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REPORT OF THE
CHIEF OF THE
CONSTRUCTION DIVISION

TO THE SECRETARY OF WAR



1918



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REPORT OF THE CHIEF OF THE CONSTRUCTION DIVISION.

WAR DEPARTMENT,
OFFICE OF THE CONSTRUCTION DIVISION OF THE ARMY,
Washington, D. C., September 30, 1918.

To the SECRETARY OF WAR.

SIR: I have the honor to submit the following report covering the operations of the Construction Division for the fiscal year ending June 30, 1918:

The Construction Division came into existence by authority given in a letter from the General Staff dated March 13, 1918. By this letter the former Cantonment Division, which had been formed from the Construction and Repair Division of the Quartermaster General's office, was separated from the office of the Quartermaster General and set up as the Construction Division of the Army, and instructed to report to the Assistant Chief of Staff in charge of operations.

The conditions during the past year have been so extraordinary that it is deemed necessary to prepare this report in much greater detail than has been customary.

EMERGENCY CONSTRUCTION.

War was declared April 6, 1917, and on April 12, 1917 the Secretary of War declared that an emergency existed in the meaning of section 3709, Revised Statutes, under which statute emergency construction could be carried on without resorting to advertising and the taking of competitive bids. The selective draft law was passed May 16, 1917. Preliminary plans for housing the new National Army were well under way in the early part of May. All work of this character under existing law has in peace times been executed by the Construction and Repair Division of the Quartermaster General's Office, but it was at once apparent that that division was not properly organized to take up the construction of cantonments and camps required for housing the new armies.

In order to carry to prompt completion the vast building program incidental to the housing of the new armies, it became necessary to organize a separate division of the Quartermaster General's Office and this was done by authority of a letter from the Adjutant General, dated May 19, 1917, by which Col. Isaac W. Littell, Quartermaster Corps, was assigned to take charge of a special division which was given the name of Cantonment Division. To this new organization was assigned the work of construction of cantonments and camps.

Immediately upon the declaration of war, a Council of National Defense was organized which, with its subcommittees, has been very helpful in carrying through the program of construction and production developed by the War and Navy Departments.

The subcommittee on emergency construction and engineering took an active part in working out the various problems connected with the location and design of the camps. This committee consisted of Chairman William A. Starrett (now colonel, Q. M. C.), of New York; Frederick Law Olmsted, of Boston; M. C. Tuttle, of Boston; C. W. Lundorf, of Cleveland; and Maj. William Kelley, Corps of Engineers. Under this committee there was a sub-committee on preliminary plans, sanitation, and engineering relative to cantonment work. This committee, reporting through Mr. Olmsted, was composed of Leonard Metcalf, of Boston; George W. Fuller, of New York City, and Asa E. Phillips, of Washington, D. C. There were other committees which aided materially in expediting the construction program. These committees dealt with such subjects as supplies, labor, transportation, priority, storage, auditing, etc.

The original organization of the cantonment division is shown in the following office order, dated May 24, 1917.

CANTONMENT CONSTRUCTION—OFFICE ORDERS.

The following is quoted for the information of all concerned:

1. All work pertaining to cantonments and post extensions coming within the jurisdiction of this office is divided into two groups.
2. All work pertaining to the housing of the Regular Army increments and extensions to existing posts will be handled by Capt. Oury, who will also act as executive officer and assistant to the officer in charge of cantonment construction.
3. All work pertaining to these 32 cantonments for housing the National Guard and National Army will be handled by Capt. Marshall through the organization which has just been set up for that purpose.

By authority of the Secretary of War.

(Signed) I. W. LITTELL,
Colonel, Quartermaster Corps,
In Charge of Cantonment Construction.

2. In order to carry out the work outlined in paragraph 3 of the above-quoted office orders, dated May 24, 1917, and referring to the organization chart, the duties and responsibilities of the several divisions are further defined as follows, to wit:

3. No action will be taken involving the expenditure of funds without my approval secured in advance.

4. *Engineer division.*—The officer in charge of the engineering division will prepare typical plans of cantonments, including water distribution, internal sewer and draining lines, lighting distribution, tracks, roads, etc. He will prepare or secure through the consulting architect detailed plans of the different buildings required. He will secure, with my approval in each case, the services of consulting engineers to do all the engineering involved in water supply and sewage disposal, as this is work which must be done in the field.

Designs prepared for such works will be submitted through me to the consulting engineers of the committee on emergency construction for approval or comment.

He will determine and define the requirements in the way of laundry, incinerators, refrigerating plant, etc., and inform the material officer of the requirements, with any other information that he may get incidental to these investigations, and he and the material officer together will discuss and recommend to me where these contracts and other similar contracts should

be placed, the details of the purchasing to be in the hands of the materials officer.

It may be necessary to call on engineering concerns for help on some of the other engineering details, and in case this is necessary my approval should be obtained before any action is taken.

5. *Material division.*—The officer in charge of the material division will make recommendations as to placing all contracts for material to be purchased by this organization. He will consult freely with the engineer officer and with me in connection with the purchase of such equipment as power plants, pumping machinery, refrigerating plant, and similar items, and with the construction officer on building materials and supplies.

He will be expected to keep in touch with the various supply committees of the General Munitions Board and to work out with its committees the best method of handling supplies of material which they may control.

He will also have charge of the inspection and expediting of materials and equipment, excepting such part of this work as may be turned over to the several contractors, and even in these cases shall be ready at all times to help the contractors in any way possible to secure the necessary materials.

