A relentless warfare will be waged on this pest at all times. Traps, fly paper, and poison will be used. Poison may be obtained of the surgeon daily.

8. *Canteen*.—This must be kept clean at all times, and free from all litter and refuse. All boxes and crates kept neatly piled in an orderly manner. Area around canteen must be kept clean and oiled daily.

C. B. LIVINGSTON,
First Lieutenant, M. C., Camp Surgeon.

MOSQUITO CONTROL

In the report of the survey of Newport News, made in August, 1917, by representatives of the United States Public Health Service, and which was referred to earlier in this chapter, there are abundant references to the widespread and prolific occurrence of *Anopheles quadrimaculatus*, *Anopheles crucians*, and *Anopheles punctipennis* (in order of abundance), and to the prevalence of malaria. In the midst of these malarial conditions were located Camp Stuart, Camp Hill, and Camp Alexander, and, in spite of the difficult drainage problems, it was possible to report a year later that not a single case of malaria had originated in these camps. The necessity for the antimosquito work which followed as a consequence of the survey referred to is emphasized by the following paragraph from a letter dated November 27, 1917, from the surgeon of the port of embarkation, to the Surgeon General.

I regard the proper drainage of these swamps as the most important sanitary work that we have to do in this vicinity, as, if it is not done properly, troops stopping here while waiting overseas transportation during the mosquito season between July and October will unquestionably become infected with malaria in spite of netting and mosquito bars.

An officer of the Sanitary Corps was assigned to duty October 13, 1917, as assistant to the sanitary inspector, with instructions to make a survey of drainage conditions at the port of embarkation camps. Another officer of the same corps was later assigned temporarily in command of the engineering party making surveys and plans and estimating costs. The survey began about February 1, 1918. A detail of 200 colored troops arrived April 8 and was organized as a malarial drainage detachment (Medical Department), and shortly thereafter the officer in charge of the mosquito-control work was given the supervision of insect control in general. Assistants were placed in charge of the mosquito-control work in two of the outlying sections of the port area in May, 1918.

Twelve white enlisted men, Medical Department, were used as inspectors and noncommissioned officers in the work of the malarial drainage detachment. Forty-seven colored enlisted men, Medical Department, and 50 colored stevedores

were added to the organization, the latter, temporarily, making a maximum of 300. Detachment headquarters was maintained at Camp Stuart. Smaller detachments were stationed at Camp Hill and Camp Morrison, and emergency details at Nansemond ordnance depot (Pig Point), reservoir guard (near Lee Hall), the rifle range, and elsewhere, as needed. The detachments at Camp Stuart, Camp Hill, and Camp Morrison each maintained its own mess and exchange. A spirit of friendly rivalry in work and sports was promoted.

The drainage problem at once becomes obvious in the light of the following extract from a letter dated March 29, 1918, by the surgeon of the port of embarkation to the Surgeon General:

Briefly, the camps constituting this port of embarkation are in swamps or so near that to all intents and purposes, so far as the mosquito menace is concerned, they might as well be swamps. Mosquitos breed by the million in the swamps in question. These mosquitos are of the malaria-carrying variety. Plenty of people in the vicinity suffer from malaria. * * *

The following example will serve to illustrate the difficulties concretely. Newmarket Creek, really only a wooded watercourse draining an area of 700 acres, originated about 6 miles beyond the northern boundary of Camp Alexander and formed a typical fresh-water swamp immediately east of Camp Morrison, Camp Alexander, and Camp Hill, including several miles of swamp both northerly and southeasterly from that point. The natural grade near its upper reaches was about 2.3 feet per mile, reducing rapidly to 12 inches per mile, thus producing a swamp. This meager fall made drainage operations difficult in nearly every part of the lower peninsula.

Camp Hill and Camp Alexander were also affected by Beaver Creek swamp partly tide water and partly fresh water, including about 20 acres between the two camps and draining in a southwesterly direction, with an outlet in the James River. Drainage of this swamp presented no extraordinary difficulty. Camp Stuart comprised nearly 300 acres, of which 25 acres consisted of tidal swamp. Salters Creek swamp was located on the northern and eastern boundaries of the reservation and the Ivy Avenue swamp in the extreme southwestern corner of the reservation. Ivy Avenue swamp presented no difficult control problem, but Salters Creek swamp, in addition to being very low (only 0.5 foot above high tide), received a part of the city sewage and the effluent from a number of private sewers.

In addition to the drainage and mosquito-control work at the camps mentioned, more or less extensive control operations were carried out at the Army supply base near Norfolk, the Nansemond ordnance depot at Pig Point, the rifle range and the Lee Hall Reservoir, and much extra-cantonment work was done in the vicinity of the camps mentioned and in Newport News in cooperation with the United States Public Health Service.

Drainage and grading work within the actual confines of the camps was largely done by contract under the supervision of the construction quartermaster and the Government supervising engineer. This work, while fundamental in the building of a camp, may not affect the mosquito question materially, this portion of the work being, as a rule, merely incidental.

Ditching by the Sanitary Corps began April 15, 1918, at Camp Stuart, a small amount having been done for about a month prior to that date at Camp

Hill by details from colored labor battalions. Salters Creek swamp was systematically ditched so as to concentrate the water, and a 36-inch tide gate was put in place at the point where the channel crossed Chestnut Avenue. The Ivy Street marsh was also properly ditched, the outlet into the James River being left open, thus allowing the tides to flood the ditches. Although a tide gate was planned for this point, it was deemed unnecessary after the ditching was completed, and considerable progress was made in filling the marsh with refuse, incinerated as far as possible, from the camps.

At Camp Hill, the Beaver Creek swamp was channeled, diked, and sumped from Virginia Avenue to its outlet in the James. Aside from small local mosquito-breeding places dependent on the seasonal rains and careless disposition of water containers, Beaver Creek and Newmarket Creek were responsible for practically the entire mosquito population of Camps Hill and Alexander.

Newmarket Swamp, as already explained, presented a problem of considerable proportion owing to its extent and scant grade. As originally planned, a cut-off ditch was begun under contract about October 1, 1918, extending from the eastern end of Beaver Creek to Newmarket Creek in order to divert the upper waters from the latter to the former and thence into the James River. The length of this cut-off (open-ditch canal) to Beaver Creek at Virginia Avenue was about 4,000 feet, with a maximum cut of 16 feet, a minimum of 3 feet at the junction with Newmarket Creek, average width at the top about 18 feet and at the bottom about 3 feet and a grade of 1 foot to 1,000 feet, and representing an excavation of about 20,000 cubic yards.

Very slow progress was made on this ditch, with little prospect of its completion before April 1, 1919. In the meantime, all of the water from Newmarket Creek was being carried through a new canal paralleling the old watercourse and constructed by the Sanitary Corps from the junction of the cut-off canal to the Sconesdam Road, a distance of 4,000 feet. The original survey called for a ditch following the general course of Newmarket Creek through the swamp. This plan was discarded in favor of a ditch paralleling the swamp on comparatively dry ground and tapping the swamp at frequent intervals with laterals. This plan rendered the work much easier and made possible a much better ditch, giving just as good results. This new canal, 4,000 feet in length, with a maximum cut of 7 feet, a minimum of 2 feet, side-sloped 1 to 1, and a width of about 6 feet at the top, represented an excavation of 4,396 cubic yards. The work on this ditch was started September 12, 1918, and completed December 1, 1918. Carried under the Sconesdam Road through a culvert, the water poured into a ditch constructed by the United States Public Health Service and thence through an old canal about $1\frac{1}{2}$ miles in length, 10 feet deep, and 25 feet wide at the top, built, according to old negroes living in the neighborhood, from 50 to 60 years before, apparently as a part of an old drainage project, and then abandoned.

With the completion of work on Newmarket swamp, which included considerable channeling north of the cut-off by the United States Public Health Service, many acres of land on both sides were reclaimed for agricultural purposes, malaria was very materially reduced, and a serious manace to the adjacent camps placed under control.

Camp Morrison, though in the midst of a swamp, rapidly became a well-drained camp, largely due to effective and extensive drainage operations by the camp personnel. The work of the malarial drainage detachment there, though intensive, was against odds, due to the proximity of Newmarket swamp and the malaria-ridden town of Morrison. Soldiers from Camp Morrison not only frequented the village but found rendezvous in and about eating houses for several miles along the Richmond road toward Lee Hall. In spite of these odds, there occurred only 10 malaria infections which were contracted locally.

In April, 1918, a company of the 48th Infantry was stationed about a mile south of the town of Lee Hall to act as a guard for the reservoirs at Lee Hall and at Harwood's Mill. The morbidity rate from malaria among the surrounding civil population was estimated by the United States Public Health Service at well over 90 per cent for the previous season, and *Anopheles quadrimaculatus* was the predominating and abundant species. Control work directed against the mosquitoes consisted of temporary canalization of the portion of the swamp adjacent to the camp on the west. This swamp was formed by the backwaters of the Warwick River, which originates at this point. At the time of the ditching, it was only hoped to concentrate the waters, but the operations so changed the ecological conditions that anopheline breeding was entirely inhibited in that portion of the swamp where the ditching was completed.

Weekly oiling of the pools, water barrels, and other possible mosquito-breeding places in the immediate vicinity failed to eliminate the abundant supply of mosquitoes infesting the camp until it was decided to oil the borders of the cut-off portion of the reservoir located about 400 yards from the camp site. This impounded water had a slight current, due to the fact that its overflow was carried away by a spillway located at the end of the pond nearest the camp. This flow brought down large masses of floatage always infested with larvæ and pupæ. By oiling the borders of the pond, already covered with floatage, the additional masses that floated down were well covered with oil. The treatment of this source caused an immediate decrease in the number of mosquitoes infesting the camp. The United States Public Health Service, although operating in this district, was primarily interested in the protection of Camp Eustis and the town of Lee Hall and was not able to do much work in the vicinity of the guard camp. The nature of the work done by the troops at this camp (guard duty among the civil population and at some distance from points where control work was done) rendered them especially liable to infection. Head nets, repellents for the hands and wrists, mosquito bars, and a biweekly dose of 30 grains of quinine were the additional precautions exercised. In addition, a daily collection of mosquitoes was made in tents and barracks throughout the camp. The tabulation of these captures is noteworthy, since the records were begun at the time when mosquitoes were normally the most abundant in that section.

Date	Number of anophelines taken	Average per screened shelter
1918		
Aug. 27 to Sept. 2.....	745	4.1
Sept. 2 to 9.....	245	1.4
Sept. 11 to 16.....	60	.25

Despite these precautions, 25 cases originated among troops stationed at this camp during the nine months from April to December, 1918. These cases were more than half the total incidence of malaria in the port. A comparison of this morbidity rate of 5.3 per cent among these troops as compared with the high rate among the civilian residents (certainly over 90 per cent and actually 100 per cent in 1917 for eight families living within a few yards of the camp) throws a more favorable light on the results of the mosquito-control efforts at that station. That cases occurred at all was due to the inability to enforce rigidly the wearing of head nets and the use of repellents. Numerous social entertainments were given for the men in the neighborhood, baseball games often continued through the dangerous period of dusk, and men on guard, unless constantly watched, were likely to become lax, particularly when the mosquitoes were not extremely abundant. The quinine treatment in many cases masked a latent infection which manifested itself when the drug was discontinued through the man's transfer to another station or to the hospital for treatment of some disease other than malaria.

Nansemond ordnance depot, located at Pig Point, opposite Newport News, on the James River, was seriously menaced by mosquito-producing swamps of both salt and fresh water. Except for guards of the 48th Infantry and, later, guard and fire companies, very few soldiers were stationed at this depot during the building operations, which were carried on by civilian contractors. For this reason, no extensive draining operations were undertaken and routine inspection and oiling for mosquitoes was in the hands of the sanitary engineer stationed at the Army supply base near Norfolk. Inspections made August 3, 1918, showed an abundance of *Anopheles quadrimaculatus* in the civilian barracks and tents. Immediate arrangements were made to attack this problem. An officer and a detail of 28 men from the malarial drainage detachment began work on this project about August 10. An intensive campaign, which included an extensive ditching program, embracing a large amount of extra-cantonment work, oiling, protection with head nets, bamber oil, collection of mosquitoes in tents and barracks, and quinine prophylaxis for both soldiers and civilian laborers, was instituted over a period of four weeks. The result was most gratifying in that but 4 cases of malaria developed during late August and 5 in early September in a military population numbering 725. Thirty cases occurred in 1,500 civilian employees not under military control.

The Army supply base near Norfolk embraced a large acreage of swamp, much of which was permanently eliminated by the use of hydraulic dredges. Necessary mosquito-control work, consisting of some ditching, the installation of two automatic drainage gates, and the systematic oiling of sundry pools, was carried on by the camp sanitary engineer with the aid of a small detail of enlisted men. All extra-cantonment work was carried on by the United States Public Health Service. Although a few anophelines (*A. quadrimaculatus*) were found at the base hospital, no cases of malaria originated at this camp and there was little complaint about mosquitoes in general.

The city of Newport News presented numerous drainage problems affecting the many military organizations located within its limits. The city was inadequately sewered and the existing storm sewers presented clogged catch basins

much of the time during the summer. Gutters and ditches in many parts of the city, originally designed to carry away water, became stagnant pools swarming with mosquito larvæ. Little or no attempt was made by the city authorities to correct these conditions, so the United States Public Health Service concentrated its efforts on the destruction and prevention of anophelines. At times during the summer, mosquitoes became abundant enough to be the cause of numerous complaints, and anopheline adults were taken in the heart of the city at frequent intervals. As a matter of protection to the military population, the malarial drainage detachment was instructed to carry out control measures in various parts of the city during August and September, 1918. This work included the maintenance, regrading, and cleaning of a mile and a quarter of ditches (6,920 feet), construction of a few new ditches (total 500 feet), and the application of 450 gallons of oil to mosquito-breeding pools.

Inspection for mosquitoes was divided into two phases: The inspection of all possible breeding places with the collection of samples for laboratory breeding; the collection of adult mosquitoes in and about the quarters and buildings as a prophylactic measure and for laboratory purposes. This work was done by both white and colored enlisted men who had been trained by their officers in this special line of work. Inspections were made at least weekly of each subdivision of the territory covered by the particular detachment. The presence of larvæ was reported to the detachment commander daily and oiling by a special detail formed for this purpose followed. The oiling was immediately followed by another inspection.

The cost of inspection and oiling totaled 28 per cent of the entire cost of the work done by the malarial drainage detachment. The oil used was a half-and-half combination of Mexican crude oil and kerosene. Three hundred and ninety-nine barrels were sprayed during the season, the cost of spraying per barrel being \$14.37. This apparently excessive cost of application was due to the intensive character of the spraying and the long hauls necessary to carry out some of the work. There was very little opportunity or necessity for spraying large areas in which the pumps would be emptied quickly and the cost of application per barrel decidedly reduced. The oil was delivered to the detachment camps by tank trucks and stored in open-top barrels until used. Knapsack spray pumps were used for the work. The first oiling for the season was done during the week ending November 2, 1917. Applications during the height of the season were made about once every 10 days. However, considerable variation in time intervals was necessary, depending on the weather conditions; for example, oiling was repeated several times at intervals of five or six days when the weather was excessively hot, dry and windy, and, during cooler weather, two weeks might elapse between oilings. Careful inspections and a good knowledge of mosquitoes proved essential to the proper conduct of this work.

Each detachment was assigned a given area, for which it was responsible. These areas were in turn subdivided into plots to which letters were given in order to facilitate the giving of directions and the tabulation of collections. Each detachment made a weekly report of the mosquitoes, both larval and adult, that were taken during the week, designating the subdivision in which

they were taken. In this way, the port surgeon's office was able to exercise a fairly accurate check on the effectiveness of the control measures under way. A large blue-print spot map in the port surgeon's office, showing by appropriate map tacks the occurrence of the different anopheline species, the occurrence of cases of malaria, and the location of ditching and oiling operations, was kept up to date. Weekly reports were submitted to the port surgeon covering the activities of the detachments for the previous week, such as the number of feet of ditch built or maintained, barrels of oil sprayed, and acres of brush cleared. These records were consolidated from time to time and curves were prepared to show the relation of the work to the set program. Special problems were covered by extra reports accompanied by maps and drawings.

SPECIES OF ANOPHELINES

Three species of anophelines were found in the tide water region: *A. quadrimaculatus*, *A. crucians* and *A. punctipennis*, in order of their abundance. Their local distribution seemed to depend entirely on a given set of ecological factors, *A. crucians* occurring in the neighborhood of slightly brackish water and *A. quadrimaculatus* in the so-called typical anopheline breeding places, such as wayside pools, neglected ditches, and the borders of impounded water, while *A. punctipennis* was found in wooded areas.

With these factors in view, it is noteworthy that collections at Camp Stuart showed *A. crucians* almost exclusively; Camp Hill and Camp Alexander, *A. crucians* and *A. quadrimaculatus*; Nansmond ordnance depot, Pig Point, *A. quadrimaculatus* greatly predominating, and *A. crucians*, while at Camp Morrison, which was farther removed from the tide water and in the midst of a wooded area, *A. quadrimaculatus* existed to the extent of 50 per cent for all collections and *A. crucians* and *A. punctipennis* in about equal proportions. At Lee Hall, when the nearby wooded marsh was controlled, *A. punctipennis* practically disappeared and *A. quadrimaculatus*, breeding in the nearby impounded water of the reservoir, became the dominant species.

The first anopheline larvæ for the season of 1918 were seen May 11, 1918, at Camp Stuart, and were all very young. These were discovered, together with culicine larvæ, in water barrels piled near a warehouse. Mosquito collections made at this time embraced only culicine species, larvæ and pupæ of these being encountered in abundance during the last week of April, 1918. Anopheline adults began appearing in the collections about May 15, 1918, when *A. crucians* began to be taken under the wards at the embarkation hospital, where they appeared in increasing numbers for about two weeks. It is believed they originated in a portion of Salters Creek marsh 300 or 400 yards distant. Great numbers of anopheline larvæ were found in this marsh, and this species (*crucians*) was hatched out. The number of anophelines in the collections became very low, with the correction of this location by ditching and oiling during June, 1918, ranging from 140 at the beginning of the month to zero during the first week in July. Weekly collections for this area thereafter included anopheles (all *crucians*) as follows: 8, 1, 11, 2, 1, 3, 3, 2, 5, 5, which indicates in a very fair manner the degree of control exercised in the vicinity of the embarkation hospital. While *A. crucians* and *A. punctipennis* were

the first to appear and persisted in greater or less numbers during the entire summer in a given locality, *A. quadrimaculatus*, appearing somewhat later, rapidly became the dominant species for the region.

Anopheline larvæ, ranging in size from very small to practically full grown, were seen in large numbers in impounded waters in Newmarket swamp as late as the second week in November, 1918. About 50 of these in various sizes were transplanted to a pool that was screened and observations were made to determine their fate. These larvæ grew slowly, and, favored by occasional warm periods, the older ones pupated one by one, and the imagoes emerged. An examination made on December 26 showed one full-sized larva remaining on the surface, but careful search in the mud therein where it was thought hibernation might possibly take place until spring, when further development would be continued, failed to reveal a single hidden larva.

OCCURRENCE OF MALARIA

One hundred and forty-four cases of malaria were treated at the embarkation hospital, to which all cases and suspects were sent during the malarial season of 1918, the first case reporting April 8, 1918, and the last December 12, 1918. This is a fairly accurate statement of all the cases actually occurring, as all suspects were hospitalized at once, and cases were diagnosed only on the basis of a positive blood smear.

Complete histories of the cases were made whenever possible, and in every instance data were secured in an adequate amount to determine whether the case was of local origin or was imported. A tabulation of this information showed that 44 cases were contracted within the zone of this port, while 100 were contracted elsewhere, although treated at the embarkation hospital. In this connection, a rather striking point is that no cases originated at the large camps—Stuart, Hill, and Alexander—where the great majority of the troops were quartered. All cases of local origin became infected at the outlying camps at Morrison, Lee Hall, and Pig Point, where the extra-cantonment conditions were so extensive that perfect mosquito control was not possible of accomplishment by the Army authorities.

Accurate histories of 60 per cent of the imported cases showed that 40 per cent of the infections were contracted at home before entering the service, while Camp Johnston, Fla., and Camp Eustis, Va., contributed 20 per cent and 13.3 per cent, respectively, the remainder being scattered. The infections were all of the tertian variety, except three cases of æstivo-autumnal (all imported), one of which, the only fatal case, was a mixed infection of tertian and æstivo-autumnal.

A more direct comparison of the degree of protection afforded men at the port of embarkation is found in a consideration of the local morbidity rate of 0.28 per 1,000 and the admission rate from malaria for troops in the United States for 1917 of 7.46 per 1,000, and the incidence of malaria in the Southern Department for 1917 of 6.8 per 1,000. The comparison of these figures, although relatively accurate, should be tempered by a consideration of the difficulties of determining a mean strength at the port of embarkation. This was particularly difficult owing to the constant flow of men through the port which rendered

the final results not strictly comparable with fixed stations or populations. The question may be raised as to whether men quartered here for a few days did not become infected and manifest symptoms only after they had embarked for overseas. It seems fairly safe to assume that this was not the case, for practically all the troops for overseas were quartered at Camp Stuart, Camp Hill, and Camp Alexander before embarkation, at which camps none of the troops permanently stationed became infected; furthermore, no reports of malarial admissions of overseas troops were received at this office from transports.

CONTROL OF FLIES

Flies were noticeably abundant in the vicinity of the port by May 1, 1918, and, for the week ending May 25, it was reported that the restaurants of Newport News were seriously infested with them and they were numerous in all the camps. To understand the difficulties which had to be met in the matter of fly control the following facts are cited: Camp Stuart was well within the range of flies originating in the city, and the latter was no doubt affected by flies bred in corrals occupied by horses awaiting overseas shipment; however, the principal animal embarkation depot was located rather too far (about a mile and a half) from the business section of the city to have played an important rôle in this connection, particularly with Camp Hill between. The British corrals were quite close enough, in part, to have been of some consequence, though the number of horses was not large (about 1,800 in early June) and the nearest corrals were fairly well kept. On the other hand, within a distance of a half mile from Camp Stuart in the vicinity of Boat Harbor, the city of Newport News maintained a series of garbage dumps comprising an area of about 5 acres. The dump in the vicinity of the gas tanks extended for the distance of about one long city block on both sides of the street, nearly blocking the same at several points. Besides receiving quantities of dead fish and all manner of perishable garbage, this dump received all the night soil from city privies, estimated by the United States Public Health Service to be 900 in number. Jefferson Avenue, near Boat Harbor, one-fourth mile from Camp Stuart, was strewn with garbage to the car track in the middle of the street, and the stench was indescribable. Flies fairly swarmed over all and maggots beyond number pervaded the mass. Numerous pig pens, mostly just outside the corporate limits of the city, but easily within a half mile of Camp Stuart, added to the fly-breeding menace. Over 50 pens were counted within a distance of about two city blocks at the north end of Wickham Avenue, in addition to a group on Salters Creek opposite the embarkation hospital. These pens were in an indescribably filthy condition and literally alive with flies and maggots, as were many of the slop barrels. The matter of correcting the serious condition of the dump fell to the Army, owing to the scarcity of civilian labor and partly because a portion of the refuse from Army camps was added.

The tremendous problem of manure disposition can be partly conceived when it is known that the animal embarkation depot had in its corrals alone a daily average of 7,000 horses and mules, which produced approximately 1,000 tons of manure a month. There were hundreds of horses and mules in corrals at the various camps in addition to those passing through the animal embarkation depot.

The problem where 7,000 to 10,000 horses and mules were congregated was not a simple one, even under the most favorable climatic conditions for fly control. It was much more complicated to handle a situation of this magnitude in a moist, warm climate with limited railroad service to haul manure, no large open areas (except swamps) on which to spread, dry, and burn the same, and with a very limited agricultural demand. Owing to these limitations, it was found necessary to begin dumping the manure in a shallow swamp in the immediate vicinity of the animal embarkation depot corrals. This, of course, served to fill the swamp but resulted in breeding numerous flies in the superficial layer, although the manure became more and more compact, due to pressure from the dump carts and horses' feet. The exposed sides of the manure fill made during the winter and spring, while of small consequence in breeding houseflies because of old manure, became literally packed with larvæ of the biting fly (*Stomoxys calcitrans*), which became very troublesome to the animals during the latter part of May and early June, 1918.

The manure was hauled direct from the corrals to the cars on a spur track at the animal embarkation depot when cars were available; however, the slowness with which these cars were finally moved is shown in the fact that during the period from August 23 to 31, 1918, inclusive, there were 46 carloads on the sidetrack (practically in the heart of Newport News) with an average of over three days retention each, and 8 remained for the entire period of nine days.

Much of the camp refuse was incinerated. Perishable garbage was collected on contract by civilians. In order to assist in filling at the dumps, as much as 50 loads of refuse daily (perishable matter not permitted) were added, under supervision, to the city garbage for a time. This was discontinued in July and thereafter used for filling purposes at Ivy swamp in Camp Stuart. The dump was kept in good condition by constant supervision, burning over, and grading.

Work on the city dumps was started by the Army with 50 colored stevedores May 15, 1918, several barrels of crude oil having been applied to the night soil and the worst fly-breeding portions, and burned over on May 11 and 12. As soon as work on the dumps was begun, an order was issued directing that all garbage be dumped in one or the other (alternating) of two large swamp holes near Boat Harbor, on Jefferson Avenue. Between four and five weeks of continuous labor were spent in getting the dumps in order, clearing the streets, leveling and burning refuse. A system of night soil disposal was instituted through the efforts of the United States Public Health Service, and the method of surface disposal at the city dump was permanently discontinued during the week ending May 18, 1918, thus eliminating a very dangerous practice. It is a matter worthy of note that of 1,295 privies reported for Newport News in January, 1919, 1,278 were of the sanitary bucket type installed under the direction of the United States Public Health Service.

A marked decrease in the number of flies, both house flies and biting flies, followed in a little more than a week after the thorough spraying of the manure with crude oil, which was applied with spray pumps as for mosquito control. Myriad dead larvæ were seen in the thin coating of oil. Just why so many of these larvæ came to the surface in this manner is a matter of interest, since it is contact with oil which destroys them.

A matter of some interest to sanitary officers is that septic tanks may be the source of numerous flies of several species, mainly house flies. This was brought to the attention of the sanitary inspector by an invasion by flies of a ward in the immediate vicinity of a septic tank. Careful inspection in the vicinity failed to reveal the source until an inspection of the tank showed two or three 6 or 7 inch circular openings which had been left by workmen in making recent changes. Numerous flies were coming and going through these apertures, and examination of the sludge mat revealed numerous maggots, with pupæ on top where there was little moisture. Oiling the contents (in spots only, as a matter of precaution) and closing the apertures ended the trouble. Inspection of other tanks showed similar conditions where battens were omitted over crevices between boards used in building the superstructure.

The usual methods were employed for the destruction of adult flies, covered by the following extract from General Orders, No. 144, headquarters port of embarkation, Newport News, Va., dated May 31, 1918:

(a) *Fly papers*.—The "sticky fly paper" is best. It is to be used liberally wherever needed.

Fly-paper boards have been found serviceable. They are made as follows: Boards 10 to 14 inches are used. Along one of the 14-inch edges is nailed a strip of 2-inch light board, so that it extends for a short distance on either side. Viewed from the end, the large board and the strip make an inverted letter T.

One-half inch from the upper edge of the board, near each end, there is bored a hole. Sheets of sticky fly paper are tacked on both sides of the board, which is suspended from the ceiling or rafters by means of strings passed through the holes. The strip along the lower edge catches any drip which there may be from the fly paper.

Fly-paper boards prepared in this way are convenient. They are not in the way of cooks and do not litter up the mess tables. Inasmuch as flies have a tendency to alight, particularly in the later hours of the day, in the upper part of rooms and on ceilings, the boards, which are suspended, afford a lighting place to which the flies are attracted.

(b) *Fly poisons*.—There are many kinds of fly poison in use. The kind which has been used with most success in camps has been a mixture of formalin with milk and water.

Formalin.....	pint..	1
Canned milk.....	can..	1
Sugar.....	pound..	1
Water (1 bucket).....	gallons..	3

It is used as follows: A thin slice of bread is placed on a plate. Over it is poured a cupful of the fly-poison mixture, about a half pint. There should be enough to saturate the bread and leave some of the liquid about it in the plate. The plate is then placed where there are the most flies. Cheap tin plates are used, and plenty of them.

As the formalin evaporates in the course of a few hours, the plates must be freshly baited two or three times daily. Flies which drink this mixture are killed in the course of a few minutes. The dead flies may not be seen in the plates or on the bait, but will be found scattered about on the ground. The poison is very effective.

(c) *Flytraps*.—Each company or equivalent organization should be supplied with three large flytraps. Two of these should be kept at the kitchen and mess hall, one of these outside near the entrance, the other in the mess hall. The third one at the latrine or other place where flies are attracted.

Flytraps, to be of use, must be kept baited and must be placed where flies come. They can not be neglected or set aside in some place out of the way and be expected to catch flies. Cooks and others in charge must be required to pay suitable attention to the care of flytraps.

Bait for flytraps commonly used is a mixture of sugar, vinegar, and water. An excellent fly bait may be made by mixing bran, mashed boiled potatoes, sugar, yeast, and water. This is mixed to the consistency of a thin mush and allowed to ferment for 24 hours.

Swatting the fly is even more necessary in camp than elsewhere. Swatters may be made from small waste pieces of fly screening, the handles being made out of laths and the like. By their use the mess halls and kitchens are cleared of flies which get in through the doors.

CONTROL OF BEDBUGS, COCKROACHES, AND FLEAS

Control measures were instituted, from time to time, against bedbugs, cockroaches, and fleas, which were not generally prevalent. Bedbugs were destroyed in one of three ways: First, by sulphur fumigation, using 4 pounds of sulphur per 1,000 cubic feet. This was done in one instance only in which a large brick house was to be used as a detention home and was reported to be infested with bedbugs. Second, quarters infested with bedbugs were liberally treated with kerosene. Third, at Debarkation Hospital No. 51, formerly used as a soldiers' home and badly infested with bedbugs, the iron beds were flamed with a plumber's torch, the bedding steam sterilized, and wall crevices washed with a solution of bichloride of mercury, 1 to 500. The control of cockroaches was largely accomplished by the use of sodium fluoride diluted one-half with gypsum or flour and dusted in places frequented by the insects. An infestation of fleas at the local railroad depot was controlled by mopping floors and baseboards with kerosene.

CONTROL OF LICE

In anticipation of the danger of the spread of disease by lice, steps were taken early in the occupation of the port for their detection and destruction. Early in 1918, one 30 by 42 by 60 inch sterilizer was received and installed at the embarkation hospital, and on April 20, 1918, the Surgeon General wrote the surgeon as follows:

It is desired that you submit as promptly as practicable such detailed recommendations as you may be able to make regarding the establishment at your port of sufficient delousing plants to provide for the needs of outgoing troops. Recommendations are also desired as to the steps needful to provide for the disinfection of such ships as are under the control of the War Department. Information is desired as to the facilities you now have available for either of these purposes. Early action is requested.

The desired information was immediately sent forward, and on May 17, 1918, after considerable correspondence and several telephonic conversations on the subject, the following letter was written by the port surgeon to the Surgeon General:

1. Regarding your communication of April 20 on the subject of delousing plants, and the several telephonic conversations we have held on this subject since that time, I feel a preliminary report can now be made.

2. You explained to me over the telephone this morning that your office did not desire at the present time to go into the subject of an elaborate plant, but proposed to provide facilities at the various camps so that men might come to the port of embarkation free from lice. This, of course, would much reduce what we would have to do here, though with the pressure for space during the coming summer it is very probable that this port will be used for a mobilization point as has been the case in the past. However, so far as this is concerned, we can meet the situation fairly well if the two steam sterilizers, which I understood from you had been shipped, are provided.

3. I am not wholly in agreement with a point which I understood you to make over the telephone. It was very difficult to hear this morning, and I may not have heard you right. It is my understanding that picking out men, who are actually lousy, never proves a success. Medical Director Pleadwell of the Navy told me that this was his experience in Europe and is equally so on the Mexican border. Therefore, if a lousy man is found in any organization, it will, in my opinion, be necessary to delouse all men of that organization, with their clothing. We can, in my opinion, do this here with the steam sterilizers mentioned above.

4. So far as the disinfection of ships is concerned, nearly all of these ships are now run by the Navy. We have only a few cargo ships and horse boats. I think, therefore, that all this work should properly be done by the Navy. It would hardly be worth while to duplicate the necessary plant. In return, it might be arranged that we provide for the disinfection of the crews and their bedding, clothing, etc. Possibly we could do this without any addition to our equipment.

5. You now know the facilities we have here for delousing troops, and also that we have no equipment for the ships. From what I have said, it should not be understood that we are not active in the matter of delousing, so far as this can be done with the inadequate supply of steam sterilizers. Careful instructions have been issued on this subject, and are being carried out.

6. One other point—the expert from the American Sterilizer Co. reported yesterday, and our portable sterilizers, and also the one in the laundry, are now in good working condition. They will be useful for the embarkation hospital, but can hardly be made of use for troops except to a limited extent.

7. We have done a great deal of work on the preparation of plans for an elaborate delousing plant, as I explained to you over the telephone. This work will be completed so that you may have it, even though you have no use for it at the present time.

The reply to this letter, from the Surgeon General, is as follows:

MAY 22, 1918.

From: The Surgeon General.

To: The surgeon, port of embarkation, Newport News.

Subject: Delousing plant.

1. Referring to your letter of May 17 on the above subject, you are right in assuming that you misunderstood me in our conversation over the telephone in regard to the inadequacy of picking out the individual man who is lousy and delousing him without giving the necessary attention to the rest of the company. What I intended you should understand was this—that it is not the intention to require general delousing of all commands at ports of embarkation; that delousing plants would be established in all camps and cantonments and that troops were supposed to come to ports of embarkation clean.

I have sent you advance copy of regulations which this office has recommended to The Adjutant General of the Army for publication to the Army on this subject. You will note that daily examinations will be required of all commands under orders for overseas service prior to their departure from camp. This daily examination will be continued while awaiting transportation at ports of embarkation, and also while en route overseas. If this procedure is carried out, it is believed that ship disinfection will be unnecessary. This latter question, however, is now up for consideration and will not be finally settled until the return from Europe of certain expert observers who are about making a round trip on transports to observe and report conditions in relation to louse infection aboard ship.

2. Capt. Harry Plotz, M. R. C., who has had a great deal of experience in delousing, has been relieved from station at one of our southern camps and ordered to this office for a conference. His report, with blue-print plan of a simple delousing plant, was sent you a few days ago. It is the intention to send Captain Plotz to Newport News to advise and assist you in carrying out your plans for delousing troops. When you have no further need for his services, if you will telephone this office (Colonel Howard), Captain Plotz will be relieved and then sent to Hoboken for similar duty.

3. The supply division informs me that two portable sterilizers have been shipped to you under priority orders. They should be available shortly.

By direction of the Surgeon General:

D. C. HOWARD, Colonel, Medical Corps.

Meanwhile, the following circular letters were promulgated by the port surgeon:

Circular Letter No. 23.

OFFICE OF THE SURGEON, PORT OF EMBARKATION,
Newport News, Va., April 21, 1918.

To all Medical Officers:

1. It is reported that lice are being carried by troops overseas. The destruction of lice in this port is a most important matter, to which all medical officers will give their careful attention.

2. The following methods have been found efficacious:

(a) To kill both adults and ova, hot ironing of the seams of clothing.

(b) To kill the adults forthwith, smear all the interior seams of clothing with grease, which will asphyxiate the young as they hatch from the ova. It is obvious that by this means cure will only be complete when the last batch of eggs is hatched, which may not occur for six weeks. Meanwhile, however, comfort is assured, and the laying of eggs is prevented.

The adults are best killed by powders, of which the following have been proved effective, in conjunction with grease on the seams of clothing, in the following order:

(1) N. C. I. powder consisting of 2 per cent each of iodoform and creosote, with 96 per cent of naphthaline. One ounce per man should be dusted on the interior of all clothing once a week. It is most effectual if the men dust their clothes freely and roll themselves and their clothing tightly in blankets for the night. Few, if any, lice will be found alive on the following morning.

(2) Zinc oxide and French chalk (magnesium silicate), 25 per cent of each, with 50 per cent of ammoniated mercury.

(3) Keating's powder (pyrethrum).

For asphyxiating the young as they hatch the most suitable grease is a jelly of crude mineral oil 9 parts, soft soap 5 parts, and water 1 part. This compound is known as "vermijelli." One ounce per man smeared once a week on all interior seams of the clothing has been found effective in conjunction with the above dusting powders.

3. When troops are found to be infested with lice, immediate report will be made to this office.

By direction of the Surgeon:

A. J. COLCORD, *Captain, M. R. C.*

Circular Letter No. 27.

OFFICE OF THE SURGEON, PORT OF EMBARKATION,
Newport News, Va., May 3, 1918.

From: The surgeon, port of embarkation.

To: The transport surgeons.

Subject: Procedure for the destruction of lice.

1. Recent reports show that lice are being carried by troops overseas. Medical officers in charge of troops will give strict attention to the destruction of vermin and will report infested men to their commanding officers, who will direct that the man and his quarters be freed of the infestation without delay.

2. One of the following methods may be followed:

(a) One ounce of naphthaline powder should be dusted on the interior of all clothing once a week. This is most effectual if men dust their clothes freely and roll themselves and their clothing tightly in blankets for the night.

(b) The man is stripped and while he is taking a full lather bath, his clothes are treated with gasoline. This is best done by applying the gasoline to his clothes with a sponge or old cloth. Each garment and blanket should be gone over in this manner, using from a pint to a quart of gasoline. Clothes and blankets so treated should be immediately rolled into a tight bundle and left for 30 minutes. They can then be shaken out in the open and returned to the man. Precautions should be taken against fire or explosion.

(c) Neither of these methods destroys the eggs—nits—but only the adults, so it is necessary to repeat either method in about a week in order to destroy the young lice after they are hatched.

(d) Quarters may be treated with kerosene.

CHARLES LYNCH,
Colonel, Medical Corps.

Plans for an adequate delousing station were prepared and submitted during the week ending May 11, 1918, and revised plans were further submitted to the office of the Surgeon General by the surgeon of the port of embarkation, with explanations of same, about June 12, 1918. These plans were not adopted, however, and it was not until October 28, 1918, that the construction of delousing plants (one for Camp Stuart and one for Camp Hill) was approved. Construction of the plant at Camp Stuart was begun shortly thereafter and was completed March 11, 1919. Approval for the Camp Hill plant was finally withdrawn by the War Department and directions were given to improvise for the purpose an existing building. This was done and equipment was installed as for Camp Stuart, the plant being ready for use on April 1, 1919. In the meantime, while negotiations relative to the erection of permanent delousing stations were in progress, the emergency had to be met and delousing was accomplished in other ways. Delousing on a much larger scale was begun with the installation of portable steam sterilizers at certain latrines with showers, one at Camp Stuart, June 24, 1918, and one at Camp Alexander, June 21, 1918. Prior to this time, cases of louse infestation found by the preembarkation physical inspectors were sent either to the embarkation hospital or the camp infirmary for treatment.

PREEMBARKATION DELOUSING

In order to determine the degree of lousiness of troops arriving at this port from mobilization camps, examinations were made in cooperation with an officer detailed by the Surgeon General for that purpose. Each man was carefully examined, as well as his clothing, with the following results:

	Number examined	Organization	Pediculus vesti- menti	Pediculus capitis	Pediculus pubis	Per cent
White.....	1,000	Infantry.....	4	0	2	0.6
Colored.....	310	Labor battalion.....	3	3	124	42

Directions were then given for delousing all colored troops before embarking, which was done as follows: All reported by organization at a designated latrine (and bathhouse) adjacent to which stood the sterilizer; each man had his hair clipped, took a thorough bath with warm water and soap, and finally rubbed himself all over with kerosene; his clothing was sterilized during this time and was turned over to him when he was ready to leave. All were examined before embarking by the preembarkation physical inspectors to determine their freedom from lice. General delousing was not practiced in the case of white troops, only those receiving treatment who were found to be lousy by the preembarkation inspectors. This inspection required freedom from nits as well as lice, the presence of even one nit disqualifying a soldier from embarking with his organization until deloused. This was done by the camp surgeon concerned.

The time element made control measures especially difficult, as all the accepted insecticides required considerable time and continued application to insure successful results. In a majority of cases that came to the camp surgeon for delousing, it was necessary to return them to their organizations ready for

reexamination or embarkation within 24 hours. This debarred any form of treatment except shaving the body, a hot-water shower, and an application of kerosene. This process was slow and painstaking. The system worked out consisted in the report of infested men at a designated latrine with soap, towels, and safety razors. The men shaved themselves to the extent possible, the process being completed by Medical Department men. Five of these were able to shave satisfactorily from 15 to 20 men in an hour. A medical or sanitary officer was always on duty when the process was under way to inspect the men as they were finished. In the case of head lice, the hair was clipped close and kerosene applied to the scalp. The clipped hair was burned.

The following data, taken from reports of the preembarkation inspector, give additional information as to the degree of lousiness in troops, bearing in mind, however, the fact that the colored troops had been deloused before this inspection and that the white troops had not.

Date reported	Color	Number examined	Number infested	Kind	Per cent
Aug. 29, 1918	White	4,869	8	Pubic	0.16
Sept. 29, 1918	do	1,879	26	do	1.3
Do	Colored	1,344	2	do	.14
Oct. 20, 1918	do	1,910	46	do	2.4
Do	White	4,827	89	do	1.8
Nov. 11, 1918	Colored	1,237	3	do	.24

Comparing the above table with that previously given, it is seen that the average percentage of lousiness among white troops remained low; i. e., for 11,575 men there were 123 cases, or 1.06 per cent, as compared with 0.6 per cent in the former table. In the case of colored troops, who invariably came with a high percentage of louse infestation (42 per cent in one group examined), there was a very marked reduction indicated in the latter table; i. e., in 4,491 men there were 51 cases, or 1.1 per cent. This low percentage at preembarkation inspection must be attributed to the effects of the primary delousing treatment. The remaining cases were given a final treatment and were entirely freed from lice before embarking.