The details of transportation from points of manufacture to the several cantonments will be handled by the several contractors, but transportation requirements should be worked out in advance and arrangements made with the railroad association and with the transportation committee of the Munitions Board so that cars will be available and transportation expedited in every way possible.

It will be necessary for the material officer to build up a force of assistants, but he will obtain my approval before actually employing any assistants.

6. *Construction division.*—The officer in charge of the construction division will be in charge of all operations in the field and will handle the correspondence directly or, through his representative, all questions arising between this office and the contractors or between this office and constructing quartermasters stationed at the several cantonments.

He will select assistants, assigning to each one to follow in detail the work located in several cantonments as assigned later on.

Any correspondence originating in any part of this office, other than the construction division, will be signed by the officer originating the correspondence but will go out over the desk of one of those assistant construction officers, so that they can be familiar with all matters under discussion.

In the same way all correspondence coming in from construction quartermasters, referring to engineering, material, or accounting matters, shall come in over the desk of the proper assistant construction officers to be noted and forwarded to the officer in charge of the department having jurisdiction.

In addition to the assistant construction officers located in this office, and mentioned above, there shall be other assistant construction officers, similarly assigned, who will act as field supervisors and will circulate each in his own territory, practically all of the time, reporting to this office after each visit to a job.

7. *Accounting division.*—The officer in charge will have charge of accounting, legal matters, and with the general administration of the office.

Under his direction an accountant would be chosen who would handle the account of this office and will supervise the work of the accountants stationed at the various cantonments, and also of the auditors. Each of these auditors will cover a territory corresponding to the territory covered by one of the assistant construction officers and will be in the field most of the time visiting the jobs in his territory often enough to be sure that office routine and accounting matters are being handled in a satisfactory way.

The officer assigned to duty in this division for legal matters will advise all divisions of the office at any and all times and every precaution takes to comply with law and regulations governing with particular reference to matters involving expenditure of funds.

8. *Constructing quartermaster's office.*—Each constructing quartermaster will report to this office through one of the assistant construction officers outlined above. He should have an assistant who shall be a civil engineer, and under him will be whatever force of surveyors, draftsmen, auditors, etc., as needed by particular circumstances.

The constructing quartermaster will have the responsibility of adapting to the topographical conditions typical plans furnished by this office.

As outlined above he will have the assistance of civilian engineers in the planning of water supply, sewage disposals, and if he requires other help he should promptly notify this office of such requirements. It will probably be better to retain civil engineers or civil engineering concerns rather than to attempt to build up a considerable field force to work under his personal direction. The engineering force to be sufficient for supervisory purposes. The contractor to do such engineering work as is necessary to carry out the plans.

The conditions in various cantonments will differ and matters of this kind will have to be left largely to the judgment of the construction quartermaster to be decided for each cantonment on its own merits, after consultation with this office.

The theory of the field organization should be to use the contractor's organization as far as possible for the field work required and for any engineering details.

The chief accountant will be responsible for the administration of the job office of accounting for all expenditures of the contracting officer direct, and for verifying and auditing the expenditures of the contractor, and payments to the contractor by the constructing quartermaster to be made practically on the certificate of the chief accountant.

This office will issue instructions for the chief accountant, who will be a part of the constructing quartermaster's organization.

The number of clerks, stenographers, and inspectors will be determined later, and will of course vary at the different jobs, depending on local conditions.

9. *Correspondence.*—All correspondence with contractors, with concerns concerning material, with constructing quartermaster, will be signed by the officer in whose department the letter originates, and will be signed—

By authority of the Secretary of War,

I. W. LITTELL,

Colonel, Quartermaster Corps, in Charge of Cantonment Construction.

By _____

Major, Quartermaster Reserve Corps.

Telegrams will be signed:

I. W. LITTELL,

Colonel, Quartermaster Corps.

Letters or memoranda to the War Department, or to the Council of National Defense, or any of its committees or subcommittees should be signed by either Col. Littell or by me.

All internal office memoranda shall be headed in the manner shown below:

To: Constructing Division,
From: Engineer officers,
Subject: Refrigerating machinery,

and such memoranda may be signed with the surname of the officer in whose department they originated.

10. All questions of policies relating to any matter in any division will be submitted to me for approval.

11. *Assignments.*—The following assignments in charge of divisions is made: Material division, Mr. R. E. Hamilton; engineering division, Mr. F. N. Gunby; construction division, Mr. M. J. Whitson; accounting division, Maj. W. A. Dempsey.

12. For the present and until those in charge of the engineering, material, and construction divisions receive their commissions, all outgoing mail will be prepared for my signature, excepting such as should be prepared for Col. Littell. Upon receipt of these commissions, this procedure will automatically stop and each will sign his own mail, excepting of course, such as should be signed by Col. Littell or myself.

R. C. MARSHALL,

Captain, Quartermaster Corps.

Approved: I. W. LITTELL,
Colonel, Quartermaster Corps.

The organization shown above was supplemented by the addition of Maj. Peter Junkersfeld, Engineer Reserve Corps, now colonel, Quartermaster Corps, who took immediate supervision over the general construction, and Maj. Joseph N. Willcutt, now colonel, Quartermaster Corps, who supervised construction of National Guard camps.