DEBARKATION DELOUSING

The delousing of troops returning from overseas was supplementary to that carried out prior to embarkation abroad, and on transports en route.

Patients.—All patients returning from overseas were examined for lice and bathed, and their clothing was sterilized at the hospital sterilizers or at the camp delousing stations. All patients debarking at the port were taken to either Debarkation Hospital No. 51 (Hampton) or the embarkation hospital (Camp Stuart) or Debarkation Hospital No. 52 (Richmond), where they were examined and deloused. While there was considerable variation in the percentage of lousiness in the various shipments, the average for December, 1918, for example, was about 10 per cent for a total of 5,896 patients received. For the first 10 days of January, 1919, 5,214 patients were received and 12 per cent were lousy, while for the week following, of 432, only 6.3 per cent were lousy.

Troops.—In the absence of permanent delousing stations as explained above, 7 temporary delousing stations were improvised at latrines—4 at Camp Stuart and 3 at Camp Hill. At Camp Stuart, where the latrines were double, a 30-foot extension of the roof was built to shelter the portable sterilizers and thus permit operation during inclement weather, a door being put into this end to provide direct communication with the latrine. At Camp Hill, where the latrines were single, opposite, and close together, a roof extension was built connecting two of these, thus affording proper shelter, and a convenient passageway was provided by new end doors.

The portable sterilizers were used in pairs, one for blankets and underwear and the other for clothing, and were of standard size. Operating the sterilizers in pairs made it possible to handle the blankets and clothing of about 35 men per load and a load every 30 to 35 minutes. Thus the seven stations could handle approximately 5,000 men daily. With lighting facilities provided, work proceeded at night when necessary, greatly increasing the capacity. These stations were put in operation December 16, 1918. Each station was in charge of a commissioned officer with five or six enlisted men as assistants.

Civilian employees.—Male civilian Government employees were handled in the ordinary manner, while females (nurses and others) were cared for under the supervision of the chief nurse, embarkation hospital, Camp Stuart.

METHOD EMPLOYED

Upon the arrival of a transport, the troop movement officer notified the port surgeon, who notified the camp surgeon concerned, giving the number of men and the time of arrival at camp. Having been assigned to quarters, the commanding officers of the returning units were ordered to report to the camp surgeon for instructions. The latter informed them where their men were to report and the manner of handling the men during the process.

The troops, after being instructed, reported at the designated latrines with their blankets and extra clothes tied in a bundle, to which one of their identification tags was attached. They then passed into the latrine (25 to 30 in each), undressed, placed uniforms over clothes hangers as carefully as possible, and attached to this their second identification tag. These clothes were carried from the latrine by a detail and placed in the sterilizer. Their property was sterilized while the men were bathing, and was finally returned to them. Another group in the meantime, had entered the other latrines of the station and their property was started as soon as the others' was taken from the machines. The bath included a thorough soap lather from head to foot and, in the case of pubic and head lice, special treatment was prescribed. The sterilization of clothing and blankets was carried out as follows: After loading and closing the door, a vacuum of about 15 inches was produced, followed by steam sterilization at 15 to 20 pounds for about five minutes. A vacuum was then again produced. The preliminary vacuum was absolutely essential in the destruction of lice, and the terminal vacuum rendered the clothing dry on coming in contact with the air after being unloaded.

When the delousing was completed, the commanding officer of the organization signed a certificate that his entire command, stating number of officers

and men, had been deloused. This was executed in duplicate, one copy was retained by the camp surgeon and one was forwarded to the port surgeon. The estimated average percentage of louse infestation of all kinds for all troops, numbering 3,704, returning between December 16 and 21, 1918, inclusive, was placed at 1 per cent, while for the period January 1 to 11, 1919, inclusive, covering 22,702, it was found to be slightly less than 0.5 per cent. However, here again, we find some variation, depending on organizations; for example, the week ending January 18 showed 12.2 per cent lousiness for 4,009 men, due largely to the fact that one organization alone, consisting of 738 men, showed a louse infestation aggregating 44 per cent. The percentage for all troops arriving in February was 1.19 per cent, and for March, 1.04 per cent.

MORBIDITY AND MORTALITY DATA

The collection of the morbidity and mortality data for a constantly shifting population is an exceedingly difficult matter, even though that population be under military administration. In a port of embarkation where all operations are carried on at top speed, where the bulk of the personnel is busily engaged in outfitting for overseas service, where men are being inspected and otherwise prepared for embarkation, the difficulties surrounding the acquisition of reliable statistics are increased manifold. The confusion and attendant difficulties are still further increased if large building operations are taking place coincidentally with the disorder which results from the detrainment, embarkation, and debarkation of troops. This explanation is made to account for an occasional hiatus in the statistics which follow. These statistics mainly cover the period from the beginning of the port to January 1, 1919. It will be noted that the data for the period prior to April 1, 1918, are incomplete. A careful search of the files failed to discover the material with which to bridge this gap.

Since all mortality and morbidity rates are of necessity dependent upon the strength of the command, it will be necessary to preface the statistical data of this report by a consideration of this intricate and puzzling question. There was a considerable daily fluctuation in the strength of the port, owing to the importation and exportation of troops. This produced the paradox that the greater the number of troops passing through the port, the less was the average strength. In other words, the strength of the port was determined by the relation between the rates of inflow and outflow of troops. Since the number of troops passing through the port influenced the number of cases and deaths, especially from communicable diseases, a further distortion of the rates occurred, for as the average strength falls the factor per thousand rises. In order to equalize these errors, an attempt was made to compute the number of man-days of the port for the period in question. This figure, divided by the number of days of the period, would equal the yearly strength. Thus, if S equals the strength and T equals the length of time in days that the strength obtains, the product of S and T divided by 365 gives the yearly strength of YS . This would give the formula $\frac{ST}{365} = YS$. Unfortunately, it did not prove practical to determine the exact length of time each unit remained in the port, and it was found that, even in the units themselves, there was a daily fluctuation of

the strength. The average monthly strength has therefore been used in the tables that follow as the basis of computation. This was obtained by dividing the sum of the daily strength for the month in question by the number of days in the month. Yearly rates are based on the results of dividing the sum of the monthly strength by 12. There is an element of error in this method, but it is believed that the rates as given furnish a fairly accurate picture of the sanitary results obtained. It should be pointed out, however, that morbidity and mortality data for a port of embarkation are not comparable with those of a fixed post or cantonment in which a constant movement of entrance and exit of troops does not occur. The condition in a port of embarkation is that of a constantly rising and falling fluid from which cases and deaths are continually being precipitated.

The extent of troop movement at this port of embarkation from the commencement of operations in 1917 until August 22, 1919, is shown in the following table:

Troop movements through port of embarkation, Newport News, Va., August 1, 1917, to August 22, 1919, by years

Year	Incoming		Outgoing		Remaining at end of year
	From interior	From overseas	To interior or Hoboken	To overseas	
1917.....	27,617	0	0	1,604	26,013
1918.....	273,462	17,625	23,563	260,636	22,827
1919.....	0	349,122	366,126	0	* 5,558
Total.....	301,079	366,777	389,689	262,240	-----
Grand total.....	-----	667,856	-----	651,929	-----

* Remaining Aug. 22, 1919.

The following table shows the average strength of the port by month and by color:

Average strength, port of embarkation, Newport News, Va., September 1, 1917, to August 31, 1919

Month	1917			1918			1919		
	White	Colored	Total	White	Colored	Total	White	Colored	Total
January.....				13,136	4,986	18,122	20,290	4,345	24,635
February.....				16,482	5,186	21,668	19,901	3,623	23,524
March.....				14,296	7,627	21,923	20,590	2,960	23,550
April.....				19,214	5,625	24,837	15,797	2,510	18,307
May.....				23,383	6,715	30,098	18,804	2,032	20,836
June.....				27,867	3,955	31,822	20,526	1,568	22,094
July.....				18,126	5,334	23,460	13,696	2,095	15,791
August.....				17,129	8,302	25,431	5,510	992	6,502
September.....	3,635	1,383	5,018	19,340	8,897	28,237	-----	-----	-----
October.....	5,485	5,775	11,260	18,001	6,275	24,276	-----	-----	-----
November.....	5,675	8,239	13,914	22,234	5,238	27,772	-----	-----	-----
December.....	11,782	5,119	16,901	21,654	2,471	24,125	-----	-----	-----

The foregoing data regarding strengths and the movements of troops were supplied by The Adjutant General's Office. The mortality and morbidity data which follow were received from two main sources; i. e., the reports of the embarkation, debarkation, and camp hospitals and the reports of the camp

surgeons. The following daily telephonic reports were received from hospitals: (1) Number of patients under treatment; (2) number of vacant beds; (3) admissions by specific causes by name and organization; (4) admissions from influenza, pneumonia, meningitis, and empyema; (5) deaths from pneumonia and from other causes; (6) field report on sanitary personnel and transportation. All telephonic reports were verified by written reports except (4) and (5).

A sick and wounded report was received on each Friday from all hospitals. This report included admissions to hospitals by total and by certain specific diseases, deaths by cause, disposals of patients, and the number of patients remaining at the close of the week. In addition, the embarkation hospital reported weekly on venereal admissions by causes, venereal disposals by causes and complications, and the number of venereal cases remaining by causes.

All hospitals and camps submitted monthly reports of sick and wounded. These included: (1) Register card for each admission, showing name, rank, etc. of the patient, diagnosis, complications, disposition, days of treatment, etc. (the item "disposition" included deaths); (2) report sheet, showing average make-up of the command for the reported month, with numerical report for the month of admissions from the command, completed cases and patients remaining; (3) nominal check list of admissions as taken up on the report.

Daily telephonic reports were rendered by camp surgeons on the incidence of communicable diseases in the command by name, rank, organization, and specific disease. Written daily reports were made on the number sick from all causes, with dispositions and an analysis of remaining cases, and on sanitary personnel and transportation. Each command submitted on Friday the data for the weekly telegraphic report to the Surgeon General. This report included sick and wounded admitted to quarters, with dispositions and number remaining, venereal admissions, and total under treatment.

A monthly venereal disease report was made by each camp surgeon. This report was based on the results of the semimonthly physical examinations and contained data on prophylaxis, neglect of duty, etc. All infirmaries and hospitals submitted a report on the social history of each new case of acute venereal disease. These reports were submitted at the time of identification of the disease or of admission to hospital.

All morbidity data were assembled daily by organization and disease. From this card, which was a permanent record, the data were assembled by camp, and these, in turn, were consolidated upon a single card. Mortality data were filed by card for each organization, for each camp, and for the entire port. This enabled the port surgeon to have accurate information available at all times as to the incidence of disease and deaths and to apply corrective measures promptly. Complete morbidity data for the period prior to April 1, 1918, are not available, and the statistics for that calendar year are therefore incomplete. It will be noted that practically all cases recorded were of the sputum-borne class, if venereal diseases are excluded.

MORBIDITY

INFLUENZA

This disease was present throughout the nine months for which data are obtainable. A severe epidemic occurred in late September, 1918, which continued at a high incidence rate throughout mid-October and slightly recrudesced in December. The following table shows the monthly incidence of the disease.

Month, 1918	Number of cases	Average strength	Monthly rate per 1,000	Month, 1918	Number of cases	Average strength	Monthly rate per 1,000
April.....	113	24, 837	4. 5	November.....	313	27, 772	11. 2
May.....	50	30, 098	1. 6	December.....	229	24, 125	9. 4
June.....	37	31, 822	1. 1	Total.....	6, 287		
July.....	35	23, 460	1. 5	Average.....		25, 147	250. 2
August.....	60	25, 431	2. 3	Annual rate.....			333. 6
September.....	1, 005	28, 237	35. 5				
October.....	4, 445	24, 276	183. 1				

The daily incidence of influenza is of interest, in that it shows that this disease was present throughout the entire period for which statistics are obtainable, and that, beginning with September 20, 1918, there was a sharp rise which reached its peak on October 7, 1918. It then fell sharply and continued on about the same level, with slight daily variations, for several days, when a secondary fall took place. From this point there was a gradual fall, followed by a short recrudescence on December 6, 1918. This is shown in the following table:

Influenza, daily morbidity rate per thousand, 1918

Day	Month								
	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		0. 0000	0. 0840	0. 1410	0. 0550	0. 0800	10. 2800	0. 3339	0. 5712
2.....		. 0862	. 1668	. 0000	. 0000	. 0790	12. 2400	. 8773	. 2872
3.....		. 0000	. 0356	. 0000	. 0526	. 0349	12. 6800	. 3924	. 3366
4.....		. 1059	. 0000	. 0000	. 0000	. 0000	7. 2890	. 9982	. 1536
5.....		. 0632	. 0278	. 2830	. 1920	. 2536	8. 4720	. 4956	. 5395
6.....	0. 1684	. 0316	. 2202	. 0716	. 0424	. 3480	24. 4200	1. 3020	. 0406
7.....	. 1272	. 0292	. 0000	. 0000	. 0411	. 2010	25. 7800	1. 2410	. 3546
8.....	. 0842	. 1490	. 0000	. 0000	. 0876	. 1528	6. 2130	. 7150	. 3208
9.....	. 2105	. 1204	. 0000	. 0000	. 0000	. 2352	6. 4880	1. 1770	. 2760
10.....	. 4010	. 0000	. 0000	. 0000	. 0000	. 1352	6. 3980	. 4920	1. 0140
11.....	. 3375	. 0000	. 0552	. 0000	. 0000	. 4257	7. 1910	. 2960	. 5291
12.....	. 1488	. 0338	. 0000	. 0394	. 0000	. 0381	4. 7750	. 0370	. 4956
13.....	. 2976	. 0602	. 0798	. 0400	. 0328	. 1456	5. 8650	. 2016	. 3328
14.....	. 0000	. 0000	. 0366	. 0000	. 0820	. 0000	7. 4030	. 2880	. 6480
15.....	. 1855	. 0326	. 1122	. 0360	. 0000	. 3087	2. 7470	. 0570	. 1251
16.....	. 2030	. 0996	. 0360	. 0000	. 1980	. 0886	2. 3180	. 0285	. 9174
17.....	. 2030	. 0346	. 0374	. 0354	. 0364	. 3184	2. 1320	. 0570	. 3843
18.....	. 0814	. 0469	. 0367	. 0548	. 0945	. 3072	1. 8960	. 2280	. 2898
19.....	. 0000	. 0000	. 0000	. 0000	. 1445	. 6940	2. 0280	. 1995	. 2150
20.....	. 1995	. 0460	. 1026	. 0059	. 1734	. 5661	1. 0110	. 4275	. 1704
21.....	. 1592	. 0000	. 0328	. 1647	. 0000	. 3652	. 6820	. 2272	. 2821
22.....	. 1191	. 0000	. 0039	. 0722	. 0361	. 2424	. 6015	. 1415	. 1227
23.....	. 1182	. 0308	. 0000	. 0000	. 1992	. 1992	. 5124	. 1280	. 2085
24.....	. 0469	. 1260	. 0336	. 0934	. 1610	. 2618	. 8925	. 1312	. 2532
25.....	. 1374	. 0484	. 0000	. 2200	. 0000	. 7240	. 5525	. 0984	. 0000
26.....	. 0458	. 1112	. 0000	. 0507	. 0616	5. 3090	. 5908	. 1030	. 0876
27.....	. 1377	. 0000	. 0269	. 1473	. 1364	3. 7160	. 5408	. 2310	. 0439
28.....	. 2295	. 1673	. 0526	. 0000	. 1630	6. 5090	. 1676	. 0984	. 0872
29.....	. 0000	. 0558	. 0000	. 0000	. 0414	3. 1550	. 1070	. 0728	. 1410
30.....	1. 1380	. 0560	. 0445	. 0000	. 0828	7. 7300	. 3888	. 1071	. 0469
31.....		. 0283		. 1098	. 1576		. 0475		. 9480

From a study of statistics alone, it would appear that the white troops were far more susceptible to influenza than were the colored troops. The maximum daily rate at Camp Alexander, where the troops were almost exclusively colored, 9.12 per thousand, a low rate when it is considered that a fairly large number of infected men were introduced from interior camps. The following table shows the comparison between the maximum daily rates per thousand of the various camps:

Camp Morrison, entirely white.....	53.02
Camp Hill, entirely white.....	22.36
Camp Stuart, mixed, largely white.....	65.98
Norfolk, Va., mixed, largely white.....	38.86
Newport News, entirely white.....	18.72
Pig Point, entirely white.....	60.60
Camp Alexander, entirely colored.....	9.12

In considering these data, however, it should be borne in mind that many of the colored troops had been in the port for a considerable time and had accustomed themselves to the environment; that they had had an opportunity to build up a series of sanitary safeguards, such as sanitary messing and housing; that they had not, for the most part, been exposed to the debilitation of travel and to the opportunities for contact with infected persons incident thereto; that, on account of working in detachments, they did not come in contact with large groups of persons, as did the white troops. When they did become infected, they seemed to show less resistance to pneumonia than did the whites, as shown in the table below.

Weekly admissions, pneumonia, all forms, absolute numbers and rates per thousand, by color, for the 20-week period from August 15, 1918, to January 3, 1919

Week ending --	Total		White		Colored	
	Admissions	Rate per thousand	Admissions	Rate per thousand	Admissions	Rate per thousand
Aug. 23.....	8	0.262	0	0.000	8	0.888
Aug. 30.....	23	.726	0	.000	23	2.921
Sept. 6.....	33	1.072	6	.259	27	3.537
Sept. 13.....	25	.969	11	.565	14	2.123
Sept. 20.....	8	.268	0	.000	8	1.094
Sept. 27.....	5	.173	2	.097	3	.362
Oct. 4.....	45	1.666	25	1.372	20	2.444
Oct. 11.....	152	8.165	88	5.115	64	16.224
Oct. 18.....	224	8.673	148	6.867	76	17.958
Oct. 25.....	121	5.126	94	4.940	27	5.880
Nov. 1.....	28	1.339	20	1.296	8	1.451
Nov. 8.....	17	.545	12	.469	5	.880
Nov. 15.....	4	.114	2	.068	2	.313
Nov. 22.....	6	.170	1	.034	5	.862
Nov. 29.....	9	.328	7	.324	2	.310
Dec. 6.....	19	.748	0	.000	19	4.094
Dec. 13.....	15	.598	6	.360	9	2.187
Dec. 20.....	10	.417	8	.396	2	.794
Dec. 27.....	2	.084	2	.094	0	.000
Jan. 3.....	3	.114	3	.124	0	.000
Total.....	797	29.090	435	20.184	362	62.408
Annual rate per thousand.....		75.634		52.478		162.260

It is difficult to set an arbitrary date at which the epidemic of influenza began, since, as is shown by the foregoing data, the disease was reported as present almost every day for which statistics are available. It is well-nigh impossible

to draw a sharp line of demarkation in all cases in the absence of a proved causal agent. Undoubtedly there have been included in the cases reported above many which, in the light of future knowledge, would not have been diagnosed as influenza vera, but which medical officers were unable to classify in any other way. On the assumption that the epidemic began on September 26 and ended October 20, 1918, it consisted of 5,370 cases, 719 of which, or 13.9 per cent, developed pneumonia. Of these 719 in which pneumonia occurred, 201, or 27.5 per cent, died. The death rate for the entire 5,370 cases was 3.74 per cent. But some of the cases which became ill before October 20 developed pneumonia or died after that date, and it is therefore not accurate to consider the epidemic closed on October 20. Since a slight recrudescence occurred subsequent to that date, it would seem more correct to consider the epidemic as certainly over by December 31, 1918, and to consider all cases after that date as between epidemics. On this basis, the epidemic consisted of 6,036 cases, 927 of which, or 15.3 per cent, developed pneumonia. Of the pneumonia cases, 250 died, or 26.8 per cent. The death rate of all cases was then 4.1 per cent. It is more than probable that the truth lies between the two sets of figures, a pneumonia rate of 14 per cent with a fatality rate of 27 per cent, and an influenza fatality rate of 4 per cent being fairly accurate.

It would seem as though a more accurate picture could be obtained when the incidence of the disease is studied by camps. Such was not always the case, however, since the importation and embarkation of troops was not discontinued on account of the epidemic. Hence, there was a constant change in the personnel of the various camps; cases were constantly imported, and the fluctuations in the daily strengths very greatly distorted the rates. For example, the strength at Camp Alexander was 10,146 on September 28, 1918, the day the first case occurred in that camp. The strength was 5,167 on October 20, the day that the epidemic was practically concluded there. The average strength for the 23-day period was 7,620. The incidence of the disease in this camp was greatly augmented by the introduction of a considerable number of men already ill with influenza. An attempt to overcome the distortion has been made in the tables which follow by figuring the daily rate per thousand on the daily strength rather than on the maximum or the average strength.

Daily incidence of influenza, Camp Morrison, fall of 1918, rate per thousand

Day of month	Month				Day of month	Month			
	September	October	November	December		September	October	November	December
1.....		40.29	0.00	1.32	17.....		0.56	0.00	0.49
2.....		41.51	2.46	.00	18.....		.52	.00	2.17
3.....		29.08	1.18	.00	19.....		.80	1.75	.00
4.....		38.59	11.86	.00	20.....		.28	3.51	1.95
5.....		17.57	3.87	3.99	21.....		.00	1.16	5.90
6.....		40.60	13.33	2.66	22.....		.56	.58	.00
7.....		53.02	7.74	2.72	23.....		1.16	.29	1.00
8.....		3.03	12.61	.00	24.....		.58	.00	3.06
9.....		3.31	10.93	.00	25.....		.00	.00	2.22
10.....		2.41	4.05	8.04	26.....		.00	.29	.00
11.....		1.80	.60	.00	27.....		16.53	.00	.32
12.....		2.71	.30	3.39	28.....		21.09	.00	.64
13.....		1.51	1.82	2.17	29.....		8.83	.00	.32
14.....		.28	1.82	2.04	30.....		15.15	.00	.64
15.....		.84	.28	.00	31.....		.00	-----	.00
16.....		.56	.00	.87					

In the consideration of the above table, it should be borne in mind that there was a considerable variation in the strength of Camp Morrison, fluctuating between 3,000 and 3,400 in the period prior to November 11, 1918, after which date a gradual decline to 875 occurred. It should also be noted that the boiling of mess kit wash water was instituted on October 5 and maintained at a high standard until late in October, when its efficiency was impaired through a misinterpretation of orders. It was reinstated in mid-November, after which practically all cases reported were imported. A total of 1,448 cases occurred during the period shown.

Daily incidence of influenza, Camp Alexander, fall of 1918, rate per thousand

Day of month	Month				Day of month	Month			
	September	October	November	December		September	October	November	December
1.....		6.64	0.37	0.00	17.....		0.20	0.00	0.00
2.....		7.73	.15	.00	18.....		.20	.30	.00
3.....		5.34	.00	.00	19.....		.57	.00	.00
4.....		3.16	.15	.00	20.....		.00	.15	.22
5.....		1.30	.15	.00	21.....		.00	.30	.00
6.....		8.61	.15	.00	22.....		.00	.15	.00
7.....		3.16	.00	.00	23.....		.00	.00	.00
8.....		1.27	.45	.00	24.....		.18	.00	.00
9.....		.97	.15	.00	25.....		.00	.00	.00
10.....		1.21	.00	.00	26.....		.17	.00	.00
11.....		1.23	.00	.00	27.....		.00	.00	.00
12.....		1.37	.00	1.00	28.....	0.49	.00	.00	.00
13.....		.41	.00	.00	29.....	.49	.00	.00	.00
14.....		.68	.00	.00	30.....	9.12	.18	.00	.00
15.....		.42	.00	.22	31.....		.00		.00
16.....		.00	.00	.00					

The personnel of this camp was entirely colored, with the exception of the commissioned officers and the noncommissioned staff. The colored strength was variable, being about 9,500 at the beginning of the epidemic and 2,645 on December 31, 1918. Part of the command was under canvas, part in hutments, and part in barracks. Some of the command had entered the Army in the August draft; some had served over a year. Part of the command consisted of reserve labor battalions, the men of which were unfitted for overseas duty for some physical reason, usually venereal disease. The great bulk of the command was engaged in stevedore and labor operations. Overcrowding did not exist. A total of 520 cases occurred in this camp during the period under consideration. That the disease was introduced in ample quantity is shown by the following incident:

A detachment of the 328th Labor Battalion, 239 men, entrained at 4 p. m., September 26, 1918, at Camp Beauregard, La., and arrived at Camp Alexander, Va., at 2 p. m., September 29, 1918. Twelve of the men, or 5.02 per cent, had shown symptoms of influenza prior to entrainment; 120, or 42.67 per cent, developed the disease en route; 61, or 29.7 per cent, developed the disease subsequent to detrainment but prior to October 2. The evolution of the outbreak took place in an almost arithmetical progression, which is shown by the following table of daily incidence. The data for this table were secured in part from the patients and in part from the camp surgeon.

Prior to entrainment:	Rate per thousand
Sept. 23.....	8.36
Sept. 24.....	8.36
Sept. 25.....	16.72
Sept. 26.....	33.44
En route:	
Sept. 27.....	200.62
Sept. 28.....	129.62
After detrainment:	
Sept. 29.....	246.70
Sept. 30.....	121.22
Oct. 1.....	8.36

It may be noted that the rate was at the peak during and immediately following the journey.

Each of the sick was carefully interrogated on the following points: Name, rank, organization (including company at Camp Beauregard), date of induction into the service, previous occupation, date of onset, symptoms, exposure to weather, common vessels used, exposure to other cases, roller towels used, debilitating factors, fatigue, overcrowding, untoward incidents of the journey, food, clothing, bedding, and the probable source of infection. After carefully sifting all data obtained in this way, the following facts of epidemiological importance remained. No debilitating factors prior to entrainment could be elicited by the most careful and patient questioning. There was no exposure to inclement weather, no history of fatigue. The food was uniformly satisfactory. The outer and under clothing and the bedding were adequate. There was no marked exposure to other cases at Camp Beauregard. One or two men said that the disease existed there among the white troops. A few said that there had been much sneezing and coughing in their company, but no one remembered contact with men presenting the influenza complex until just before entrainment. Nothing was discovered which directly incriminated food or drink as the vehicle of infection. A common cup was used on one car during the first part of the journey.

This organization did no work for two or three days preceding departure from Camp Beauregard, save the orderlies, cooks, and kitchen police, since the command was "standing by" awaiting orders for entrainment. The organization was practically in quarantine during that time, no passes being granted. This would rule out mass infection from exterior sources. Overcrowding at Camp Beauregard seems to have existed to a certain extent, as shown by the following table:

	Number of men per tent ¹						
	2	5	6	7	8	9	10
Number of instances reported.....	1	1	2	16	114	23	18

¹ Average per tent, 8.18.

The journey was begun with 12 men, or 5.02 per cent of the command, already in the active stages of the disease. Still others were presumably infected,

as 4 were taken sick on the afternoon of the entrainment and 48 more were actively ill by the time the journey had continued 48 hours. Tourist cars were used, and all the windows were closely shut in the evening of the first day, causing the cars to become rather warm. This occasioned much discomfort, as the men had become habituated to open-air sleeping during their two months of service. Twenty-four new cases appeared on the following morning and the same number sickened in the afternoon; i. e., 52 cases occurred in the first 24 hours of the journey.

The men were drilled for 20 minutes on the platform at Memphis and for 30 minutes at Knoxville; otherwise they spent their entire time in intimate contact in the hot, unventilated cars. It was not possible to check the statements of the men against those of their officers, since the latter returned to Camp Beauregard as soon as they had delivered their commands to Camp Alexander, but it would seem that the receipt of the infection from exterior sources in transit could be excluded.

It was difficult to separate the cases of this detachment from those of the remainder of the battalion after the former arrived in Camp Alexander, the latter having arrived from Camp Gordon on the day previous. The battalion then consisted of 768 men, 528 of whom were from Camp Gordon. The following table shows the incidence of the disease while this battalion was at Camp Alexander:

Incidence of influenza in the 328th Labor Battalion

Date	Cases	Rate per thousand	Date	Cases	Rate per thousand
Sept. 28.....	8	10.41	Oct. 7.....	8	10.41
Sept. 29.....	76	98.95	Oct. 8.....	0	.00
Sept. 30.....	68	88.53	Oct. 9.....	5	6.51
Oct. 1.....	64	83.32	Oct. 10.....	4	5.20
Oct. 2.....	5	6.51	Oct. 11.....	0	.00
Oct. 3.....	7	9.11	Oct. 12.....	0	.00
Oct. 4.....	0	.00			
Oct. 5.....	8	10.41	Total.....	264	343.72
Oct. 6.....	11	14.32			

This organization furnished 50.7 per cent of the cases occurring in this camp. The following table gives the pneumonia fatalities (all forms) in this group of 264 men during a period in October, 27 in all:

Deaths	Deaths	Deaths
Oct. 4..... 1	Oct. 13..... 0	Oct. 22..... 0
Oct. 5..... 3	Oct. 14..... 0	Oct. 23..... 0
Oct. 6..... 1	Oct. 15..... 1	Oct. 24..... 0
Oct. 7..... 3	Oct. 16..... 2	Oct. 25..... 0
Oct. 8..... 3	Oct. 17..... 0	Oct. 26..... 0
Oct. 9..... 1	Oct. 18..... 1	Oct. 27..... 1
Oct. 10..... 1	Oct. 19..... 0	Oct. 28..... 1
Oct. 11..... 4	Oct. 20..... 0	
Oct. 12..... 3	Oct. 21..... 1	

The strength of this battalion was increased to 1,042, and the organization embarked for France on October 13, 1918, in company with the 701st Stevedore Engineers, 3 field remount squadrons, and 40 casual officers. The following table shows the incidence of influenza in the 328th Labor Battalion en voyage:

Date	Cases	Rate per thousand	Date	Cases	Rate per thousand
Oct. 16.....	1	0.95	Oct. 22.....	0	0.00
Oct. 17.....	5	4.79	Oct. 23.....	0	.00
Oct. 18.....	1	.95	Oct. 24.....	0	.00
Oct. 19.....	1	.95	Oct. 25.....	1	.95
Oct. 20.....	2	1.91	Total.....	11	10.53
Oct. 21.....	0	.00			

It is interesting to make a comparison between the influenza rates in the 328th Labor Battalion and the 701st Stevedore Engineer Regiment. The latter was formed on September 23, 1918, at Camp Alexander, from the 304th Stevedore Regiment and a few casuals. Its average strength was 958. The following table shows the incidence of influenza in this organization:

Date	Cases	Rate per thousand	Date	Cases	Rate per thousand
Sept. 28.....	3	3.12	Oct. 14.....	0	0.00
Sept. 29.....	0	.00	Oct. 15.....	0	.00
Sept. 30.....	1	1.04	Oct. 16.....	0	.00
Oct. 1.....	0	.00	Oct. 17.....	0	.00
Oct. 2.....	0	.00	Oct. 18.....	2	2.08
Oct. 3.....	2	2.08	Oct. 19.....	3	3.12
Oct. 4.....	1	1.04	Oct. 20.....	0	.00
Oct. 5.....	1	1.04	Oct. 21.....	0	.00
Oct. 6.....	2	2.08	Oct. 22.....	0	.00
Oct. 7.....	2	2.08	Oct. 23.....	0	.00
Oct. 8.....	6	6.24	Oct. 24.....	0	.00
Oct. 9.....	2	2.08	Oct. 25.....	0	.00
Oct. 10.....	3	3.12	Oct. 26.....	1	1.04
Oct. 11.....	4	4.16	Total.....	38	39.52
Oct. 12.....	1	1.04			
Oct. 13.....	4	4.16			

It may prove of value to compare the foregoing tables with those of other reserve labor battalions, as shown below.

Incidence of influenza, reserve labor battalions

Date	404th (992 men)		405th (995 men)		429th (956 men)		430th (972 men)	
	Cases	Rate per thousand	Cases	Rate per thousand	Cases	Rate per thousand	Cases	Rate per thousand
Oct. 3.....	1	1.00	0	0.00	0	0.00	0	0.00
Oct. 4.....	1	1.00	0	.00	0	.00	0	.00
Oct. 5.....	0	.00	1	1.00	1	1.04	1	1.02
Oct. 6.....	2	2.01	1	1.00	2	2.09	3	3.08
Oct. 7.....	2	2.01	0	.00	0	.00	0	.00
Oct. 8.....	0	.00	0	.00	0	.00	1	1.02
Oct. 9.....	0	.00	0	.00	0	.00	3	3.08
Oct. 10.....	0	.00	0	.00	0	.00	0	.00
Oct. 11.....	1	1.00	0	.00	0	.00	2	2.05
Oct. 12.....	1	1.00	0	.00	0	.00	0	.00
Oct. 13.....	2	2.01	0	.00	0	.00	0	.00
Oct. 14.....	1	1.00	0	.00	2	2.09	0	.00
Total.....	11	11.03	2	2.00	5	5.22	10	10.25

PNEUMONIA

The following table shows the number of cases of pneumonia occurring during 1918 and a part of 1919, by months, the average strength, the rate each month per thousand of strength, the number of deaths from pneumonia, and the percentage fatality each month.

Month	Strength	Cases	Rate per thousand	Deaths	Mortality percentage
1918					
January.....	18,122	248	13.60	26	10.4
February.....	21,668	164	7.56	7	4.2
March.....	21,923	174	7.93	24	18.8
April.....	24,837	126	5.06	33	26.1
May.....	30,098	63	2.02	8	12.0
June.....	31,822	62	1.63	5	9.6
July.....	23,460	54	2.30	7	12.9
August.....	25,431	53	2.08	7	13.2
September.....	28,237	73	2.58	7	9.5
October.....	24,276	738	30.40	226	30.6
November.....	27,772	58	2.08	11	18.9
December.....	24,125	58	2.40	6	10.3
1919					
January.....	24,345	73	2.99	15	20.5
February.....	23,517	84	3.57	18	21.4
March.....	23,625	65	2.75	6	9.2
April.....	17,671	31	1.54	5	16.1
May.....	20,803	65	3.12	7	10.7
June.....	22,017	42	1.90	3	7.1
July.....	15,945	44	2.75	6	13.6
August.....	6,351	17	2.67	0	0
Total.....		2,282		427	

Average monthly rate per thousand..... 5.05
 Annual rate per thousand..... 60.60
 Percentage fatality of pneumonia cases..... 18.71

OTHER DISEASES

The incidences of mumps and measles may be taken as indices of the degree of sputum commerce among nonimmunes. The following table shows the incidence of these and other diseases:

Month	Average strength	Mumps		Measles		Tuberculosis, ^a cases	Diphtheria		Scarlet fever		Cerebrospinal meningitis	
		Cases	Rate per thousand	Cases	Rate per thousand		Cases	Rate per thousand	Cases	Rate per thousand	Cases	Rate per thousand
1918												
April.....	24,837	401	16.04	85	3.40	135	12	0.48	3	0.12	18	0.72
May.....	30,098	324	10.36	68	2.17	175	6	.19	3	.09	2	.06
June.....	31,822	285	8.83	30	.93	69	2	.06	1	.03	3	.09
July.....	23,460	202	8.68	25	1.07	61	4	.17	2	.08	2	.08
August.....	25,431	158	6.16	52	2.02	42	5	.19	0	.00	2	.06
September.....	28,237	117	4.09	26	.91	55	4	.14	0	.00	3	.10
October.....	24,276	81	3.44	42	1.72	103	4	.16	1	.04	9	.36
November.....	27,772	125	3.50	157	5.65	102	8	.28	0	.00	5	.18
December.....	24,125	149	6.10	62	2.54	61	14	.57	0	.00	6	.24
Total.....		1,845		547		803	59		10		50	

^a The monthly rate per thousand for tuberculosis is not included because all cases were among troops sent to the port for embarkation or were returned from overseas.

MORTALITY

The following table shows the gross deaths by total and by color, and the rate per thousand by total and by color. The strengths for the year 1919 on which to base the rate by color are not available:

Month	1917						1918						1919			
	White		Colored		Total		White		Colored		Total		White number	Colored number	Total	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate			Number	Rate
January							7	0.11	39	7.80	46	2.53	26	7	33	1.35
February							9	.54	10	1.92	19	.87	19	3	22	.94
March							8	.55	25	3.27	33	1.50	21	8	29	1.23
April							14	.72	35	6.19	49	1.96	10	2	12	.68
May							7	.29	11	1.62	18	.59	11	2	13	.63
June							5	.17	8	2.01	13	.40	7	1	8	.36
July							7	.38	7	1.30	14	.60	2	1	3	.19
August							3	.17	9	1.08	12	.46	1	0	1	.16
September							7	.36	7	.78	14	.39				
October							178	9.79	70	11.13	248	10.16				
November	0	0.00	11	1.33	11	0.78	8	.35	7	1.33	15	.54				
December	4	.33	32	6.24	36	2.12	8	.36	4	1.61	12	.49				
Total	4		43		47		261		232		493		97	24	121	

PNEUMONIA

An analysis of the gross deaths shows that, of the 540 deaths from all causes that occurred in the port from November, 1917, to December, 1918, inclusive, 389, or 72 per cent, resulted from pneumonia. Of the 493 deaths in 1918, 367, or 74 per cent, were due to pneumonia. The data for this disease will therefore be analyzed first.

The following table shows the number and rate per thousand of deaths from all forms of pneumonia by month and by color.

Month	1917						1918						1919	
	White		Colored		Total		White		Colored		Total		Total	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
January							2	0.15	24	4.80	26	1.43	15	0.62
February							2	.12	5	.96	7	.30	18	.76
March							4	.27	20	2.62	24	1.09	6	.25
April							10	.52	23	4.07	33	1.32	5	.28
May							2	.08	6	.88	8	.25	7	.34
June							2	.03	4	1.00	5	.15	3	.14
July							1	.11	5	.93	7	.30	6	.38
August							0	.00	7	.84	7	.27	0	.00
September							6	.31	1	.11				
October							159	8.22	67	10.65	226	9.26		
November	0	0.00	3	0.36	3	0.21	4	.17	7	1.33	11	.39		
December	2	.17	17	3.31	19	1.12	4	.18	2	.80	6	.24		
Total	2		20		22		196		171		367		60	

The following table is an analysis of the total pneumonia deaths occurring during 1917 and 1918 by bronchiopneumonia and lobar pneumonia, and the monthly rates per thousand of each.

Month	1917				1918			
	Bronchopneumonia		Lobar pneumonia		Bronchopneumonia		Lobar pneumonia	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
January.....					6	0.33	20	1.10
February.....					2	.09	5	.25
March.....					4	.18	20	.90
April.....					9	.36	24	.96
May.....					3	.09	5	.16
June.....					0	.00	5	.15
July.....					2	.08	5	.21
August.....					0	.00	7	.27
September.....					1	.03	6	.21
October.....					137	5.61	89	3.64
November.....			3	0.21	7	.25	4	.14
December.....	4	0.23	15	.88	4	.17	2	.08
Total.....	4		18		175		192	

Of the total of 389 deaths from pneumonia which occurred in the above noted 14 months of 1917-18, 179, or 46 per cent, were bronchopneumonia and 210, or 54 per cent, were lobar pneumonia. Not included in the foregoing statistics are 3 cases of bronchopneumonia secondary to pulmonary tuberculosis, 1 of lobar pneumonia secondary to pulmonary tuberculosis, 1 bronchopneumonia secondary to tuberculous meningitis, and 2 bronchopneumonias secondary to cerebrospinal meningitis. Pneumonia included in the above statistics was reported as secondary to influenza in 99 instances. This figure is, without doubt, greatly below the actual number.

CEREBROSPINAL MENINGITIS

The following table shows the monthly occurrence and rate per thousand of cerebrospinal meningitis deaths by total and by color. Of the total deaths from this disease from November, 1917, to December, 1918, inclusive, 24 were in colored and 8 in white troops; i. e., 75 per cent colored and 25 per cent white. The same ratio was maintained in the 10 deaths occurring in 1919 prior to August 23.

Month	1917						1918						1919*					
	White		Colored		Total		White		Colored		Total		White		Colored		Total	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
January.....							0	0.00	3	0.60	3	0.16						
February.....							2	.12	1	.19	3	.13						
March.....							0	.00	1	.13	1	.04						
April.....							0	.00	4	.70	4	.16						
May.....							1	.04	1	.14	2	.06						
June.....							1	.03	0	.00	1	.03						
July.....							1	.05	0	.00	1	.04						
August.....							1	.05	1	.12	2	.07						
September.....							0	.00	3	.33	3	.10						
October.....							0	.00	1	.15	1	.04						
November.....	0	0.00	3	0.21	3	0.21	2	.08	0	.00	2	.07						
December.....	0	.00	6	1.14	6	.35	0	.00	0	.00	0	.00						
Total.....	0		9		9		8		15		23		8		2		10	

* Monthly figures for 1919 not available.

TUBERCULOSIS, ALL FORMS

During the 14-month period before mentioned, 42 deaths from tuberculosis in its various forms were recorded. Of these, 14, or 33.3 per cent, were in white troops and 28, or 66.7 per cent, were in colored troops. The rate per thousand for 1917 was 3.16; it was 1.34 for 1918. There was a total of 38 deaths from tuberculosis in 1919, prior to August 23.

MISCELLANEOUS CAUSES OF DEATH ^b

External.....	23	Mastoiditis.....	3
Cardiovascular.....	17	Septicemia.....	6
Appendicitis.....	4	Erysipelas.....	3
Diabetes.....	2	Peritonitis.....	5
Nephritis.....	7	Cholelithiasis.....	1
Diphtheria.....	5	Dysentery.....	2
Abscess of liver.....	2	Malaria.....	1
Acute yellow atrophy of liver.....	3	Smallpox.....	1
Neuropsychiatric.....	7	Pemphigus.....	1

No deaths occurred from typhoid or paratyphoid fevers. Of the 675 deaths for the entire period, 424 were due to pneumonia, 42 to cerebrospinal meningitis, and 80 to tuberculosis. In other words, 546, or 80.1 per cent, were due to sputum-borne diseases. On the contrary, the only deaths from fecal-borne organisms were 2 from dysentery, less than 0.4 per cent. Only 1 death occurred from a mosquito-borne disease, 0.15 per cent.

VENEREAL DISEASES

It was early recognized that morbidity reports were quite as necessary to the successful prosecution of the control of venereal disease as of any other communicable disease, but it proved exceedingly difficult to secure accurate and continuous reports on the venereal infections. This resulted, in part, from the congestion and hurry which existed during the construction period, a time when troops, animals, and supplies were constantly pouring through a port in which building operations were still going on. A greater factor was the failure of medical officers to realize that it was quite as necessary to report a case of gonorrhea as to notify the port surgeon of the occurrence of a case of smallpox. Furthermore, the intense public interest in the control of these diseases created a new situation for the administration of which no precedents existed; add to this the unexpected magnitude of the problem and the well-nigh universal distaste for statistical collection on the part of medical men, and it is seen why the accumulation of accurate data for the entire period of the war is almost impossible.

The port was visited from time to time by experts from the Surgeon General's Office. These advised with the port surgeon on the various phases of the problem, but even the most optimistic admitted the almost insurmountable difficulties in its solution, particularly as applied to colored troops. At least 20 per cent of the colored troops arriving at the port were found to be suffering from obstinate chronic venereal infection of several years' duration.

^b Nov. 1, 1917, to Aug. 22, 1919, inclusive.

In the great majority of cases, this had not materially interfered with the earning of a livelihood in civil life, neither did it prevent the performance of work at the port. Yet these men could not be embarked so long as they were suffering from a venereal disease. Here arose the difficulty of defining accurately when a man once infected ceased to have the disease. The Wassermann reaction furnished a reliable standard in the case of syphilis, chancroids offered a visible evidence of cure, but gonorrhoea, which supplied the bulk of the cases, proved much more difficult. The presence or absence of an urethral discharge offered no reliable index since many of the discharges were intermittent or very scant, while a few were apparently not due to gonorrhoea. Also, it was discovered that malingerers simulated gonorrhoea through the aid of an urethral syringe and a can of condensed milk. It was finally determined that the solution lay in whether or not the discharge was infectious. This resulted in the preparation of a certificate by the Surgeon General's Office (April 12, 1918) based on microscopical examination of superficial and deep smears. This was excellent in many ways, but inasmuch as the certificate was not made a part of the soldier's service record, much of the usefulness of the scheme was lost so far as relieving the port from the burdensome duty of treating noninfectious venereals was concerned. The certificate issued by the surgeon's office was used for about six months, but little benefit resulted from the plan, for the certificate and the man almost invariably became separated. A record form to accompany the service record was finally evolved and put into use. The results were extremely satisfactory, in that much useless labor was obviated and an accurate trace was kept of a series of urethral catarrhs which were noninfectious. This served to relieve the situation very materially.

Until the incidence of venereal disease became recognized as an acute problem, little attention was paid to the accuracy or continuity of reports from surgeons of the several camps or station to the port surgeon. Thus, during 1917, when at no time were there probably more than 800 or 900 venereals in the port, the records of them were very meager and no attempts were made at classification. Occasional informal reports were made, the earliest noted being for a period of seven weeks from the middle of October to the middle of December, 1917. But where such reports occur there follows a break of a month or more, and thus data lose all continuity and considerable value. Reports were occasionally made showing the number of venereals in organizations arriving at the port of embarkation, yet it appears that such reports were prompted only by a dangerous situation rather than by any definite idea of keeping continuous records.

Such a state of affairs existed with little improvement until April, 1918. The first authorized weekly reports on venereal diseases were received at the office of the port surgeon for the week ending April 13, 1918. Each post within the port of embarkation forwarded the same report the same day each week. Such reports showed the strength of the organization, the number of acute and chronic cases of syphilis, gonorrhoea, and chancroid identified during the reported week, and the number of prophylactics administered to the men in the command. Thus a relatively accurate record could be kept of the venereal situation of the port, week by week. At the same time it was urged that

sources of infection should be discovered where possible and reported to the Tidewater Health Department (United States Public Health Service), which in turn attempted to apprehend the carrier for treatment.

These weekly reports were officially continued until September, 1918. During the same period, the weekly report on sick and wounded was established in the port. This entailed a report from each camp on men in quarters. Such a report also included a report of venereal cases under treatment; showed the number of new acute and chronic cases (though no attempt was made at dividing into specific diseases) and the number of cases disposed of. It was from these reports that the first accurate record of the number of cases of venereal diseases treated at the camps was obtained, and the weekly report on sick and wounded became the most accurate and continuous data available. The weekly venereal report (April 13 to August 30, 1918) was discontinued primarily because it was obviously incomplete.

Beginning with September, 1918, a new report was submitted by the several posts under the port of embarkation. This was in the form of a monthly report in considerable detail. The report was divided into two periods, each period determined by the dates of the semimonthly physical examinations. All cases of acute and chronic venereal diseases identified at such inspections were reported. The report included the strength of the command, the number present at inspection, the number of failures to take prophylaxis, and the number tried by court-martial. In fact, it was a complete report on the venereal situation at each post, month by month. In addition, commanding officers of each organization reported, separately from the medical officers on the absences from physical examination.

This form of monthly report furnished the surgeon all necessary data wherewith it would be possible to note, definitely, changes in the venereal situation. At first, considerable difficulty was experienced in obtaining complete reports, and the data were not really useful until November, 1918.

Systematic reporting by the embarkation hospital was begun with the week ending September 6, 1918. The weekly sick and wounded reports, Form 86, M. D., were the only ones received, as a routine, prior to that date. Such reports were essentially generalizations, and no data as to specific diseases were available. The new reports showed admissions by specific diseases, disposals by method and cause, and those remaining under treatment at the end of each week, by specific disease. Such reports were accurate, but unfortunately could not be used as a criterion for the venereal situation of the port, week by week, since they included only those venereal cases which demanded hospitalization.

It was always urged that sources of infection should be discovered, and special forms were prepared in the port surgeon's office for the use of the medical officers in fulfilling this purpose. These special forms were called social history sheets. During December, 1918, 26 cases of acute venereal diseases were reported on the social history sheets, and in January, 1919, it was felt that all new cases were thus being reported. While it was not anticipated that more than 10 per cent of such reports would disclose anything of value for the

law enforcement work on repression, at least this percentage was constantly discovered. These social history sheets formed a further check on the other reports.

Thus reporting had been established on a relatively firm basis by January, 1919. The reports received at that time included: Weekly venereal report, embarkation hospital; weekly reports on sick and wounded, all hospitals; weekly report on men in quarters, including venereal cases under treatment not carried on sick report; monthly venereal reports from all commands, and consolidated for each post; social case histories on all cases of acute infections. Thus several means were at hand to assist in determining the venereal situation at the port of embarkation, and the relatively accurate data could be assembled.

It is obvious from the foregoing description of the status of venereal data prior to April, 1918, that it can be expected that only an occasional glimpse into the venereal situation during 1917 can be obtained, and then only during the last three months of the year.

The first reported general survey of venereal diseases in the port was made on December 21, 1917. The figures presented are not accurate in many cases, some organizations being only partly examined, and in others no record had been kept of cure, discharge, or transfer. The time covered by this report is October, November, and the first half of December, 1917. It is obvious that, if records were partially kept, it was difficult to obtain accurate data for the one or two months preceding the making out of the report. Furthermore, certain organizations had been at their camps for only a short period, and the reports of such organizations were included with those whose station at the port covered a longer period.

Consolidating the several items of this report, it is found that there existed at that time among approximately 12,000 troops, 628 cases of chronic venereal disease, or 5.2 per cent. The actual figures probable exceeded this, since, at the time of report, six labor companies (colored) had not been examined. Over the reported period, 329 prophylactics had been administered and 60 cases of acute venereal disease had been reported. It is difficult to estimate how many of these acute diseases were contracted through exposure in or about Newport News, but probably not more than 80 per cent, judging from the time certain of the organizations had been at the port.

It was reported on January 25, 1918, that over 300 men from the stevedore regiments had been discharged during the previous month because of physical disability "not in line of duty." It was further reported that there were 445 cases of venereal diseases in the stevedore regiments at that time, divided as follows: Gonorrhea, 322; syphilis, 72; chaneroid, 41. These figures are probably accurate as far as they go, but it is evident that they are not complete, since on the day prior to this report it was ordered that all men in the stevedore regiments suffering from venereal diseases be put under treatment by the regimental surgeon at once. Yet the figures do show that, up to the time of report, approximately 745 cases of venereal disease had been identified among the colored soldiers. These 745 cases had existed among 22 labor companies with a strength of about 4,000 men, representing an incidence of approximately 18 per cent. Later reports indicate that this figure is probably too low.

In March, 1918, 619 colored soldiers were discharged on surgeon's certificate of disability. In April, 1918, 23 more were so discharged and 1,100 cases of venereal diseases from the colored organizations remained under treatment. Thus from January to April, 1918, colored venereal cases were found to the approximate total of 2,000, some 900 of which had been discharged and 1,100 remained under treatment. These figures show that, during this three-month period, nearly 1,300 cases had been detected among organizations arriving at the port of embarkation. No account is taken of discharges on surgeons' certificates of disability for January or February, of which there is no record. Venereally diseased colored troops continued to arrive at the port of embarkation during the summer and fall of 1918, until, in spite of constant discharging and of other means of disposal, the number of colored men under treatment in the camps, alone, reached approximately 332 men in December, 1918, and there were some 500 additional cases in the hospital.

Specific instances of the degree of infection existing in any one organization are rare. Of three labor battalions arriving on August 10, 1918, venereal diseases were found among 8, 16, and 15 per cent of the troops, respectively, thus averaging 13 per cent, or 390 cases, in about 3,000 men. In contrast to this, 21,309 white troops picked at random, only 0.6 per cent, or 127 cases, were found infected. The proportionate number of cases for 21,309 colored troops, estimated on the foregoing basis of 13 per cent, would be 2,770. That this percentage is actually too low for colored troops is indicated by the fact that about 12,000 cases were reported during 1918 among colored troops sent to this port; from available records, it appears that some 59,000 colored troops were detained, either for embarkation or permanent duty; thus approximately 20 per cent of all colored troops were venereally diseased.

CHRONIC VENEREAL DISEASES

While, on the one hand, the incidence of chronic venereal disease (cases contracted prior to enlistment) among the white troops stationed at or passing through the port was low, on the other, the incidence was very high among colored troops. This difference was largely due, in all probability, to the fact that it was not disorganizing to keep back the few cases of chronic diseases among white troops at their several interior posts; but it was tremendously disorganizing to keep back cases among colored troops, since, in some instances, it would have removed 50 per cent of the organization. Hence, despite War Department instructions which prohibited sending such cases to ports of embarkation, colored organizations arrived at the port with many cases of chronic gonorrhoea and syphilis among them. The diseased were separated from the sound men after arrival and formed into definite organizations for local labor duty while they underwent treatment. Thousands of negro troops passed through the infirmaries attached to their organizations.

The most representative figures over any considerable period of time are furnished by the weekly telegraphic reports from the several posts and the weekly report of sick and wounded from the hospitals. In the former reports are included the number of cases of chronic disease, not demanding hospitalization, treated in the camps. These men were not carried on sick report and

were on duty during their treatment. The latter reports furnish data on cases of chronic and acute diseases which demanded hospitalization. It is admitted that there are probably duplications, but they are not sufficiently numerous to seriously alter the totals. Complete figures for the weekly telegraphic reports are shown by the accompanying table.

Weekly telegraphic reports, all troops, May 25, 1918, to August 22, 1919

Week ending—	Hospitals		Hill	Brewery	Stuart	Norfolk	Alexander	Head-quarters	Others	Cases disposed of from camps
	Old	New								
May 31	317	16	3	1						156
June 7	328	12	1		5	1				65
June 14	229	8	1		2					377
June 21	137	36	3		1					67
June 28	19	10			2					202
July 5	123	10	4		8	2				136
July 12	275	8	3		1	1				53
July 19	115	5	4		5	1			1	41
July 26	92	8	3	3	4	1	1			82
Aug. 2	102	8	8		1	1				46
Aug. 9	158	10	2							124
Aug. 16	101	4	3			1				52
Aug. 23	164	9	6		1		3			94
Aug. 30	95	9	4							36
Sept. 6	106	3	6	3	4					154
Sept. 13	105	7	1		1	1		2	1	18
Sept. 20	65	7	2		1					62
Sept. 27	99	9			9					697
Oct. 4	62	5			6		2			26
Oct. 11	83	4	10		2					182
Oct. 18	103	0	10		2					405
Oct. 25	145	7	3	1	6					31
Nov. 1	67	2	5		1					35
Nov. 8	36	2	2		1	1				29
Nov. 15	33	5	1		1	1				31
Nov. 22	36	1	1			1				13
Nov. 29	22	4	3	1	1					268
Dec. 6	22	1	2	1		1				28
Dec. 13	84	5	4	2						387
Dec. 20	203	3	2		1		1			163
Dec. 27	97	2	2		2					739
Jan. 3	41	2	3		1	2				720
Jan. 10	124	1	1		1	2				248
Jan. 17	196	2	4	1	1			9		126
Jan. 24	67	4	5		2					366
Jan. 31	108	1						4	1	1,009
Feb. 7	142	3	3						2	183
Feb. 14	135	12	6		1					50
Feb. 21	104	7	5		1					84
Feb. 28	52	12	3		2	1			1	20
Mar. 7	67	8	1	2	1			2		21
Mar. 14	63	10						1	1	25
Mar. 21	52	8	4	1	2			1	4	29
Mar. 28	76	14	3			3		1	2	11
Apr. 4	26	5	4	1	3			1	1	26
Apr. 11	37	8	1		3				2	38
Apr. 18	28	7			2					16
Apr. 25	22	6	2		3					38
May 2	50	11	7		2					38
May 9	25	11	3		1	1			3	22
May 16	28	11	8		1	1		2		28
May 23	100	3	3	3					2	32
May 30	145	8	4		1					30
June 6	49	8	7		4	1		1		29
June 13	42	8	4		3	1				30
June 20	60	14	9		1					34
June 27	38	8	6			1			1	33
July 4	123	10	4		8	2				66
July 11	64	9	18		1	2				36
July 18	66	6	12		1	1				30
July 25	107	8	13		2					25
Aug. 1	86	15	5					1		40
Aug. 8	55	11	1							18
Aug. 15	55	3								9
Aug. 22	37	4								13
Total	6,183	478	248	20	116	31	6	26	23	8,382

It has seemed advisable, in order to arrive at the more representative figure, to consider the number disposed of each week by the infirmaries rather than the number admitted, in order that the admissions to the infirmaries might not be duplicated with admissions to hospitals. To the total thus acquired, the number remaining under treatment in the posts at the time of this report must be added.

It will be noted that the disposals among cases under treatment at the several posts increased considerably during a period after December 13, 1918. On December 8, 1918, a port order directed that all cases of venereal disease which were shown by microscopic examination to be noninfectious should be discharged to duty and treatment discontinued. The effect of this order was to reduce the number of cases under treatment at the several camps from over 3,000 for the week ending December 13, 1918, to 24 for the week ending February 21, 1919. Those cases which proved infectious were transferred to the hospitals. A total of 6,183 such patients were admitted to hospitals during this reported period, not including 478 acute cases. Eight thousand three hundred and eighty-two cases were disposed of in the several camps. These men were not entered on the sick report. The total reported by the camps agrees, within 8, of the total as determined by hospital reports alone. It is significant that Camp Alexander, which at all times had from 2,500 to 6,000 colored troops, reported only 6 cases as acute.

In order to estimate the relative proportion of white and colored troops infected with chronic venereal diseases, hospital admissions from this cause were studied, covering a period of 12 weeks, November 29, 1918, to February 14, 1919. This showed that, of the 1,378 admissions, 1,169 were colored patients and 209 were white patients; that is, the colored patients represented about 90 per cent of the total. Applying this percentage to the total number of hospital admissions as given in the preceding table, it is found that, of the total of 4,426 admissions, 3,983 were colored and 443 were white patients.

In a somewhat similar manner, the relative proportion of white and colored troops treated in the camps is obtained. Weekly reports on sick and injured, among colored troops only, were received from the week ending August 2, 1918. During the period of August 2, 1918, to February 14, 1919, 5,758 cases of chronic venereal diseases among colored troops were disposed of at the several camps. It is shown in the above table that there was a total of 6,101 disposals during this same period. Thus it can be estimated that the number of cases among negro troops greatly exceeded the number among white troops, in the ratio of 17 to 1; that is, 94 per cent of such cases were among negro troops. Applying this figure to the total cases reported for the entire period, it appears that, of 7,340 chronic cases passing through the camp infirmaries, 420 were cases among white troops and 6,920 were cases among colored troops. Adding to these figures cases of chronic diseases which demanded hospitalization, there is obtained a total of approximately 863 chronic cases among white troops and 10,903 among negro troops. There are also some 900 discharged "not in line of duty." Thus a grand total of 12,660 chronic cases is obtained.

During 1918, 291,000 men detained at the port. From the above estimate it would appear that 4.3 per cent of these troops were venereally diseased.

Two hundred and thirty-two thousand of these troops were white, with a venereal incidence of 0.37 per cent. Of the 59,000 colored troops, the venereal incidence was 20 per cent.

ACUTE VENEREAL DISEASES

The only reliable index of the efficacy of the antiveneal disease measures carried out in the community and among troops is the current incidence of acute venereal diseases. Reports for the port of embarkation indicate that over relatively long periods of time—a month or more—pertinent data are reliable, but it is impossible to draw conclusions concerning the incidence from daily or weekly returns, since the rise and fall curve over these shorter periods is too magnified.

No attempt is made to divide the incidence of acute venereal diseases among the white and negro troops. It is true, however, that these cases recorded here refer practically in their entirety to white troops. Colored soldiers were themselves so greatly infected in the beginning, particularly those among the labor organizations retained at the port, that the diagnosis of an acute case was most difficult and little attempt at differentiation of chronic and acute cases was made. Considering the large negro population of Newport News, it would seem probable that many cases of acute infection among the negro soldiers were not identified as such, and were treated among the thousands of chronic cases.

The incidence of acute venereal diseases by weeks at the several stations comprising the port is shown in the following table. Since these cases eventually were taken up by the hospitals, it is the hospital report which logically forms the basis for the estimate on the current incidence of acute venereal diseases. Reports, other than weekly telegraphic reports, indicate that, from time to time, more cases occurred than were reported by the hospitals. Thus to arrive at the more nearly correct figure for acute venereal disease incidence, all reports have been studied, and the following data obtained.

Incidence of acute venereal diseases, June, 1918, to August, 1919

Mouth	Mean strength	Number of cases	Annual rate per 1,000	Mouth	Mean strength	Number of cases	Annual rate per 1,000
1918				1919			
June.....	32,083	66	24.8	March.....	25,545	16	7.5
July.....	20,718	39	22.8	April.....	22,251	16	8.6
August.....	26,594	34	15.4	May.....	23,436	18	9.3
September.....	28,594	28	11.7	June.....	20,882	17	9.8
October.....	25,018	15	7.2	July.....	8,258	2	2.9
November.....	32,225	12	4.5	August.....	4,107	1	2.9
December.....	24,525	22	10.8	Mean.....	21,818	20.83	11.61
1919							
January.....	24,378	30	14.8				
February.....	*23,901	*25	18.1				

* Figures are for 3 weeks.

The rate of infection per year, therefore, was 11.6 per thousand troops. A sharp decrease is to be noted in the figures for August, 1918. Many factors doubtless combined to produce this decided diminution in the number of such cases at this time, but it would seem that the chief of these was the commence-

ment of the law enforcement program on July 15, 1918, conducted under the auspices of the War Department. In December, 1918, a decided increase in the incidence of such cases was noted. Probably the cause underlying this change is more complex than in the first case. Attention is invited, however, to two factors: The abolition of the law enforcement program, as originally conceived, on December 15, 1918; the signing of the armistice, with the resultant relaxation among troops; loss of morale; return of overseas troops; and the illogical idea prevailing in the community that, since the emergency was over in respect to the war, the emergency was over in respect to safeguarding health and morals.

RELATIVE INCIDENCE OF SYPHILIS, GONORRHEA, AND CHANCROIDS

It is difficult to draw any satisfactory conclusions as to the percentage of specific venereal diseases to those of the total venereal diseases, since the data on this point are meager and the data which are available cover only the period subsequent to September, 1918. It is safe to say that most of the cases among the thousands of colored troops under treatment throughout the year were of chronic gonorrhea. The single basis upon which to estimate the relative prevalence of each specific infection among 7,500 cases which underwent treatment in the camps is the report from Camp Alexander, previously quoted, covering some 4,000 cases from August 22 to December 31, 1918. Here it appears that the percentage of each specific disease to the total was 1.7 for syphilis, 89.2 for gonorrhea, and 9.1 for chaneroids. It should be borne in mind that these cases were all chronic, and did not require hospitalization. The table of hospital admissions given below shows a different relation.

It was not to be expected that the various venereal diseases would occur in the same proportions as among the colored troops. All troops were inspected before entraining for the port and all of the more obvious cases of venereal infection were held back, the more or less obscure being sent forward with their organizations. Syphilis being more difficult of detection than is gonorrhea the port statistics show an increased proportion of syphilis. Relatively few white soldiers underwent treatment in the camps of the port, therefore the hospital statistics furnish the only reliable indication of the relative proportion of the venereal infections in white troops.

The following data were obtained from a study of the hospital admissions over a period of 13 weeks:

Hospital admissions for the venereal diseases, November 29, 1918, to February 21, 1919

Disease	Number			Percentage to total disease		
	White	Colored	Total	White	Colored	Total
Syphilis.....	137	234	371	49.3	19.2	24.8
Gonorrhea.....	115	756	871	41.4	62.8	58.4
Chancroid.....	26	224	250	9.3	18.5	16.8
Total.....	278	1,214	1,492			

In the case of acute infections the only source of data available relative to the proportionate distribution of syphilis, gonorrhea, and chaneroids, prior

to September, 1918, is the weekly venereal report instituted in April, 1918, and discontinued September 1, 1918. While it is true that these data are not complete, it is believed that they furnish a fairly accurate picture of the relative proportion in which the specific venereal infections occurred. In all, from June 1, 1918, to February 7, 1919, 189 acute cases were reported. The proportionate occurrence of the three infections is shown in the following table:

	Cases	Per cent
Syphilis.....	52	27.5
Gonorrhoea.....	118	62.4
Chancroid.....	19	10.1
Total.....	189	100.0

It is not felt that the foregoing data warrant any general conclusions. Nor does it seem advisable to compare data shown above with like figures from other localities, since conditions prevailing at a port of embarkation are necessarily of a different nature than those prevailing elsewhere.

COMPLICATIONS

Statistics are not available relative to the occurrence of complications of syphilis and chancroid. From available data relative to complications following gonorrhoeal infection it is indicated that their number among colored patients greatly exceeded that among white patients. Among 871 hospital admissions for acute and chronic gonorrhoea the following conditions obtained:

Complication	White		Colored		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
Epididymitis.....	7	6.1	16	2.1	23	2.6
Prostatitis.....	6	5.2	102	13.5	108	12.4
Stricture.....	3	2.6	74	9.8	77	8.8
Arthritis.....	4	3.5	60	8.0	64	7.3
Total complications.....	20	17.4	252	33.3	272	31.2
Total admissions for gonorrhoea.....	115		756		871	

Of 115 white patients admitted, 17.4 per cent showed complications, chief of which was epididymitis. Of 756 colored patients admitted, 33.3 per cent showed complications, chief of which was prostatitis.

DISPOSAL OF CASES

With regard to disposal, venereal cases may be divided into three main classes: Cured, returned to duty; declared noninfectious, returned to duty; discharged on surgeon's certificate of disability. There was a fourth group for which no data of value are available—men under treatment at the camps transferred to the hospitals, and men transferred from hospitals to camp for continuance of treatment. How great a factor this fourth group might be can not be estimated.

The percentage of cures can be estimated only by assuming the proportions contained in the report from Camp Alexander (previously quoted). On that basis, the cured amounted to 27 per cent of the gonorrhoeas, 57 per cent of the chaneroids, none of the syphilitics, and 29.5 per cent of all cases. Thus, of 4,770 cases of venereal diseases (many of long standing), 29.5 per cent were reported cured. It is impossible to state whether or not this figure can be applied to all cases treated. It would seem likely that treatment was discontinued in the majority of these chronic cases, not because the case could be declared cured, but that the disease could be declared noninfectious.

Detailed data are available for cases disposed of at the embarkation hospital, but, unfortunately, these data cover only a very limited period, namely, the period of 13 weeks, from November 29, 1918, to February 21, 1919, mentioned above. The following classification of disposals covers 1,484 cases, 294 of which were white patients and 1,190 colored patients:

Disposition	Syphilis			Gonorrhoea						Chancroid			Total		
	White	Colored	Total	Acute			Chronic			White	Colored	Total	White	Colored	Total
				White	Colored	Total	White	Colored	Total						
Number returned to duty.....	111	190	301	35	4	39	35	186	221	20	61	81	201	441	642
Transferred.....	10	39	49	8	0	8	13	45	58	5	35	40	36	119	156
Deserted, absent without leave.....	0	0	0	1	1	2	0	3	3	1	2	3	2	6	8
Discharged for disability.....	10	36	46	3	1	4	39	481	520	3	106	109	55	624	679
Total.....	131	265	396	47	6	53	87	715	802	29	204	233	294	1,190	1,484
Percentage returned to duty.....	84.7	71.7	76	74.5	66.6	73.6	40.2	26	27.5	70	30	35	70	37.1	43.3
Percentage discharged for disability.....	8	13.6	11.6	6.4	16.6	7.5	45	67.3	64.8	10.3	52	46.8	19	52.5	46

PROPHYLAXIS

As with other data, the records relative to prophylaxis among troops stationed at the port of embarkation are not complete, and it would seem that figures which are at hand are lower than the actual number administered. The weekly venereal reports from individual camps and posts were the only source for these data prior to September, 1918. As stated previously, these reports were far from reliable because of irregularity in submitting them by certain organizations.

The estimation of the prophylaxis figures was further complicated by the fact that, particularly after September, 1918, it was urged, in certain colored organizations, that soldiers who left camp take prophylaxis upon their return, regardless of admitted exposure, and this procedure was made practically mandatory for February, 1918. It is readily seen that, with possibly 20 per cent of an organization on leave in an evening, all taking prophylaxis upon their return, the prophylaxis figure was bound to exceed the actual number of exposures. If there were included all prophylactics administered, there would be obtained a figure which in no way would indicate the number of exposures to infection, since it does not seem probable that every time a negro left camp he

would indulge in sexual intercourse. On the contrary, the prophylaxis figures for the white troops probably fell below the number of exposures. Each prophylactic administered to a white soldier represented an exposure and would therefore be a gauge upon the existing opportunities for sexual intercourse. Division has been made as far as practicable. Fortunately, the weekly reports from May, 1918, until September, 1918, do not include figures for the negro troops, and monthly reports from September, 1918, through February, 1919, may be divided into figures for white and colored troops.

Prophylactic administrations

Month	White		Colored		Total
	Number	Rate per 1,000	Number	Rate per 1,000	
1918					
April.....	680	35.4			
May.....	455	19.4			
June.....	815	29.2			
July.....	487	26.2			
August.....	241	14.1			
September.....	458	23.6	800	90.0	1,258
October.....	300	16.7	1,589	252.0	1,889
November.....	582	26.1	1,546	296.0	2,128
December.....	365	16.8	1,218	304.0	1,585
1919					
January.....	606	29.8	1,151	279.0	1,757
February.....	711	35.6	2,174	544.0	2,885
March.....	302		1,829		2,131
April.....	447		1,964		2,411
May.....	314		1,512		1,827
June.....	172		362		535
July.....	167		153		320
August.....	97		74		171

Annual rate per 1,000, white, 226.4 (based on figures for 11 months); negro, 1,570 (based on figures for 6 months).

These figures indicate little of importance except that it would appear that social conditions in Newport News had passed through a complete cycle, the conditions obtaining in February, 1919, being comparable to those of April, 1918. There is certainly a tendency for the prophylactic rate to increase, a decided increase being noted for both January and February, 1919. It does not seem justifiable to attempt to explain any fluctuations from month to month, since the data at hand prior to October, 1918, are incomplete.

PORT VENEREAL OFFICER

The port venereal officer, under the instructions of the port surgeon, was charged with the prevention of new infections, establishment and equipment of venereal infirmaries in the various camps, and the supervision of treatment.

On January 30, 1918, port headquarters issued General Orders, No. 1, which provided for the control and prevention of venereal disease through the following means: First, the diversion of athletics. Second, instruction of the soldiers in the methods of prevention and control of venereal disease. Officers of each regiment were required to meet as often as necessary to receive instructions, and they were held responsible for the instruction of the men under their immediate commands. Third, the prompt reporting of all new infections detected by medical officers and trial by court-martial of all men who failed to take prophylaxis.

Meanwhile (on January 1, 1918), the United States Public Health Service announced that it was prepared to place in hospitals all prostitutes who were found to be carriers of venereal infection. This information was furnished to all medical officers by the port surgeon through a circular letter, inclosing social history blanks on which to obtain from the infected soldier the names and addresses of women and such other information as was necessary in order to locate and place them under treatment.

Prophylactic stations were established in all organization infirmaries. A central station was established at the attending surgeon's office in Newport News. Each station was supplied with proper equipment, and enlisted personnel who had been carefully instructed. Records were kept according to the Manual for the Medical Department, and were inspected regularly by the port hospital inspector.

There was little improvement in the situation until June 5, 1918, when port instructions were issued, calling attention to the existing conditions as to venereal diseases and as to public and clandestine prostitutes, and directing that this fact be forcefully placed before the enlisted personnel by their immediate commanders. A marked decrease was noted in the number of new infections from this time on, and this continued until the signing of the armistice, after which the number of new infections rapidly increased.

During the early period of the war, owing to the lack of hospital facilities all cases of acute and chronic gonorrhea, and syphilis not having open lesions, were treated in their regimental infirmaries. Open lesions and the complications of gonorrhea were sent to the embarkation hospital. All troops passing through the port for overseas were carefully examined before embarking and those found with venereal disease were left behind and placed under intensive treatment. Reserve labor battalions were formed from the negro troops found physically unfit for overseas service. Fully 75 per cent of these were suffering from gonorrhea, late syphilis, and old suppurating buboes. They were quartered at Camp Alexander, with a small tent in use for a venereal infirmary. With 3,800 patients, it was impossible for one medical officer to handle the situation and give these men proper treatment, so a small building was equipped and occupied in August, 1918. The patients were divided into four groups, each group reporting every fourth day for treatment. These soldiers invariably had to be transported several miles from the camp to their duties, and it was found to be impossible to give them treatment during the day on which they were to report, as they were not returned to camp until late in the afternoon. This condition continued until after the armistice was signed, when a larger building was equipped and arrangements were made to treat at night men who were on duty during the day.

Few venereal cases were handled at Camp Hill and Camp Morrison. Prior to April 28, 1918, all cases of acute and chronic gonorrhea were treated in the regimental infirmaries, syphilis and the complications of gonorrhea being sent to the embarkation hospital. After the above date, they were sent to the venereal camp, embarkation hospital, for treatment.

At Camp Stuart, prior to April 28, 1918, all cases of chronic and acute gonorrhea and inactive syphilis were treated in the regimental infirmaries. But on that date venereal camp No. 1 was opened and all cases of acute and

active gonorrhoea of the port, excepting those from Camp Alexander and Camp Morrison, were sent to this venereal camp for treatment. This camp consisted of 100 tents, each tent being equipped with 6 beds, and 1 building, which was used for a treatment and office building. This building was divided into six treatment rooms, a laboratory room and an office. Each treatment room was equipped with all necessary supplies for the treatment of gonorrhoea and chancroids, and the laboratory was equipped with a dark-field illuminator and stains for making all venereal smears. The average number of patients treated daily at this infirmary was about 400. All patients found infected with syphilis were sent to a special ward in the hospital for treatment and further disposition. This ward was also used for dermatological cases.

Much trouble was experienced in getting the men to return for further syphilitic treatment after they had been discharged from the hospital, so a general order was issued in September, 1918, which placed upon company commanders the responsibility of returning syphilitics for further treatment. Each patient on leaving the hospital was returned to duty with a notice to his commander which listed the dates on which he should be returned for further treatment or serological examination.

On the Norfolk side of the river, cases of chronic gonorrhoea and inactive syphilis were treated in the camp infirmaries. Cases of acute gonorrhoea and open lesions were sent to the embarkation hospital. Later the Army supply base hospital was opened and cases of acute gonorrhoea and open lesions were sent there for treatment.

DEMONSTRATION IN COMMUNITY VENEREAL DISEASE CONTROL

The general program of action of the American Social Hygiene Association proposed to combat venereal disease by reducing the number of infective contacts through the discovery of persons already infected and preventing their sexual contact with uninfected persons. Concretely it was proposed: (1) To render prostitutes and other antisocial venereal carriers inaccessible through law enforcement or quarantine. (2) To provide adequate proper treatment of those already infected. (3) To diminish the number of potential vectors of venereal disease by protecting weak girls, attempting rehabilitation of delinquent girls and women, and by providing permanent custodial care for the weak minded. (4) To provide adequate social and recreational facilities for soldiers and for civilians of both sexes. (5) To conduct a nation-wide campaign of education regarding social hygiene and the dangers of the venereal infections.

The Rockefeller Foundation made a grant of \$35,000 to the American Social Hygiene Association to carry out such a demonstration in a war camp community. This demonstration was designed to develop and report the best methods for combatting venereal diseases and venereal moral hazards in a city which presented typical military, naval, industrial, and civil conditions and problems. This was, in effect, an intensive disease control experiment in which the community was to be utilized as a laboratory in which the various organizations interested in the venereal problem were to be stimulated and assisted and the whole situation of vice suppression and the prevention and cure of gonorrhoea, syphilis, and chancroid studied actively.

Newport News seemed to be the ideal community in which to carry on such a demonstration. It was one of the primary ports of embarkation, with coincident concentration of military, naval and industrial activities; it was sufficiently large to furnish adequacy of data but small enough to keep the expense of the demonstration within the appropriation; it was readily accessible to Washington; it included a large colored population; its statute books contained most of the essential ordinances; while its institutional facilities were meager and therefore required upbuilding rather than reorganization. Newport News was chosen, therefore, as the scene of the demonstration, which had its initiation on June 7, 1918.

When the port was occupied as a military base, there existed a de facto "red-light" district. The restricted district had been abolished by an act of the State legislature in 1916, but in its place there had sprung up a series of restaurants, coffee houses, and dance halls which were thinly disguised houses of prostitution. The attitude of the city administration and the local courts at this time was one of tolerance, and the solicitation of men in uniform was well known and notorious. Late in September, 1917, an officer of the Sanitary Corps was detailed by the Surgeon General to cooperate with the local representative of the United States Public Health Service in venereal-disease control, and, a little later, another officer of the Sanitary Corps was ordered to Newport News as the representative of the Commission on Training Camp Activities in charge of the law enforcement program. This officer, with the assistance of another, made a thorough investigation of vice conditions, which emphasized the necessity for immediate energetic action. It was recommended by him that an order be issued forbidding soldiers to enter the section of the town just east of the Chesapeake & Ohio Railroad tracks between Twentieth and Twenty-eighth Streets, and a general order to this effect was promulgated. The Navy followed with a similar order, and, through newspaper interviews and otherwise, it was made apparent to the general public that, unless there was an immediate improvement in the vice situation, it would be necessary to forbid the entrance of men in uniform to the city except on official business. A storm of protest and indignation followed; mass meetings were held; there was a demand that the grand jury fix the responsibility for the situation. But wise council prevailed and the citizens realized that the welfare of the troops and the good name of Newport News were at stake. The result was a wholesome stimulation of public opinion. A committee was appointed to confer with the Government's representatives in the formulation of a program for the control of prostitution and its resultant evils, the improvement and augmentation of the police force, the lighting of the dark corners of the city, and the creation and maintenance of a prison farm. There was an activation of the police department and the courts, and between November 10 and 23, 1917, 90 cases involving sexual turpitude were tried. On November 30, 1917, the local board of health adopted a resolution directing the health officer to detain, under a quarantine, in the city jail, all convicted prostitutes who proved to be infected with a communicable venereal disease. The jail was old, dilapidated, filthy, vermin-ridden, insanitary, and ramshackled, and was soon overcrowded. There was a vigorous protest from the jail physician, who refused the admission of any more women

until conditions were remedied, and for a time the whole law enforcement program was threatened with disruption. It was saved from complete annihilation by the prompt action of the United States Public Health Service, which came forward with the offer of the contagious disease hospital, which had been created on the outskirts of the city, as a place for the confinement of venereal patients. The offer was accepted by the common council and the Newport News Board of Health, which resolved, on December 6, 1917, "That all persons not of good fame in the city jail and all persons who may be found in the city suffering with or having a venereal disease shall be sent to and cared for at such hospital of other suitable place as may be designated by the board of health, and there kept in quarantine for such period as the health officer may deem best."

The property thus placed at the disposal of the city consisted of a 10-room farmhouse about a mile and a half east of the city. A hasty campaign raised \$750 by voluntary subscription and \$300 by a grant from the city council to supply the necessary additional beds, bedding, stoves, furniture, and provisions and to install plumbing and sanitary privies. The provost marshal of the port detailed a guard to prevent the escape of the patients, and, within a few days, the institution opened with eight patients under the immediate charge of a Red Cross nurse.

The stimulation of the public conscience of Newport News reacted in a similar quickening of the entire State, and the State legislature passed no less than five acts looking to the direct and indirect control of venereal disease.

Little further progress was made in the local field, however, as the venereal disease control situation was found to be in a deplorably chaotic condition by May, 1918, the failure of the various agencies to actively cooperate in their endeavors having resulted in antagonisms and apathy.

It was evident that, unless there was such a rejuvenation of public opinion that the city administration would meet and discharge its venereal control functions in no half-hearted manner, there would occur a retrogression which would produce a condition worse than that which existed before any steps were taken. Therefore the city officials, the retail merchants' association, the chamber of commerce, the Rotary Club, the ministerial union, the medical society, the Red Cross, the Young Men's Christian Association, the local labor unions, and all other recognized civic and social groups were invited to meet with the law enforcement officer and the surgeon of the port in the corporation court on the evening of June 7, 1918. Conferences were held on the morning of the same day and on the day following. The first conference agreed that the discussion of the police system should be delayed until after a mass meeting in the evening had cleared the atmosphere. With regard to the detention system, it was decided that the Tidewater Hospital should be increased from 22 beds to 52 beds, with a corresponding increase in personnel, but that this institution should be regarded as an exigency to be discontinued as a venereal disease place of detention as soon as the building on the jail farm was ready for occupancy.

The evening meeting was well attended and permitted a free expression of beliefs and grievances. This resulted in a better understanding between the champions of the demonstration and the city officials, and when the meeting

broke up it was with the agreement that a small group of municipal and Federal officers would assemble the next day to discuss the details of the plan. This meeting was held and the city accepted the Government's proposition for the formation of a joint civil and military vice squad, and agreed to appropriate \$5,000 to pay the salaries of the civil members of the squad.

The commanding general recognized the fact that the demonstration would be more effective if it was linked in some definite way with the various social activities which were being conducted in the port by a number of non-military organizations. It was decided, therefore, to vest in the same officer the duties of director of venereal disease demonstration and of supervisor of nonmilitary activities. This was done, and a medical officer with wide experience and tact in the administration of public health problems was detailed to undertake these duties. His office was announced by the commanding general of the port of embarkation in the following general order:

General Orders, No. 193.

HEADQUARTERS PORT OF EMBARKATION,

Newport News, Va., June 27, 1918.

Maj. Wilber A. Sawyer, Medical Reserve Corps, having reported for duty in compliance with paragraph 63, Special Orders, No. 136, War Department, Washington, June 11, 1918, is hereby announced as on the staff of the commanding general as his representative in the direct supervision of all nonmilitary activities connected with the administration of the port of embarkation, as follows:

1. War Department Commission on Training Camp Activities.
2. War camp community service.
3. War work council of the Young Men's Christian Association.
4. War work council of the Young Women's Christian Association.
5. National Catholic war council.
6. Christian Science camp welfare committee.
7. Hebrew Welfare Association.
8. Knights of Columbus
9. Hostess house of the Young Women's Christian Association.
10. City Young Men's Christian Association.
11. Ministerial union.
12. Camp pastors' association.
13. All churches.
14. Lutheran Soldiers and Sailors Club.
15. All fraternal orders.
16. National League for Women's Service.
17. American Library Association.
18. Rotary Club.
19. Visiting Nurse Association.
20. Chamber of commerce.
21. Army song leader.
22. Army athletic director.
23. United States Public Health Service.
24. American Red Cross.
25. Commercial amusements.
26. All other philanthropic, social, and civic organizations.

By command of Brigadier General Hutcheson:

DANIEL VAN VOORHIS,
Lieutenant Colonel, Chief of Staff.