Maj. F. B. Wheaton, Quartermaster Reserve Corps, now lieutenant colonel, Quartermaster Corps, was assigned to assist Maj. Gunby as advisory architect. Maj. D. H. Maury, Engineer Reserve Corps, now lieutenant colonel, Quartermaster Corps, was assigned as waterworks expert; Capt. L. S. Doten, now major, Quartermaster Corps, as expert on roads and sewers; Capt. L. H. Tripp, Quartermaster Reserve Corps, now major, Quartermaster Corps, expert on heating; and Capt. George Gibbs, Quartermaster Reserve Corps, now major, Quartermaster Corps, expert on camp planning.

Maj. Evan Shelby, Quartermaster Reserve Corps, now colonel, Quartermaster Corps, took charge of all matters concerning contracts and real estate.

The Chief of Staff was furnished, under date of May 11, 1917, with a schedule of the approximate locations of the camps, together with a statement as to what organizations it was expected would be housed in the respective camps, and on the same date telegrams were sent by The Adjutant General to the commanding generals of the departments, giving the same information.

Telegram of the commanding general, Northeastern Department, reads as follows:

MAY 11, 1917.

One cantonment camp for the First National Army Infantry Division and one telegraph battalion, one aero squadron, one balloon company, and one regiment of Heavy Artillery will be established in the Northeastern Department. The site for this camp will be selected by the department commander, and instructions to that end have already been given. In order that the selection may be promptly made, the department commander will need much assistance. Moreover, the work of construction at the camp will require the supervision of at least one thoroughly qualified quartermaster with proper and sufficient assistance. The quartermaster general will be directed to immediately select such quartermasters, and they will be directed to report to you without delay. As rapidly as a camp site shall have been selected one of the quartermasters will be designated by you to immediately take charge of the work. All of the preliminary work, such as the location of supplies of lumber and other material, the collection of labor, blocking out plans for camps, etc., that can be done before the money becomes available for the construction work will be a distinct and absolutely necessary gain in order that the work may be done on time.

MCCAIN.

Throughout the construction of the original camps, close relation existed and has continued to exist between the (then) Cantonment Division and the General Munitions Board and its subcommittees, notably the Committee on Emergency Construction and Engineering. As an indication of the active interest which the Chairman of the Munitions Board took in the matter of construction of cantonments, the following extract from the minutes of that board of May 17, 1917, is quoted as follows:

Resolved, That in the opinion of the General Munitions Board it is imperative that at least three sites for cantonments be selected by the Government within five days from date, and

Resolved, That the General Munitions Board through its chairman, present to the Secretary of War, through proper channels, a statement to the effect that

in their judgment, immediate, definite action relative to cantonments is necessary, and that an officer should be designated to this work with full authority and power to arrange for the immediate construction of the necessary cantonments.

The chairman spoke of the necessity of immediate action with reference to the building of cantonments, reporting as to a conference held with the Secretary of War in line with instructions of the board through their action at the meeting of Tuesday, May 15, 1917.

Mr. Scott reported in substance that the Quartermaster Department through the Secretary of War, had decided to place the cantonment problem in charge of one officer, probably Col. Littell, with the understanding that the cooperation and facilities of the Emergency Construction Committee was to be given such officer, in fact, that the members of such committee were to act with this officer in such capacity as he might direct.

As a further indication of the active interest taken in this construction by the Emergency Construction Committee, there is herewith quoted a letter dated May 25, 1917, from W. A. Starrett, chairman:

To: Col. I. W. Littell, Quartermaster's Department. May 25, 1917.
From: Committee on Emergency Construction of Buildings and Engineering Works.

Subject: Difficulty of building cantonments within necessary time limit.

In offering for your acceptance the organization which we are recommending for the construction of the cantonments the committee believes it imperative that certain considerations growing out of the magnitude of the undertaking and the time limit under which it labors should be emphasized. The seriousness of these considerations can not be overstated.

In 16 weeks you are expected to have suitable quarters ready for the training of 1,100,000 men. This is equal to providing in each of 32 places for the housing of the inhabitants of Zanesville, Ohio, or Nashua, N. H., or Bangor, Me.

You must be building in 32 places at once. Most of the sites for the cantonments have not yet been chosen. When they have been fixed a group of engineering problems of first importance must be settled. The water supply for each camp must be carefully studied. Failure to supply abundance of pure water may jeopardize the whole undertaking. Proper sewerage must be provided if the danger of epidemic is to be forestalled. Heating, lighting, refrigerating, and laundry facilities must be furnished. The solution of these engineering problems will be different in every locality.

The planning alone for construction work of each of the camps would normally take as many weeks as is given you for the completion of both the engineering and the building. In the present situation the planning, engineering, and the building must go together. There is no time for any other method of procedure.

In each camp the building, aside from the engineering problems, is a huge operation. Each cantonment will probably require more than 12,000,000 feet of lumber and several thousand carloads of construction freight must be handled in each yard. Extra railroad facilities will have to be provided for handling of the materials necessary to the construction of the camps, for several of the localities chosen are served by one track only.

The hugeness of the undertaking becomes clearer if we compare the sums to be expended in these 16 weeks by one agency, the Quartermaster's Department, with the sums expended in other great recent construction feats and the period of time they covered. It has been estimated that each cantonment will cost between \$2,000,000 and \$3,000,000, and that the whole undertaking will probably demand a total expenditure of over \$90,000,000.

The past fiscal year has been a record year for building in the city of Washington, yet as busy as Washington has been it has expended in these 12 months not over \$13,500,000.

The total cost of the building of the Panama Canal was approximately \$375,000,000. This operation covered a period of 10 years, and the largest amount expended in any single year in the construction of the Canal was \$49,000,000, but a little over one-half of the sum that you are asked to expend in 16 weeks.