Official:

O. W. BELL,
Colonel, Adjutant General,
Adjutant.

The law enforcement officer was a second member of the demonstration staff. Another person working in immediate relationship to the demonstration was a woman who came to Newport News to take charge of the work of the section on women and girls of the Commission on Training Camp Activities, first as the local post worker, and later as the district supervisor, with a district covering the entire State of Virginia. She continued to make Newport News her headquarters, even after she had become State supervisor, but relinquished the local work. An officer of the Sanitary Corps was sent to Newport News, at the instance of the demonstration, to take charge of social hygiene educational work among the troops of the port and to develop and systematize a training course for enlisted social hygiene instructors. Another officer of the Sanitary Corps was attached to the demonstration staff for statistical and research work. The demonstration contributed the services of the matron of the detention house, and, later, of the matron of the city jail farm. An enlisted man of the Medical Department was the assistant to the director from the early days of the demonstration until its close.

It was for a long time impossible to find suitable office space for the demonstration on account of the crowded conditions in the city. Persistent search finally discovered a suite of four rooms. One office was set aside as a reception and stenographic room and the remaining offices were assigned to the director of the demonstration and his assistant, to the law enforcement officer and his staff, and to the representatives of the section on women and girls, respectively. Later on, when the demonstration outgrew its accommodations, two offices in another building were taken over for the educational work. The gathering together of the local workers in one group of offices proved to be of the greatest advantage in the development of the law enforcement program and in relating it to the broader program of the demonstration.

Every woman who was committed to the detention house because of sexual immorality was given a physical examination to determine the presence or absence of venereal disease and a psychological examination to ascertain her mental condition, as an aid to the court and to the protective worker in arriving at such a disposition of her case as would best serve the welfare of the individual and of the community.

In considering the observations which follow it should be borne in mind that few of the women were professional prostitutes. Most of the white women were clandestines, operating in hotels and lodging houses; all of the colored women were casual inmates of the low-grade entertainment houses on the east side. Very few women of either race had ever been inmates of houses of prostitution.

The work of examining mentally the women held at the detention house for prostitution and similar offenses was voluntarily undertaken early in July, 1918, by an officer of the port surgeon's office. Unfortunately, there are no satisfactory statistics on the prevalence of venereal disease among convicted prostitutes at Newport News. The United States Public Health Service, which made the clinical examinations, failed to keep a record of coerced patients who were sent for examination unless the result of the examination proved to be positive. Its records, therefore, offer no basis for estimating the prev-

absence of venereal infection among sexually delinquent women in Newport News. The only index of such infection is offered by the case records prepared by the protective worker. In compiling data from the case records it has been assumed that a woman was free from infection unless it was specifically stated otherwise, in spite of the fact that a notation of infection is known to have been omitted in a great many cases merely through inadvertence.

The following table gives the distribution of 306 sexually delinquent women of Newport News according to infection with venereal disease as was noted upon their case records:

Distribution of 306 cases according to venereal infection

Diagnosis	White		Colored		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
Syphilis.....	3	2.6	4	2.1	7	2.3
Gonorrhoea.....	80	70.2	145	75.5	225	73.5
Both diseases.....	1	.9	2	1.0	3	1.0
Not infected.....	30	26.3	41	21.4	71	23.2
Total.....	114	100.0	192	100.0	306	100.0

The figures for gonorrhoea are believed to approximate correctness, but the figures for syphilis are known to be far below the true facts, inasmuch as no Wassermann tests were made by the public-health clinic for an extended period, and the presence of syphilis was not ascertained unless it happened to be apparent in open lesions. The Wassermann test was used later on, but the result of the test frequently failed to be noted upon the case records, especially in cases which had already been found positive for gonorrhoea.

The women who were sent to the Tidewater Hospital were, of course, infected with a communicable venereal disease in every case. The table below indicates the distribution of the several venereal diseases:

Distribution of venereal diseases in 132 infected prostitutes

Diagnosis	White		Colored		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
Gonorrhoea.....	41	87.2	59	64.4	100	75.8
Syphilis.....	2	4.3	4	4.7	6	4.5
Gonorrhoea, syphilis, and chancroid.....	0	0	4	4.7	4	3.0
Gonorrhoea and syphilis.....	3	6.4	11	13.0	14	10.6
Gonorrhoea and chancroid.....	1	2.1	4	4.7	5	3.8
Syphilis and chancroid.....	0	0	3	3.5	3	2.3
Total.....	47	100.0	85	100.0	132	100.0

The following table gives the distribution of 314 female delinquents according to the cause of their detention:

Distribution of 314 cases according to cause for detention

Cause	White		Colored		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
Ill fame.....	106	89.2	163	83.6	269	85.7
Disorderly house.....	1	.8	14	7.2	15	4.7
Fornication.....	0	0	4	2.0	4	1.3
Bigamy.....	1	.8	0	0	1	.3
White slavery.....	1	.8	0	0	1	.3
Incorrigibility.....	0	0	2	1.0	2	.6
Rape.....	1	.8	1	.6	2	.6
Health warrant.....	0	7.6	11	5.6	20	6.5
Total.....	110	100.0	195	100.0	314	100.0

"Ill fame" is an old common law phrase covering a multitude of sins which might more properly perhaps have been specified on the police docket. It includes cases of prostitution, illicit cohabitation, lewd and lascivious conduct, and, in some cases, keeping a house of ill fame. The words "health warrant" indicate the procedure under which the health officer summons a suspected venereal carrier to appear before him for examination and, if necessary, for quarantine, under the authority of the health regulations.

That the demonstration, through the continued pressure of its several operations, did have a noticeable effect on vice conditions in the city is indicated by the continuous falling off of the venereal morbidity rate. From a per thousand rate of 24.8 in June, 1918, the rate dropped consistently to the low mark of 4.5 per thousand in November, 1918. There is reason to believe that there was a comparable reduction in the incidence of venereal disease among the civil population, a belief substantiated by the statement of several leading physicians.

However, beginning in September, 1918, certain political and civic antagonisms to the antivice program frankly demonstrated themselves. The situation was further complicated by the signing of the armistice, with the resultant let-down in morale and extensive changes in the personnel of the port of embarkation and of this demonstration. The end result was the disruption of both the city's vice squad and the antivice squad operating under the office of the law enforcement officer. Thus, with the disorganization of the law enforcement system through this unforeseen turn in local sentiment, the obstacles to the demonstration became so formidable that continuance of the vice-control operations along the program of this demonstration, as first conceived, was not warranted. Newport News, which had at first appeared an ideal type of city in which to carry on such a social experiment, fulfilled the conditions of such a type no longer, either physically or politically. The demonstration closed its operations in the middle of November, 1918. Of the \$35,000 appropriated for its use by the Rockefeller Foundation, barely a fifth of it had been expended. In applications, the program of the demonstration, mainly through its law

enforcement division, materially aided in the reduction of venereal morbidity. As an experiment, it clarified existing theories in the operations of vice-control measures and formed a practicable basis for the development of the national policy into a national program.

An interesting corollary to the cessation of the demonstration was the venereal morbidity for subsequent months: From the low rate of 4.5 per 1,000 in November, 1918, the rate increased for several months, then dropped abruptly in March, 1919, as shown in the table on page 403. The city had succeeded in controlling its vice just as long as it desired; but just as soon as an opportunity presented itself it had permitted vice interests to return and an immediate rise in venereal incidence resulted. Explanation of the terminal depression in the rate is not available.

CHIEF MEDICAL EXAMINER

Upon the office of the chief medical examiner, under the direction of the port surgeon, devolved the final physical examination of all troops entering or leaving the port, regardless of destination. Thus this office was required to examine troops on detrainment, during their stay at the port, and prior to embarkation, entrainment, or demobilization. The great bulk of this work was performed at Newport News, but about 50,000 men were examined at Camp Lee, Va., by examiners detailed from the port. These important operations were organized early, a captain of the Medical Corps being placed in direct charge. The first chief medical examiner was not assigned until November, 1917, and he continued to exercise the duties of this office until he was honorably discharged from the service in April, 1919.

In the early days of the port, there were no precedents to follow in the conduct of the examination of such large numbers of men prior to a prolonged sea voyage. It was essential that no man be shipped to Europe who would not be able to do full duty immediately on debarkation. This required elimination of all physical nonefficients, all cases of communicable diseases, and all men presumably in the incubation period of an infectious disease.

The work was well organized by June, 1918, when the staff of the chief medical examiner consisted of 10 medical officers especially selected and trained for the work. These were mostly genitourinary and dermatological specialists of the rank of captain and lieutenant. They were assisted by orthopedists and neuropsychiatrists.

The method of procedure was as follows: All men were placed in quarantine immediately upon their arrival in camp. They were then given the preliminary physical examination, which resulted in the immediate elimination of the great bulk of the nonefficients. As a rule, these examinations were conducted by the surgeon of the camp in which the men were quartered, under the direction of the chief medical examiner and with the assistance of members of his staff. The remaining men were subjected to a daily physical inspection which was designed especially for the detection of cases of communicable disease before they could infect others.

The prescribed period of preembarkation quarantine was 10 days. Its length, of necessity, was subject to great variation, but it served a very useful purpose, in that it permitted the prompt removal of all cases of communicable disease and the contacts thereto and gave opportunity for a complete check on vaccinations and inoculations, in addition to a very thorough preliminary culling out of men who were not physically or mentally fit for full duty overseas. Theoretically all nonefficients, excepting those who fell ill on the journey to the port, had been removed prior to entrainment. Practically, many men arrived at the port who never should have been accepted by the draft boards. The number of nonefficients arriving gradually decreased as the war progressed. This may be taken as an indication that there was a coincident improvement in the preentrainment physical examinations, which may have been stimulated by the lists of nonefficients forwarded by the surgeon to the commanding officers of camps from which they came.

The final preembarkation physical examinations of troops were made 24 hours prior to embarkation. If, from any cause, embarkation was delayed over 48 hours, a complete reexamination was made. Appointments for final examination were made in writing with the commanding officers of the organizations to be examined, the following form being used:

OFFICE OF THE SURGEON, PORT OF EMBARKATION,
Newport News, Va., (date)..... 1918.

APPOINTMENT WITH COMMANDING OFFICERS FOR PREEMBARKATION INSPECTION OF TROOPS.

Name of organization Number of men to be inspected Officer in command.....
 Phone..... Location Block
 Barrack..... Date of inspection.....1918.
 Hour.....

HENRY SMITH BARTHOLOMEW,
Major, Medical Reserve Corps,
Preamblekation Physical Inspector of Troops.

Phone, 166 Embarkation.

Commanding officers were directed to collect all absent men prior to the examination. Men who had broken quarantine were not permitted to embark. Prior to the preembarkation physical examinations, the following form was executed by the commanding officer and the surgeon of the organization to be examined:

PREEMBARKATION REPORT OF PHYSICAL EXAMINATION OF TROOPS

HEADQUARTERS PORT OF EMBARKATION,
Newport News, Va.,, 191...

Organization	Strength of command		
	Officers	Enlisted men	Others
.....			
.....			
.....			
Total.....			

PREEMBARKATION REPORT OF STATUS OF VACCINATIONS

I certify that vaccinations against smallpox, typhoid and paratyphoid fever are complete, or will be completed at the time of debarkation, among members of the above organizations about to embark for overseas and same recorded on service records, in accordance with paragraph 14, G. O. No. 31, 1917, port of embarkation, Newport News, Va.

That preembarkation quarantine began on -----, 191---

-----,
Commanding.

Med. Dept. P. of E. Form No. 5,
Approved C. G., P. of E., Jan. 28, 1918.

PREEMBARKATION REPORT OF INFECTIOUS DISEASES AND CONTACTS

I certify that to the best of my knowledge there are no infectious diseases or contacts among the members of the above organizations about to embark for overseas. That G. O. No. 2, P. of E., has been complied with.

-----,
Surgeon.

Med. Dept. P. of E., Form No. 6,
Approved C. G., P. of E., Jan. 28, 1918.

Organization surgeons or medical officers other than those under the direction of the chief medical officer were not permitted to certify as to the fitness of officers and men for overseas services. Orders covering this point were issued as follows:

Memorandum from the chief of staff to commanding officers.

PREEMBARKATION PHYSICAL INSPECTION OF TROOPS

JUNE 6, 1918.

1. The final physical preembarkation inspection of troops about to embark for overseas will be made under the direct supervision of the surgeon, port of embarkation.

2. At the appointed time for inspection you will have the entire personnel of your command present, officers, enlisted men, and others, at the designated place, under their company, troop, battery, or detachment commanders.

3. No man will be allowed to embark without this inspection.

4. All officers will be inspected with their commands unless other arrangements have been made.

5. Men who are absent without leave or otherwise and returned to their command during the prescribed 10-day period preembarkation quarantine will not be allowed to embark.

6. Rosters: A duplicate roster made on forms furnished by preembarkation inspectors or camp surgeons (as per instructions on back) will be furnished by organization commanders.

7. The medical officer who has been taking sick call for each organization must be present at the time of inspection.

8. The medical officer making the inspection will call upon the surgeon of the regiment, or other organization, for such assistance as he may require.

9. Men will file by the inspector in roster formation, stripped to the waist, with breeches unbuttoned and clothing of the upper part of the body carried over the left arm.

10. A suitable building, affording adequate light and protection to the men is required; barracks are preferable. Under no circumstances will men be allowed to undress in the open.

11. Men will not be permitted to use latrines just previous to this inspection.

12. As soon as practicable upon completion of this inspection, a list of rejections at this inspection will be furnished organization commanders.

13. It involves upon commanding officers and organization surgeons to maintain the strength of their commands while at this port awaiting overseas service.

By command of Brigadier General Hutcheson:

DANIEL VAN VOORHIS,
Lieutenant Colonel., General Staff,
Chief of Staff.

After the completion of the final preembarkation examination—that is, every man's name on the roster being accounted for—five copies of the list of rejections were made; one copy was given to the commanding officer of the troops, one to the camp surgeon, one to the casual officer, one to the transport department (through the chief of staff), and one copy was retained by the examining board. These lists were in the form of a certificate as follows:

PREEMBARKATION REPORT OF PHYSICAL EXAMINATION OF TROOPS FOR OVERSEAS SERVICE

HEADQUARTERS PORT OF EMBARKATION,
NEWPORT NEWS, VA.,

Camp -----, 191...

To The COMMANDING OFFICER:

Organization	Strength of command		
	Officers	Enlisted men	Others

Total.....			

I certify that the individual members of the above organizations have this day been physically examined and found free from communicable diseases, with the following exceptions as herein noted below. These men will not be allowed to embark, in accordance with provisions of G. O. No. 2, port of embarkation, Newport News, Va.

Name	Rank	Organization	Cause

HENRY SMITH BARTHOLOMEW,
Major, Medical Corps
(For the surgeon, port of embarkation).

Med. Dept., P. of E., Form No. 6,
Approved, C. G., Jan. 28, 1918.

The same disposition was made of these retained men as at the preliminary examination—they were sent to hospital for correction of the disqualifying cause. Contacts were held in quarantine and when released were sent to the casual companies. The same disposition was made of hospital cases released after their organization had embarked.

During the interim between the final examination and the boarding of transports, troops were kept under close observation to prevent the embarkation of cases of contagious disease. Not infrequently a case of contagious disease would be found within an hour of troops leaving camp for the transport. Contacts were determined and not allowed to depart. This entailed considerable trouble, as baggage and equipment were already aboard, sailing rosters made out, and other arrangements for sailing completed. In spite of orders to the effect that rejected men would not be allowed to embark, many made the attempt and, in several instances, succeeded in getting aboard the transport. At times this was apparently facilitated by the immediate commanding officers, but was easily controlled by rigid gangplank inspections.

Measles depleted the ranks more than any other cause, particularly through the detention of contacts. The method of determining measles contacts at first included all men quartered in the room or tent where the disease occurred. Each barrack was separated into two rooms, so the contents of a room, or 32 men, were held. Contacts were later designated as being the men sleeping on either side of the case and all others in the room who had not had the disease. This reduced the number of contacts materially.

Venereal diseases probably contributed the largest aggregate cause of rejections. It certainly was the most troublesome condition with which the Medical Department had to contend. At the beginning of embarkation, gonorrhoea was designated as a cause for disqualifying a man for overseas service. On April 4, 1918, the War Department stated that both acute and chronic gonorrhoea were communicable diseases. While it was comparatively easy to detect acute gonorrhoea at the examinations, it was not so with chronic gonorrhoea. There was no end of trouble in attempting to eliminate chronic gonorrhoea in colored troops. They were given a two-hour march, preceding the examination for overseas service and ending at the appointed place and time of examination. This was most effective in bringing out urethral discharges otherwise dormant, and prevented men from using the latrines before examination. It also insured all men being present at the examination.

While these preliminary marches were of material assistance in determining whether or not a man had an urethral discharge, they did not decide whether or not the discharge was due to acute or chronic gonorrhoea. The decision was not difficult in the frank case of acute gonorrhoea, but was an exceedingly vexatious problem when a chronic discharge was concerned. In many of the latter cases the discharge had had its origin as a gonorrhoeal infection, but the gonococcus had long since ceased to be demonstrable. The rejection for overseas service of all men having an urethral discharge of any sort would result in the retention of many physically competent men. This, however, was the practice during the war, though decision on the basis of a microscopic examination was contemplated.

Louse infestation in troops did not exist to any great extent, but a careful search was made for these parasites. The reports of the chief medical examiner show 11 cases of body lice in white troops and 3 cases in colored troops. Crab lice were very much in evidence from July, 1918, to the close of the embarkation period, 658 cases being reported in white troops and 91 in colored troops. No men having lice were permitted to embark.

Cases of scabies were held and sent to the hospital for treatment.

Records were kept showing the name and disposition of every soldier arriving at the port. Printed forms were used for this purpose, on which was written a complete roster of every organization upon its arrival. This included the name of the organization, strength, race, date of arrival, and camp or place from which the organization came. The form was ruled so as to allow notations to be made opposite each man's name at the preliminary and final examinations. Spaces were also ruled for recording the status of vaccinations and inoculations, for the dates of examinations, and for the signatures of examiners. This form is shown below.

Reports of men rejected at the examinations were made on printed forms which were of the nature of orders to organization commanders stating that "the members of the following-named organizations have been examined and found free from communicable diseases with the following exceptions, herein noted, who shall not embark" (vidæ supra). The copy of this report, which had been sent to the transport department, was used by the checker of sailing rosters at the gangplank. This proved to be very effective in preventing rejected men from boarding transports. It was also of great value to the casual officer, camp surgeons, and others.

Reports were submitted whereby the Chief of Staff was kept constantly informed of the immediate overseas strength of organizations. This was extremely essential to all concerned relative to arranging for transportation, etc. The chief medical examiner was prepared at all times to give the status of organizations relative to strengths of overseas fitness.

Reports were made to camp commanders of camps from which troops came relative to any cause of communicable disease or of men unfit for overseas service arriving at the port. Reports were made to the War Department relative to the incidence of lice found in the examination of troops as shown below.

Report of physical condition of troops arriving at port of embarkation, Newport News, Va., for embarkation

From ----- Date -----

Organization	Strength	Race	Date of arrival	Vene- real	Lice			Other unfit	Contacts	Total	Remarks
					Pubic	Body	Head				

After the signing of the armistice, it became apparent that there would be a reversal of direction in troop movements, changing the port from one of embarkation to one of debarkation, through which the troops would pass on their way to demobilization camps. Accordingly, the preembarkation examining staff was perpetuated, with slight modifications, for the purpose of examining troops as to fitness for transfer as outlined in Circular No. 162, War Department, December 18, 1918. Troops arriving from overseas were quartered at the various camps under the jurisdiction of the port until they were deloused, and equipped with clothing. They were then split up into detachments or casual companies corresponding to certain geographical areas, and sent for discharge to the demobilization camps nearest their places of induction. Rosters of the complete personnel of organizations were obtained. Men found physically unfit for transfer were sent to hospitals through camp surgeons, who were furnished with a list of rejections.

Troops arriving at the port from overseas were found to be in exceptionally good condition physically.

With the signing of the armistice and the consequent demobilization of the Army, steps were immediately taken to provide for the medical examination of such troops as should be locally discharged from the service. It was seen at once that, since the surgeon of the port was responsible for the procedure of medical examinations, as contemplated in Circular No. 73, War Department, November 18, 1918, it would be imperative to have all of these medical examinations made under one control. Accordingly, a port order was issued designating a chief medical examiner. This prohibited examinations being made by medical officers other than members of the medical board. A check was made, by agreement with the port personnel officer, whereby no report of examination was allowed to go through unless it bore the stamp of the board. The personnel office also returned to it for reexamination any officer or man whose report bore date of examination more than five days old.

In the formation of the medical board, the suggestions of Circular No. 73 were kept in mind, together with the nature of the work which would be encountered in this port. It was determined that the best combination would be an examining team consisting of a principal medical examiner who should also do the general examining, assisted by one medical officer for each of the following specialties: Dentistry; eye, ear, nose, and throat; orthopedics; neuropsychiatry; tuberculosis; diseases of the heart; and diseases of the lungs. Any number of examining teams could, of course, be created as circumstances required. A permanent board of review was designated, consisting of two medical officers from the staff of the embarkation hospital. The examinations in Camp Morrison were conducted by a team working under the camp surgeon of that camp, but under the direct control and supervision of the chief medical examiner of the port.

The examining board established offices in the administration building, Newport News, where a permanent board sat daily for the examination of casuals and small detachments. When an organization, or detachment of 100 men or more, was to be examined, an examining team was sent out and the men were examined in their companies. Each member of an examining team was responsible to, and under the supervision of, the principal medical examiner of the team, who, in turn, was responsible to the chief medical examiner for the work of his team.

The printed form shown below was adopted, on which each specialist in turn made notations of conditions found, with opinions as to how incurred and as to degree of disability, if any. This form was used as a guide by the principal medical examiner, who thereby, and by his personal examination of the soldier, determined the nature and decided upon the degree of disability or of the sum total of several disabilities. The principal medical examiner then completed and signed the report of examination.

PHYSICAL EXAMINATION, PORT OF EMBARKATION, NEWPORT NEWS

Team No.	Date		
Location			
[Surname]	[Christian name]	[Serial No.]	[Race]
[Rank—Grade]	[Organization]	[Co., det., Dept.]	
[Occupation]	[Date of enlistment]		
Dental:*			
Before enlistment			
After enlistment			M. C.
Eye, ear, nose, and throat:*			
Before enlistment			
After enlistment			M. C.
Orthopedics:*			
Before enlistment			
After enlistment			M. C.
Neuropsychiatry:*			
Before enlistment			
After enlistment			M. C.
Tuberculosis, heart, lung:*			
Before enlistment			
After enlistment			M. C.
General:*			
Before enlistment			
After enlistment			M. C.

_____, M. C.,
Principal Medical Examiner.

* State degree of disability incurred in service only.

The completed form was then filed and constituted the record of the soldier's examination. In the cases of an officer or soldier referred to the hospital or to quarters for any reason, the form was filed separately for reference at the future reexamination. Obscure conditions requiring X-ray or laboratory examination or observation for diagnosis were referred to the hospital, the examiner interested following the case directly. Patients who were acutely ill or who were suffering from a communicable disease were sent to the hospital, as were those with diseases or injuries which could be cured or improved by a short period of hospital care before discharge.

The prime purpose of the work was to determine any disabilities incurred as a result of military service and the degree of disability in relation to the occupation previously followed in civil life. Notations were made, however, on the report of examination, of all abnormal conditions found, irrespective of origin of degree of disability.

Special mention should be made of the examination of guard and fire companies. These organizations were composed almost exclusively of limited service men, all of whom had from one to six different disabilities upon entrance into the service. The examination of these men was slow and tedious, since all of the abnormalities were to be examined and recorded and an estimate made of percentages, if any, of exaggerations, as the result of service, of disabilities which existed prior to enlistment.

The examinations for demobilization conducted at the port were largely confined to the permanent personnel of the port; guard and fire companies; portions of some organizations destined for overseas service who had reached the port at the time when embarkation ceased; portions of the 12th Infantry, which was sent to the port for guard duty after that time; and such casuals as were discharged from the port for various reasons. Examinations were also conducted for the colored officers' training camp located at the Hampton Institute, Hampton, Va. With the exception of casuals, these organizations had not been overseas and therefore presented a relatively small number of disabilities incurred in the service.

The first of these local demobilization examinations was made November 25, 1918. From that time on, the number of daily examinations made in the office gradually increased until the latter part of December, when an average of about 80 a day was reached, with a high-water mark of 143.

MEDICAL SUPERINTENDENT OF TRANSPORT SERVICE AND DIRECTOR OF HOSPITAL TRAINS

In organizing the office of the surgeon of the port of embarkation, provision had to be made for the medical care and sanitary inspection of troops embarking for Europe and, later, for the debarkation and hospitalization of the returning sick and wounded from overseas and the transportation of men by hospital trains to hospitals in the interior. To this end, there was established the office of the medical superintendent of transport service and director of hospital trains, a dual function combined in one office.

The first few months were devoted almost exclusively to the work connected with the embarkation of troops for overseas service. Under this office was appointed a sanitary inspector of transports with the necessary number of assistants. It was the duty of these officers to meet the ships arriving at the port for use either as troop or animal transports, and to inspect and report on the condition of each. In addition, during the early days of the port, this office furnished the Medical Department personnel and obtained the medical and surgical supplies required on the transports. All medical personnel required on troop transports was later supplied by the Navy. Medical officers were detailed to merchant ships acting as Army transports and, on occasion, as during the influenza epidemic of 1918, to Navy transports, in order to augment their medical force. The final medical inspection of all embarking troops was made at the gangplank. This was a cursory examination, but gave the trained medical officer the opportunity to recognize men frankly sick and to exclude from going aboard many men in the early stages of communicable or other diseases.

The general duties of the office consisted of embarkation work as follows: Sanitary inspection of transports; assignment of transport surgeons and enlisted medical personnel on all troop ships; requisitioning all medical and surgical supplies and matériel required for use on troop-carrying ships; final medical inspection and the debarkation of all cases of beginning communicable diseases prior to sailing; and membership on a board of officers appointed to determine the fitness of freight ships for conversion into troop ships.

The sanitary inspection of transport and cargo ships covered the following: Ventilation of troop compartments; sanitary condition of all troop compartments; ventilation of quarters for officers; sanitary condition of quarters for officers; inspection of latrines and shower baths as to their sanitary condition and whether or not they were in proportion to the number of troops carried; suitability of sick bays (it was necessary to enlarge them in many instances); capacity and sanitary condition of cold-storage plants; equipment and sanitary condition of mess rooms and galleys; and the bacteriological examination of the drinking water on the first voyage of a ship, any tank showing the presence of colon bacilli being cleaned and cemented.

Medical personnel for duty on transports, converted commercial liners, and ships operated by the British Ministry of Shipping were assigned from among individuals who had been detailed to duty at the port. Transport surgeons so assigned were given the following instructions prior to sailing:

INSTRUCTIONS TO TRANSPORT SURGEONS

1. Every effort will be made to deliver troops on board free from contagious or active venereal diseases. A medical officer from the list of preembarkation inspectors will be on duty on each ship from the time troops begin to go on board and will remain until sailing. He will keep in touch with the transport surgeon and medical officers with troops and assist in the removal of any man who may have developed contagious or active venereal disease after boarding or who may be otherwise too sick to travel. This officer can be identified by a Red Cross brassard on left arm.

2. Sanitary inspection of the ship will be made each morning at 10.30 by the transport surgeon and senior medical officer with troops. This inspection will include particularly galleys, mess decks, latrines, shower baths, and living spaces devoted to troops, including equipage. Irregularities and deficiencies noted on these inspections will be promptly reported to the proper authority for immediate correction.

3. Venereal inspection on shipboard will be held twice a week. Cases of venereal disease discovered will at once be given vigorous treatment.

4. Recent reports show that lice are being carried by troops overseas. At each venereal inspection twice a week, a careful examination of the men, including also an examination of the clothing, for the detection of lice will be carried out. Any cases discovered will be promptly deloused. A supply of naphthaline powder is provided on each ship for this purpose. One ounce of this powder should be dusted on the interior of all clothing once a week. This is most effectual if the men dust their clothing freely and roll themselves and their clothing tightly in blankets for the night. This method does not destroy the egg but only the adult, so it is necessary to repeat the procedure in a week in order to destroy the young lice after they are hatched. Sleeping quarters and standees that may become infested are to be treated with kerosene.

5. The hospital is under the charge of the transport surgeon, who is responsible for the proper care and use of the hospital equipment and property and for the discipline and instruction of the hospital attendants. The hospital will not be used for other purposes than for the accommodation of the sick, except in cases of emergency, and then not without the approval of the medical superintendent, if the vessel is at home port, or of the transport surgeon if at sea. (Par. 176, Medical Dept., A. T. C. Reg.)

6. Ample bathing facilities have been provided on each ship, and men should be made to bathe twice a week.

7. Records will be kept of all venereal cases developing en route, as well as all cases of lousiness; these will be reported by the transport surgeon, who will submit a report to the surgeon, port of embarkation, upon return of ship to this port; otherwise, this will be mailed.

8. Whenever practicable, weather and other circumstances permitting, the troop spaces will be vacated twice a day for aeration by opening all available ports and hatches. During at least one of these periods the men will take their blankets on deck for airing.

9. Troop decks should be thoroughly sprinkled before being swept and mopped. This procedure should be carried out while troops are on deck.

10. The use of tobacco, either smoking or chewing, will be prohibited at all times in troop berthing spaces and, during the serving of food, in mess spaces.

11. No food will be served outside of mess spaces for officers, troops, or crew, except upon recommendation of the transport surgeon. No food will be permitted in troop berthing spaces.

12. Sleeping and lying upon hatches is prohibited. The main source of fresh air is through the hatches and any blocking of this space seriously interferes with the proper ventilation of compartments below.

13. A supply of hot water should be on hand after each meal, and as many containers as necessary, for washing mess gear.

14. A sufficient number of enlisted men of the Medical Department should be detailed to look after sanitary conditions in quarters, latrines, and showers. Any failure on the part of the flushing system should be reported at once. Latrine seats should be scrubbed thoroughly with soap or lye once daily.

15. In order that sanitary regulations may be properly carried out, the transport surgeon should confer with the medical officers with organizations on board and certain details be made and a definite program be mapped out for the voyage.

16. Before disembarkation, all troop spaces, mess decks, latrines, and shower baths will be inspected to see that they are left in a clean and orderly condition.

17. Careful examination will be made of patients and casual passengers returning for the detection of lice. Any cases will be deloused on shipboard.

18. Head-to-foot berthing: Sleeping compartments will be inspected each night after troops have retired to insure head-to-foot sleeping.

REPORTS TO BE MADE BY TRANSPORT SURGEONS

1. Report of infectious diseases, including venereal diseases and lousiness developing en route.

Infectious and venereal report will include (a) name of patient, (b) rank and organization, (c) type of disease, (d) acute or chronic, (e) date of development.

Report of lousiness will include (a) name of patient, (b) rank and organization, (c) parts affected (head, body, or pubic), (d) probable source, (e) whether or not deloused on board.

All cases of venereal disease will be given vigorous treatment on shipboard.

All cases of lousiness will be promptly deloused on shipboard.

Surgeons with the organized military forces on board are instructed to furnish the transport surgeon with report of venereal disease and lousiness.

2. Sanitary reports of voyage on Form 50 will be filled out and handed in to the general superintendent, Army Transport Service.

3. Return of enlisted personnel, Medical Department (Form 47a), will be made monthly and forwarded through military channels to the Surgeon General, as provided in Manual for the Medical Department, paragraph 50.

4. A full record of sick and wounded will be kept in conformity with Manual for the Medical Department, paragraphs #427 to 465. Report of sick and wounded will be completed and handed in to the medical superintendent, Army Transport Service, upon arrival in port. (Forms 51, 51a, 51b, and 52.)

5. If sick and wounded are brought back, three lists, giving (a) name, (b) rank and organization, (c) diagnosis, should be ready upon arrival in port and transfer cards made for each patient to be transferred to the hospital.

6. Requisition for medical supplies needed for next voyage (Form 35 and blank forms, Form 37). Transport surgeons will be held responsible that they have sufficient medical supplies and blank forms.

Medical officers attached to and embarking with troops were given the following instructions in addition to those of general application given to transport surgeons:

GENERAL INSTRUCTIONS FOR MEDICAL OFFICERS EMBARKING WITH TROOPS

1. As soon as practicable after arrival on board transport, the senior medical officer of the organized military forces embarking will confer with the senior transport surgeon so that he may familiarize himself with sanitary regulations of the transport and have places assigned for holding sick call.

* * * * *

5. A written report giving the required information concerning the incidence of venereal disease and lousiness will be handed over to the senior transport surgeon upon arrival on the other side, same to be transmitted to the surgeon, port of embarkation, Newport News, Va.

RELATIONS OF ARMY AND NAVY SURGEONS ON TRANSPORTS

Extracts from consolidated General Order No. 1, headquarters, port of embarkation, Newport News, Va.

179. The senior medical officer of the military forces, upon embarkation and disembarkation, shall submit to the commanding and medical officers of the ship a statement to the effect that the command is clean, harbors no communicable diseases, and all individuals have been vaccinated against smallpox and typhoid fever. He will take care to prevent the embarkation of infected persons and property.

183. The ship's medical officer will be responsible for the care and treatment of the sick and injured among the ship's crew, casual passengers, those not attached to any military force on board, and for all patients in hospital.

184. When there are medical officers on duty with troops on board, the medical officer of the ship will provide hospital accommodations, supplies, and attendants in the sick bay for the sick of the command, sick call of the troops being held by the medical officers attached thereto. Patients requiring rest in bed or hospital treatment will be transferred to the ship's sick bay and the care of the medical officer of the ship, the same as to a hospital.

185. The commanding and medical officers of the ship will see to it that a suitable place is set aside where the medical officers on duty with the troops on board may hold sick call, and the medical officer of the ship will issue to the medical officers of the troops such stores as are necessary to render medical relief in quarters. The medical officers on duty with troops holding daily sick call shall utilize, to assist them, the Medical Department enlisted men attached to the troops, the Hospital Corps men attached to the ship being under charge of the medical officer of the ship for duty in the ship's sick bay (hospital).

188. A copy of all reports concerning the health of all forces, together or individually, that may be on board, will be furnished the medical officer of the ship for cognizance.

THE WASHING OF TABLEWARE AND MESS KITS

1. Wash water for both tableware and mess kits is, in many instances, not sufficiently hot to kill disease germs nor sufficient in amount to cleanse eating utensils. Men with mild, unrecognized cases of influenza, measles, pneumonia, etc., contaminate the wash water; if it is only tepid, the germs are not killed but spread to the hands and eating utensils of other men, who develop the disease.

2. It has been found that the number of cases of influenza in a command can be reduced about 75 per cent by the use of boiling water for washing utensils. It is believed that this holds true for many diseases, such as measles, scarlet fever, mumps, and pneumonia.

3. Most diseases are "hand-to-mouth" infections. The man with a mild, unrecognized case of influenza or measles soils his hands with disease-laden saliva and, through his contact with things which he, as well as others, handle, the disease germs spread to the hands of others; hence they are carried into the mouth, particularly at mealtimes.

4. It is, therefore, directed that all eating utensils be washed in boiling water and that all men wash their hands thoroughly with soap and water before each meal and after visiting the toilet.

5. Commanding officers with organized military forces embarking will detail one officer to act as mess officer for each mess. Mess officers will be responsible for the sanitary messing of troops and will see to it that mess kits are washed in scalding hot water after each meal; at no time will tepid or cold water be used. The mess officer will also be instructed to take such measures as may be necessary to insure that all men wash their hands thoroughly with soap and water before meals.

DEBARKATION OF SICK AND WOUNDED FROM OVERSEAS

This work was handled by appointing two or more medical officers as medical debarkation officers. They met all incoming transports and arranged with the ship's surgeon for the debarkation of the sick and wounded. Many large ships were met before the ship docked, a gasoline launch having been secured for this purpose and for inspecting ships at various places in the harbor. This launch was operated by the Medical Department.

The National Home for Volunteer Soldiers at Hampton, Va., having been procured by the Army, was designated as a debarkation hospital. All sick and wounded arriving at this point from overseas were to be sent to this hospital and the embarkation hospital. Since the long ambulance haul from Newport News to Hampton offered serious difficulties in the transportation of large numbers of sick and wounded, the steamship *Montauk* was leased, overhauled, equipped, and operated by the Medical Department as a hospital ship, plying with sick and wounded from the transports to the hospital dock at Hampton. This made a comfortable and excellent method of removing patients from transports, the *Montauk* being able to come alongside the ship and unload patients without interference with the discharge of cargo or troops from the opposite side.

The movement of troops overseas having been suspended after the armistice was signed, the large hospital at Camp Stuart previously used for embarkation purposes was used for debarkation work. The capacity of all hospitals available being under 6,000, it was necessary to organize an efficient system for evacuating patients from hospitals by train into hospitals situated in the interior. This was the second major function of this office. Hospital Train No. 3 was assigned to the port for this purpose. The train was stationed at Camp Stuart. Sufficient officers and men of the Medical Department were assigned to duty at this camp to furnish medical personnel for each trip of the train, this averaging in patients about 70 officers and 300 enlisted men.

A sufficient number of patients having accumulated in the debarkation hospitals to warrant an evacuation, the hospital commander communicated directly with the Surgeon General's Office, requesting authority to send a designated number of patients to certain hospitals. A list of the patients to be sent to designated hospitals was transmitted to the port surgeon when the authority had been received. A train sheet was then made up in the surgeon's

office which showed the designated number of patients, listed by rank, whether litter or ambulant, and the number requiring medical care en route. This list was submitted to the troop movement office of the port and to the railroad representative, and a schedule and time of movement was worked out. The commanding officer of the train was given ample notice so as to cover the movement of the medical personnel by proper orders and to prepare and stock the kitchen cars. The Motor Transport Corps, having charge of the ambulances, was notified to have a sufficient number ready to convoy the cases from the hospital to the train.

As there was not a sufficient number of hospital trains to handle all evacuations, trains were made up, consisting of standard Pullman or tourist cars with one medical car containing a kitchen. There was also a shortage of kitchen cars, so the United States Railroad Administration supplied baggage cars fitted with cooking ranges, and these served admirably in place of the usual kitchen car. Cars used in hospital trains were of the following classes: (a) Cars owned by the Medical Department of the Army, represented by Hospital Train No. 3; cars Nos. 1 to 10 were received from Chicago, Ill., January 20, 1919, but Nos. 6 and 7 were sent to the port of embarkation, Hoboken, N. J., on February 27, 1919, by direction of the Surgeon General; (b) cars leased from the Railroad Administration, 3 Pullman, and 4 tourist cars; (c) cars rented for the trip only. Classes (a) and (b) returned to the port, class (c) were released to the railroad after discharge of the patients, the medical personnel returning on regular passenger trains.

Kitchen cars, under the command of a medical officer, were attached to each hospital train and accompanied the larger number of cars if the train was eventually divided. Arrangements then had to be made to feed the patients and personnel in the detached cars. For this purpose and to provide proper inspection of hospital trains, medical officers were stationed at the following points as junction inspectors: Richmond, Washington, Baltimore, Philadelphia, New York, Chicago, Cincinnati, St. Louis, Salisbury, N. C., and, temporarily, at Kansas City. The duties of the junction inspectors included investigations as to the cleanliness, discipline, food supplies, general comfort of the patients, and, when required, the arrangements for rationing patients on detached cars. Train commanders wired to junction inspectors the time of arrival, number of meals required, if any, or for any help required. Junction inspectors submitted written reports to the port surgeon, Newport News, for each inspection made.

Special care was exercised by the hospitals to entrain only cases able to travel. Any case requiring special attention or care en route was marked with a red tag, and instructions were furnished for his care. Trained attendants were provided to accompany mental and nervous cases to their destination. Prior to arrival at the destination, the train commander, or the commanding officer of separated cars, wired to the commanding officer of the receiving hospital the expected time of arrival and the number of patients, classified, in ample time to enable the hospital authorities to provide ambulance service and attendants for unloading the train.

The general administration of the command of a hospital train was that of a detachment. The necessity of preparing lists of names of medical officers and attendants, the usual records, reports, and correspondence covering train movements, the refunding of ration money to patients, when necessary, and the requisitioning and supplying of rations, created a great deal of paper work at train headquarters.

The general scheme of organization for debarkation of sick and wounded, the hospitalization and, later, evacuation by train to interior hospitals, worked very satisfactorily and allowed the steady flow of the stream of sick and wounded arriving from overseas to be diverted to designated interior hospitals with great comfort to the patients and with the least possible delay at the port and en route.

The numbers and classes of sick and wounded disembarked are as follows:

Month	Nervous and mental	Syphilis	Tuberculosis	General surgical	General medical	Organic heart disease	Leprosy	Menigitis contact	Undiagnosed	Total
1918										
January.....	0	2	7	2	7	4	0	0	60	91
February.....	0	0	0	0	0	0	0	0	0	0
March.....	6	2	9	2	6	0	0	0	0	25
April.....	12	0	33	0	16	7	0	0	0	68
May.....	33	0	108	16	47	38	0	0	0	242
June.....	28	0	42	24	48	28	0	0	0	170
July.....	32	0	67	24	103	0	0	0	0	226
August.....	32	0	38	49	33	0	0	0	0	152
September.....	134	3	40	491	121	0	0	0	3	792
October.....	263	4	95	759	72	0	1	0	0	1,194
November.....	536	37	97	3,099	699	0	0	0	16	4,484
December.....	217	12	56	1,171	438	0	0	0	4,033	5,927
1919										
January.....	306	14	143	4,070	1,479	0	0	0	21	6,033
February.....	230	19	105	2,833	1,677	0	0	0	16	4,881
March.....	636	12	271	2,940	2,324	0	0	0	9	6,192
April.....	269	12	240	1,401	1,426	0	0	0	1	3,349
May.....	624	21	157	1,979	1,651	0	0	0	1	4,433
June.....	538	39	72	1,505	1,707	0	0	8	3	3,872
July.....	110	3	28	71	59	0	0	0	0	371
August.....	1	2	0	360	214	0	0	16	16	593
Total.....	4,016	182	1,609	20,706	12,127	77	1	24	4,179	42,995
Sick en route.....										838
Grand total.....										43,833

IDENTIFICATION OFFICE

Prior to October 1, 1917, the work in connection with the identification office was conducted by three civilian employees, one of whom was a photographer. The function of this office was to prepare and issue certificates of identification to civilian employees of the Government engaged in the United States Army Transport Service. Each certificate was prepared in duplicate and contained a brief description of the man, together with a 2 by 3 inch photograph of the holder and both thumb prints.

A medical officer was designated as identification officer of the port about October 1, 1917, with headquarters in the office of the port surgeon. Two enlisted men were assigned to him for duty as assistants, replacing civilians. The services of the civilian photographer were retained. All Army transports arriving in the port were boarded and the necessary photographs taken aboard ship, a copy of his certificate being delivered to each man before sailing, one

copy being retained in the office files. A new form of certificate was adopted to cover civilians about December 1, 1917, and also individual forms for casual officers departing for overseas on a detached service status, and for Army and quartermaster field clerks. The routine of the office having greatly increased, another enlisted man was added to the staff and the office was removed to the newly completed administration building.

Two small rooms in the recently completed building assigned to the attending surgeon were allotted to the identification officer on January 10, 1918. A photographer was inducted into the service at this time, and the services of the civilian photographer were dispensed with. The necessary equipment had meanwhile been requisitioned to carry on the photographic work and, by March 1, 1918, one room was fully equipped as a dark room and the second room was used as an office. A noncommissioned officer directed the work, assisted by three privates. There was a constant increase in the number of certificates issued, not only to civilian crews but to large numbers of casual officers transported overseas. A detailed list of the certificates issued was forwarded to the State Department, Washington, D. C., every 10 days, through The Adjutant General of the Army. A fifth enlisted man was added to the force in June, 1918, the duties of the office having been further increased by a port order which required every officer, enlisted man, and civilian employee on the piers under Government operation to be provided with a pass issued by the provost marshal of the port. Each pass contained a photograph of the holder, taken by the identification office. The work of the office was well organized and moved very smoothly during the remainder of the year.

The signing of the armistice greatly reduced the amount of work passing through the office, and 3 enlisted men were assigned to other duties, 2 remaining to care for whatever further identification work was necessary. The building occupied was destroyed by fire on January 7, 1919, and all equipment was lost. The requirement of photographs on passes was discontinued at this time, and a civilian photographer was engaged to handle any future requirements relative to identification certificates. From about December 1, 1917, to December 31, 1918, 5,909 certificates were issued, and 6,514 pass photographs were taken between the dates of June 1, 1918, and January 7, 1919.

THE ATTENDING SURGEON

The attending surgeon's office was established on August 15, 1917, in Newport News, with a captain of the Medical Corps in charge. This officer, in addition to conducting the regular duties of an attending surgeon, held sick call for four companies at the quartermaster depot and for one troop of Cavalry at the Casino grounds. He was assisted by two officers. The office was transferred to a special building on December 12, 1917. This building was well fitted and equipped as an office, dispensary, and emergency hospital, and was occupied until it and its contents were destroyed by fire on the evening of January 7, 1919. As all records were burned, it is impossible to give any statistics relative to the operation of this important adjunct of the port. The office was reestablished in a frame building on January 9, 1919. This was speedily remodeled and contained an office for the attending surgeon, a consul-

tation room, a prophylaxis station, a dispensary, a dental office, and an emergency ward. This building was partially destroyed by fire on the morning of March 29, 1919, but was repaired and continued in use.

The attending surgeon acted as recruiting officer and made all records and reports pertaining thereto; made physical examinations of officers and enlisted men and recorded the same; administered vaccinations against smallpox and typhoid fever, and made the necessary records; held daily sick call, and prepared sick and wounded records of the same for headquarters detachment, 323d Fire and Guard Company, Company K of the 12th Infantry, 304th Stevedore Regiment, Engineer Corps, and the 404th Reserve Labor Battalion; made provisions for emergency treatment at any time during the day or night; provided medical treatment for officers, enlisted men, their families and dependents, and emergency treatment for civilians employed at the port; and maintained a prophylaxis station.

HOSPITAL INSPECTOR

The inspection of hospitals began February 8, 1918, the results being reported verbally to the port surgeon, who in turn made written reports to the commanding general. The eventual duties of the hospital inspector may be summarized as follows: (1) The inspection of all hospitals and infirmaries in the port area. (2) The checking of all sick and wounded cards received, their preparation and forwarding to the Surgeon General. (3) The preparation of weekly telegraphic reports of sick and injured to the Surgeon General. (4) Coordinating and assisting in the proper carrying out of venereal work. (5) Keeping records relative to infectious diseases, etc. (6) The investigation of discrepancies in recommendations made to the Surgeon General relative to hospitals, infirmaries, etc., with recommendations regarding the same.

The inspection of all hospitals in a systematic manner gave the hospital inspector an almost continuous routine to perform. The following hospitals and infirmaries were inspected: Embarkation hospital, Camp Stuart; camp hospitals, Camp Morrison and Camp Hill; Army supply base in Norfolk, and Nansemond ordnance depot at Pig Point; Water-front Emergency Hospital, Newport News; and infirmaries. These latter varied in number from time to time, but averaged approximately 10 to 12 at all times, located in Camp Hill and Camp Stuart, and in Norfolk and Newport News.

A critical inspection was made. All departments of each hospital, from the administrative to the mess and the enlisted personnel, were required to perform their functions in strict accordance with hospital regulations and the Manual for the Medical Department. Rapid transportation was necessary, as many of these places were located at a considerable distance from headquarters. This was accomplished by automobile and, at times, a Government launch, the latter being necessary to get rapidly to such places as Pig Point and Norfolk. These inspections were made, not only to determine if the duties of these places were being properly performed, but also to acquire information on which suggestions for improvements might be based. Wards were inspected minutely; the care of the sick was observed, including their messing; general sanitation and care of the hospital grounds were considered.

All prophylactic stations were inspected as to their equipment and method of administration, together with the preparation of records. Another function of the inspector was to assist in the coordinating of venereal treatments by hospitals and infirmaries and to observe that all existing orders relative to the treatment of venereal diseases were carried out. Again, as in the inspection of hospitals, every effort was made to improve methods of treatment, especially by insuring that patients reported for treatment as ordered.

The checking of all sick and wounded cards, numbering many thousands, at the beginning of each month, their preparation for return to organizations for corrections, and their forwarding to the Surgeon General in a way relieved the routine of the hospital inspector. A telegraphic report tabulating the various types of diseases, injuries, deaths, and transfers of all patients in hospitals and infirmaries was prepared on Friday of each week. This demanded extreme accuracy and furnished information as to the progress of diseases in the port. Many other records were kept, principally those of local interest to the port surgeon.

No officer was regularly detailed as hospital inspector during the period from October 1 to 23, 1918, the duties being performed by the adjutant and his assistant. The functions of the office were somewhat altered in January, 1919, when the preparation of records was turned over to the statistical officer and the coordinating venereal work was transferred to the officer in charge of the genitourinary work of the port.

THE NEUROPSYCHIATRIC SERVICE

A port of embarkation and debarkation is, so to speak, the neck of a double bottle through which pass two currents of men, the one outward bound to the theater of war and the other returning from the front. Theoretically, the outward-bound stream has been so carefully examined that no person of physical or mental unfitness is brought to the port of embarkation. As a matter of fact, this condition did not obtain in actual practice, and, as has been shown in other pages, it was necessary to maintain a large force of special examiners at ports of embarkation to weed out the physically and mentally unfit who may have escaped examination at interior points, or whose mental or physical disability had been made apparent by the fatigues and excitement of travel toward the zone of operations. These facts were emphasized by the results obtained by the neuropsychiatrists at the port. Theoretically, they should have acted as reviewing officers, not as examiners, and this would have been possible had the work of the neuropsychiatrists at the interior points been more highly developed. That this could be accomplished was shown by the facts that some organizations arrived at the port without a single nervous or mental case, while others, which had been less carefully examined, contained many. Since it was obviously impossible to discriminate between the well examined and the poorly examined organizations, it was necessary to examine all. Much the same condition of affairs obtained in the inward-bound stream. Theoretically, the abundant time of the sea voyage was occupied in the classification of all patients on board the transport and, when the vessel docked, all data upon which to determine ultimate destination were completed. Practically,

such was not the case with neuropsychiatric cases, chiefly by reason of the fact that neuropsychiatrists were not a part of the permanent transport personnel. Had they been, it would have been possible for the neuropsychiatric operations at the port to have resolved themselves into review and consultation, since, obviously, a port of embarkation is not the place to initiate a large neuropsychiatric classification scheme.

Before June, 1918, the embarkation hospital had installed adequate beds and secured a force of officers to handle the nervous and mental cases that came to it through its functioning as a general hospital. The port had a succession of neuropsychiatric officers who examined outgoing troops, but none of these officers remained long enough to build up an organization. A neuropsychiatrist was permanently assigned to the port in June, 1918, with the result that a system of neuropsychiatric examination, consultation, and review was built up under the surgeon and with the help of the division of neuropsychiatry. The functions of this organization were to examine outgoing troops; to care for incoming patients; to furnish consultants for port personnel; to examine recruits; to examine soldiers demobilizing; to coordinate neuropsychiatric activities with other port activities.

PREEMBARKATION INSPECTION

The chief work prior to the signing of the armistice was the prevention of sending unfit men overseas. Conditions favoring this work were the nearness of the camps and good transportation, advance information concerning the movements of troops, and the cooperation of the other port authorities. Conditions that hindered were the limited number of days available for troops to outfit and undergo the numerous inspections, and the fact that only one neuropsychiatrist was available at the time when the greatest number of troops was embarking.

An effort was made to deal with companies as units. It was usually possible to secure from the organization commander a list of dull, queer, or nervous men in the company. The men so designated were individually examined. While such examinations indicated clearly enough that certain soldiers were unfit, the hurry in which it was usually performed left the impression that many men remained with the company who should have been rejected.

The worst conditions mentally were found in organizations whose quotas had been completed with large numbers of men just before leaving camp. Though few cases of insanity were found, many cases of feeble-mindedness were discovered which should never have gotten as far as the port. Mental instability was frequent, and it was reasonable, even after the most careful weeding-out process, to expect this to first become evident at a port, under the strain of traveling and of waiting to embark.

Prompt action in these cases facilitated operations very greatly. The soldier was separated from his organization and on the road to final disposition a few hours after recommendation for his rejection had been made. The only form used gave the soldier's identification, diagnosis, and disposition recommended; of the three copies, one went to the casual officer, one to the camp surgeon, and one was kept for the port surgeon's file.

CARE AND DISPOSITION OF PATIENTS FROM OVERSEAS

After November 11 emphasis naturally was placed upon the reception of neuropsychiatric cases from France. This had long been a function of the embarkation hospital, where patients were received in small groups; of 100 admissions to the neuropsychiatric ward in August, 1918, for instance, 30 were from overseas. By September 4 the accommodations at this hospital, for 38 insane and 60 nervous patients, were manifestly insufficient, even for the immediate future. At this time it was recommended to the port surgeon that 180 more beds be provided, this special need to be merged in the general need of a large debarkation hospital. Debarkation Hospital No. 51, which was opened on November 17, 1918, included 30 beds for the care of acute psychoses and 110 beds for neuroses. In January, 1919, accommodations for 30 more psychoses were provided and 2 wards of 40 beds each were nearly ready.

Before these new accommodations were available the U. S. S. *Aeolus* docked on October 13 with 243 cases, divided as follows: 127 psychoses, 18 feeble-minded, 55 epileptics, 39 neuroses, and 3 cases of organic disease of the nervous system. No warning had been received, the force of attendants at the embarkation hospital was crippled by the influenza epidemic, and other ships were due. Under these circumstances special trains were requested to carry these patients directly inland, and, after a day's wait, the psychoses and feeble-minded were sent to General Hospital No. 6, Fort McPherson, Ga., and the others to General Hospital No. 31, Plattsburg, N. Y. Two patients hung themselves on the ship, one on the last day of the voyage and one while the transfer from boat to train was going on. The ship, of necessity, carried these patients between decks without lights from sunset to sunrise. The trains trips were made without incident.

When Debarkation Hospital No. 51 was opened, its first large group of patients was one of 300 nervous and mental cases received from overseas. Upon receipt of advance information as to the arrival of this transport a psychiatrist went out to meet the ship and classify the patients, but, unfortunately, the ship did not stop to take on a pilot, so the classification could not be made. A hospital boat was brought alongside at the pier, received the patients and landed them at a dock inside the hospital grounds. Here one man dived overboard but was rescued unharmed. These patients were successfully transferred to interior hospitals, although wards were in charge of new men and lock and keys were unobtainable. Subsequently, other ships, each carrying 200 or 300 mental cases, were unloaded, and a procedure was developed which gave very satisfactory results in the transfer of these patients from ship to hospital wards: On advance information, the neuropsychiatrist, with a detail of experienced men, reported at the pier as advisers of the medical superintendent of transports. The medical officer and the noncommissioned officer in charge of the detail boarded the ship and secured from the ship's surgeon and the attendants all possible information regarding the behavior of the patients. Quarters on the hospital boat or the routes to the ambulances were inspected and attendants placed at strategic points—gangways, ports, stairways. Patients from whom trouble could be expected were each placed in charge of an attendant and

landed first. The milder mental cases were grouped and taken next, with several attendants. At the receiving hospital patients were taken off in the same order; thus the more disturbed could be placed in the most protected ward, and the patients who needed no special care could, when necessary, be admitted to the general medical wards.

The customs of the hospitals with regard to diagnosis of general cases were followed. This meant the filling in before midnight on the day of admission of a "classification for distribution" form, of which the following is a synopsis: (1) and (2) Name and identification. (3) Diagnosis. (4) Classed as psychoneurosis, peripheral nerve injury, epilepsy, psychosis, mental defect, convalescent, other medical groups, other surgical groups. (5) Ambulatory or bed patients. (6) Individual attendant, special care or litter.

It is obvious that the future care of patients was dependent, to a considerable extent, upon the accuracy with which the diagnosis was made prior to entrainment for an interior hospital. The ratio of accuracy would be lowered if conditions were such as to limit the time which the neuropsychiatrist might expend in making the diagnosis. After numerous experiences, the neuropsychiatrists of the port arrived at the conclusion that, while theoretically the good of the patient and the service alike would be best served by allowing more time for making the investigations upon which an accurate diagnosis must rest, it was impracticable to secure more time without greatly interfering with general evacuation. In other words, a port of debarkation, by its very nature, could not become a place for scientific niceties of diagnosis. Therefore, an endeavor was made to combine speed with accuracy. That this succeeded in a great measure is well illustrated by the experience and experiments described below.

A large group, 300, was landed at the hospital dock at 6 p. m., where they were enrolled and sent to the ward with Form 55a made out. The ward surgeons assigned each man to a bed and entered the number of the bed on the 55a slip. Supper was then served. Then four men at a time were taken from each of the five wards for delousing. Field cards from overseas arrived at the wards and were matched with the 55a forms, always with some discrepancies which took time to adjust. A neuropsychiatrist stationed himself at the door of each ward, called a patient, read the field card, entered a diagnosis, and checked the appropriate class.

Many diagnoses could be confirmed in a few seconds; epilepsy, for instance, by a history of convulsions antedating Army service, or undiagnosed psychosis by the presence of any delusional remnant or behavior disorder. It should be remembered that such a diagnosis had little of the significance that it had in civil life, merely meaning at the port that the psychotic individual was being sent to a hospital with the proper specialists to care for or discharge him. Therefore, when epilepsy was the term used to describe a disease characterized by convulsions which first appeared under shell fire, a change was made to psychoneurosis in order to make sure that the patient should receive specialized treatment. The diagnosis "constitutional psychopathic state" covered such varied conditions that at first it seemed best to change it; later it was retained and its constituents separated by checking under classification "psychosis, epilepsy, psychoneurosis, mental defect," according to the treatment the patient required.

In questions involving mental defect, patients would remain for a psychologist to examine individually.

When diagnosis and classification had been made by a specialist, the patient took his papers to the ward surgeon, who completed them. The distribution sheets were then ready with the sheets from other medical and surgical wards for early action the next day; from them were made up the travel orders which caught the patient in a system which landed him at an interior hospital. At times a patient would remain several days before entraining and many valuable clinical notes could be entered on his field card. It was found best not to alter his diagnosis, since this meant disarranging complicated travel orders, unless an injustice was being done to a soldier.

Hospital trains formed a medical unit separate from the hospitals. For mental patients, however, the hospitals were asked to furnish additional neuropsychiatric attendants. The 35 trained enlisted men sent to the port at the instance of the Surgeon General "to escort nervous and mental cases from the port to the general hospitals" were used here as well as in the transfer from ship to ward and ward to train. Berths were made without curtains and toilet rooms were specially guarded.

Efforts were made to improve the above-described routine. Attention was first centered on the short time allowed for diagnosis in these difficult cases. As has been stated above, careful consideration made the neuropsychiatrists feel that no increase in time should be asked if such an increase would give mental patients second place in travel arrangements.

The question of discharging patients at the port was raised in an effort to clear beds in interior hospitals. Certificates of disability for discharge were made out for 30 epileptics whose convulsions clearly antedated their enlistment and where treatment could not be expected to improve their conditions. No difficulty was experienced in getting convincing histories. The result was that these patients were held about a month and then sent under escort to widely separated homes, a procedure which resulted in a multiplication of travel orders and a tying up of many Medical Department enlisted men in travel. The scheme was abandoned as having no advantages over immediate distribution to hospitals near their homes.

SUPERVISION AND COORDINATION OF ACTIVITIES

The function of the neuropsychiatric member of the port surgeon's staff was determined by the fact that the port surgeon's office was the first unifying control of independent organizations containing neuropsychiatric officers. The work in all these organizations tended to pile up at intervals, with slack times between. Some central officer was required to move men toward the accumulating work and as promptly get them away when the work was over. The port surgeon acted as spokesman for neuropsychiatric matters to the Surgeon General and to the different organizations under him at the port.

The neuropsychiatric organization came in close contact with and was serviceable to the following officers: Chief medical examiner, in the preembarkation inspection, examination for discharge, examination of permanent personnel; medical superintendent of transports, in the transfer of patients from

ship to hospital, transfer of patients from hospital to train; commanding officers and chiefs of medical service of hospitals, in the assignments of neuropsychiatric officers and enlisted men, and correlations between hospitals; camp surgeon, in preembarkation inspection; attending surgeon, in consultation.

THE PSYCHOLOGICAL SERVICE

Unfortunately, it was not possible to make much use of psychology at the port of embarkation until after the signing of the armistice. A port of embarkation and debarkation, with its constant movement of population, was not an ideal place in which to carry on psychological investigations. While psychological examinations at such ports, because of the nature of the environment in which they are conducted, can not reach the perfection and usefulness which they attain in the relative quiet of interior posts and cantonments; they act to increase very greatly the margin of safety. They were of great assistance in the classification and consequent distribution of sick and wounded from overseas.

PSYCHOLOGICAL EXAMINATIONS

No psychological examinations were made at the port prior to December 1, 1918, except as incidental to other examinations. The return of mental and nervous cases from overseas in considerable number then made it necessary to undertake examinations by neuropsychiatrists familiar with psychological methods. As a matter of experiment, it was desirable to apply group methods of examinations to these patients, and two officers of the Sanitary Corps were assigned to this duty on December 1, 1918.

The functions of these officers were: (1) To assist the neuropsychiatrists in the classification of nervous and mental patients by the group application of a brief neuropsychiatric questionnaire; (2) the reexamination of patients returning from overseas with a diagnosis of mental deficiency; (3) the psychological reexamination of patients returning from overseas with a diagnosis of mental or nervous condition other than mental deficiency. Other duties were the group mental examination of the medical detachments of the embarkation hospital and of Debarkation Hospital No. 51, with the view of eliminating men of low-grade mental efficiency; and the individual mental examination of women detained for examination by the United States Public Health Service at the Newport News Detention Home.

THE GROUP METHOD

The first opportunity to attempt the group method of psychological examination with a large number of mental cases from overseas presented itself on the arrival of the U. S. S. *Zealandia* on December 21, 1918.

It was hoped that the group method would permit a more rapid classification of the patients upon arrival by a more rapid and accurate selection of the mentally deficient; by using a neuropsychiatric questionnaire to indicate those who might be epileptic or paranoid, and by utilizing the patients themselves in filling part of the forms used.

The *Zealandia* docked at 6.30 p. m., December 21, 1918, and the patients were unloaded the following morning. All the examining material and mimeo-

graphed blanks were assembled in a ward of the embarkation hospital. The patients were admitted to the ward at 2 p. m., and by 3 p. m. had been assigned to beds, clothed in pajamas and bath robes, and were ready for examination. The 77 patients were assembled in one-half of the ward on the second floor. Pencils and information blanks were distributed and the patients instructed in the filling of the blanks. Those who were relatively illiterate were assisted by their brighter neighbors. The information blanks were filled out very satisfactorily within five minutes, and were then given to the ward nurse and ward master, who immediately filled out the other forms required.

The *Beta* examination^e for foreigners and illiterates was then given, in order that those who were illiterate might not fail because of that fact. Upon completion of this examination, the neuropsychiatric questionnaire was filled out by the patient, and the patients were returned to their beds by 4 p. m.

The *Beta* papers and questionnaire were then scored. As soon as a paper was found scoring below D (inferior intelligence) one of the examiners called for that patient and gave him a brief individual examination. Five of the 77 patients scored less than 19 points (D), and were therefore given individual examinations. Of these five, one was of such low mentality as to warrant a diagnosis of mental deficiency, assuming that no other cause of low mental age was operative. This patient, Case I, had an overseas diagnosis of psychopathic state; *Beta* rating, D; mental age on Stanford-Binet examination, 8.8. The result of this examination was given to the psychiatrist and a diagnosis of mental deficiency was made by him. From the above facts, it can be seen that only one overseas diagnosis was changed; i. e., from psychopathic state to mental deficiency.

This method of detecting mentally deficient men did not yield positive results of any great significance. The following table indicates that the conditions for examining patients in hospital wards are so unfavorable as to make the group examination less reliable than when used under other conditions; e. g., in examining draft quotas in the cantonments:

Case	Overseas diagnosis	Beta score and rating	Individual examination, mental age	Diagnosis at embarkation hospital
II	Mental deficiency.....	37 D	8.5	Mental deficiency.
III	do.....	41 D	12.0	Do.
IV	do.....	65 C	8.8	Do.
V	do.....	31 D	6.6	Do.
VI	Psychoneurosis.....	23 D	9.3	Do.
VII	Mental deficiency.....	64 C	10.0	Do.

The greatest discrepancy occurred in Case V, who rated D in the group examination and had a mental age of 6.6. In this case it was discovered that the patient had copied from a neighbor. This indicates that the group method needs close supervision. Of the 7 patients who were diagnosed as mentally deficient, 4 would have been referred to the psychiatrists by the psychological examiners on the basis of individual examination. It is

^e The *Beta* examination is the psychological examination which was used by the Army psychologists in examining illiterates and foreigners upon their arrival in camp in draft quotas. For further details, consult: *Memoirs of the National Academy of Sciences*, Vol. XV, Government Printing Office, Washington, 1921.—*Ed.*

doubtful if Case VII (mental age, 10), Case VI (mental age, 9.3), and Case III (mental age, 12) would have been diagnosed as mentally deficient by the psychiatrist had the mental-age data been in his hands at the time he made his diagnosis. Case III seems to have had unusual ability for one diagnosed as mentally deficient, having been within two classes of graduation from a parochial school and having later been employed as a machinist's helper. The psychological examination showed him to have a good knowledge of abstract words, to be able to detect absurdities, to be able to form good sentences using three given words as a basis, and to have good ability in putting dissected sentences together. In fact, he was able to pass some adult tests. Another case where it seemed the mental age would have aided the psychiatrist at the time of his brief interview with the patient was that of Case VI. A psychiatrist from the port surgeon's office picked out this man as an apparent defective. And so he seemed on first impression. The patient was partially deaf, had a thick speech suggesting feeble-mindedness, and was slow in movement. He had been reared in an isolated community and had attended school for only one year. He had been employed as a teamster for the greater portion of his life. His mental age of 10 years was surprising, in view of his appearance and lack of education. The psychiatrist who called attention to this man was convinced, after listening to the psychological examination, that the man was not definitely feeble-minded but that his apparent feeble-mindedness was due to a lack of a favorable environment in childhood and to his defective hearing. This illustrates the value of the individual psychological examination in differentiating a congenital defect and one due to accident or lack of schooling.

From this experiment it seemed that the group method was of little value in examining overseas patients because of the inherent difficulties of conducting such examinations under the conditions existing in debarkation hospitals, and also because the method entailed the needless examination of 90 per cent of the patients. On the other hand, the individual examination of all cases of suspected mental deficiency was of value because it permitted accuracy of diagnosis. Cooperation between psychiatrist and psychologist was thus developed without delaying the important work of rapidly classifying the patients. As the psychiatrist interviewed the patients, he could refer to the psychologist for a determination of their mental age those who appeared mentally deficient. With this information in hand, the psychiatrist could arrive at an accurate diagnosis more quickly. In this plan of cooperation the psychologist performed a function for the psychiatrist similar to that rendered by the bacteriologist for the internist.

In the examination of the patients from the *Zealandia*, inspection of the neuropsychiatric questionnaires revealed only two patients who claimed to have had fits, fainting spells, or convulsions prior to entering the Army. This information was given to the psychiatrist by the psychologist prior to the former's interview with the patients, but proved of no value. Three patients of this group stated that they "had not been treated right in the Army." On the whole, the questionnaire was barren of results. This was due, perhaps, to the fact that the experiment was undertaken in the debarkation hospital

where there was always a rapid movement of patients to interior hospitals. Under other conditions, it might have been possible to devise a group test which would have differentiated roughly the various types of psychiatric cases.

The information blanks filled out by the patients proved workable but not valuable. The nurses and the ward master were able to fill out the forms from the information given by the patients, but it is doubtful if the group method of securing this information was sufficiently economical to warrant its adoption. The nurse who used the information blanks seemed to think that the information could have been secured in the same length of time from the patients when they were lined up preparatory to bathing. If it were necessary to secure this information from two or three hundred patients, it is obvious that a group method would be economical of time. This was rarely the case, the number rarely exceeding 80 in any one ward; therefore, little time would be gained by having the patients fill out the information sheet in groups.

THE INDIVIDUAL METHOD

On January 1, 1919, the next large contingent of nervous and mental cases arrived at the port of embarkation from overseas on the U. S. S. *Princess Matoika*. It was decided to employ individual methods of examination, both by neuropsychiatrists and the psychologist. The success of the method, with certain limitations, was indicated in a report to the Surgeon General, to the following effect:

The *Princess Matoika* docked at 11 a. m. January 1, 1919, and the patients were taken off between the hours of 2 and 10 p. m. The 204 nervous and mental cases were transferred to the steamer *Smithfield*, which carried them to Debarcation Hospital No. 51, Hampton, Va. All cases were placed in wards by 6.30 p. m. No psychological examination of the 91 insane patients was attempted because of their obvious mental condition, although 6 of these cases were diagnosed overseas as mentally deficient. The others were at their beds by 7.45 p. m., having eaten and disrobed. While the chief of the neuropsychiatric service and his assistants checked up overseas diagnoses on the field hospital cards of the men, the psychological examiner passed from bed to bed and, by brief interview, selected nine men for psychological examination who gave evidence of low mentality. A complete canvass was impossible owing to some confusion incident to bathing. It was later found that three cases whom the psychologist would undoubtedly have selected for examination were missed in this way.

Examination of these nine men, without reference to their overseas diagnoses, was begun at 9.45 p. m. It was possible to examine only three patients, because by 11.30 p. m. the remaining 6 patients had gone to sleep. It seemed unwise to continue the examination at such a late hour. The psychological examiner continued the examination the next day, even though the diagnoses had been filed by the neuropsychiatric chief in accordance with the usual procedure. The results were as follows:

Case number	Scale	Mental age	Overseas diagnosis (unchanged by debarkation hospital)
I	Stanford-Binet.....	9.9	Psychoneurosis-ecneussion.
II	do.....	9.3	Psychoneurosis.
III	do.....	9.5	Psychoneurosis-neurasthenia.
IV	do.....	9	Mental deficiency.
V	Performance.....	7.2	Psychoneurosis-hysteria.
VI	Stanford-Binet.....	Over 10	Constitutional psychopath.
VII	do.....	Over 10	Psychoneurosis-psychasthenia.
VIII	do.....	10.10	Constitutional psychopath.
IX	do.....	Over 10	Psychoneurosis.

The examination was discontinued as soon as any patient rated over 10. Three other patients selected for examination were not examined, on the advice of the ward psychiatrist, who believed that their mental deficiency was complicated with other nervous and mental symptoms and that they were therefore in need of further hospital treatment. In addition to the foregoing, Case X was examined at the request of the port neuropsychiatrist because of undiagnosed mental condition. He was not found to be mentally deficient (12 Stanford-Binet).

From the above, it can be seen that at least four patients with a diagnosis of psychoneurosis from overseas should possibly have been diagnosed mentally deficient. The chief of the hospital's psychiatric service concurred in this opinion. However, the time allotted to the neuropsychiatric officers for submitting a classification of the patients was so short as to prevent the utilization of these data. The result was that the diagnosis on the field medical card constituted the basis of classification.

After examining the above cases, the 11 overseas diagnoses of mental deficiency were checked up. By comparison of the names with the list of men examined, it was discovered that only one of the overseas deficiency cases had been uncovered by a personal canvass (Case IV, mental age 9). The overseas mental deficiency patients were then examined with the appended results:

Case	Scale	Mental age	Overseas diagnosis (unchanged by debarkation hospital)
IV	Stanford-Binet.....	9.0	Mental deficiency.
X	do.....	8.5	Do.
XI	do.....	8.3	Do.
XII	Performance.....	9.3	Do.
XIII	Stanford-Binet.....	9.7	Do.
XIV	do.....	9.7	Do.
XV	do.....	Over 11.0	Do.
XVI	do.....	11.8	Do.
XVII	do.....	12.7	Do.
XVIII	do.....	13.2	Imbecile.
XIX	do.....	14.0	Mental deficiency.

From the above, it can be seen that the mental ages of five men diagnosed overseas as mentally deficient were so high as to render the correctness of the diagnoses questionable, which accounts for the failure of the psychological examiner to select these particular cases for examination at the time of the individual interview.

Case XV, mental age 11, was a French-Canadian by descent who had had little schooling, but who had taught himself to read and write English, although

French was his mother tongue. He was a bright-looking young man, and would probably have scored even higher than 11 had time permitted the completion of this particular examination.

Case XVI, mental age 11.8, a Kentucky farm lad with education to the fourth grade, was found to be well oriented, able to make change accurately, to repeat five digits backward and seven digits forward, able to do "clock" problems, and to show a fair degree of practical judgment.

Case XVII, mental age 12.7, was only slightly below the average soldier in mental ability and by no means to be considered deficient. Had reached the fifth grade in the schools of Baltimore, Md., read and wrote well; employed prior to Army service as a box maker at \$15 a week. He was not very prepossessing in appearance but would not be considered a defective from his appearance.

Case XVIII, mental age 13.2, diagnosed overseas as an imbecile, was an illiterate but self-supporting Alabama cottonmill hand, who had excellent mental power for one without an education and was by no means to be considered an imbecile. He performed all of year 10 tests, 4 out of 5 tests in year 12, and 3 out of 4 in year 14. His only failures up to year 16 were inability to repeat five digits backwards and seven digits forward.

Case XIX, mental age 14; was a normally intelligent man with a slight congenital speech defect which might easily have given a wrong impression as to his mentality; schooling to the fourth grade; worked in civil life at embalming and at driving an undertaker's wagon. His mental age indicated a mentality higher than that of 40 per cent of the general run of draft as judged by tabulated results of psychological examinations. He was able to repeat six digits backward and able to differentiate abstract terms, such as idleness and laziness, character and reputation, with fair judgment.

The chief of the neuropsychiatric service concurred in the belief that the overseas diagnosis of mental deficiency could not be sustained in these particular cases. The psychological examination of the remaining six overseas mental deficiency cases confirmed the diagnosis made. The psychologist had selected one of these in his individual interview, leaving five cases that he had apparently missed. It was found that three of these had been at their baths, and consequently only two who should have been selected had been missed in the individual interview: Case XI (8.3), a negro, and Case X (8.5). The reasons for the failure to select Case X for examination can be found in the fact that he had schooling to the sixth grade and two years of trade school, and the possibility of mental deterioration.

PSYCHOLOGICAL RATING OF MEDICAL DETACHMENTS

The entire medical detachment of Debarkation Hospital No. 51 and a portion of the detachment at the embarkation hospital, Newport News, were given the *Alpha* examination during December, 1918, by groups of 100 to 200. The purpose of the examination was to classify the men according to their mental ability, to discover men of unusual mental ability who were serving in low-grade types of work, and to facilitate the discharge of incompetents who might be shown to be such by reason of low mentality. The results of the

examination showed rather a high percentage of low-grade men in both hospitals. In order to improve the service a number of these were given their discharges and their work was taken up by higher grade men.

The value of psychological ratings in the selection and promotion of men for more responsible positions is indicated in the results of the examination of a group of 99 unselected enlisted men taking the *Alpha* examination at the embarkation hospital. The men were requested to write their actual kind of duty in the hospital on the blank. The results are as follows:

Occupation	Psychological rating						Total
	A	B	C+	C	C-	D	
Clerical workers.....	1	3	2				6
Detachment sergeants.....	1	3		1			5
Ward masters.....		3	3	1	1		8
Corporals.....	1	2	1	2			6
Ward attendants.....	3	1	3	10	1	3	22
Ambulance service.....		1		2	1	1	5
Cooks.....		1	1	6	2	4	16
Kitchen police.....			2	8	3	9	25
Medical warehouse.....				1	1	2	4
Latrine orderlies.....					2		2
Total.....	6	14	12	31	11	19	99

Computing the average score by points and letter rating, the occupations are arranged in order of score made:

Number	Occupation	Score	Rating	Number	Occupation	Score	Rating
6	Clerical workers.....	117	B	5	Ambulance service.....	55	C
5	Detachment sergeants.....	109	B	16	Cooks.....	44	C-
8	Ward masters.....	94	C+	25	Kitchen police.....	37	C-
6	Corporals.....	86	C+	4	Medical warehouse.....	32	C-
22	Ward attendants.....	67	C	2	Latrine orderlies.....	28	C-

The number of cases was not large enough to warrant far-reaching conclusions, but there were sufficient data to show a relationship between the mentality of the men and the kind of work they were doing. The intelligence rating in the above list decreased in proportion to the degree of mental ability needed in the doing of the work satisfactorily. The above data indicate the value of psychological ratings in assigning or promoting men to more responsible duties, especially when little other information is available concerning the relative ability of the men. The data are further indicative of the fact that men in a detachment can be classified for suitable duty within one or two hours with almost the same degree of certainty as by the longer method of assigning and reassigning, extending through a long period of intimacy with the men in question.

ORTHOPEDIC SERVICE

The necessity for final orthopedic examinations became increasingly apparent in connection with the various medical examinations which took place prior to the embarkation of troops. Immediately upon the arrival of troops destined for overseas service, arrangements were made with the organization commanders for an orthopedic examination of their commands. This consisted chiefly in the determination of previous or existing disabilities of the

feet and joints as well as the liability of recurrence of conditions which would render the soldier unfit for overseas duty. As a result of these examinations made in connection with the preliminary medical examination, officers and men were recommended for overseas duty, for domestic service, or for discharge on surgeon's certificate of disability.

A course of lectures was conducted by members of the orthopedic board for officers and enlisted men of arriving organizations. Special stress was laid on the importance and necessity of maintaining the feet in perfect condition while on active campaign. Instructions in the prevention and treatment of minor foot injuries were given. This included the distribution, to each officer and noncommissioned officer, of the booklet entitled "Minor Foot Ailments," issued at the instance of the Surgeon General.

An orthopedic board was established at the port in March, 1918. The functions of the board were as follows: (1) The examination of soldiers prior to embarkation; (2) the classification of the unfit in the casual detachments for limited service, domestic service, or domestic interior service; (3) consultations on special cases, both in the camps and at the embarkation hospital.

By the end of April, 1918, the orthopedic work included the examination of troops at Camp Stuart, Camp Hill, Camp Morrison, and Camp Alexander, with consultation at these camps and at the embarkation hospital. It was found necessary to increase the number of orthopedic surgeons in order to maintain a high degree of efficiency in this work and properly to conduct the pre-embarkation examinations of the rapidly increasing number of troops arriving for overseas duty. The orthopedic board then consisted of three members, a major, a captain, and a lieutenant. The number of arriving troops continued to increase rapidly and it became necessary to request a second augmentation of the board by the close of May, 1918.

The examinations were conducted in the mess halls of the various companies, each officer examining one company at a time. Shoes and socks were removed and the feet examined manually and by the use of selected exercises. The following classification table was prepared with a number assigned to each condition, in order to systematize the recording of the pathological and physical defects discovered by the examinations:

- | | |
|----------------------------------|---------------------------------|
| 1. Weak feet. | 13. Corns. |
| (a) With subjective symptoms. | 14. Callosities. |
| (b) Without subjective symptoms. | 15. Warts. |
| 2. Flat feet. | 16. Ingrown nail. |
| (a) Flaccid. | 17. Horn nail. |
| (b) Rigid. | 18. Supernumerary toe. |
| (c) Spastic. | 19. Webbed toes. |
| 3. Loss of transverse arch. | 20. Intertrigo. |
| 4. Cavus. | 21. Blister, abrasion, fissure. |
| 5. Equinovarus. | 22. Short heel tendon. |
| 6. Hallux varus. | 23. O. K. |
| 7. Bunion. | 24. Inflamed heel bursa. |
| 8. Hallux rigidus. | 25. Relaxed circulation. |
| 9. Hammer-toe. | 26. Hyperidrosis. |
| 10. Claw-toe. | (a) Bromidrosis. |
| 11. Overriding toes. | 27. Exostoses. |
| 12. Amputated toes. | 28. Tenosynovitis. |

Preembarkation physical examinations practically ceased with the signing of the armistice and demobilization examinations began immediately. Boards of demobilization examiners were formed for this purpose, which included members of the orthopedic board. The inspection and examination of orthopedic cases debarking from overseas necessitated a change in the operations of the orthopedic board. Such cases began to arrive in considerable numbers within a week after the signing of the armistice, and were first inspected on board arriving transports prior to landing. A second examination was made at the hospital to which they were transferred, and a third just preceding entrainment. Splints, traction apparatus, and plaster work were carefully examined at these inspections and corrected when necessary. Faulty positions, pathological changes, and physical disabilities were carefully studied and appropriate treatment was instituted.

About 90 per cent of men examined were found without listed orthopedic conditions. Corns, bunion, hallux valgus, hyperidrosis, horn nail, weak feet, ingrown nail, and overriding toes, in the order mentioned, were the commoner conditions noted.

LABORATORY SERVICE

Laboratory service for the port of embarkation was furnished by the laboratory at the embarkation hospital, Camp Stuart. This laboratory was inaugurated early in December, 1917, in the temporary hospital, with an equipment consisting of a microscope, a few stains, and a meager amount of glassware. The hospital was moved to its later site in January, 1918, and two small rooms were assigned for the use of the laboratory. As there was no gas supply, and no bacteriological equipment had been received, it was necessary to borrow media and incubator room from the United States Public Health Service. The personnel then consisted of one officer and one enlisted man. During the latter part of March, 1918, the laboratory was expanded by the addition of two rooms, and its personnel was augmented by an officer and three enlisted men. Gas from the city mains was installed at about this time.

An officer arrived in April, 1918, to study the laboratory situation. Proper incubator space, an additional room, and better cooperation between the clinical services and the laboratory were secured through his efforts. Supplies, which up to this time had been very slow in arriving, were received promptly. Studies on the respiratory diseases then prevalent in the port were inaugurated a short time later. There were three officers and five enlisted men in the laboratory at that time, and it was able to meet practically all of the demands made upon it. Ten enlisted men were on duty in the laboratory by June, 1918, and an animal house was built which gave adequate housing to the supply of animals on hand.

An ever-increasing number of demands was made on the laboratory with the beginning of the summer season and the increase in overseas troop movements. The appearance of malaria was the occasion for the inauguration of a system of reporting positive cases and of close cooperation with the malarial drainage detachment. The occasional cases of meningitis and diphtheria among troops bound overseas necessitated arrangements for the quick determination of carriers. Accordingly, upon the discovery of a positive case by the laboratory,

the camp surgeon concerned was notified and he at once quarantined all contacts with the case, and an officer from the laboratory then proceeded to culture these contacts. It was thus possible to release from quarantine the next morning all negative contacts and to arrange promptly for the disposition of positive or questionable carriers. It was deemed advisable to examine the stools of all civilian food handlers in the port for typhoid and dysentery on account of the occurrence of a number of cases of enteric disturbance in the permanent garrison. This was done and resulted in the finding of one carrier of bacillary dysentery, Flexner type. Close cooperation was maintained between the laboratory and the sanitary officials of the port in the control of the water and sewage situation.