Out of this situation arises the consideration that the committee feels it a duty to emphasize, and which the Quartermaster's Department must face

squarely. It is nearly physically impossible to carry out this great operation—completely in the time given—without serious mistakes; yet it must be carried out. The best engineering organization in the world could not handle this mass of detail in this time without blunders. The need of haste makes it certain that much of the material used in the camps will be unsatisfactory. The same need of haste makes it certain that the business arrangements for the transportation and installation of all this material will frequently be unsatisfactory.

It is inconceivable that all of these 32 operations can be fully completed by September 1, and equally inconceivable that any of them will be an entirely satisfactory product up to the usual peace standards by that date. The most that can be hoped is that the majority of the camps will be laid out in a reasonably systematic way, and that the sanitary provisions will be sufficient to prevent serious sickness.

The tremendous drive required by the emergency should be thoroughly understood. The physical limitations should be equally understood, and the department should have a clear conception of just how much it is reasonably to expect under the time limit set.

It is the judgment of the committee that to devote more time to planning or to proceeding in anything but the most vigorous fashion would result in failure to deliver housing for anything like the force of men that will be called. The failure to deliver even faulty housing is too serious to consider.

Under these circumstances it seems to our committee that the Quartermaster's Department has no choice but to take the most vigorous measures possible to produce what we both frankly recognize will be an unsatisfactory product. A clear realization of these facts should stimulate the tremendous energy which must be put into this work.

The authorities should be made to understand at the outset that any hampering of your efforts, any delay through criticisms of details will certainly result in a still more serious situation than we are now facing. You should be free from criticism of details of plans, details of quality, details of method. Nothing should be considered now but the biggest features of this huge operation. Nothing should be considered now but essentials.

(Signed)

W. A. STARRETT,

Chairman Committee on Emergency Construction and Engineering Work.

Form of contract.

Up to within a few years, it has been customary and in connection with many lines of work is still customary to take competitive bids for construction work. These bids, however, can only be properly prepared when based upon detailed plans and specifications. In the construction of the camps it was proposed to build in an entirely undeveloped tract of land a city capable of housing on an average of 40,000 persons. This city was to be complete with housing, railroad tracks and roads, and all of the various utilities. The sites for the cantonments were not selected until the period from May 24 to June 17 and construction had to be sufficiently advanced so that the cantonments could accommodate the first contingents by the 5th of September and were to be completed so as to house the entire personnel by the middle of November. Under the circumstances, detailed plans and specifications could not be prepared and competitive bids were therefore entirely out of the question, either on a lump-sum or on any unit-price basis. It would not have been fair either to the Government or to the contractor. Time was short and the market for labor and materials extraordinarily unstable and likely to become more so due to the extraordinary demand for the labor and material required in this particular work. It was therefore determined to adopt a form of contract, already referred to. It is known as the "Cost, plus a sliding scale fee" form of contract with a maximum fixed limit. The prevailing conditions are best shown in a letter

from the Committee on Emergency Construction, dated May 31, 1917, which is quoted herewith as follows:

From: Committee on Emergency Construction of Buildings and Engineering Works.

To: Col. I. W. Littell, Quartermaster Corps, In Charge of Cantonment Construction.

Subject: Profit on daywork contracts.

1. It seems worth while to give you a statement of the information and the reasoning on which we based the 7 per cent profit recommended in the contract for cantonments.

2. It is necessary to clearly remember the imperative need of finishing these buildings at a specified date. This need transcends all others and precludes the consideration of anything which remotely tends to defeat this primary object.

3. The accomplishment of the work in anything like the time specified requires the service of the largest and best organizations. No others can be considered if the work is to be completed in the length of time which is given. It is unthinkable to suppose that any contractor not possessing a highly skilled organization could create a machine capable of turning out satisfactory work at the speed required and on anything like an economical basis.

4. The Government is in effect hiring a contracting organization to spend the Government's money as wisely as may be in order to build these cantonments. The contractor receives \$7 for spending \$100 of the Government's money. The essence of the problem of selecting the builder is to find one who will get as much cantonment for the hundred dollars as it is possible to get under the given circumstances.

5. It is obviously bad judgment to engage an unskilled man to spend Government money simply because he is willing to act in that capacity for less remuneration. It would also seem unwise to hire an inadequate organization to spend this money simply because they were willing to work for a less compensation. The saving on the compensation would quite likely be more than balanced by the greater amount of money that they would spend to accomplish the result. Gen. Goethal's statement to the Munitions Board that this was an exceeding difficult operation has been echoed by every competent authority who has examined the matter. We have accordingly been led to the conclusion that only firms possessing the largest and best organizations are capable of handling these works successfully.

6. Such firms are necessarily controlled by managements made up by big men supported by a permanent staff of subordinates, and such organizations are necessarily expensive.

7. The distinction between the small concerns that carry but a few permanent employees and the well-organized concerns who never part with a large and capable organization may be somewhat confused through the fact that both are lumped, in common parlance, under the head of "contracting firms." There is actually as much variation in efficiency between the best and the mediocre contracting firms as there is between the modern Pennsylvania Railroad and the old Erie Canal.