A temporary branch laboratory was established at Camp Alexander during the months of September and October, 1918, to assist in the campaign against hookworm and gonorrhoea. Two officers and one enlisted man were assigned from the main laboratory and took with them such supplies as were necessary to inaugurate the work. These officers made routine examinations of the stools of several labor battalions for intestinal parasites. Examinations of routine smears from cases of gonorrhoea were also carried out in conjunction with the clinicians, in an effort to coordinate treatment with the results of treatment as shown by the microscope.

The increasing work and the scarcity of laboratory officers made the question of skilled technical assistance an acute one. As there were 3 women technicians and 5 officers on duty in the laboratory, the question of training competent enlisted men for commission in the Sanitary Corps was considered. Enlisted men who were college men or who had had technical training were secured and a regular course of instruction was carried out. Under this plan, the men spent a certain definite time in each department, learning the routine bacteriological and clinical microscopic work under the officer in charge or under the women technicians doing the work. By giving the women fixed posts, it was thus possible to transfer and train the men without having the routine work suffer. It usually meant a double check on each specimen. The men were encouraged to study and were to be found in the laboratory almost every evening, busy with the various textbooks. Three enlisted men were thus prepared for commissions in the Sanitary Corps by the time the armistice was signed, and the other men were making such progress that two would have been ready every two months had the war continued. The good effect upon the morale of the enlisted personnel was marked. Each man saw the possibility of a commission dependent upon his efforts and worked accordingly.

The work of the women technicians was accurate and reliable, on the whole, but the large amount of emergency work and frequent demands for long hours constituted too heavy a tax upon them. They frequently lacked initiative and adaptability to the unusual conditions which, of necessity, obtained at the laboratory, and their feeling of superiority to the enlisted personnel constituted a source of friction. This militated against the achievement of the highest degree of success in their work and, in all probability, would not have occurred in a laboratory devoted entirely to research or to routine operations.

The building occupied by the laboratory soon proved entirely inadequate for the character and the amount of work. It was at first thought that it would be

possible to enlarge the old building and thus provide the additional room needed. It was found, however, that sufficient room could not be had on account of fire regulations, and that the additional room that could be made could not be coordinated with the rest of the laboratory without a great deal of lost space. An entirely new structure was deemed advisable, and plans for a two-story tile building were prepared and forwarded to the Surgeon General for approval. These were approved and construction was begun. The construction progressed irregularly on account of labor troubles, and the building was finally occupied on January 7, 1919. Even then, there was much minor work to be finished. In spite of the inconvenience caused by workmen in the building, it became possible to organize and coordinate the work of the laboratory in a way never possible in the old building. The plan of the new building made it possible to so arrange the departments as to cause a minimum of disturbance in the work.

The new building, with the consequent broadening of the work, required an increase of personnel to 12 officers and 34 enlisted men. The laboratory was equipped and manned to do any work asked of a department laboratory and served the whole port in that capacity. In order to give the hospitals of the port the benefits of the laboratory, a daily courier service was inaugurated to Debarkation Hospital No. 51 and Camp Morrison hospital. These couriers delivered reports and such materials as had been requested the previous day and brought back to the laboratory specimens for examinations.

It was the policy of the laboratory to encourage such research as it was possible to carry on in conjunction with the routine work. It was possible to make a study of the bacteriology of the 1918 epidemic of influenza in the port, in spite of the sickness of half of the officers in the laboratory. Studies were made of the bacillary dysentery organisms isolated from cases of dysentery. Investigations were carried on to determine the possibility of indirect transmission of sputum-borne diseases.

THE DENTAL SERVICE

The Dental Corps began operations at the port, August 22, 1917, when one dental officer and two enlisted assistants established an office in the Western Union Building in Newport News, there being no Government building available. The equipment in use was purchased from the dental officer on duty. Two more dental officers reported for duty on October 27, 1917, and a portable dental outfit was then installed. The dental office was removed to the temporary embarkation hospital at Camp Stuart on November 20, 1917, and remained there until the permanent hospital was completed in January, 1918. Nine dental officers were assigned to the hospital at this time, and, pending the arrival of base equipment, the dental services were conducted in conjunction with the laboratory department. Space was finally provided in storeroom No. 1, which later was remodeled to suit the dental and the eye, ear, nose, and throat clinics. The dental clinic building was occupied July 13, 1918, and had 10 separate operating rooms, a prosthetic laboratory, a record room, and a waiting room. The equipment was all of the base type and complete in all details. When headquarters building of the port was completed in the city, a dental clinic was established in the attending surgeon's office to care for the staff at headquarters and the officers' families.

Twenty-seven dental officers were on duty on September 24, 1918, stationed as follows: 10 at the embarkation hospital; 3 at Camp Stuart; 6 at Camp Hill; 5 at Camp Alexander; 1 at the attending surgeon's office; 1 at the engineer depot; 1 at the ordnance depot. The equipment at this time consisted of 11 base and 16 field outfits, with 1 laboratory equipment at the embarkation hospital. A request had been made for the construction of three unit buildings capable of accommodating approximately 20 operators each. The plan was to place one building in each of the larger camps and one in the port, and to equip them with the base type of equipment, complete in all respects. Prospects for the fulfillment of this need were bright, but the signing of the armistice caused the plans to be dropped.

Geographical conditions of the port necessarily spread the dental activities over a considerable area on both sides of the James River. Stationed at the port were 17 fire and guard companies of approximately 250 men each, all limited service men presenting many varieties of dental conditions. Many dental mechanical restorations were necessary for the members of these companies, and the construction of same was accomplished at the embarkation hospital laboratory by experienced men. Excellent results were obtained in this branch of the work.

Three more dental officers reported for duty during October, 1918, making a total of 30 on duty.

The Air Service station, Camp Morrison, Va., was made a part of the port on October 17, 1918. An excellent dental clinic had been established in its camp hospital, with three complete base equipments. Plans were completed at this time whereby the soldiers' home at Hampton, Va., was converted into a debarkation hospital. Two dental officers and complete base equipments were assigned to this hospital. Fourteen dental officers reported for duty during November, 1918, making a strength of 44 officers at the port. This number slightly exceeded the equipments in use in the available space. The camp hospital, army supply base, Norfolk, Va., was completed during this month and two dental officers were assigned there for duty.

The average weekly strength of the port had been approximately 30,000 men. As the population was mostly of a temporary character, inasmuch as it consisted chiefly of troops for embarkation, their stay being for a period of 4 to 10 days, the character of the dental work varied. Efforts were made to treat as many men as possible yet render the maximum amount of service to each man. Special effort was made to remove all unserviceable teeth and to repair all simple carious conditions of the teeth, with other necessary prophylaxis, before dismissing the patient. From September, 1918, to August 30, 1919, the following conditions were cared for:

Total patients treated.....	21, 132
Total sittings given.....	33, 125
Permanent fillings inserted.....	19, 759
Unserviceable teeth extracted.....	7, 057
Prosthetic restorations.....	914
Root canal fillings.....	1, 437

In respect to the number of patients treated and the number of sittings given, the conditions existing at the port should be taken into consideration.

As stated, the object was to cover as much individually as was possible considering the short period the troops remained in the port. This accounts for the fact that root canal fillings were not relatively great in number.

No expense was spared in material, and the effort resulting in the use of the material and equipment was in direct ratio to the ability and care of the operator. Efforts were successfully made to standardize amalgam and root canal technique. The resin-chloroform method of filling root canals was most adaptable and proved very acceptable. The element of time was the greatest handicap to the dental operator. Many men accepted for the service were dentally deficient. With the men's time so fully occupied with varied sorts of military training under pressure, many were not brought to a point of dental fitness. This fact often left the dental surgeon to choose between extraction and an attempt to restore the tooth. Considering the after results of root canal work when improperly or too quickly completed, extraction was frequently preferable.

The permanent fillings consisted of gold, amalgam, amalgam combinations, oxyphosphate, and synthetic porcelain. The gold fillings were largely performed upon officers and at their personal expense, as regulations forbade the use of gold or other precious metals upon enlisted men except in certain authorized cases. All anterior teeth were restored with synthetic porcelain fillings or porcelain crowns. The mechanical prosthetic restorations consisted chiefly of vulcanite dentures, mostly of a partial type.

Figurative tabulation of the above conditions would not give a balanced comparison, due to the fact that the system of recording cases was not as comprehensive as it might have been. Variance in diagnosis in the individual operator to a great extent retarded the proper completion of the register cards. It was believed that a system of charting should have been used whereby the man's dental condition at the time of entrance into the service and each subsequent operation would have been charted. This would have furnished a basis on which progress could have been determined. His dental condition at all times should have been made a part of his service record, thereby enabling his commanding officer to determine the dental fitness of his men at any time, and also to act as an aid in identification.

Oral surgery was limited to minor conditions, due to the fact that the sick and wounded from overseas were retained at the port only for a period of classification and were then transferred to general hospitals. This fact contributed to the condition of unsatisfactory results to a great degree, as the follow-up results of the cases could not be recorded.

THE VETERINARY SERVICE ^d

The one port veterinary service developed by the Army during the World War was that of the port of embarkation, Newport News, Va. This service consisted of two main divisions, that of the port of embarkation proper and the animal embarkation depot.

^d The following account of the Veterinary Service, port of embarkation, Newport News, Va., is based, in the main, on: "History of the Office of the Port Veterinarian, Port of Embarkation, Newport News, Va." by the port veterinarian. On file, Record Room, S. G. O., 314.7 (P. of E., Newport News, Va.) N., and "Activities of the Veterinary Division S. G. O.," by Col. C. F. Morse, M. C. On file, Historical Division, S. G. O.

PORT SERVICE

The senior veterinary officer was an assistant to the port surgeon from the time of the organization of the port until Special Regulations, No. 70, War Department, was published early in 1918, which placed him under the port commander. His relation to the port surgeon then became that of consulting veterinarian, and his assistance was of particular value in the matter of meat and dairy inspection. His other duties were the supervision of veterinary sanitation, meat and dairy inspection, sanitary inspection of animal transports, assignment of veterinary officers and enlisted personnel, supervision of the loading of animals, supervision of medical supplies, forage, grain, and animal equipment for all transports, etc. He maintained an office in the administration building, and was a member of the transport inspection board, which conducted a general inspection of all Army transports entering the port of Norfolk, Va. This board was composed of one officer of the Inspector General's Department, one assistant to the surgeon, the port veterinarian, and a representative of the Shipping Board. A quarantine station for animals returned from overseas, established after the armistice was signed, under the supervision of the port veterinarian, had facilities for caring for 200 officers' private mounts. The veterinary personnel consisted of an officer, in charge, and 98 enlisted men of the Veterinary Corps.

ACTIVITIES CONNECTED WITH THE SHIPMENT OF ANIMALS

The shipment of animals overseas was inaugurated October 15, 1917, and continued until March 22, 1918, when it was temporarily discontinued. Shipments were resumed August 12, 1918, and finally discontinued November 30, 1918. Twenty-five veterinary officers were designated at an early date to act as transport veterinarians, each permanently detailed to a ship. Casual veterinary officers were used as transport veterinarians when necessary. Veterinary units ready for overseas service were sent to Newport News and their personnel assigned to duty on animal transports for the trip. This often scattered the personnel, that of one unit being divided among several ships. It furnished veterinary attendance on the transports, but at the expense of the efficiency of the units. Other casual troops were used for the purpose when veterinary personnel was not available. This use of casuals insured a new and inexperienced detachment of attendants each trip, with consequent confusion and loss.

The unsatisfactory conditions arising from the lack of a permanent enlisted force led to a recommendation from the remount division of the Quartermaster General's Office that permanent detachments of enlisted Veterinary Corps men be assigned to each boat to provide for the care of animals. The recommendation was not concurred in for the reason that the enlisted Veterinary Corps was for the purpose of caring for sick animals and it seemed improper to assign them as caretakers of animals in transit. At the same time the necessity of a small veterinary detachment to assist the transport veterinarian in caring for the sick was freely admitted.

The use of civilian employees was suggested and failed, by reason of the difficulty in securing suitable men. Eventually, authorization was received

for the addition of 300 enlisted men to the veterinary detachment at the animal embarkation depot, Newport News, where they were trained as a part of the permanent detachment which was drawn on to furnish a detachment of 20 men for each horse transport. The actual care of the animals continued to be rendered by casual troops.

The veterinary detachment was intended to assist the transport veterinarian in treating the sick and for general supervision in caring for the animals. On the return trip the cleaning and disinfecting of the ship was done under veterinary supervision. This arrangement proved satisfactory.

All animals were given a thorough examination, such as being mallein tested and their temperatures taken, as well as being thoroughly examined otherwise at the animal embarkation depot. They were then haltered, tied together in groups of 4 and led a distance of about $3\frac{1}{2}$ miles and placed in what were designated as Pier No. 5 corrals. This was done the day previous to embarkation. They were fed the usual grain allowance in the afternoon and were allowed hay in an unrestricted quantity during the night, drinking water being available at all times.

On the day of loading, they were put through the chute and there examined by a veterinary officer for overnight developments, such as nasal discharge, injuries, contused, lacerated, and penetrating wounds. All those passing this inspection were led to the pier to be loaded. They were again examined by the transport veterinarian at the pier gate; membranes were examined, pulse noted, respirations counted, mouth examined, submaxillary and parotid glands palpated. Any animals showing symptoms of coryza, even to the slightest extent, were at once rejected. All animals rejected by him were reported in writing to the port veterinarian, with a statement as to the number and cause of rejections.

Previous to loading animals, all stall-division boards were removed in each compartment and set aside in a convenient place where they could be reached in the least possible time to expedite loading.

The brow, in the meantime, had been attached to the ship. The closed-side brow was the type used at this port and proved very satisfactory.

The animals were then led to the entrance of the brow and were led aboard ship or were turned loose in the brow and driven aboard. The lower decks were loaded first. The animals were led to the farthest stall in the compartments and tied to the breast board.

When the desired number of animals had been placed in each stall, division boards were put in place. Stalls in which it was desired to load no animals were placarded with a printed placard, "NO STALL."

All transports, before being loaded, were inspected by the port veterinarian in regard to the suitability of the fixtures and the water supply, and the forage as to quantity, quality, and place of storage. This inspection also included stable utensils, such as forks, brooms, shovels, buckets, and feed pans. All animals were led aboard ship by employees of the company which had the contract for placing animals aboard. This could have been done more economically by enlisted men, as the men employed by the firm were largely inexperienced in handling animals and were constantly being changed to other

duties, and it was only on rare occasions that an experienced crew was available. This naturally retarded the loading. An enlisted personnel of 50 men could have done the work better and in a much shorter space of time.

The port veterinarian requisitioned for the necessary veterinary medical supplies and instruments.

All inspections of transports, when possible, were made in ample time so that recommendations for the correction of irregularities could be made to the commanding general and corrected as per his command prior to loading animals.

The remount officers cooperated with veterinary officers in every way possible and rendered as much assistance as they could at times of loading. They supervised the haltering of animals and the leading of same to the piers and aboard ship.

Transports used in the first shipping period were equipped much better than those in service during the following period. The superstructure and stalls on the weather deck were more securely anchored. The breast boards were held in place by strong iron cleats, one breast board to each stall, and could therefore be removed in sections. Those in the transports used in the latter period were bolted on and provided a removable board at 30-foot intervals only, thereby often necessitating the removal of an 18 or 20 foot board which was secured to the stanchion by bolts in order to remove one animal from a stall. This greatly interfered with the proper policing of the ship, and was a great inconvenience in case it was desired to move the animals.

The stalls were generally 8 feet in depth and 10 feet in width, accommodating four animals. Some transports were fitted with individual stalls during the latter period. These proved to be entirely unsatisfactory for the following reasons: They gave the animal less freedom than the 4-animal stalls; they were not as accessible to police; the dividing boards were not fastened securely and the animals were continually knocking them down.

All transports were equipped with bell-mouth funnel ventilators and wind sails, and a great many with the blower-fan system. The allowance of air space was decidedly deficient, averaging about 338 cubic feet per animal, when the allowance for ordinary conditions should have been 1,500. It is apparent that the ventilation should have been as nearly perfect as possible. The blower-fan system gave a great deal of trouble, due mainly to the improper installation of the electric motors. These were usually installed on the decks and would short-circuit and fail to operate when wet by surplus water on the decks. While the ventilating system would appear inadequate upon casual observation, it really functioned in a quite efficient manner, as was proved by the large percentage of animals which were debarked in excellent condition. Animals were often sent to active duty within a week after their arrival overseas. On the other hand, there were 13 deaths from influenza and pneumonia on a transport which put in to New York and was held six days for repairs without unloading the animals. These deaths were attributed largely to the lowered powers of resistance of the animals as a result of the poor ventilation while the ship was lying at anchor.

The ships used in animal transportation were not built for that purpose, consequently the drainage system was entirely inadequate. The drainage

or scupper pipes were about 3 inches in diameter, and it required the constant attention of one person in each compartment to maintain a proper drainage.

The water supply was adequate and the quality good, as a whole. It was stored in tanks in the hold and pumped to the different horse compartments. Barrels were placed about 50 feet apart along the water-pipe line and the animals were watered with buckets.

Following are the specifications for horse fixtures on animal transports.

Preparation.—All compartments selected for accommodation of animals to be thoroughly cleaned out and washed down, as necessary, and placed in proper condition for the erection of stalls.

Deck covering.—'Tween deck to be sheathed in horse stalls and in passageways only and to be of 2-inch spruce or yellow pine. Sheathing of sectional flooring taken from other vessels to be used as far as practicable. If there is not sufficient sheathing to cover the decks as required, new and similar sheathing will be furnished and installed by the contractor.

On the main and upper decks, instead of sheathing there will be footlocks 2 by 4 inches thoroughly secured to wood decks by $4\frac{1}{2}$ -inch nails, with suitable openings for drainage. The first footlock will be placed 16 inches inside of foot board and the other spaced as follows: 14, 26, and 14 inches between.

Stalls.—All stalls for animals will be arranged with animals standing athwartship, facing fore-and-aft passages. Stalls to be arranged to accommodate one horse, allowing 30 inches in width for each horse. Length in clear 7 feet 6 inches to 8 feet where possible. Passages between stalls to be not less than 4 feet, but may be reduced to 3 feet 6 inches abreast of hatches, if necessary. Where mules are to be carried 5 mules will be placed in the space occupied by 4 horses; that is, the mules will be placed in pens of 5, using the space of 4 horses.

Front stanchions.—To be spaced 5 feet center to center and to be of 6 by 4 inch yellow pine dressed on all sides, corners rounded and made smooth. All stanchions will have a 2 by 4 inch tenon to receive athwartship beams, this tenon to be 4 inches high.

In the way of horses heads, the front stanchions to be covered with galvanized iron, with the edge of sheets well nailed.

Heels of stanchions to rest on deck and to be thoroughly braced in position with 3 by 4 inch yellow pine or spruce.

Rear stanchions.—To be 6 by 4 inch by 7 feet 6 inches high from deck to shoulder and spaced to suit front stanchions. Rear stanchions will have a 2 by 4 inch tenon to receive athwartship beams, this tenon to be 4 inches high.

The rear stanchions to be set against rail and secured by means of hook bolts. Back of stanchions to be filled flush with outside of rail to admit of the outside sheathing being properly secured thereto. The filling piece and outside piece to be through-and-through bolted to rear stanchions by $\frac{5}{8}$ -inch screw bolts.

Heels of these stanchions to be secured by bracing same as the front stanchions.

Beams.—Beams must be of good sound spruce or hard-pine lumber 4 by 6 inches, to run clear across the ship's beam where practicable. Should any horse or deck fittings be in the way, the beams should butt up closely to same. These beams shall have a 2 by 4 inch mortise to receive the tenon of each and every stanchion and to take the same crown as deck of ship by springing down to shoulder of outside stanchion and to be properly pinned or nailed to tenon and wedged tightly afterwards. Diagonal braces on each stanchion on both sides of same running to top beam, secured by well nailing to both stanchions and beams. The mortises shall be cut not less than 6 inches from outside ends of beams.

Roof.—To be $1\frac{1}{2}$ inch or 2 inch tongued-and-grooved yellow pine, as obtainable, and carried over 2 feet in front beyond line of front stanchions. This roofing shall be laid close and driven tight.

Back sheathing.—To be $1\frac{1}{2}$ inch or 2 inch thick yellow pine, as obtainable, on outside of stanchions, extending from deck to roof. Where there are no obstructions, similar sheathing will be worked on the inside of outboard stanchions to a height of 5 inches above deck. Where obstructions occur, such as stanchions, braces, rigging, etc., 3 by 4 inch stanchions shall be set clear of all obstructions and receive sheathing.

Breast boards.—To be $9\frac{3}{4}$ by $2\frac{3}{4}$ inch yellow pine or spruce dressed and fitted with galvanized iron on rounded top edge. Breast rails to be filled with iron cleats and toggle pins, the fittings removed from other ships to be used in this instance. Footboards, 3 by 9 inches to be installed on the outside of stanchions in passageways, fastened with $4\frac{1}{2}$ -inch nails.

Parting boards.—To consist of one board 2 by 9 inches dressed on both sides and rounded on top edge, the stanchions to be cleated to receive these parting boards. Midway between all stanchions there will be installed a 2 by 6 inch pine upright secured to headboard and to footboard and cleated in a similar manner to the stanchions to receive the parting boards.

Fittings.—A screw ringbolt for hitching purposes to be installed on each stanchion. A hole to be drilled in breast board in the way of each stall, about 1 inch in diameter.

Fittings on 'tween-decks for horse stalls are to be similar to those on upper deck in every respect, except that that roof is to be omitted.

'Tween-deck stanchions to be secured by bracing at heels and head of stanchions, across the ship. These braces shall be 2 by 3 inch yellow pine. A piece of 2 by 3 inch pine shall be driven tight between the beams and secured by nailing to the head of front board stanchions.

Scuppers.—All scuppers throughout the ship to be cleaned, thoroughly repaired, and put in good working condition and to be fitted with proper strainers and means for washing down.

A passageway of at least 18 inches to be left in way of scuppers.

Brows.—Brows to be provided for hatchways to Nos. 2 and 3, to enable animals to be led to the compartments from the upper deck. These brows to be strongly made of 3 inch timber for the bottom and 2 inch for the sides, the sides to be dressed smooth on one side. Brows to be well cleated with 3 by 4 inch pine spaced 4-inch center to center. Protection rails to be suitably built of 2-inch material; side rails also be 2-inch material carried on stanchions 4 by 4-inch spaced about 5 feet apart.

Lighting.—Animal compartments will be properly wired to provide a sufficient equipment of electric lights throughout, in number, about as follows: Main deck, 50; 'tween-deck, forward, 17; 'tween-deck, aft, 17.

All wires to be run in conduit; suitable panel boards and switches for controlling these lights to be furnished. All light sockets in all compartments to be of the snap-switch type. Conduits to be carefully run for protection and properly supported.

Water service.—A permanent water service of not less than 2-inch diameter galvanized-iron pipe to be fitted in main and 'tween decks carried fore and aft, with cross sections to opposite sides. A cock to be fitted at convenient distances, say, 50 feet apart, with a hose connection 5 feet long. A hose connection to be run from pipe line below up through hatchway to upper deck. Spigots to have male hose outlet connections.

Barrels to be placed on all decks in the way of taps specified above, from which buckets for watering the animals can be filled.

Ventilation.—These will be 6 cowl ventilators, 4 forward and 2 aft, as per blue print attached, and as specified below, installed where directed to ventilate the main deck, and 6 aft to ventilate 'tween-decks.

Ventilation will be made in accordance with the blue print, details and dimensions to conform to type of standard 18-inch cowl ventilator specified. Cowl head to be made in four pieces, using No. 14 United States standard gauge galvanized sheet iron. Lower course to be made of same material, lapped 1 inch, with rivets spaced 2 inches on center line, driven flush outside. All courses of ventilation above weather deck to be No. 18 United States standard gauge galvanized sheet iron, lapped 1 inch and similarly riveted. All courses below weather deck to be of No. 20 United States standard gauge galvanized sheet iron, let through decks and secured in place as shown.

Ventilation will be provided with two $\frac{3}{4}$ -inch wrought-iron trimming handles, riveted to cowl. Cowls to be portable and to have sufficient working clearance so as to be capable of being easily trimmed at all times.

Flanges on weather deck to be of 3 by 3 by $\frac{1}{4}$ inch angle iron riveted to vent and welded continuous. Angle flanges to be set down on 4 by 4 inch circular yellow pine margin pieces, where decks are not sheathed with wood. Butts of margin pieces to be properly calked and payed. Tared felt liberally coated with white lead will be laid on deck before margin pieces are fitted in place, and again between angle-iron flanges and margin pieces. Bolts used to

hold angle flange down to be $\frac{5}{8}$ -inch through bolts, 12 in number, fitted with galvanized-iron extra-heavy grommets. Flanges and margin pieces to be similarly fitted on between decks, except that margin pieces will be $2\frac{1}{4}$ by 4 inches. Wood to be properly leveled so as to allow ventilator to set plumb.

All bare iron to receive one coat of first-quality red lead.

Contractor will submit a separate price in quintuplicate:

a. For each portable cowl, including wrought-iron band and trimming handles, furnished and installed.

b. For each deck flange furnished and installed.

c. Per foot of ventilator courses furnished and installed above and below decks. (As special specifications may require for individual ships.)

It is agreed that any fittings or appliances temporarily removed to facilitate the installation of any of the ventilators will be reinstalled upon the completion of said installation by the contractor.

The contractor will also submit a separate price, quintuple, to cover the cost of items a, b, c, exclusive of installation on ship. (Six separate prices in all to be submitted.)

Workmanship.—All workmanship, material, and general arrangements of the stalls to pass the inspector appointed, who may make any reasonable alterations in this specification while the work is in progress. Workmanship to be carried out in first-class manner.

NOTE.—All stalls in way of cargo hatches on upper deck to be made portable.

To accompany plan of ventilation.—This plan is merely a typical one, and is intended to illustrate the wishes of the director of shipping, outports, as to the approximate location and arrangement of cowl-head ventilators to be installed in animal transports when animals are carried on one or more underdecks. It is understood that any ventilators of this type found in the ship are to be, as far as possible, utilized. The locating of the new ones will have to be governed by the structural and operating details found. At the time of locating it is important not to use any more animal space than is absolutely necessary and to avoid, in arranging uptake or exhaust groups, exhausting into the supply groups of different compartments. The general rule to be guided by is that each underdeck compartment used for animals must have at least four bell-mouth ventilators of not less than 18 inches diameter, running without break from the deck to be ventilated to the open, the under edge of the cowl to be not less than 7 feet above the deck. In compartments exceeding 75 feet in length or decks without bulkheads two additional (one in each wing) ventilators will be necessary for every 75 feet of length.

In urging this method of ventilation the director of shipping, outports, does not wish to be understood as disapproving the fan system heretofore employed, but, on the contrary, will be glad to see both systems employed in the majority of cases and especially in the warmer months.

Years of experience have demonstrated, however, that no ship can carry a large number of animals comfortably and successfully without the above method of air supply and exhaust, which is independent of electric or steam power or the running of machinery for its efficiency.

Breast boards.—Breast boards shall be of $2\frac{3}{4}$ by $9\frac{3}{4}$ inch spruce or hard pine, dressed on both sides and upper edge rounded galvanized iron covering, as before mentioned.

Breast boards will be secured to stanchions with $\frac{5}{8}$ -inch bolts with washer under nuts.

Portable sections of breast boards will be formed at distances of 30 feet to admit of horses being moved into or out of stalls. These portable sections to be secured by iron cleats bolted through stanchions, with toggle set on stanchions above breast boards to hold same in place.

At least one portable section of breast board must be in each section of stalls.

Flooring.—Flooring to be laid fore and aft, built in sections of about 32 inches wide. Three sections to cover the 8-foot depth of stalls. Sections to be 15 to 16 feet in length, where possible. Sections will be of 2-inch spruce or hard pine with 2 by 3 inch cleats well nailed to underside of sections. Cleats to be placed not more than 3 feet between centers.

Fore-and-aft footlocks 2 by 4 inches will be laid on top of sections leaving openings each 10 feet for waterway. Athwartship cleats 2 by 3 inches will be well nailed to sections

of flooring at center line of each stanchion and between fore-and-aft footlocks to outer end of stalls. A 2-inch opening will be at outer end of athwartship cleats to allow water to run.

On exposed decks 2 by 3 inch batten will be placed at heels of stanchions to run athwartship over flooring and footlocks, nailed to footlocks, and secured at either end by cleat set on top of same and nailed to stanchions at front and rear of stalls, or to inner sheathing in rear of stalls.

The number of stalls reserved for sick animals was generally about 5 per cent of the total. In some compartments the percentage of vacant stalls was somewhat in excess of this percentage, this being due to the arrangements of the stalls in these particular compartments.

Transport veterinarians were instructed as to the importance of maintaining, as nearly as possible, perfect sanitation of the transports en route. The manner in which the breast boards were bolted to the stanchions prohibited the removal of one animal from each stall while the stall was being policed. This method was permissible on transports having the breast boards fastened to the stanchions by means of iron cleats.

Forage was stored in respective holds, the other cargo being loaded first and the forage last so as to render it available for immediate use when desired.

Veterinary supplies were ample and consisted of such drugs and instruments as could be obtained by requisition per veterinary supplies table.

Forks, shovels, hoes, rakes, water buckets, feed measures, etc., constituted the veterinary utensils used on animal transports. Feed boxes were of the standardized galvanized-iron transport feed boxes, having two hooks to hang them on the breast boards.

Little or no attempt was made to groom animals. Exercising them was practically out of the question owing to the manner in which the breast boards were attached.

The more common injuries received by animals en route were those inflicted by other animals, such as bites and kicks. When a vicious animal was discovered and his nearness to other animals was considered dangerous, he was immediately placed in one of the vacant stalls.

The most common cause of death was pneumonia. It occurred among animals stabled in the remote corners of the animal compartment where the ventilation was not functioning properly.

Transport veterinarians were fully instructed in the following subjects: The sanitation of transports; disinfecting of same; care of veterinary supplies; feeding and watering of animals; assignment of enlisted personnel to duties.

In view of the fact that, as nearly as possible, perfect sanitation was the predominant factor in the successful transportation of animals overseas, it was of the utmost importance that the transport should be kept in a clean and sanitary condition at all times. To accomplish this, unceasing efforts for the removal of manure and débris were enforced during the daylight hours.

After thoroughly policing the ship, the free use of disinfectant was recommended. Solution of liquor cresolis compositus in strengths of from 2 per cent to 5 per cent was freely used in the animal compartments. Grain sacks saturated with 10 per cent formaldehyde solution were hung in different sections of the animal compartments, likewise grain sacks saturated in a solution

of chloride of lime were utilized. This was found to be of great advantage to combat foul odor and purify the atmosphere of the respective compartments.

All officers were instructed to keep all veterinary supplies locked in the room which was furnished for that purpose, and to see that too free use of medicines was not indulged in. Animals, as a rule, requiring the attention of a veterinarian (excepting those injured) were more in need of fresh air than medicines, with the exception of medicinal stimulants.

All animals were fed hay as soon as possible after being placed aboard ship. No grain was fed for 48 hours after embarking, preferably 72, and then the daily allowance did not exceed 2 pounds for the first three days, thereafter gradually increased until, at the time of debarking, the animal was receiving full rations. These hours of feeding were those used after the transport began to function without being convoyed. Previous to the armistice, it having been declared that no lights were permissible in any part of the transport after dark, all feeding and watering of the animals was done in daylight.

During the first period of shipping animals, no permanent personnel was assigned to the transports, the attendants being secured from casual detachments at this port awaiting transportation overseas. This method proved unsatisfactory, as the majority of the animal attendants were either inexperienced in the care of animals or were very indifferent in the performance of their duties. The result was that the transports arrived overseas and returned to this port in a filthy condition, which necessarily delayed shipments, the transport having to be policed and disinfected after arrival at this port.

It was then recommended that a permanent personnel be assigned to each transport. The Surgeon General was requested to assign 300 members of the enlisted personnel, Veterinary Corps, to this port to be utilized as a permanent personnel on the different transports. In compliance with this request, 100 enlisted men, Veterinary Corps, from Camp Lee, Va., reported for duty September 15, 1918, and 200 from Camp Devens, Mass., reported October 24, 1918. These men were assigned to duty on the different transports in numbers of from 5 to 20 men to each transport, depending on the number of animals the transport carried. Additional attendants were selected from casuals awaiting passage overseas and were generally remount, veterinary, or quartermaster detachments.

The accommodations for troops on board animal transports were generally sufficient for 1 attendant for every 10 animals, including the veterinary detachment, which was assigned as a permanent personnel. The troop quarters were inspected by the port veterinarian and an officer from the office of the port surgeon in regard to sanitation, etc., and were generally satisfactory.

The port veterinarian always informed the commanding officers of transports as to the status of the transport veterinarians. They were advised that the latter had full charge of all animals aboard ship; had direct supervision over the feeding, watering, stabling, grooming, and exercising of the animals; the ventilation, lighting, and cleaning of their quarters; the handling and storage of forage; and the direct supervision of methods of artificial ventilation. The commanders, as a whole, thoroughly recognized the duties of the transport veterinarians and

cooperated to the fullest extent in the performance of such duties. Recommendations made by the transport veterinarians usually received favorable action.

Shipping statistics are shown in the following table:

Total number of animals shipped from the port.....	47,263
Number lost en route from all causes.....	515
Number of shipments made during the war.....	66
Average number of animals each trip.....	716
Rate of loss per thousand.....	10.90

DISTRIBUTION OF DEATHS

First period:

Number of animals died of accident.....	284, or 60.54 per cent.
Number of animals died of disease.....	185, or 39.46 per cent.
Most prevalent diseases causing deaths.....	Pneumonia and heat stroke.
Most prevalent accident causing deaths.....	Storm.

Second period:

Number of animals died of accident.....	14, or 30.33 per cent.
Number of animals died of disease.....	32, or 69.67 per cent.
Most prevalent diseases causing deaths.....	Pneumonia and heat stroke.
Most prevalent accident causing deaths.....	Storm.

MEAT AND DAIRY INSPECTION

In the early days of the port, meat was delivered direct from the contractor to the different organizations. A veterinary officer acting as meat inspector was permanently stationed at the delivery point. An adequate refrigeration plant was installed at the quartermaster depot in June, 1918, where all beef and meat products were thereafter inspected at the time of receipt and issue. An order was issued and enforced requiring all vehicles used in the transportation of meats from point of issue to the different organizations to be kept in a thoroughly sanitary condition at all times; in addition, paulins were required to be used both under and over meats, the paulins to be clean at all times. Line and medical officers were instructed in the treatment of refrigerated quartered beef to avoid its condemnation on account of appearance.

In the heat of the summer months, cargo beef in many instances arrived at the port in a more or less softened condition, due to the long time in transit from western points and the failure to re-ice the cars at frequent intervals. It was deemed necessary, therefore, to have all beef refrozen at Richmond, Va., and relayed to this port. A veterinary officer was eventually stationed at Richmond as supervisor of operations of the cold-storage plant used there in connection with the shipment of beef overseas. Conditions improved greatly as a result.

Meat inspection at the port was conducted as follows: Upon receipt of a car of meat, each piece was inspected and, if accepted, was stamped with the date of its receipt, as passed. Each inspector had a number assigned to him. The meat was so arranged in the cooler that the first received was available for first issue. The refrigerator was inspected daily as to cleanliness and proper sanitary conditions; also to see that a proper temperature was maintained at all times. Meat and meat products, when purchased locally (which was done only on rare occasions), were thoroughly and rigidly inspected. The refrigerator as well as the meats were inspected at the place of purchase. Trucks with

meat and dairy products intended for delivery to organizations reported at a designated point for an inspection of such products. The organization bill and the dry receipt were there stamped if the products passed inspection.

The inspection of cargo frozen beef intended for shipment overseas was an important duty and was conducted as follows: Cargo beef for consumption by the American Expeditionary Forces was inspected at the time of transfer from refrigerator cars to transports, cars being unloaded immediately upon arrival. All beef not thoroughly frozen was rejected and placed in cold storage to be issued at this port, providing the meat was free from decomposition and bad bruises.

The meat and dairy inspection work was performed by various veterinary officers prior to August, 1918. One who had received special training in this line was assigned at that time, and marked improvement in the meat and dairy inspections was immediately noticeable. A meat-inspection service was gradually developed until it took in the local supply, including abattoirs and butcher shops.

No post-mortem examinations were made for Army-purchased beef, although several inspections were made at the request of the United States Public Health Service. The animals thus posted were milk cows which had reacted to the tuberculin test. They were inspected for disease only, as they were not for Army consumption.

No camps (with one exception) or organizations at the port used any fresh milk purchased at local dairies, evaporated milk supplied by the quartermaster being the only milk used. The milk used at the embarkation hospital, Camp Stuart, and Debarkation Hospital No. 51, at Hampton, was purchased from Washington, D. C. The dairies supplying this milk were not inspected by a representative of the port, owing to the distance from the port. A private dairy consisting of 36 cows supplied Camp Morrison with 15 gallons of milk daily. This herd and dairy were frequently inspected by the dairy and meat inspector. A firm in Newport News manufactured and supplied ice cream to some of the organizations of the port. The milk used was purchased from some 19 dairies in the vicinity of Waynesboro, Va. These dairies were inspected on several occasions. The meat and dairy inspector rendered valuable assistance in correcting insanitary conditions existing in the Pasteurization plants of this company, thus greatly reducing the former high bacterial count and improving sanitary conditions in general.

All condemned meat, meat products, and dairy products were immediately denatured with coal oil and sent to the salvage division. The inspector made four copies of an affidavit stating the place inspected, reason for condemning, the amount condemned, inspection numbers or other marks of identification, and the disposition recommended. Affidavits were sent through the port veterinarian and the depot supply officer, the inspector swearing to the report of survey.

ANIMAL EMBARKATION DEPOT NO. 301

This depot was located 3 miles north of Newport News, in Warwick County, Va., where the soil was a sandy loam and the drainage inadequate. Apparently, no effort was made to install a proper drainage system when the corrals

were built. The personnel assigned for policing the corrals was insufficient, and the system of policing was not such as to accomplish proper sanitation. As a result, in February, 1918, the veterinary hospital contained over 2,000 patients, 90 per cent of which were affected with dermatitis in its various forms. An effort was made to drain the corrals during March, 1918. Lateral box drains were installed along the roadways, connecting with others which emptied into the river. The corrals were plowed and graded so that they would drain into the lateral box drains. This system was fairly successful where the corrals were policed daily; when not, the corrals soon became very insanitary.

There were 30 corrals, each 200 by 400 feet in dimensions, and having a capacity of 300 animals. Six were located on the east side of Virginia Avenue and were known as receiving or quarantine corrals. Arriving animals were placed in these corrals for a period of 21 days and were carefully observed twice daily for contagious infections or other diseases. They were mallein tested for glanders, and were moved to what were known as the duty corrals on the west side of Virginia Avenue when found to be free from any disease. Each corral had a shelter shed inclosed on both ends and on the north side. These sheds extended from east to west, the southern exposure being open. They were 23 by 300 feet in dimensions.

The forage was ample and, as a rule, good. The grain was ample, 8 to 10 pounds daily being fed each animal. The animals were fed twice daily, 7 a. m. and 4 p. m. Hay was fed from open racks and the grain ration from grain troughs built in the open. No provision was made for feeding animals in any of the shelters.

The source of the water supply was the Newport News city waterworks. The quantity was ample at all times and the quality excellent. The animals were watered from troughs which were kept in an excellent sanitary condition, being drained and scrubbed twice daily.

It was contemplated that animals would be held for a short time while awaiting overseas shipment, but the shortage of bottoms interfered with shipments and the depot became filled and largely remained so. It was impossible to keep the crowded corrals free from mud and accumulated manure, and the sick rate was high, with infections and injuries of the foot predominating.

The veterinary hospital first constructed could not be called a hospital in any sense of the word. It consisted of five sheds similar in type and construction to those in the other corrals. There were no operating rooms, no properly equipped dressing rooms; in fact, the lack of equipment was a serious handicap in rendering efficient veterinary service. Two thousand animals were receiving treatment at this hospital in February, 1918, and necessarily in the open air under more or less insanitary conditions. Authority was therefore requested and obtained for the construction of a modern veterinary hospital.

This hospital was erected on a bluff overlooking the James River and was completely separated from the corrals of the animal embarkation depot. The hospital proper consisted of a building 30 by 196 feet, with two wings extending from each end 30 by 65 feet in dimensions. It had sewer connections, hot and cold water throughout, steam heat, electric lights, and good lighting ventilation. The operating room measured 30 by 64 feet, was well lighted and ventilated,

and was equipped with modern operating table, casting mat, and modern instrument sterilizer. Immediately adjoining and communicating with it were two recovery rooms, 15 by 15 feet, for anesthetic patients. There was an office, a pharmacy, a surgical dressing room, a diet kitchen, an animal equipment room, a supply room, a disinfecting room, a bacteriological laboratory, a boiler room, a feed room, shower baths, and water-closets. The hospital building and court had concrete floors. In the court were 16 stalls having concrete floors. These were used for surgical cases. In addition to the hospital proper, there were four wards. These were 100 by 100 feet and were wooden shedlike stables with dirt floors. Each ward accommodated about 60 patients. On the west, at a distance of about 1,000 feet, were five more wards having a total capacity of 600 patients.

The total number of animals handled at the depot was 57,944. The total number of deaths from disease was 1,140. The death rate per thousand was 19.68.

ANIMAL QUARANTINE

The armistice reversed the main functions of ports of embarkation as they concerned animals as well as men. The volume of the reversed function for animals was comparatively insignificant; it was of immense importance, however, for it constituted the national defense against Army importation of diseased stock from Europe. The veterinary activities in the port proper and in the animal embarkation depot were those of any of the large camps, with the exception of such as concerned animals returned from Europe. In this connection The Adjutant General issued the following instructions:

WAR DEPARTMENT,
THE ADJUTANT GENERAL'S OFFICE,
Washington, January 30, 1919.