8. The efficiency of these large contracting organizations, combined with their selling ability, keeps them constantly employed, and if we ask one of these concerns to take a piece of work which will tax their facilities they must necessarily disarrange work which they have under way and send these men and this equipment to the work which the Government needs done quickly. Usually part of the work which they have on, at least, is on lump-sum contracts on which lack of efficiency will result in financial loss to that concern. In any case they are using up capacity for business which they can sell normally at a better rate than we are recommending the Government to pay.

9. The lowest overhead expense which has reached our attention is that of a company doing upward of \$30,000,000 worth of work a year. This firm has an overhead charge of almost exactly 2 per cent and has cleared for the past two years above this fixed charge 6 per cent net on its entire business. Overhead expenses run as high as 5½ per cent and average probably 3½ per cent. Accepting this figure, you will see that at 7 per cent the contractor would net 3½ per cent as profit on his work, or \$35,000 on each \$1,000,000 worth of business done.

10. It is to be remembered that the Government is making contracts running into the millions of dollars with the shipbuilders, the gun makers, and other trades, on which 10 per cent net is paid after allowing the overhead charges as

part of the cost—that is, the Government is knowingly allowing 10 per cent net on contracts of that sort, and surely on its own scale a net of $3\frac{1}{2}$ per cent can not be considered exorbitant.

11. At the present time contracting firms are showing the same patriotic wish to be of service that we find in all other industries. We have known of offers being made for handling work at absolute cost, for handling it at cost and overhead expense, and from that up. It has seemed to us economically unsound for the Government to permit contracting firms to handle work on a basis which will weaken the firms. Our understanding of the policy of the Government is that in the long run it will pay to place its work in such a way that the firms will not be crippled and that they will be able and willing to continue to handle work for the Government on some uniform basis of profit. We have accordingly, after consulting with a great many engineers, contractors, and architects, arrived at the conclusion that 7 per cent is a reasonable profit at which the best concerns of the country should be willing to handle the work of the Government at maximum efficiency and in such a way that will be profitable to them, and we have tried to arrive at a figure which is fair both to the Government and will permit employing the services of the very best concerns that there are in the business. We should be glad to furnish you the list of the people with whom we have consulted on this matter, if you wish such a list, and should be glad to amplify any point on which you may care for additional information.

(Signed) W. A. STARRETT,
Chairman.

A form of contract was formulated by the Committee on Emergency Construction of the General Munitions Board. (See Appendix D.) Under this form, contracts were made for the construction of 16 cantonments (a complete list of these cantonments with the names of the contractors and the constructing quartermasters is found in Appendix E). Under the same form, contracts were made for 16 National Guard training camps (the name of the contractor and the constructing quartermaster will also be found in Appendix E).

In addition to the above, camps for embarkation purposes and for the training of quartermasters were constructed (these are listed in Appendix E).

Appendix D is a draft of the contract as used in connection with the original list of cantonments. In the later editions, a reduced schedule of fees is provided and a revised list of machinery rentals, and a few other modifications of a minor nature.

By the beginning of the spring of 1918 the program of work ahead of the Construction Division was so extensive that it seemed advisable to have the merits of this form of contract again passed upon and this was done by a committee appointed by the War Department, consisting of engineers, architects, business men, and contractors, as follows:

Prof. A. N. Talbot, president, American Society of Civil Engineers, Urbana, Ill., chairman.

John Lawrence Mauran, president, American Institute of Architects, St. Louis, Mo., secretary.

John R. Alpine, representing the American Federation of Labor.

Frederick L. Cranford, president, General Contractors' Association of New York, Brooklyn, N. Y.

Charles T. Main, president, American Society of Mechanical Engineers, Boston, Mass.

Oscar A. Reum, representative of the president of the Building Construction Employer's Association, Chicago, Ill.

R. G. Rhett, president, Chamber of Commerce of the United States, Charleston, S. C.

E. W. Rice, president, American Institute of Electrical Engineers, Schenectady, N. Y.

All records and files were placed at the disposal of this committee, who, after several days of careful deliberation, unqualifiedly indorsed the form of contract in the following terms:

The committee unanimously concurs in advocating what may be termed the cost-plus, a sliding scale fee scheme of contract for both general contracts and subcontracts. In this application it enjoys the same confidence in the building world as to the equities as does the lump-sum contract, as is evidenced by its very extensive use. Its essential features are its applicability to projects great and small—its extreme flexibility with automatic adjustment of all variations in plan and scope. Under its terms the rates of pay for labor are known to be more equitable than under other methods. It requires for its successful application a painstaking review of the records and standing of contractors, just as is now made under existing methods to insure the selection of an organization which measures to the requirements of the contemplated project but without working any hardship, since no one can escape the axiom that in the final analysis each job can go only to one contractor.

The committee believes that one of the objections charged to this form of contract is that it encourages extravagance and holds open temptations to increased cost because such increase is accompanied by increased compensation. The general form of contract now in use by the Cantonment Division in which the percentage decreases as the cost increases and is broken by fixed fees at intervals seems calculated to check effectually, if not prevent, this tendency. Moreover, under the contract proposed, the Government retains the right to control the prices of most materials and labor. Under these circumstances, it does not seem to the committee that such an objection would have any force in relation to this form of contract. No reasonable objection can be pointed out by anyone possessing a full understanding of its equitable operation in practice, and, finally, this scheme appeals to the committee as possessing one qualification which must commend it to all thinking men—it permits starting actual work weeks and even months before the details are completely worked out and delineated, and permits the Government to push the job at any speed it may elect, changing at will its plan and scope but paying only what the work actually costs, plus a fee which is so reasonable as to be above the reach of fair-minded criticism.