From: The Adjutant General of the Army.
To: Commanding general, port of embarkation, Newport News, Va.
Subject: Danger of returning Army animals from foreign service.

In accordance with telegram from this office of January 30, 1919, relative to above subject, a receiving and quarantine station will be established at the port of embarkation, Newport News, Va., for all private mounts returning from France.

You will take the necessary steps to establish such a station after consultation with the port veterinarian and the representative of the Bureau of Animal Industry stationed at Newport News. One veterinary officer to be designated by the port veterinarian and the necessary Veterinary Corps enlisted personnel will be detailed for duty in connection with this station.

The following regulations will govern until further orders:

All private mounts received from Europe will be segregated immediately in a designated place at Newport News *apart from all other animals* and placed under the personal charge of a veterinary officer and the necessary attendants to be recommended by the port veterinarian. The place of quarantine is to be mutually satisfactory to the Surgeon General and Chief of the Bureau of Animal Industry.

Any equipment which accompanies the animals will remain with them until the quarantine is raised.

This quarantine will be maintained for a period of six months from the date of its establishment, during which time these animals shall not come in direct contact with any other animals nor be allowed to feed or water away from the place of quarantine.

They will not be removed from the place of quarantine for exercise except under veterinary supervision. In case any one of them develops a serious communicable disease, it may be necessary to extend the quarantine period six months additional, as the Surgeon General may recommend.

During the quarantine period necessary instructions will be issued from the office of the Surgeon General to the port veterinarian regarding details of quarantine regulations, laboratory and other examinations, and treatment deemed necessary. On the appearance of any symptoms of serious communicable disease, especially mange, glanders, equine trypanosomiasis, epizootic lymphangitis, ulcerative lymphangitis, or piroplasmiasis, the Office of the Surgeon General will be informed by telegraph.

The Surgeon General will direct the release from quarantine of any of these animals after suitable recommendations from the port veterinarian. When so released the owners of the mounts, on proper notification, will take prompt steps to remove them. Newly imported animals will be kept wholly isolated from those in quarantine, otherwise the six months' quarantine of all animals coming in contact with the newly imported animals will be extended to cover a six months' quarantine from the date of contact.

By order of the Secretary of War:

PAUL GIDDINGS,
Adjutant General.

These instructions referred to private mounts only, but it developed later that the return of a number of public animals was also desired. For example, General Pershing requested the return of 100 such animals. He did not desire any quarantine in this instance, but arrangements were made with the Bureau of Animal Industry by which the quarantine period was divided into 30 days in France and 150 days at Newport News. This permitted the Army to return certain valuable stock while protecting the livestock interests of the country. Arrangements were also made by which dogs and other organization mascots might be returned.

The quarantine regulations of January 30, 1919, were amended as follows:

WAR DEPARTMENT,
OFFICE OF THE SURGEON GENERAL,
Washington, July 23, 1919.

From: The Surgeon General of the Army.

To: Port veterinarian, port of embarkation, Newport News, Va.

Subject: Quarantine regulations.

1. You are informed that the following quarantine regulations, amending those under date of January 30, 1919, will govern for all Army animals which have been or which may be in future imported from France.

2. This quarantine will be in charge of a competent veterinary officer, to be selected by yourself subject to the approval of this office, and assisted by the necessary veterinary officers and noncommissioned officers and sufficient enlisted men to insure one attendant (personal) for each animal. Should a shortage of attendants render it impossible to provide one for each animal, several animals, not to exceed five, may be placed in charge of an attendant under the following conditions: All the animals of a group given in charge of an attendant shall have been in quarantine at Newport News at least 30 days. All preferably shall have been in quarantine the same length of time; none of them shall have presented symptoms or other signs of communicable disease at any time since they entered quarantine in France; the attendant for a group shall be selected for his trustworthiness and efficiency and shall not be changed unless absolutely necessary during the remainder of the quarantine and the principle of separate stall, equipment, individual grooming kit, water bucket, etc., and freedom from direct contact between any two animals shall be as strictly observed as where each animal has an individual attendant.

3. Should any animal of a group develop symptoms of serious communicable disease, the group in question will be broken up by assigning an individual attendant to each animal; the usual procedures governing the control of communicable disease, including the weekly report, will be carried out and the circumstances reported to this office by telegraph. With this exception, there shall be no shifting of animals between groups nor adding or subtracting from groups after they are once formed. In other words, if five or less animals are turned over to one attendant, the latter retains the absolute and undivided care of these animals and of no other during the remainder of the quarantine period.

4. The officer in charge, under your supervision, will have entire control of the animals. He will inspect each animal at least once daily at the place of quarantine and will be responsible for their veterinary examinations and treatment and for their proper care and condition all the time. He will be responsible that the equipment which accompanies each animal is kept separate, is properly cared for, cleaned and disinfected, and that there is no interchange of grooming or other utensils, etc.

5. He will make a thorough physical examination of all animals on every Wednesday. A report of this examination and of any unusual occurrence during the preceding week, including results of all laboratory examinations will be forwarded through your office to the Surgeon General.

6. A veterinary officer will be on duty at the place of quarantine at all times. The enlisted force should be quartered at the place of quarantine and, under the supervision of the veterinarian in charge, will perform all duties in connection with the proper and necessary care of the animals, such as feeding, watering, grooming, exercising, etc.

7. Each animal shall be provided with shelter, dry standing, and a separate stall to permit of carrying out of the principle of isolation. All manure, bedding, and refuse from manger and feed box will be collected daily and stored in a water-tight covered container and will be disposed of by burning.

8. The animals will invariably be fed, watered, and groomed at the place of quarantine, and their feeding or watering elsewhere is strictly prohibited. They will be exercised at the place of quarantine, and they will not be allowed to use any road or other place to which outside animals have access. They will not be exercised by any other person than the attendant assigned and only when authorized by the officer in charge. They will be shod at the place of quarantine.

9. It is contemplated these animals not only shall be kept apart from all others except as provided in paragraph 2, but each animal shall be isolated and have its separate grooming kit, blankets, watering buckets, stable utensils, feeding place, etc., and every precaution will be taken to keep these articles permanently separate.

10. All animals will be kept securely tagged. The tags will contain the necessary descriptive data for the purpose of identification, also the date of arrival and, in case of private mounts, the name of the owner.

11. Animals will arrive in different shipments. Should any animal of a later shipment come in contact with one already in quarantine except as provided in paragraph 2, the quarantine of the latter will be regarded as broken and said animal will be subjected to the full quarantine period from the date of such contact irrespective of any time which has already elapsed.

12. The quarantine period for animals imported from France will normally comprise 180 days, 30 of which shall be in France and 150 days in Newport News, Va., including the time while enroute. No animal should be accepted for quarantine at Newport News unless satisfactory evidence is submitted to you that it has undergone the required 30 days' bona fide quarantine in France.

13. All animals received at quarantine will receive as a minimum a mallein test within 21 days of the date of arrival and again within 21 days of release from quarantine. All doubtful or positive reactors to the mallein test and all animals showing suspicious symptoms of glanders at any time will be handled as directed in Circular Letters Nos. 28 and 30, Surgeon General's Office, Veterinary Division.

14. Blood examinations for piroplasmiasis, trypanosomiasis, and for any other suspected communicable disease will be made normally at three different times during quarantine and

at any other time deemed necessary. Specimens for the regular examinations will be taken immediately after arrival, on the 21st day after arrival, and on the 21st day from the date of expiration of the quarantine period. In addition to the specimens which will always be forwarded to the Philadelphia laboratory under standing orders, a duplicate will be forwarded to the Department of Agriculture, Washington, D. C. See Circular Letters Nos. 24 and 30, Section III and IV, Surgeon General's Office, Veterinary Division, regarding collection and shipment of specimens.

15. On the discovery of any evidence of mange, glanders, epizootic lymphangitis, ulcerative lymphangitis, piroplasmosis, equine trypanosomiasis, or other communicable disease, or on the occurrence of any other serious sickness or accident, the officer in charge will at once notify you and you will transmit full particulars by wire to this office.

16. A complete clinical record of each animal will be kept on Form 115, M. D., during the entire time it is in quarantine, and you will inspect these records as to accuracy and completeness from time to time. The temperature of each animal will be taken daily throughout the entire quarantine period and made a part of the clinical record.

17. You will arrange with the port authorities to receive timely notification of the arrival of an Army animal at this port, and will require the officer in charge of the quarantine to board the transport and take over all such animals after proper release and under such regulations as the Department of Agriculture may require, together with the equipment pertaining. The veterinary officer, at this visit, will make a careful physical examination of the animal. Should evidence of any serious communicable disease be discovered, the animal should be prohibited from landing pending instructions from this office, and the accredited representative of the Department of Agriculture and the port veterinarian will be promptly notified. You will at once make a personal inspection of the animal in such case and verify the findings.

18. You will notify this office by wire on the day of arrival of any animal or animals from France, giving the name of its owner if a private mount, its physical condition on arrival, whether the 30-day quarantine period in France was complied with, and whether the papers hereinafter described were complete and, if not, wherein they were incomplete. If the animal presents symptoms of serious communicable disease, full particulars and suitable recommendations as to its disposal will be furnished. The following papers should accompany each animal and copies thereof turned over to you, namely:

(a) A certificate of the officer owning the mount, in case of private mounts, that he is the bona fide owner and that it was acquired for his personal and official use as an officer of the Army.

(b) A certificate of a veterinary officer, in case of private mounts, that the animal is suitable as an officer's mount under existing regulations.

(c) A certificate of the veterinary officer in charge of the quarantine in Europe to the effect that the animal is free from all evidence of communicable disease, stating the length of time in quarantine; that the animal has passed a negative test for glanders, dourine, piroplasmosis, and trypanosomiasis while in quarantine and that all the quarantine and other requirements of these regulations have been complied with.

(d) A clinical history of the animal during the entire quarantine period showing what, if any, symptoms of disease manifested, the nature and results of all laboratory or other examinations, and treatment applied. Copies of laboratory reports will be inclosed. This record will be signed by the veterinary officer in charge of the quarantine.

(e) A certificate or affidavit, properly executed, by the officer or noncommissioned officer who accompanied the mount to the port of embarkation to the effect that the animal, while en route to the port, did not come in contact with any others or use a public watering trough or feeding place.

19. The veterinary officer in charge will accompany the animal from the transport to the place of quarantine and will be held personally responsible that it does not come in contact with any other animal nor use any public watering trough or feeding place or frequented roads. If a vehicle of any kind is used for its transportation, said vehicle will be cleaned and disinfected before and after use.

20. The Surgeon General will authorize the release from quarantine of any animal on receipt of your recommendations and statement that all requirements of these regulations have been complied with; and when so authorized, the owner of the mount, or other authority on proper notification, should take prompt steps to remove the animal and its equipment from the place of quarantine.

21. This quarantine will be conducted in full accord with the requirements of the Department of Agriculture and will be subject to the inspection and approval of its authorized representative. He should be allowed to inspect the place of quarantine whenever he desires. Steps will be taken to comply promptly with any suggestions which he may make, and should the officer in charge deem such suggestions impracticable, he will report the circumstances to you. Should you be unable to adjust matters to the satisfaction of both parties, you will at once report the facts to this office for further instructions.

22. You are directed to prepare a list of instructions based on these regulations to be posted in prominent places at the place of quarantine for the guidance of all concerned. Before posting, these instructions will be submitted to this office for approval.

23. This letter supersedes instructions forwarded you from this office dated January 30, 1919.

By direction of the Surgeon General:

C. F. MORSE,

Colonel, Medical Corps, Director Veterinary Corps.

Rules and regulations to the following effect governing the care of animals in quarantine were compiled by the port veterinarian and approved by the Surgeon General. These regulations were thoroughly complied with during the entire quarantine period.

1. Animals, upon arrival at the quarantine station, shall be assigned to their respective stalls by the veterinary officer in charge. They shall remain in the stalls assigned to them. There shall be no interchanging of stalls.

2. In the event of any contagious disease developing which, in the opinion of the veterinary officer in charge, endangers the other animals, they may be removed to the more isolated stalls when so ordered by him.

3. Each stall shall be numbered and all animals securely tagged.

4. Each feed box, water bucket, grooming utensil, and other utensil used shall be numbered to correspond with the number on the stall.

5. All grooming utensils shall be kept in each animal's stall in the locker provided for that purpose. Under no circumstances shall there be an interchanging of grooming utensils. The same caution must be exercised that there shall be no interchange of feed boxes or water buckets and other utensils.

6. Attendants assigned to the care of an animal are strictly forbidden to assist in the care of any other animal unless so ordered by the veterinary officer in charge. Each animal shall be kept in a clean condition at all times. Especial attention shall be paid to the careful cleaning of all animals' feet daily.

7. Each stall shall be kept in a thoroughly clean condition at all times. The litter shall be thoroughly shaken each morning, all soiled litter and manure removed, stall floors swept, and air-slaked lime sprinkled on damp spots. The clean litter to be placed in one corner of stall until after the exercise hours (10 to 11 a. m.). The litter is then to be shaken out evenly, covering the floor of stall, and allowed to remain until the following morning. Droppings promptly removed as soon as made and placed in cans.

8. Urine-soaked litter shall be removed from stalls at least twice daily and placed in cans. Positively no soiled straw shall be allowed to remain in small piles, but will be placed in cans by the animal attendant. Cans shall be emptied once daily and the contents burned.

9. Animal attendants will be responsible for the covers being kept on cans at all times, and they will be required to perform the proper policing of corrals. No baling wire shall be thrown about; the grounds must be kept free from débris.

10. The feed boxes and buckets, as well as the woodwork in each stall, shall be kept clean at all times and scrubbed as often as is necessary to keep same thoroughly clean.

11. The animals in quarantine shall be exercised one hour daily. They shall be led by the halter or leading bridle. They shall be watered, fed, and exercised regularly at hours designated by the veterinary officer in charge.

12. No animals shall leave the confines of the quarantine at any time.

13. Attendants of animals will promptly report the sickness of any animal to the veterinary officer in charge; in his absence, the noncommissioned officer on duty shall be notified. All guards on duty at night are instructed, when an animal is discovered sick, to report the same immediately to the corporal of the guard, who, in turn, shall notify the veterinary officer in charge without delay.

14. No person other than those assigned to duty at the quarantine station shall be admitted to the station.

15. No dogs shall be permitted to enter the station inclosure.

16. Smoking is positively forbidden within the station corrals.

17. Any violations of the above instructions will be dealt with by disciplinary measures.

MEDICAL DEPARTMENT ACTIVITIES IN THE CAMPS OF THE PORT

The port of embarkation in addition to its headquarters and embarkation and debarkation hospitals, embraced seven organized camps and a number of smaller posts, chiefly water projects. The camps included Camps Stuart, Hill, Alexander, and Morrison on the east, or Newport News, side of the James River; and the Army supply base (quartermaster terminal), camp of United States troops (engineering depot), and the Pig Point, general ordnance supply depot on the west, or Norfolk, side of the river.

The medical activities of each of these camps were directed by a camp surgeon, who, in turn, was responsible to the port surgeon. The field medical organization of the port may be closely compared with that of a base, the port surgeon comparable to the base surgeon, the camp surgeons comparable to the division surgeons, though their sphere of work was more extensive in most cases, not in so far as basic administration was concerned but in the size of the personnel and in the number of troops under their command. Under the camp surgeons were sanitary inspectors and the regimental and battalion infirmaries. Medical Department troops arriving at the camps for overseas duty automatically came under the supervision of the respective camp surgeons. All reports from the various units in the camp came through the camp surgeon's office, and these were incorporated in the morning and other reports of the camp to the port surgeon's office.

General policies of administration and special sanitary measures were outlined by the port surgeon through the medium of circular letters and memoranda. The camp surgeons were responsible for the proper interpretation and carrying out of such measures. Considerable latitude was allowed the camp surgeons in the arrangement of details of sanitary policy, and interference by the port surgeon was prompted only when exigency demanded it.

Sufficient elasticity to meet all emergencies was allowed in the camp Medical Department organizations. The adaptability of such organizations to meet a peak load was well demonstrated in the influenza epidemic of October, 1918, when, though taxed to the utmost, all possible attention was given the many sick and no organization broke down under the strain. A high standard of health and cleanliness prevailed throughout the camps of the port, almost without exception.

It is true that, in 1917, the negro soldiers at Camp Alexander lived under relatively insanitary conditions, being insufficiently clothed and quartered, and with insufficient medical personnel. These conditions were due to the confusion existing at that time and to the delay in receiving supplies and personnel. The medical and line officers at this camp worked through long, tedious hours under the most trying conditions, and the low mortality at this camp may be directly attributed to their ceaseless endeavor to make the best of a bad condition and to their spirit of unselfish service.

CAMP HILL

Camp Hill, Va., was exceptionally well located on the east bank of the James River, in Warwick County, Va. The camp was constructed on terrain which was decidedly flat. The soil was sandy in its composition. The camp was relatively free from high-flying dust because of its close proximity to the river and free from mud because of the sandy soil, the latter being conducive to a rapid drying of the surface, even after days of repeated rain. The climate of this locality in general was of a moderate temperature, but the winter of 1917-18 proved an exception and was unusually severe. During the warm weather of the summer months, the temperature was moderated by the breeze from the James River on the west of the camp.

The construction of Camp Hill began in the early part of August, 1917, and proceeded with precision and dispatch. The camp extended from Fiftieth Street, Newport News, Va., on the south, to Camp Alexander on the north. In the beginning, Camp Hill also included what was later known as Camp Alexander. The camp was approximately 1 mile long. From west to east the camp extended from the James River to a point 200 yards east of the Chesapeake & Ohio Railroad tracks. There were sections of barracks located at both the northern and southern ends of the camp. All told, this area had within its limits approximately 400 buildings. Flanking the central section of the camp on the east was a series of large, spacious warehouses, used for the storage of all types of war material, while on the north this section was bordered by the animal embarkation depot corrals. These were an integral part of Camp Hill and had a capacity of some 20,000 animals. Approximately 10,000 troops could be accommodated in this camp.

The last building additions to the camp were the Young Men's Christian Association building, the hostess house, and a complete bakery unit.

The water supply was the same as for the rest of the port. Sewage disposal from the camp was good. All sewage passed through a standard septic tank and the effluent was chlorinated before final disposition in the James River. Latrines were conveniently located and of sufficient number, 1 being provided for every 3 or 4 barracks. A combination type of latrine building was used containing 8 or 9 shower baths grouped in one end of the latrine, while flush toilets and hot-water boilers, etc., occupied the other end. All garbage of the camp was disposed of by reclamation and by incineration. The usual sanitary methods of garbage collection were in use.

All parts of the camp were illuminated by electricity. The barracks were heated by coal furnaces. Officers' quarters and hospital buildings were steam heated, each building having a complete heating unit.

The development of Camp Hill represents an interesting evolution from the medical and sanitary standpoints. The swampy area immediately northwest of the camp, an exceptionally fertile place for the breeding of mosquitoes, was successfully drained by ditching and the construction of wooden conduits. All parts where drainage was exceptionally difficult and where the water showed a tendency to remain were repeatedly oiled. Mosquitoes were considerably reduced by these methods. From a very insanitary beginning, the camp progressed until it had an excellent sewerage system, was well drained, was clean, and presented a neat appearance throughout. Good macadamized roads connected all parts of the camp.

When the camp was first occupied, the sick and injured were, for the most part, treated at the regimental or field infirmaries. Cases requiring hospital treatment were transferred by ambulance over almost impassable roads to the post hospital at Fortress Monroe, Va., a distance of approximately 12 miles. It was not until the latter part of October, 1917, that a hospital with a capacity of 30 beds was constructed. This was the first hospital erected and operated in the port of embarkation. The need for a contagious disease hospital became apparent a month or so after its completion, and an additional hospital building, similar to the original, was constructed at the northwestern corner of the camp. Both buildings were then brought under one administrative head and were collectively known as the camp hospital. Practically all the communicable diseases of the port were treated in the contagious part of the hospital, and, at times, its capacity was sorely taxed until the stress was relieved by establishing the embarkation hospital at Camp Stuart.

The camp then made progressive strides in the care of its sick and wounded. It had three well-established infirmaries—the animal embarkation depot infirmary, the camp infirmary, and the motor truck group infirmary. These, together with the camp hospital, provided all the ordinary attention for the sick and injured of the camp. All patients who required special surgical treatment or hospital care were sent to the embarkation hospital or to the Camp Morrison hospital.

Both sanitation and medical administration of this camp were given an impetus when, in March, 1918, the position of camp surgeon was created. The infirmaries became better organized and equipped and excellent ambulance service was established, the work of all medical officers in the camp was coordinated and a dental infirmary with standard equipment was established.

The Medical Department personnel of the camp on October 1, 1918, consisted of 12 medical officers, 8 dental officers, and 28 enlisted men.

During the latter part of September, 1918, the influenza became epidemic in the camp and, because of its rapidity of onset and the great number of cases occurring daily, hospitals of the entire port became crowded, with the result that temporary hospitals had to be established. The emergency was met in Camp Hill by converting 13 barrack buildings into temporary hospitals. Medical personnel to man all these could not be obtained, and it was necessary to use enlisted personnel from the line for this purpose. In all, approximately 800 cases of influenza developed in this camp. Of this number, 91 cases were so serious as to require treatment at the embarkation hospital, and 23 of these died.

Measles developed in Camp Hill during the early part of November, 1918, as a result of the arrival in this camp of the draft troops from Camp Jackson, S. C. Measles cases were found among them before they left their troop train. As a result, over 125 cases of measles developed, principally in this organization, causing a resultant quarantine of 600 contacts, or 15 per cent of the command.

Three stations were established for delousing troops returning from overseas. The delousing stations consisted of batteries of two sterilizers each, located in convenient parts of the camp. These were operated by a personnel of 1 officer and 15 enlisted men, under the supervision of the camp surgeon. All men arriving were deloused systematically. These units were able to delouse 1,500 troops a day.

CAMP ALEXANDER

Camp Alexander was located on the east bank of the James River, immediately north of Camp Hill. The camp began with three lines of tents for the colored soldiers on one side of the main road, with the officers' tents on the opposite side. A large hospital tent for headquarters was at the north end of the latter. The camp quickly enlarged through the addition of more tents. Even up to January, 1918, no stoves were provided for these tents, and fires had to be built on the floors of the tents to insure warmth to the inmates. During December, 1917, an officer generously donated \$500 for the purchase and equipment of a hospital tent. A pyramidal tent accommodating 12 cots was erected. A stove and sufficient blankets were supplied. A small kitchen was erected beside this tent to prepare food for the patients. This little hospital served to afford hospital facilities for the severely sick before they were transferred to a proper hospital. Construction was begun in June, 1918, at the new camp site, north of the old one, on barracks and bathhouses supplied with electric lights and hot and cold water. A delousing station was opened in July, 1918, in order that all troops going overseas might go clean. It was not until November, 1918, that the new camp site was ready for occupancy.

Thus the camp was a camp of tents for a period of more than a year; tents for quarters, for infirmaries, for hospitals, for headquarters. No wooden buildings belonged to the camp except the post exchange, the Young Men's Christian Association, the messes, and an occasional shanty hastily constructed.

The medical and line officers had to deal here with ignorant negroes of the poorest class, both physically and mentally. Thousands of negroes, first recruited, then drafted, came to this camp with scarcely any rudimentary education. Personal hygiene meant nothing to them; and if it had, living conditions were so poor that it would have been impractical to expect it.

From these men organizations were formed, and the best of them embarked for overseas duty clothed in the brass buttoned blues of the old Regular Army. Many others were discharged because of physical disability. The rest, and they were many, were formed into organizations for local labor duty. The cause of the greatest number of disabilities was chronic gonorrhoea. Fully 20 per cent of all these negroes had venereal diseases, and of those who stayed at the port for local labor duty, approximately 70 per cent were thus diseased. Brouchitis

was rife throughout the camp at all times, but, because it was usually uncomplicated, a low mortality was maintained.

The medical personnel underwent constant change, for medical officers would be assigned to organizations as they reported and would subsequently proceed overseas with them.

One of the first sanitary problems was that of the kitchens. At the head of each company street was the kitchen, comprising two field ranges, roofed by shelter tentage and often without sides. Besides each kitchen was a single faucet which supplied the water for all purposes—cooking, washing, and bathing. Since the kitchen personnel knew nothing relative to cleanliness in the preparation of food or in its preservation, it was with great difficulty and through the use of tact and diplomacy that the kitchen and messing environment was finally made satisfactory.

Another problem was to keep the tent floors dry, particularly during the autumn and the early winter of 1917-18. No stoves were available at that time and dryness had to be accomplished by drainage. A ditch was dug around each tent, and these led into two deeper ditches which bordered the company street. Ventilation within the tents was accomplished largely through the agency of the fires built on the tent floors, sparks from which made the necessary holes in the tentage. Policing of the camp occupied considerable time. The most notable achievement of this work was the clearing up of the swampy hollow in the middle of the camp, which had become a dump for all sorts of refuse. The dump was cleaned up, the hollow properly drained and satisfactorily oiled during the proper season.

The latrines at first used were of the ordinary pit type. These were replaced by latrine incinerators in February, 1918. All police and sanitary work was done by the sanitary squad. Great difficulty at first arose because too few men could be spared from stevedore duties to work on such a detail, but this matter was eventually arranged satisfactorily.

White noncommissioned officers and white troops for guard duty were sent to this camp early in 1918, and the commissioned personnel was increased. Sanitary conditions constantly improved with the increased discipline and better organization. The noneffectives were weeded out, and the whole camp gradually underwent a distinct change for the better.

A steady flow of stevedore regiments for overseas duty occurred in the spring of 1918. This camp accommodated some 5,000 men and over 50,000 negro soldiers passed through it prior to the signing of the armistice. The medical officers at this camp were worked to the utmost with medical inspection, quarantine, enforcement of sanitary regulations, delousing, and ordinary regimental medical work. An average morning sick call for a battalion numbered 125 to 500, and about 15 cases were sent to the hospital each day with the object of discharge for disability.

Sickness and mortality was kept down to an unexpectedly low figure during the occupancy of this camp. There was a serious epidemic of cerebrospinal meningitis in November, 1917. No other serious epidemic occurred at this camp except the influenza epidemic of October, 1918, and a high incidence of mumps during the early part of 1919. Over 500 cases of influenza

occurred during that epidemic, giving a lower rate per 1,000 men than at any other camp, though the rate for pneumonia with resulting death was greater than among white troops. Eight barrack buildings in the new camp were turned into emergency hospitals, and all patients were receiving systematic treatment within 24 hours after the onset of the epidemic. It usually was the case with the colored patients that a rise in temperature after 48 hours portended bronchopneumonia, and the patient was forthwith transferred to the embarkation hospital.

As stated before, chronic gonorrhoea was the greatest single cause for disability among the negro troops. Thousands of such cases passed through the infirmaries of this camp for treatment. Individual study of cases could not take place, due to the great number, and the method of treatment developed was that which did the greatest good to the greatest number. Thousands of cases were discharged for disability, yet several thousand cases remained to be treated. It was decided in December, 1918, that cases of chronic gonorrhoea which would not yield to continued treatment and which were declared to be noninfectious by microscopical diagnosis should be returned to duty with treatment discontinued. This resulted in a decrease in the number of cases under treatment among these troops from several thousand to a few hundred. As a safeguard, however, it was urged that all men who went on pass from the camp should take prophylaxis upon return.

Thus the sanitary history of this camp was a continued effort to enforce all the sanitary regulations designed to keep the camp and men clean; to administer to their many minor ailments; to discharge for disability those men who were physically incapable of performing useful service; and, in the case of the seriously sick, to transfer them to hospitals for proper treatment. All this was done with energy and kindness, and the end result of such a spirit of service was to so discount the uncomfortable, and often insanitary, living conditions that the health record was a worthy example of applied principles of field sanitation and medical administration.

CAMP MORRISON

Camp Morrison was located about 5 miles north of Newport News, Va., and 1 mile east of the James River. It was about $1\frac{1}{8}$ miles long and three-eighths mile wide. The camp site was about 10 feet above the sea level, on swampy and wooded ground.

Though the camp was occupied in October, 1917, construction was not completed until April, 1918. Barracks were available during this period, but sanitary facilities were most limited. The large construction force had little regard for sanitary and medical obligations—picket lines were neglected, fecal matter was dumped on piles but not treated, and urine was carried across the camp in cans without covers to a pit where the urine was emptied and treated with crude oil. This pit emptied through a traverse for about a mile along a public road to the James River. The construction force had a small first-aid hospital, badly equipped. There was no Government infirmary or hospital in the camp for the 750 soldiers. Sick call was held in the company barracks

and the sick were transferred to hospitals in Newport News. The company latrines consisted of a Havard box over galvanized-iron cans. There were practically no bathing facilities. Waste water discharged into open ditches.

Sanitation improved with the arrival of the medical personnel, not through any better facilities but through efficient policing and proper enforcement of sanitary regulations. Additional Medical Department enlisted personnel arrived from Fort Riley in December, 1917, and the camp medical organization was established at that time, with four commissioned officers. Barracks No. 8, still uncompleted, was used for a temporary hospital. There were no running water or other facilities, but it was scrubbed clean and cots were set up.

The one-story barracks of this camp stood lengthwise east to west, were lighted by electricity, and ventilated by windows and seven ventilators upon the roof. They were divided into two sections and heated by a poor hot-air system. These sections were planned for 75 men each, but as many as 100 had to be placed in them at times. Despite the constant opposition to such procedure, these sections were changed, beginning with April 20, 1918, by dividing each into six squad rooms and utilizing the porches, thereby giving the proper number of square feet of floor space and cubic feet of air space for 25 men.

A narrow-gauge railroad track was placed upon the street adjacent to the barracks in January, 1918, for the purpose of carrying crushed stone for the building of the macadam road, and this was used in the mornings for carrying urine and fecal matter from the barracks. The urine was carried out each morning in galvanized-iron cans and placed upon flat cars, then taken away to the end of the camp. There it was loaded upon carts and carried to a pit and treated with crude oil. The fecal matter was collected in small galvanized-iron cans which were placed in the improvised Havard boxes situated in the latrines of the barracks. These cans were carried out by a detail from each barracks to the railway, thence to the end of the camp. The contents were emptied into pits and treated with crude oil. The cans were burned out, treated with oil, and returned to the camp ready for use the next day.

Bathing facilities were installed in the latrines about January 15, 1918, the waste water passing into open ditches.

The mess halls were large but poorly arranged, being separated in the center by the kitchen, thus crowding the kitchen and having room to spare at either side. This condition was changed in September, 1918. The water supply was good and generally adequate. Ice of fair quality was obtained from different sources, but the demand in warm weather was greater than the supply.

The sewerage system was completed about March 15, 1918, and included septic tanks. The effluent passed into the James River. This sewerage system proved to be inadequate, becoming clogged. A larger sewer was then installed, gasoline pumps working meanwhile to discharge the sewage into a large open ditch which flowed the length of the camp to the septic tanks. The ditch was treated with crude oil. This procedure continued well into the month of May, 1918, before the new sewer line was completed. The septic tank proved to be too small and a larger one had to be constructed.

The construction division of the Air Service in the meantime, had begun to do valuable work in ditching the camp to get rid of the surface water, and

sanitary conditions in general had improved. Garbage was incinerated, where before it had been hauled away by farmers. The picket lines were better cared for and manure was hauled out of camp and disposed of to farmers. Latrines in each barracks emptied into the sewerage system. There were shower baths and white enameled lavatories in each barracks. Laundry work was sent outside the camp, being done mostly by colored residents. A 40-bed hospital was at first planned, to be constructed at the south end of the camp. It was recommended that this location be changed and that plans be made for a 250-bed hospital, but this capacity was reduced to 120 beds. During the time construction was in progress for this hospital, from January to April, 1918, vacant mess halls, the guardhouse, shanties, and tents were used in conjunction with the temporary hospital for the isolation of infectious diseases, of which there was a great number, mostly mumps, scarlet fever, and measles. The porch of No. 8 barracks, the hospital at that time, was used for convalescent pneumonias, with great success. Canned milk exclusively was used, at first, but milk was received from a dairy later on. The idea of cleanliness had to be instilled into the cooks' minds, especially that of personal cleanliness. All cooks were examined for carriers.

A plot of land lying at the south end of the camp was reserved for stables and supplies for the same. The stables were well policed. There were no remount stations at this camp. The clothing was sufficient, as a general rule; the quality of the clothing was good. There were no infirmaries at this camp, sick call for the whole camp being held at the hospital, with better results than if held by each company, for sufficient medical officers were present and proper attention was given to each man presenting himself. The nursing personnel consisted entirely of enlisted men of the Medical Department prior to September, 1918, when female nurses arrived. Two Ford motor ambulances and three animal-drawn ambulances were furnished the hospital. The Ford ambulances, received some time in January, 1918, were not covered. The mule-drawn ambulances arrived some time in April, 1918. The general character of the service given with this transportation was not as efficient as it would have been had more powerful ambulances been available. A Ford touring car was assigned for the use of the commanding officer of the camp hospital.

There was no medical supply depot at this camp, the nearest being at Newport News. Requisitions were made monthly to a general supply depot, but in case of emergency, supplies were received from the port of embarkation, Newport News.

Venereal inspections were held semimonthly for the local personnel and semiweekly for troops proceeding overseas. Prophylaxis was administered at the infirmary, attendants being on duty day and night. There were prophylactic stations in near-by towns and lectures were given on venereal disease and its associated problems. All venereal cases were confined to camp and all failing to take prophylaxis were reported for trial, a large number of conviction-resulting.

During the spring and summer of 1918, there were but three cases of malaria. Inside the camp and within one-half mile around it, mosquito extermination was carried on by an Army sanitary squad.

The dental work was first done in barracks No. 8, in January, 1918, with field equipment. One base hospital outfit was installed in the dental infirmary in May, 1918. Two more base units were later installed, and three dental officers were kept constantly at work.

CAMP STUART

The office of the camp surgeon was established in this camp March 23, 1918. Prior to that date, the regimental surgeon of the 48th Infantry acted as senior medical officer of the camp. This organization was on permanent guard duty for the port of embarkation, with their regimental headquarters at this camp.

Nothing of great importance in the way of medical history occurred with the exception of the epidemic of influenza, which first appeared on September 25, 1918. The camp had been remarkably free from any epidemic disorders prior to that time. Influenza was brought into this camp by replacement troops from Camp Jackson, S. C., the epidemic lasting about six weeks. Approximately 1,500 cases occurred during that time. These cases were cared for at the embarkation hospital for the first few days, but that institution was soon filled and subsequent cases were treated in a temporary hospital established in this camp in blocks 13 and 14. Approximately 1,000 cases were cared for in this manner. Only the milder cases were allowed to continue treatment in the temporary hospital, the severer ones being immediately transferred to the embarkation hospital where they could be adequately cared for. The physical inspection of troops was a large factor in the routine work of this camp. A camp infirmary was established under the camp surgeon's office. The personnel of the office was 5 medical officers, 3 dental officers, and 17 enlisted men.

ARMY SUPPLY BASE

The Army supply base was located in Norfolk County, Va., about 5½ miles north of the city of Norfolk. The terrain immediately adjacent to the hospital was very slightly rolling, with natural drainage toward the west into a small branch leading to an arm of Boush Creek, and toward the northeast and east into another depression leading to Boush Creek; both of these branches were bordered with a growth of timber. The ground to the west formerly was used as golf links and was covered with a growth of grass. The soil was a sandy loam, which, while soft with a certain degree of stickiness, immediately after a rain was permeable and dried very quickly. But little dust was noticeable, except in the roads during dry weather. The hospital site was particularly sheltered from coastal winds by its inland situation and the fringes of timber which bordered the area in every direction. A newly constructed macadam road connected the hospital with the camp and with the Jamestown Boulevard leading from Norfolk to the naval operating base. The hospital grounds were included in an angle formed by two branches of Boush Creek, both of which were tidewater streams with sluggish flow and bordered by an extent of flat grass-grown marsh. Filling-in processes were carried out at the Army base camp and modified this condition. Ditching

work in the neighboring areas carried out by the United States Public Health Service remedied defective drainage. With the exception of two or three negro dwellings on adjoining farms, there were no other particularly objectionable insanitary surroundings.

There were approximately 10,000 civilian laborers in this camp during 1917 and 1918, and the medical and surgical cases occurring among them were cared for by a civilian medical and surgical force, employed indirectly by the construction contractors. The building designated for an infirmary, among the buildings erected for two guard battalions, was assigned to them for this purpose by the Army. This infirmary building was of two stories, having a hall and reception, dispensary, operating and store rooms, with kitchen and dining hall, below; the upper floor contained ward room sufficient for 12 or 15 patients. An additional one-story ward, 29 by 64 feet, added about October 1, 1917, connected to the main building with a covered corridor. Sufficient and convenient toilet and lavatory facilities were provided. Serious cases of illness or surgical cases allowing selective operation were sent to the Protestant Hospital in Norfolk.

One room in the officers' quarters was occupied August 12, 1918, as the combined office of the commanding officer of the hospital and camp surgeon. There were five additional officers on the medical staff of the camp, two of whom were assigned to duty with the construction quartermaster. Two others were assigned to duty with military companies doing guard duty. The personnel of the hospital consisted of 9 officers and 39 enlisted men.

Sewage from this camp and the hospital flowed through septic tanks into Boush Creek. Approximately 800,000 gallons of sewage was pumped each day. Sewage disposal was unsatisfactory, the existing system proving insufficient. Tanks became clogged by large collections of scum, and it was difficult to effect its removal. Because of the bulk of sewage, the retention period of sewage was less than an hour and a quarter, thus allowing no solvent action. Satisfactory results were eventually secured in this connection by causing chemical disintegration of the sludge by adding quicklime and water. Plans were also proposed to extend this pipe line from the tanks to the Elizabeth River. The tidewater flats about the outlet of the sewage pipes were filled in.

The water supply of the base was that of Norfolk and of Norfolk County, furnished through a 10-inch main, and was derived from both the Norfolk City Water Co. and the Norfolk County Water Co., in mains from both sources passing through the reservation.

All refuse was incinerated. Kitchen waste, manure, etc., were sold in considerable quantities to farmers, who were required to remove it at least four miles from the base.

All kitchens and mess halls were carefully screened. Messing conditions among the civilian laborers were bad, but improved with the substitution of white for colored help.

Little sickness developed here. One case of typhoid fever occurred among the civilians and an effort was made to have these laborers immunized through inoculation. One case of malaria developed in the local command.

On September 17, 1918, 259 colored enlisted men arrived in camp from Camp Alexander, and were given quarters in the stevedore barracks section of the camp. On the 19th, there occurred nine cases of what apparently was influenza, the first seen in camp. These were immediately reported, and the infirmary building in that section was at once put in order for the reception of patients. Each patient brought his own bedding, but this was later supplemented by supplies of sheets, pillows, pajamas, etc., furnished by the American Red Cross chapter of Norfolk. Emergency equipment of medical supplies was requisitioned from the medical supply officer at Newport News. The infirmary thoroughly cleaned and the floors oiled, was ready on September 20 and patients were moved in on that day. Five other cases developed, 24 in all, on each of three successive days, then no more. All immediate contacts were isolated, the company was inspected twice daily, barrack floors were mopped, mess cans and utensils were scalded, and no member of the company was permitted outside the environs of company barracks. Armed guards enforced these restrictions.

Twenty cases of sudden illness were reported on September 23, originating in four different barracks occupied by civilian workman. It was at first doubted if these were cases of true influenza, as all these men had recently come from Texas and Oklahoma, and had been working in the rain on the 20th and 21st. Cases of similar character, however, continued to occur until 50 cases were under treatment. One of the regulation barracks in the stevedore section, where most of the first cases occurred, was turned over for use as a hospital. The civilian medical personnel having care of all civilian sick and injured under the employ of an insurance company, consisted of 1 consulting surgeon, 1 physician living at the hospital, 1 orderly in charge of property and records, 2 female day nurses, and 1 female night nurse. These were severely taxed and additional medical assistants and nurses were furnished. But few of the cases appeared at all serious, although a majority had very high temperatures with severe aching and the prostration of influenza. Many cases began with severe, obstinate vomiting; a marked hemorrhagic tendency was noted, and some alarming epistaxis occurred.

Two cases of influenza developed in Guard and Fire Company No. 312 on September 25; also 4 cases in the motor transport company. These were properly isolated in a barrack used as an infirmary. Supplemental Red Cross supplies were procured for these men, as noted in connection with the labor battalion. None presented any serious symptoms.

General quarantine measures and the restriction of all soldiers to the limits of the camp were instituted. Quarantine measures with reference to civilian employees were considered impracticable and were not attempted.

The epidemic soon raged disastrously among civilian employees at the base. Approximately 600 cases occurred, with 15 reported deaths. Three additional barracks were thoroughly cleaned and taken over as hospital wards. Two adjoining mess halls and kitchens were later used as adjuncts. The contractors and the agent for the insurance company were brought together and arrangements made to purchase the full supplies of sheets, pillows, pajamas, and hospital furniture necessary properly to care for the large number of patients under treatment.

Arrangements were also made, by consent of the constructing quartermaster, to use three of the complete general wards, the isolation ward, and the kitchen at the new base hospital for the reception of the more severe cases. A temporary heating plant was installed by connecting the system already placed in the wards with a small upright boiler, located near the site of the future heating plant. Occupation of these wards was begun about October 3, practically all of the equipment being furnished by the insurance company except bedsteads and kitchen fixtures.

Later cases occurring in the guard and fire companies and the motor transport company numbered approximately 100, practically all of which were of a very mild type. Six cases were considered serious and were transferred to the embarkation hospital. The epidemic subsided by October 12, 1918, though troops were quarantined during the entire month of October.