A full report of the committee was forwarded to the Hon. Benedict Crowell, the Acting Secretary of War, on March 16, 1918. A copy is hereto attached as Appendix K.

Selection of contractors.

In the selection of contractors, the Cantonment Division had very little part. The General Munitions Board gathered information concerning the facilities available in the country for the manufacture of supplies and munitions of all sorts and included in their file of information similar data concerning contractors available for carrying out construction projects.

On June 1, 1917, the Secretary of War directed the Quartermaster General to establish relations with the various subcommittees of the General Munitions Board.

In each case the request for selection of a contractor was made by the Construction Division to the Committee on Emergency Construction, and that committee's recommendations were sent to the Secretary of War for approval.

Under date of June 12, 1917, the Committee on Emergency Construction prepared, for the General Munitions Board, an extended list of the contractors whose facilities and organizations had been examined and who in the opinion of the Emergency Construction

Committee were capable of undertaking large construction projects. The list of names is too extended to reproduce here, but the letter transmitting this list to the General Munitions Board is quoted as follows:

JUNE 12, 1917.

Memorandum for General Munitions Board,
Subject: Selection of contractors.

Confirming verbal report given you at the meeting of the executive committee of the Munitions Board of May 8, I am to report herewith on the method pursued by this committee in arriving at the recommendations for letting construction contracts.

Pursuant to instruction from you, this committee, on May 12, sent out a general confidential questionnaire to the chapter presidents and secretaries of the American Institute of Architects, to the chief engineers of the railroads throughout the country, and to others in fiduciary positions, whose knowledge of contractors might be of value, the purpose of which was to develop a list of contractors throughout the country, to which the General Munitions Board might turn in case it should be called upon for advice in letting contracts for the emergency work which the Government had in contemplation.

The returns from this questionnaire developed a large list of responsible contractors throughout the country, with the result that the committee was able to make a separation of these contractors on the basis of their general volume of business, the quality of their organization, and the kind of work they have been doing. From this list the committee was able to separate a list of contractors that we deemed capable of undertaking cantonment contracts. Having made this separation, we cross referenced the contractors of this class geographically, so that we would be able, when a cantonment selection was made in any geographical area, to select contractors for that area. The list was put in charge of Mr. John H. McGibbons, Chicago representative of United States Fidelity & Guaranty Co. of Baltimore. The committee also called into consultation Mr. Leonard Metcalf, eminent waterworks and public utilities expert of Boston; Mr. George W. Fuller, expert on sewage disposal and drainage, and also widely known as a consultant on public utilities and large contracting works. Capt. Oury and Capt. Marshall, of Col. Littell's staff, attended meetings of the committee, as did Col. Littell. For your committee, Mr. Olmsted and the writer served, both Mr. Tuttle and Mr. Lundoff asked to be excused, because they are themselves contractors. Maj. Kelly, also of the committee, was not asked to attend, largely because the meetings were generally hastily called and often continued for many hours. In deference to his request, we did not engage him in view of the methods we were pursuing and in this he has since concurred.

To review: Those who took part in the deliberations were W. A. Starrett, chairman; of the firm of Starrett & Van Vleck, architects, New York City; Frederick Law Olmsted, Olmsted Bros., Boston, landscape architects and city planners, both of your committee; and, as advisors, Leonard Metcalf, Metcalf & Eddy, consulting engineers, Boston; George W. Fuller, consulting engineer, New York; John H. McGibbons, manager of the Chicago office of the United States Fidelity & Guaranty Co. of Baltimore.

Appended hereto is the list of contractors, geographically selected, which the committee is using. To this other names may be added for use in future deliberations, if the evidence warrants such addition. The recommendations on the five cantonments selected, as per our reports to you of June 6, were made from the list attached, as will appear. The file of contractors, whether on the attached list or not, is intact and considered by the committee to be the property of the General Munitions Board. Mr. McGibbons will remain in charge of it, and will be in a position to furnish very complete data should any question as to contractors arise.

(Signed) W. A. STARRETT,
Chairman.

PLANNING THE CAMPS.

The active work in constructing the cantonments commenced about June 20, 1917. The construction of National Guard camps was commenced about one month thereafter. Each cantonment and camp

was designed to house a division as based on the tables of organization dated May 3, 1916.

From information developed by the war in Europe, it was found necessary to reorganize the Army, and this made necessary a rearrangement and general alteration in the plans under which the camps were being constructed. While the cantonments and camps were to have been available for housing the majority of troops by the early part of September, the changes made necessary by the new tables of organization, definite information concerning which was not available until the last week in August, considerably delayed the completion of the construction work and also added materially to the cost. Because of the delay, a number of camps were not in condition to accommodate the entire number of men assigned until the latter part of October. This did not, however, affect the dates upon which the men were called out and housed in the cantonments for the formation of the National Army.

Each cantonment included complete housing for the organizations making up the complete division—administration buildings, regimental storehouses, rifle ranges, stables, wagon sheds, and all the necessary incidental buildings required for housing, not only the personnel, but the animals forming part of the equipment of a division. In addition, each camp was provided with a number of storehouses, ranging from 9 to 11, which number has been since materially increased; a refrigerating and meat-storage plant; a remount station capable of caring for 5,000 animals; a base hospital with capacity of usually 1,000 beds; and divisional and brigade headquarters. In addition, there were provided, not at Government expense, buildings for the Y. M. C. A., Knights of Columbus, Red Cross, hostess houses, theaters, and other buildings for recreational purposes. Each camp involved the installation of complete water, sewerage, and electric-light systems, as well as systems of roads and railroad yards.

The first provisional estimate prepared on March 13, 1917, was based in large measure on experience in housing the National Guard while in service on the Mexican border in 1916. This estimate omitted the sewer systems and included only sufficient water distribution to provide connections at points among the buildings.

During the last week in May there was uncertainty as to how many of the new Army should be placed in wooden barracks and how many under canvas. The Secretary of War decided, before the end of May, to establish cantonments with wooden barracks at 16 of the sites, to be used for the new National Army, with water supply and sewerage arrangements to meet fully all reasonable demands. The 16 National Guard camps were arranged for the troops to be quartered under canvas, with wood buildings for the kitchens and mess halls. A water supply somewhat more limited in quantity than at the cantonments was to be provided. Latrines, however, were prescribed for the National Guard camps, and not sewerage arrangements, on account presumably of the more temporary nature of the guard camps as compared with the cantonments.

It was proposed to call the first contingent of conscripted men to camp during the first week in September and hence, when the program had become formulated to the stage above indicated, there re-

mained only about 90 days in which to complete the plans in Washington for general arrangements, prepare specifications and contracts, select the contractors, organize field forces for the contractor, constructing quartermaster, supervising engineer, and auditing staff, as well as to build at each of the 16 sites a cantonment originally estimated to cost roughly \$6,000,000, to house about 40,000 people and about 10,000 animals.

Uncertain features of plans.—It is to be pointed out that at this stage there was little or no knowledge of the sites on which cantonments were to be built or of their distance from transportation lines. It was not known what the official decision would be in regard to the ultimate standard company unit, which in the United States Army was then materially different from the company units in vogue among our allies in Europe. Multiples of the standard company units to form battalions, regiments, brigades, and divisions, were all subject to this uncertainty, awaiting recommendation to the General Staff from Gen. Pershing, who reached Europe on June 15, and who, obviously, was obliged to consult and investigate before reaching his own conclusions in reference thereto.

At this juncture it was necessary to recognize in a very clear way the urgency of getting typical plans advanced to a point where construction work could be actually begun at the earliest possible day, and to do it in such a way that flexibility of procedure would permit the later adjustment to the standard Army units to be recommended by Gen. Pershing, and to make adequate and proper sanitary provisions.

The grouping of about 1,700 buildings into a general layout obviously depended on the locality about which little or nothing was known in Washington at this time. It could not be ascertained whether the sites were on a fairly level plane or on a single ridge or broken ground. The grouping of the company buildings, with officers' quarters, regimental quarters, headquarters, and various other buildings at a cantonment were arranged on typical layout plans of two types. These are known as straight-line and U-shaped layouts. It was recognized as highly improbable that either typical plan could be followed strictly, and it was known that variations in topography would require adjustments on the ground.

It is necessary to call attention to the fact that these plans had to be modified on account of changes in standard Army units, in cubage of air space per man, and in added facilities for hospitals, remount stations, trains, and structures of various sorts. All these matters made much hard work for those in charge of the actual construction on the ground, and emphasized the importance of elasticity of procedure. Comments already made as to uncertainty in plans and as to fundamentally correct decisions regarding policy will be better understood as consideration is given to the individuality of the local sites and the changes necessitated for a variety of reasons.

Each cantonment was made up of fairly simple units, as far as the structures themselves are concerned, yet, in justice to those having to do with the enterprise, it is well to bear in mind the magnitude of the undertaking, namely, the effort to build a town in less than 90 days, to make it feasible to receive at camp the first quota of the new Army during the first week in September.

As soon as sites for the cantonments were approved by the Secretary of War, it was necessary to make arrangements for the following items:

1. Execution of the leases.
2. Arrangements for railroad connections.
3. General survey of the ground and approximate layout of the camp as a whole, having in mind conditions as to drainage, prevailing winds, etc.
4. Development or provision of suitable and adequate water supply.
5. Arrangements for sewage.

In order to develop the foregoing items it became necessary to employ for service at each of the cantonments and camps supervising engineers and town planners (lists will be found in Appendix E).

In view of the lack of sufficient time to prepare complete plans and specifications, a typical set of plans showing a typical layout and general plans for typical buildings were made up. No separate specifications were prepared, but general information was included on the typical plans.

INSTRUCTIONS TO CONSTRUCTING QUARTERMASTERS.

In addition to a set of the above, each constructing quartermaster was furnished with typical instructions covering the main general features, including information rather as to the ultimate capacity and use of the various structures instead of details as to the individual buildings themselves. Under this plan the constructing quartermaster with his contractor and supervising engineer was left largely free in his efforts to accomplish the result. A special set of instructions was made up for the field auditor who cooperated with the constructing quartermaster, but reported direct to the Washington office.

A full set of these instructions is found in the general files under 652 (general).

The Quartermaster Manual had just been revised by the office of the Quartermaster General, and was practically invaluable to the constructing quartermaster.

MATERIALS.

The construction of 32 cantonments and camps, in addition to the other emergency construction going on in the various parts of the country in connection with the war, immediately placed upon the material markets a series of demands which required special arrangement in order that the construction program could go forward systematically and effectively. On this account, within the Cantonment Division, there was organized a materials branch which immediately made up lists of all available manufacturers of those items needed in the construction of the camps: Orders for lumber, iron and wood pipe, and a number of other items were placed with the lumber and other committees who had established offices in Washington. These committees serving as aids to the War Industries Board fixed the

prices to be paid and allotted the orders to the various mills throughout the country best able to furnish prompt deliveries. If this method had not been adopted 32 constructing quartermasters with their contractors would have competed with one another in attempting to obtain materials necessary to carry out their construction programs. The wisdom of having all similar materials ordered through central agencies has become so apparent that this policy has since been established for all of the departments of the Government.