ENGINEER DEPOT

The Engineer depot, in the county of Norfolk, Va., was situated about $1\frac{1}{2}$ miles from the center of the city of Norfolk and occupied two city blocks within the city limits. The camp was located almost on the shores of the Elizabeth River. The terrain was flat and open and had formerly been cultivated land. The soil was mostly red clay and therefore very dusty in dry weather and extremely muddy and sticky in wet weather. The climate was moderate. The roads in the camp, with the exception of company streets, were city thoroughfares, the one on which the infirmary faced being of unrolled, crushed stone, spread over a mixture of clay and gravel.

Two small swamps about one-eighth mile from the camp constituted the only sanitary menace. These were drained, and tide gates served to carry away the tide water and thus greatly relieved the situation. The water supply and sewage of the entire camp was that of the city of Norfolk.

This post was first occupied by soldiers, August 14, 1917, when Troop B, 11th Cavalry, arrived. The medical detachment then consisted of 1 medical officer and 2 enlisted men, the latter being attached to the Engineer depot for first aid and emergency work for the civilian employees. The troop was attached to the depot for sick call and medical service. It was relieved on November 2, 1917, by Companies I and K of the 48th Infantry. The accompanying medical detachment consisted of 1 medical officer and 6 enlisted men, and the original detachment of 1 officer and 2 enlisted men was transferred to Pig Point.

A small building of two rooms, located near the center of the depot, was used as an infirmary from the time of the inauguration of medical service at this post until the completion of the permanent building, which was occupied July 15, 1918. The permanent infirmary building was not entirely completed until about August 1, 1918. It was of one story, well ventilated, and screened. The dimensions were 80 by 14 feet, on the plan of a center hall with all rooms opening from this. The infirmary comprised 10 rooms in all, viz, ward, squad room, dining room, office, dispensary, operating room, treatment room, dental operating room, lavatory, and bath. The ward was located on the south side and the squad room on the north. The heating plant, consisting of one boiler and a hot-water heater, was installed in a cement outbuilding at the north side.

It was entirely adequate and filled every requirement, under the weather conditions which prevailed after the opening of the building. The bathroom consisted of 1 porcelain tub and 1 shower. The lavatory had 2 flush toilets, 2 urinals, 2 wash bowls, and 1 sink. Power for the lighting system was furnished by a Norfolk power company. Because of unusual conditions created by the great influx of people into the city and community, the power had to be distributed to many more points and the service was occasionally poor. There were times during the month of September when there would be no lights for from one to two hours early in the evenings. The service was greatly improved later.

While provision was made in the infirmary building for a mess hall and kitchen, it was not deemed advisable to start a mess, the enlisted personnel being only 12 men and the ward capacity 5. The enlisted men of the medical detachment were rationed first with Company K, 48th Infantry, and later with Fire and Guard Company No. 313, the meals for the patients being obtained from their respective companies.

The medical service was regimental, the daily sick call being at 7.45 a. m., when as critical examinations as were practical at that time were given to all who appeared. Those cases not easily diagnosed were detained and further examination given before rendering the surgeon's morning report of sick. The cases of a mild and not infectious type were treated at the infirmary; all others were transferred to the embarkation hospital, Camp Stuart.

PIG POINT GENERAL ORDNANCE SUPPLY DEPOT

This depot was situated in Nansemond County, Va., about 11 miles northwest of the cities of Norfolk and Portsmouth. The surrounding country was flat and partly wooded with pines. The soil was mostly sand and there was considerable high-flying dust during dry seasons.

The roads in the camp proper were made of concrete and were very good, but the road to the nearest city was mostly dirt and in some places nearly impassable.

The post was bounded on the north by Hampton Roads, on the west by the Nansemond River, on the east by Streeters Creek, and on the south by three plantations. The sanitary conditions were very poor, the surrounding neighborhood being mostly very poorly drained swamps and marshes.

An infirmary was established on December 24, 1917, in the corner of a barracks. The camp hospital was organized February 12, 1918, with a personnel of 1 medical officer and 10 enlisted men. It was officially opened February 19, 1918, and the first patient to be admitted was a case of mumps, on March 5, 1918. The hospital was situated on one of the highest points in the camp, a small bluff overlooking Hampton Roads, and about 100 yards from the water front.

The water was derived from wells driven about 90 feet deep and located about one-fourth mile from the hospital. It was pumped by electricity into two large tanks, each having a capacity of 100,000 gallons. Water was chlorinated by means of an automatic chlorinator and then piped to the various buildings. The water supply at the hospital was identical with that of the rest of the camp.

The only disease that could have been classed as epidemic was influenza, which became epidemic in September, 1918. The first case developed the last day of August and the last case was discharged October 8, 1918. As the hospital was equipped for not more than 40 patients, the entire personnel was taxed to its utmost in caring for the 300 patients who were admitted during September. Various buildings were utilized and made into temporary hospitals. Enlisted personnel was insufficient to care for the number of patients, which necessitated requesting men from the various organizations in the post to assist.

There were no physical examinations of drafted men at this post. All uncompleted vaccinations were completed and new vaccination registers started when necessary.

INDEX

	Page
Accounts and purchasing, nutrition officer, Port of Embarkation, Newport News, Va...	357
Activities:	
Medical Department, in the camps of the port, Port of Embarkation, Newport News, Va.....	468
neuropsychiatric service, Port of Embarkation, Newport News, Va., supervision and coordination of.....	438
sick and wounded division, Port of Embarkation, Hoboken, N. J.....	285
Acute venereal diseases, Port of Embarkation, Newport News, Va.....	403
Adjutant, port surgeon's office, Port of Embarkation, Newport News, Va.....	346
Administration, Medical Department, mobilization camps, mobilization and training period.....	11
Ambulance companies, director of, sanitary train, mobilization camps, mobilization and training period.....	9
Ambulance train, mobilization camps, mobilization and training period, director of field hospitals.....	9
Ambulances, director of, evacuation division, Port of Embarkation, Hoboken, N. J.....	302
American convoy, personnel on vessels assigned to.....	259
Animal Embarkation Depot No. 301, veterinary service, Port of Embarkation, Newport News, Va.....	461
Animal excreta, disposal of, mobilization camps, mobilization and training period.....	17
Animal quarantine, veterinary service, Port of Embarkation, Newport News, Va.....	463
Animals, activities connected with shipment of, Port of Embarkation, Newport News, Va.....	452
Anophelines, species of, Port of Embarkation, Newport News, Va.....	372
Anthrax, Port of Embarkation, Hoboken, N. J.....	279
Areas and departments, special, mobilization camps, mobilization and training period.....	27
Army laboratory, Port of Embarkation, Hoboken, N. J., discontinuance of.....	284
Army Supply Base, Port of Embarkation, Newport News, Va., Medical Department activities in.....	476
Attending surgeon, Port of Embarkation, Newport News, Va.....	432
Attending surgeon's division, Port of Embarkation, Hoboken, N. J.....	314
Auxiliary remount depot, mobilization camps, mobilization and training period.....	30
Bakers' and cooks' school, Camp Merritt, N. J.....	326
Bathing facilities, Camp Mills, Long Island.....	339
Bedbugs, cockroaches, and fleas, control of, Port of Embarkation, Newport News, Va.....	377
Board of officers convened at Port of Embarkation, Hoboken, N. J., to investigate and report upon the allowance of medical and hospital supplies which should be provided aboard trans-Atlantic transports, proceedings of.....	305
Boards:	
disability, mobilization camps, mobilization and training period.....	24
medical, Camp Merritt, N. J.....	336
Bread, Camp Merritt, N. J.....	327
Camp:	
Alexander, Port of Embarkation, Newport News, Va., Medical Department activities in.....	471
Beauregard, La.....	159
Bowie, Tex.....	164
Cody, N. Mex.....	169
Custer, Mich.....	41
Devens, Mass.....	47
Dix, N. J.....	52
Dodge, Iowa.....	60
Doniphan, Okla.....	173
Fremont, Calif.....	175
Funston, Kans.....	66
Gordon, Ga.....	72
Grant, Ill.....	78
Greene, N. C.....	179
Hancock, Ga.....	184
Hill, Port of Embarkation, Newport News, Va., Medical Department activities in.....	469
Kearny, Calif.....	187

	Page
Camp—Continued.	
Lee, Va.	103
Lewis, Wash.	109
Logan, Tex.	205
MaeArthur, Tex.	211
McClellan, Ala.	215
Merritt, N. J.—	
camp buildings.	322
camp site.	321
control of communicable diseases.	329
dental service.	337
disposal of wastes.	323
extra-cantonment zone.	336
heat and light.	323
ice.	323
insect control.	333
laundry facilities.	322
medical boards.	336
medical infirmaries.	328
medical personnel.	328
medical supply depot.	329
overseas casuals service.	329
troop trains.	336
veterinary service.	337
water supply.	323
Mills, Long Island.	338
bathing facilities.	339
care of the sick.	342
dental service.	342
disposal of wastes.	338
extra-cantonment sanitation.	339
louse infestation.	341
medical supplies.	341
mosquito prevention.	339
prevention of infectious diseases.	339
venereal disease prevention.	341
water supply.	338
Morrison, Port of Embarkation, Newport News, Va., Medical Department activities in.	473
Pike, Ark.	122
Sevier, S. C.	219
Shelby, Miss.	222
Sheridan, Ala.	225
Sherman, Ohio.	128
Stuart, Port of Embarkation, Newport News, Va., Medical Department activities in.	476
Travis, Tex.	136
Upton, N. Y.	141
Wadsworth, S. C.	228
Wheeler, Ga.	233
Zachary Taylor, Ky.	133
Camp buildings, Camp Merritt, N. J.	322
Camp inspections, Port of Embarkation, Hoboken, N. J.	265
Camp service, Veterinary Corps, mobilization camps, mobilization and training period.	28
Camp site, Camp Merritt, N. J.	321
Camp surgeon's office, mobilization camps, mobilization and training period.	8
Camps:	
embarkation, Port of Embarkation, Hoboken, N. J.	320
mobilization.	1
National Guard.	159-251
of the port, Port of Embarkation, Newport News, Va, Medical Department activities in the.	468
Cantonments, National Army.	41-158
Car, Hospital Unit, Group No. 1, Port of Embarkation, Hoboken, N. J.	301
Card-index systems, Port of Embarkation, Hoboken, N. J.	286
Care:	
and disposition of patients from overseas, neuropsychiatric service, Port of Embarkation, Newport News, Va.	436
of the sick, Camp Mills, Long Island.	342

	Page
Carriers, typhoid, and typhoid fever, Port of Embarkation, Hoboken, N. J.....	283
Cars, unit, and hospital trains, Port of Embarkation, Hoboken, N. J.....	296
Casual personnel, Port of Embarkation, Hoboken, N. J.....	254
Casuals service, overseas, Camp Merritt, N. J.....	329
Catgut examinations, Port of Embarkation, Hoboken, N. J.....	283
Cerebrospinal meningitis, mortality, Port of Embarkation, Newport News, Va.....	395
Chancroids, syphilis, and gonorrhoea, relative incidence of, Port of Embarkation, Newport News, Va.....	404
Chemical examinations, Port of Embarkation, Hoboken, N. J.....	284
Chief medical examiner, Port of Embarkation, Newport News, Va.....	416
Chronic venereal diseases, Port of Embarkation, Newport News, Va.....	400
Civilian employees:	
and nurses, Port of Embarkation, Hoboken, N. J.....	254
debarkation delousing, Port of Embarkation, Newport News, Va.....	382
Closing mobilization camps.....	35
Cockroaches, bedbugs, and fleas, control of, Port of Embarkation, Newport News, Va.....	377
Commanding officer, sanitary train, mobilization camps, mobilization and training period.....	9
Commissioned Medical Department personnel, mobilization camps, mobilization and training period.....	3
Communicable diseases, control of, Camp Merritt, N. J.....	329
Community venereal disease control, demonstration in, Port of Embarkation, Newport News, Va.....	409
Complement fixation tests, Port of Embarkation, Hoboken, N. J.....	283
Complications of venereal diseases, Port of Embarkation, Newport News, Va.....	405
Conservation of health, mobilization camps, mobilization and training period.....	13
Contacts, control of, Camp Merritt, N. J.....	331
Control:	
mosquito, Port of Embarkation, Newport News, Va.....	366
of bedbugs, cockroaches, and fleas, Port of Embarkation, Newport News, Va.....	377
of communicable diseases, Camp Merritt, N. J.....	329
of flies, Port of Embarkation, Newport News, Va.....	374
of infectious diseases, Port of Embarkation, Hoboken, N. J.....	270
of lice, Port of Embarkation, Newport News, Va.....	377
of louse infestation, Port of Embarkation, Hoboken, N. J.....	268
of venereal diseases, Port of Embarkation, Hoboken, N. J.....	272
Convalescent center, mobilization camps, demobilization period.....	34
Convoy, American, personnel on vessels assigned to.....	259
Coordination of transfer, evacuation division, Port of Embarkation, Hoboken, N. J.....	298
Cooks' and bakers' school, Camp Merritt, N. J.....	326
Correspondence, transport division, Port of Embarkation, Hoboken, N. J.....	291
Correspondence division, Port of Embarkation, Hoboken, N. J.....	314
Dairy and meat inspection:	
mobilization camps, mobilization and training period.....	29
veterinary service, Port of Embarkation, Newport News, Va.....	460
Death, miscellaneous causes of, Port of Embarkation, Newport News, Va.....	396
Debarkation delousing, Port of Embarkation, Newport News, Va.....	381
method employed.....	382
Debarkation inspections, transport division, Port of Embarkation, Hoboken, N. J.....	290
Debarkation of sick and wounded from overseas, Port of Embarkation, Newport News, Va.....	429
Delousing:	
debarkation, Port of Embarkation Newport News, Va.....	381
preembarkation, Port of Embarkation, Newport News, Va.....	380
Delousing plants, Camp Merritt, N. J.....	334
Demobilization period, mobilization camps.....	32
Demonstration in community venereal disease control, Port of Embarkation, Newport News, Va.....	409
Dental Corps, mobilization camps, mobilization and training period.....	27
Dental service:	
Camp Merritt, N. J.....	337
Camp Mills, Long Island.....	342
division of, Port of Embarkation, Hoboken, N. J.....	315
Port of Embarkation, Newport News, Va.....	449
Departments and areas, special, mobilization camps, mobilization and training period.....	27
Depot brigade, camp surgeon's office, mobilization camps, mobilization and training period.....	8

	Page
Development battalions, mobilization camps, mobilization and training period.....	24
Dietary, Port of Embarkation, Newport News, Va.....	359
Diphtheria, Port of Embarkation, Hoboken, N. J.....	278
Director:	
of ambulance companies, sanitary train, mobilization camps, mobilization and training period.....	9
of ambulances, evacuation division, Port of Embarkation, Hoboken, N. J.....	302
of field hospitals, sanitary train, mobilization camps, mobilization and training period.....	9
of hospital trains and medical superintendent of transport service, Port of Embarkation, Newport News, Va.....	425
of hospital trains, transportation division, Port of Embarkation, Hoboken, N. J.....	295
of medical service, Port of Embarkation, Hoboken, N. J.....	273
of neuropsychiatric service, Port of Embarkation, Hoboken, N. J.....	274
of roentgenology, Port of Embarkation, Hoboken, N. J.....	275
of surgical service, Port of Embarkation, Hoboken, N. J.....	273
Disability boards, mobilization camps, mobilization and training period.....	24
Dishwashing on hospital trains and unit cars, Port of Embarkation, Hoboken, N. J.....	298
Disposal:	
of animal excreta, mobilization camps, mobilization and training period.....	17
of cases of venereal diseases, Port of Embarkation, Newport News, Va.....	405
of garbage and waste, mobilization camps, mobilization and training period.....	13
of human excreta, mobilization camps, mobilization and training period.....	15
of wastes—	
Camp Merritt, N. J.....	323
Camp Mills, Long Island.....	338
Division, Port of Embarkation, Hoboken, N. J.:	
attending surgeon's.....	314
correspondence.....	314
domiciliary hospitals.....	263
evacuation.....	295
finance.....	303
hospital.....	273
hospital procurement.....	263
laboratory.....	275
of dental service.....	315
personnel.....	254
property.....	312
sanitary inspection.....	263
sick and wounded.....	284
transport.....	287
transport supply.....	292
transportation.....	293
Division sanitary inspector, mobilization camps, mobilization and training period.....	7
Division surgeon's office, mobilization camps, mobilization and training period.....	4
Drafted men, physical examination of, mobilization camps, mobilization and training period.....	21
Embarkation, Port of, Hoboken, N. J.....	253-342
Embarkation, Port of, Newport News, Va.....	343-481
Embarkation camps, Port of Embarkation, Hoboken, N. J.....	320
Camp Merritt, N. J.....	321
Camp Mills, Long Island.....	338
Empyema and pneumonia, Port of Embarkation, Hoboken, N. J.....	280
Engineer Depot, Port of Embarkation, Newport News, Va., Medical Department activities in.....	479
Enlisted Medical Department personnel, mobilization camps, mobilization and training period.....	4
Epidemic meningitis, Port of Embarkation, Hoboken, N. J.....	278
Epidemiology, mobilization camps, mobilization and training period.....	18
Equipment for preparation of food, Port of Embarkation, Newport News, Va., recommendation of nutrition officer concerning.....	361
Escort detachment, transportation division, Port of Embarkation, Hoboken, N. J.....	294
Evacuation division, Port of Embarkation, Hoboken, N. J.....	295
coordination of transfer.....	298
director of ambulances.....	302
hospital trains and unit cars.....	296
medical attendance en route.....	299
railroad service.....	298

	Page
Evacuation of officers, hospital trains and unit cars, Port of Embarkation, Hoboken, N. J.	298
Examination, physical, of drafted men, mobilization camps, mobilization and training period.	21
Examinations:	
catgut, Port of Embarkation, Hoboken, N. J.	283
chemical, Port of Embarkation, Hoboken, N. J.	284
pathological, Port of Embarkation, Hoboken, N. J.	284
physical, mobilization camps, demobilization period.	32
psychological, Port of Embarkation, Newport News, Va.	439
Examiner, chief medical, Port of Embarkation, Newport News, Va.	416
Examiners, specialist, mobilization camps, mobilization and training period.	23
Exerceta:	
animal, disposal of, mobilization camps, mobilization and training period.	17
disposal of, Camp Mills, Long Island.	339
human, disposal of, mobilization camps, mobilization and training period.	15
Executive officer, port surgeon's office, Port of Embarkation, Newport News, Va.	345
Extra-entonnment:	
areas, mobilization camps, mobilization and training period.	32
sanitation, Camp Mills, Long Island.	339
zone, Camp Merritt, N. J.	336
Feeding:	
on hospital trains and unit cars, Port of Embarkation, Hoboken, N. J.	297
provisions for, Camp Merritt, N. J.	326
Field hospitals, director of, sanitary train, mobilization camps, mobilization and training period.	9
Finance division, Port of Embarkation, Hoboken, N. J.	303
finance section.	303
real estate section.	311
transport supply section.	304
Finance section, finance division, Port of Embarkation, Hoboken, N. J.	303
Fleas, bedbugs, and cockroaches, control of, Port of Embarkation, Newport News, Va.	377
Flies, control of, Port of Embarkation, Newport News, Va.	374
Fly prevention, Camp Merritt, N. J.	333
Food waste, Port of Embarkation, Newport News, Va.	361
Foods, supervision of, mobilization camps, mobilization and training period.	18
Garbage:	
and waste, disposal of, mobilization camps, mobilization and training period.	13
disposal of—	
Camp Merritt, N. J.	325
Camp Mills, Long Island.	338
Gonorrhoea, syphilis, and chaneroids, relative incidence of, Port of Embarkation, Newport News, Va.	404
Group method, psychological examinations, Port of Embarkation, Newport News, Va.	439
Health, conservation of, mobilization camps, mobilization and training period.	13
Heat and light, Camp Merritt, N. J.	323
Hoboken, N. J., Port of Embarkation.	253-342
Hospital:	
and troop trains, investigation of water on, Port of Embarkation, Hoboken, N. J.	283
division, Port of Embarkation, Hoboken, N. J.	273
inspector, Port of Embarkation, Newport News, Va.	433
procurement division, Port of Embarkation, Hoboken, N. J.	263
ship, Port of Embarkation, Hoboken, N. J.	319
train—	
inspections, Port of Embarkation, Hoboken, N. J.	267
No. 1, Port of Embarkation, Hoboken, N. J.	299
No. 2, Port of Embarkation, Hoboken, N. J.	300
No. 4, Port of Embarkation, Hoboken, N. J.	301
trains—	
director of, and medical superintendent of transport service, Port of Embarkation, Newport News, Va.	425
director of, transportation division, Port of Embarkation, Hoboken, N. J.	295
trains and unit cars, Port of Embarkation, Hoboken, N. J.	296
dish washing on.	298
evacuation of officers.	298
feeding on.	297
Unit Car Group No. 1, Port of Embarkation, Hoboken, N. J.	301

	Page
Hospitals:	
inspection of, Port of Embarkation, Hoboken, N. J.-----	264
domiciliary, division of, Port of Embarkation, Hoboken, N. J.-----	263
field, director of, sanitary train, mobilization camps, mobilization and training period-----	9
Human excreta, disposal of, mobilization camps, mobilization and training period-----	15
Ice, Camp Merritt, N. J.-----	323
Identification office, Port of Embarkation, Newport News, Va.-----	431
Incidence, relative, of syphilis, gonorrhoea, and chancroids, Port of Embarkation, Newport News, Va.-----	404
Individual method, psychological examinations, Port of Embarkation, Newport News, Va.-----	442
Infectious diseases:	
control of, Port of Embarkation, Hoboken, N. J.-----	270
prevention of, Camp Mills, Long Island.-----	339
Infirmaries:	
medical, Camp Merritt, N. J.-----	328
mobilization camps, mobilization and training period-----	9
Influenza:	
control of, Camp Merritt, N. J.-----	332
morbidity, Port of Embarkation, Newport News, Va.-----	386
Port of Embarkation, Hoboken, N. J.-----	280
Insect control, Camp Merritt, N. J.-----	333
Inspection:	
meat and dairy—	
mobilization camps, mobilization and training period-----	29
veterinary service, Port of Embarkation, Newport News, Va.-----	460
of hospitals, Port of Embarkation, Hoboken, N. J.-----	264
of transports—	
sanitary inspection division, Port of Embarkation, Hoboken, N. J.-----	265
transport division, Port of Embarkation, Hoboken, N. J.-----	290
preembarkation—	
neuropsychiatric service, Port of Embarkation, Newport News, Va.-----	435
transport division, Port of Embarkation, Hoboken, N. J.-----	289
sanitary, division of, Port of Embarkation, Hoboken, N. J.-----	263
Inspections:	
camp, Port of Embarkation, Hoboken, N. J.-----	265
debarcation, transport division, Port of Embarkation, Hoboken, N. J.-----	290
hospital train, Port of Embarkation, Hoboken, N. J.-----	267
Inspector:	
division sanitary, mobilization camps, mobilization and training period-----	7
hospital, Port of Embarkation, Newport News, Va.-----	433
sanitary, port surgeon's office, Port of Embarkation, Newport News, Va.-----	353
Investigations, special, laboratory division, Port of Embarkation, Hoboken, N. J.-----	278
Kitchens and mess halls, Camp Merritt, N. J.-----	326
Laboratory, Army, Port of Embarkation, Hoboken, N. J., discontinuance of-----	284
Laboratory division, Port of Embarkation, Hoboken, N. J.-----	275
Laboratory service, Port of Embarkation, Newport News, Va.-----	447
Laundry facilities, Camp Merritt, N. J.-----	322
Liaison officer, Port of Embarkation, Hoboken, N. J.-----	317
Lice, control of, Port of Embarkation, Newport News, Va.-----	377
Light and heat, Camp Merritt, N. J.-----	323
Louse infestation:	
Camp Mills, Long Island.-----	341
control of, Port of Embarkation, Hoboken, N. J.-----	268
Mail, Port of Embarkation, Hoboken, N. J.-----	255
Malaria, occurrence of, Port of Embarkation, Newport News, Va.-----	373
Meat and dairy inspection:	
mobilization camps, mobilization and training period-----	29
veterinary service, Port of Embarkation, Newport News, Va.-----	460
Meats, Camp Merritt, N. J.-----	327
Medical attendance en route, evacuation division, Port of Embarkation, Hoboken, N. J.-----	299
Medical boards, Camp Merritt, N. J.-----	336
Medical Department:	
activities in the camps of the port, Port of Embarkation, Newport News, Va.-----	468
administration, mobilization camps, mobilization and training period-----	11
organizations, mobilization camps, mobilization and training period-----	4
personnel—	
mobilization camps, demobilization period-----	35
mobilization camps, mobilization and training period-----	3

	Page
Medical detachments, psychological rating of, Port of Embarkation, Newport News, Va.....	444
Medical examiner, chief, Port of Embarkation, Newport News, Va.....	416
Medical infirmaries, Camp Merritt, N. J.....	328
Medical personnel, Camp Merritt, N. J.....	328
Medical service, director of, Port of Embarkation, Hoboken, N. J.....	273
Medical superintendent of transport service and director of hospital trains, Port of Embarkation, Newport News, Va.....	425
Medical supplies, Camp Mills, Long Island.....	341
Medical supply depot, Camp Merritt, N. J.....	329
Medical supply depots, mobilization camps, mobilization and training period.....	10
Medical supply officer, port surgeon's office, Port of Embarkation, Newport News, Va.....	349
Meningitis:	
cerebrospinal, mortality, Port of Embarkation, Newport News, Va.....	395
epidemic, Port of Embarkation, Hoboken, N. J.....	278
Mess halls and kitchens, Camp Merritt, N. J.....	326
Mess organization and personnel, Port of Embarkation, Newport News, Va.....	357
Messes, Port of Embarkation, Newport News, Va., sanitary condition of.....	358
Milk, Camp Merritt, N. J.....	328
Miscellaneous organizations, Port of Embarkation, Hoboken, N. J.....	318
Mobilization and training period, mobilization camps.....	2
Mobilization camps.....	1-39
closing.....	35
demobilization period.....	32
convalescent center.....	34
Medical Department personnel.....	35
physical examinations.....	32
mobilization and training period.....	2
camp surgeon's office.....	8
conservation of health.....	13
development battalions.....	24
division sanitary inspector.....	7
infirmaries.....	9
Medical Department administration.....	11
Medical Department organizations.....	4
Medical Department personnel.....	3
medical supply depots.....	10
physical examination of drafted men.....	21
sanitary train.....	8
special departments and areas.....	27
training.....	11
premobilization period.....	1
Morbidity:	
and mortality data, Port of Embarkation, Newport News, Va.....	383
Port of Embarkation, Newport News, Va.....	386
Mortality:	
and morbidity data, Port of Embarkation, Newport News, Va.....	383
Port of Embarkation, Newport News, Va.....	394
Mosquito:	
control—	
Camp Merritt, N. J.....	333
Port of Embarkation, Newport News, Va.....	366
prevention, Camp Mills, Long Island.....	339
National Army cantonments.....	41-158
Camp—	
Custer, Mich.....	41
Devens, Mass.....	47
Dix, N. J.....	52
Dodge, Iowa.....	60
Funston, Kans.....	66
Gordon, Ga.....	72
Grant, Ill.....	78
Jackson, S. C.....	83
Lee, Va.....	103
Lewis, Wash.....	109
Meade, Md.....	117
Pike, Ark.....	122
Sherman, Ohio.....	128

National Army cantonments—Continued.	
Camp—Continued.	
Travis, Tex.....	136
Upton, N. Y.....	141
Zachary Taylor, Ky.....	133
National Guard camps.....	159-251
Camp—	
Beauregard, La.....	159
Bowie, Tex.....	164
Cody, N. Mex.....	169
Doniphan, Okla.....	173
Fremont, Calif.....	175
Greene, N. C.....	179
Hancock, Ga.....	184
Kearny, Calif.....	187
Logan, Tex.....	205
MacArthur, Tex.....	211
McClellan, Ala.....	215
Sevier, S. C.....	219
Shelby, Miss.....	222
Sheridan, Ala.....	225
Wadsworth, S. C.....	228
Wheeler, Ga.....	233
Neuropsychiatric service:	
Port of Embarkation, Hoboken, N. J., director of.....	274
Port of Embarkation, Newport News, Va.....	434
supervision and coordination of activities.....	438
Newport News, Va., Port of Embarkation.....	343-481
Nurses and civilian employees, Port of Embarkation, Hoboken, N. J.....	254
Nurses' mobilization station, Port of Embarkation, Hoboken, N. J.....	319
Nutrition officer, port surgeon's office, Port of Embarkation, Newport News, Va.....	356
Occurrence of malaria, Port of Embarkation, Newport News, Va.....	373
Office of transportation of sick and wounded, Port of Embarkation, Hoboken, N. J.....	294
Officers, evacuation of, hospital trains and unit cars, Port of Embarkation, Hoboken, N. J.....	298
Orders section, transportation division, Port of Embarkation, Hoboken, N. J.....	295
Organization of port surgeon's office, Port of Embarkation, Newport News, Va.....	345
Organizations:	
Medical Department, mobilization camps, mobilization and training period.....	4
miscellaneous, Port of Embarkation, Hoboken, N. J.....	318
Orthopedic service, Port of Embarkation, Newport News, Va.....	445
Overseas casuals service, Camp Merritt, N. J.....	329
Pathological examinations, Port of Embarkation, Hoboken, N. J.....	284
Patients:	
debarkation delousing, Port of Embarkation, Newport News, Va.....	381
from overseas, care and disposition of, neuropsychiatric service, Port of Embarkation, Newport News, Va.....	436
Permanent personnel, Port of Embarkation, Hoboken, N. J.....	254
Personnel:	
and mess organization, Port of Embarkation, Newport News, Va.....	357
at the port, Port of Embarkation, Hoboken, N. J.....	254
casual, Port of Embarkation, Hoboken, N. J.....	254
division, Port of Embarkation, Hoboken, N. J.....	254
medical, Camp Merritt, N. J.....	328
Medical Department, mobilization camps—	
demobilization period.....	35
mobilization and training period.....	3
on converted commercial vessels.....	260
on transports, Port of Embarkation, Hoboken, N. J.....	258
on vessels—	
assigned to American Convoy, Port of Embarkation, Hoboken, N. J.....	259
in the status of war vessels of the respective countries.....	260
sailing under the jurisdiction of the ministry of shipping of the various countries.....	260
permanent, Port of Embarkation, Hoboken, N. J.....	254
Piers, duties at, of transport division, Port of Embarkation, Hoboken, N. J.....	290
Pig Point General Ordnance Supply Depot, Port of Embarkation, Newport News, Va., Medical Department activities in.....	480
Physical examination of drafted men, mobilization camps, mobilization and training period.....	21

	Page
Physical examinations, mobilization camps, demobilization period.....	32
Pneumonia:	
and empyema, Port of Embarkation, Hoboken, N. J.....	280
morbidity, Port of Embarkation, Newport News, Va.....	393
mortality, Port of Embarkation, Newport News, Va.....	394
Port of Embarkation, Hoboken, N. J.....	253-342
anthrax at.....	279
attending surgeon's division.....	314
catgut examinations.....	283
chemical examinations.....	284
correspondence division.....	314
diphtheria at.....	278
division of dental service.....	315
division of domiciliary hospitals.....	263
embarkation camps.....	320
Camp Merritt, N. J.....	321
Camp Mills, Long Island.....	338
epidemic meningitis at.....	278
evacuation division.....	295
finance division.....	303
hospital division.....	273
hospital procurement division.....	263
hospital ship.....	319
influenza.....	280
investigation of water on hospital and troop trains.....	283
laboratory division.....	275
liaison officer.....	317
miscellaneous organizations.....	318
nurses' mobilization station.....	319
pathological examinations.....	284
personnel division.....	254
pneumonia and empyema at.....	280
proceedings of a board of officers convened at, to investigate and report upon the allowance of medical and hospital supplies which should be provided aboard trans-Atlantic transports.....	305
property division.....	312
receiving ships.....	318
sanitary inspection division.....	263
sick and wounded division.....	284
transport division.....	287
transport supply division.....	292
transportation division.....	293
typhoid fever and typhoid carriers at.....	283
Port of Embarkation, Newport News, Va.....	343-481
attending surgeon.....	432
cerebrospinal meningitis, mortality.....	395
chief medical examiner.....	416
control—	
of bedbugs, cockroaches, and fleas.....	377
of flies.....	374
of lice.....	377
debarkation delousing.....	381
debarkation of sick and wounded from overseas.....	429
demonstration in community venereal disease control.....	409
dental service.....	449
hospital inspector.....	433
identification office.....	431
influenza, morbidity.....	386
laboratory service.....	447
Medical Department activities in the camps of the port.....	468
medical superintendent of transport service and director of hospital trains.....	425
miscellaneous causes of death.....	396
morbidity.....	386
and mortality data.....	383
mortality.....	394
mosquito control.....	366
neuropsychiatric service.....	434
nutrition officer.....	356
occurrence of malaria.....	373

	Page
Port of Embarkation, Newport News, Va.—Continued.	
organization of port surgeon's office.....	345
orthopedic service.....	445
other diseases, morbidity.....	393
pneumonia—	
morbidity.....	393
mortality.....	394
port surgeon.....	345
functions.....	345
port surgeon's office—	
adjutant.....	345
executive officer.....	345
medical supply officer.....	349
sanitary inspector.....	353
port venereal officer.....	407
psychological service.....	439
tuberculosis, all forms, mortality.....	396
venereal diseases.....	396
veterinary service.....	451
water supply.....	361
Port surgeon, Port of Embarkation, Newport News, Va.....	345
Port venereal officer, Port of Embarkation, Newport News, Va.....	407
Preembarkation delousing, Port of Embarkation, Newport News, Va.....	380
Preembarkation inspection:	
neuropsychiatric service, Port of Embarkation, Newport News, Va.....	435
transport division, Port of Embarkation, Hoboken, N. J.....	289
Pre mobilization period, mobilization camps.....	1
Prevention of infectious diseases, Camp Mills, Long Island.....	339
Proceedings of a board of officers convened at Port of Embarkation, Hoboken, N. J., to investigate and report upon the allowance of medical and hospital supplies which should be provided aboard trans-Atlantic transports.....	305
Property division, Port of Embarkation, Hoboken, N. J.....	312
Prophylaxis, venereal diseases, Port of Embarkation, Newport News, Va.....	406
Provisions for feeding, Camp Merritt, N. J.....	326
Psychological examinations, Port of Embarkation, Newport News, Va.....	439
group method.....	439
individual method.....	442
Psychological rating of medical detachments, Port of Embarkation, Newport News, Va.....	444
Psychological service, Port of Embarkation, Newport News, Va.....	439
psychological examinations.....	439
Purchasing and accounts, nutrition officer, Port of Embarkation, Newport News, Va.....	357
Quarantine, animal, veterinary service, Port of Embarkation, Newport News, Va.....	463
Railroad service, evacuation division, Port of Embarkation, Hoboken, N. J.....	298
Rating, psychological, of medical detachments, Port of Embarkation, Newport News, Va.....	444
Real estate section, finance division, Port of Embarkation, Hoboken, N. J.....	311
Receiving ships, Port of Embarkation, Hoboken, N. J.....	318
Relative incidence of syphilis, gonorrhea, and chaneroids, Port of Embarkation, Newport News, Va.....	404
Roentgenology, director of, Port of Embarkation, Hoboken, N. J.....	275
Sanitary inspection division, Port of Embarkation, Hoboken, N. J.....	263
Sanitary inspector:	
division mobilization camps, mobilization and training period.....	7
port surgeon's office, Port of Embarkation, Newport News, Va.....	353
Sanitary measures, general, mobilization camps, mobilization and training period.....	13
Sanitary train, mobilization camps, mobilization and training period.....	8
commanding officer.....	9
director of ambulance companies.....	9
Sanitation, extra-cantonment, Camp Mills, Long Island.....	339
Sewage, disposal of, Camp Merritt, N. J.....	323
Ship, hospital, Port of Embarkation, Hoboken, N. J.....	319
Ships, receiving, Port of Embarkation, Hoboken, N. J.....	318
Sick and wounded division, Port of Embarkation, Hoboken, N. J.....	284
activities.....	285
Sick and wounded from overseas, debarkation of, Port of Embarkation, Newport News, Va.....	429
Sick, care of the, Camp Mills, Long Island.....	342
Special departments and areas, mobilization camps, mobilization and training period.....	27

	Page
Special investigations, laboratory division, Port of Embarkation, Hoboken, N. J.....	278
Specialist examiners, mobilization camps, mobilization and training period.....	23
Storage and supplies, nutrition officer, Port of Embarkation, Newport News, Va.....	358
Superintendent, medical, of transport service and director of hospital trains, Port of Embarkation, Newport News, Va.....	425
Supervision:	
and coordination of activities, neuropsychiatric service, Port of Embarkation, Newport News, Va.....	438
of foods, mobilization camps, mobilization and training period.....	18
Supplies:	
and storage, nutrition officer, Port of Embarkation, Newport News, Va.....	358
medical and hospital, the allowance of, which should be provided aboard trans-Atlantic transports, proceedings of a board of officers convened at Port of Embarkation, Hoboken, N. J., to investigate and report upon.....	305
Supply section, transport, finance division, Port of Embarkation, Hoboken, N. J.....	304
Surgeon:	
attending, Port of Embarkation, Newport News, Va.....	432
port, Port of Embarkation, Newport News, Va.....	345
Surgical service, director of, Port of Embarkation, Hoboken, N. J.....	273
Syphilis, gonorrhoea, and chaneroids, relative incidence of, Port of Embarkation, Newport News, Va.....	404
Tests, complement fixation, Port of Embarkation, Hoboken, N. J.....	283
Train:	
hospital—	
inspections, Port of Embarkation, Hoboken, N. J.....	267
No. 1, Port of Embarkation, Hoboken, N. J.....	299
No. 2, Port of Embarkation, Hoboken, N. J.....	300
No. 4, Port of Embarkation, Hoboken, N. J.....	301
sanitary, mobilization camps, mobilization and training period.....	8
Training:	
and mobilization period, mobilization camps.....	2
mobilization camps.....	11
Trains:	
hospital—	
and Troop, investigation of water on, Port of Embarkation, Hoboken, N. J.....	283
and unit cars, Port of Embarkation, Hoboken, N. J.....	296
director of, and medical superintendent of transport service, Port of Embarkation, Newport News, Va.....	425
director of, transportation division, Port of Embarkation, Hoboken, N. J.....	295
troop, Camp Merritt, N. J.....	336
Transfer, coordination of, evacuation division, Port of Embarkation, Hoboken, N. J.....	298
Transport division, Port of Embarkation, Hoboken, N. J.....	287
duties.....	287
correspondence.....	291
debarkation inspections.....	290
inspection of transports.....	290
other activities.....	292
other, at the piers.....	290
preembarkation inspection.....	289
Transport service, medical superintendent of, and director of hospital trains, Port of Embarkation, Newport News, Va.....	425
Transport supply division, Port of Embarkation, Hoboken, N. J.....	292
Transport supply section, finance division, Port of Embarkation, Hoboken, N. J.....	304
Transportation division, Port of Embarkation, Hoboken, N. J.....	293
director of hospital trains.....	295
escort detachment.....	294
office of transportation of sick and wounded.....	294
orders section.....	295
Transportation of sick and wounded, office of, Port of Embarkation, Hoboken, N. J.....	294
Transports:	
inspection of, Port of Embarkation, Hoboken, N. J.....	265, 290
personnel on, Port of Embarkation, Hoboken, N. J.....	258
Troop:	
and hospital trains, investigation of water on, Port of Embarkation, Hoboken, N. J.....	283
trains, Camp Merritt, N. J.....	336
Troops, debarkation delousing, Port of Embarkation, Newport News, Va.....	382
Tuberculosis, all forms, mortality, Port of Embarkation, Newport News, Va.....	396

	Page
Typhoid:	
carriers and typhoid fever, Port of Embarkation, Hoboken, N. J.	283
fever—	
and typhoid carriers, Port of Embarkation, Hoboken, N. J.	283
control of, Camp Merritt, N. J.	332
Unit cars, and hospital trains, Port of Embarkation, Hoboken, N. J.	296
Veneral disease:	
control—	
Camp Merritt, N. J.	332
demonstration in community, Port of Embarkation, Newport News, Va.	409
prevention, Camp Mills, Long Island.	341
Veneral diseases:	
Port of Embarkation, Hoboken, N. J.	272
Port of Embarkation, Newport News, Va.	396
acute.	403
chronic.	400
complications.	405
disposal of cases.	405
prophylaxis.	406
Veneral officer, port, Port of Embarkation, Newport News, Va.	407
Vessels:	
assigned to American convoy, personnel on.	259
converted commercial, personnel on.	260
in the status of war vessels of the respective countries, personnel on.	260
sailing under the jurisdiction of the ministry of shipping of the various countries, personnel on.	260
Veterinary Corps, mobilization camps, mobilization and training period.	27
camp service.	28
Veterinary service:	
Camp Merritt, N. J.	337
Port of Embarkation, Newport News, Va.	451
activities connected with the shipment of animals.	452
Animal Embarkation Depot No. 301.	461
animal quarantine.	463
meat and dairy inspection.	460
port service.	452
Waste, disposal of garbage and, mobilization camps, mobilization and training period.	13
Wastes:	
disposal of—	
Camp Merritt, N. J.	323
Camp Mills, Long Island.	338
Water on hospital and troop trains, investigation of, Port of Embarkation, Hoboken, N. J.	283
Water supply:	
Camp Merritt, N. J.	323
Camp Mills, Long Island.	338
Mobilization camps, mobilization and training period.	13
Port of Embarkation, Newport News, Va.	361
Wounded and sick from overseas, debarkation of, Port of Embarkation, Newport News, Va.	429