LABOR.

At the beginning of the construction, an agreement was made between the Secretary of War and Mr. Samuel Gompers, representing the American Federation of Labor, that the rates of labor to be paid at the various cantonments and camps would be in accordance with schedules in effect June 1, 1917. Many of the cantonments and camps were located at places remote from labor markets and from ten to fourteen thousand men were employed at each project. Labor was imported from a distance in many cases and the problem of organizing the men into efficient construction forces was very great.

In the attempt to select labor, contractors would advertise in cities remote from their own project but from which labor was being drawn for other projects. It became necessary in October to forbid contractors from doing this. Toward the completion of the work, plumbers and steam fitters were in very great demand and on this account frequent negotiations were necessary with regard to rates of wages. At this juncture, Maj. Joseph H. Alexander, Quartermaster Corps, National Army, now Colonel, Quartermaster Corps, who had much previous experience in labor and transportation problems, was assigned to take up, on an organized basis, the entire matter of labor adjustment.

PLANS AS ADOPTED.

The character of the country where located made it necessary to vary considerably from the typical layout designed and approved by the War College. An inspection of the figures showing the cost of the various camps shows a considerable variation in cost which is inconsistent with the variation in capacity of the camp. A number of elements contributed to bring about this great variation, among them being relative remoteness from labor centers, difficulty of handling materials, character of the terrain, weather conditions, difficulty in obtaining necessary labor, etc. Because of this, it has been thought best to include herewith (as Appendix F) a plan of each of the cantonments and camps.

BUILDINGS FOR CAMPS AND CANTONMENTS.

1. The first plans for camp construction, known as temporary buildings for mobilization camps, prepared in April, 1917, called for one-story buildings, 20 feet in width and variable length, for mess halls and barracks; smaller buildings for lavatories, with plumbing or for latrines where no plumbing is provided; and other simple buildings for stables, wagon sheds, storehouses, administration buildings, and other camp structures.

2. For the increases to Regular Army concentration camps started before the Construction Division was organized, and for the 16 National Guard camps in the Southern States, this type of construction was used.

3. At the time of the organization of the Construction Division the requirements for cantonments were materially changed in the demand for buildings of a more substantial character and of much greater capacity, which led to the designing of two-story barrack buildings, 43 feet in width and of varying length, to provide for companies of 200 men or less, each building to contain mess hall and barracks. With this change in requirements, a complete new set of building plans was issued, known as cantonment buildings, from which the 16 large cantonments were constructed.

4. The camp and cantonment buildings were designed of two distinct types, known as northern and southern types, which differed mainly in the fact that northern barracks were to be lined with wall board with a concealed air space for winter protection; the southern buildings to be double boarded on the outside, but with no air space which might become a serious menace in the warmer climates as a harbor for rats and vermin. The stables for northern climates were made as inclosed buildings; those for the southern climates were open sheds with a double row of mangers down the center.

5. The buildings as designed for camps and cantonments provided barrack space for 200-men companies on the basis of spacing them customary in tent camps, which provided less than 400 cubic feet of air space per man. In September, when the construction was nearly completed, orders were issued that not less than 500 cubic feet of air space per man must be provided in tents and barracks, and that infantry companies should be increased to 250 men each, and various minor changes were made in the organization and personnel of the various Army units, for which the construction had been specifically designed, which required a material increase in the construction work already nearing completion in the field.

6. Following the changes above referred to, a subsequent requirement provided that not more than 35 men should be housed in one room; that each room should be provided with four outside walls and with an independent entrance. This regulation led to the designing of a complete new set of barracks, for which a maximum size of 30 by 60 feet two stories high was adopted to hold 66 men. For a company of 250 men four of these barracks together with separate mess and lavatory buildings were adopted as standard company accommodations, and practically all camp construction since that date in the embarkation, quartermaster camps, and others have been designed on this basis.

7. Special buildings for hospitals and for medical infirmaries have been constructed in accordance with the designs provided by or approved by the Surgeon General's Office. For this construction all of the earlier buildings were of one-story cottage type, 24 feet in width, and of varying length. With the great demand for increased space a two-story building was adopted soon after the camps were completed in December, and the hospital capacity has been materially increased since that time by the addition of such buildings.

8. The buildings as completed are of fairly substantial character, although few have been painted, and the need for painting is very

great if they are to be preserved. Owing to the great pressure for time, the buildings were constructed on wooden posts, although designed for concrete foundations, and in many cases the posts are made of local material which will last but a short time. While designed on standard plans of a few simple types, the number of buildings is so great and the number of changes in requirements as the work proceeded have been so various that the camps as completed contain a great variety of buildings. Owing to the numerous changes in military organization and in the use of camps, the buildings are not entirely adapted to the uses to which they are now put, but the plan for grouping a large number of buildings in a relatively compact mass has made it possible to reorganize the grouping of buildings on new lines to meet changed requirements.

WATER SUPPLY.

Great care was taken to make arrangements for a water supply absolutely safe from a sanitary standpoint, not only for the main camp uses, but also for the construction forces.

The quantity of water needed at the cantonments was an uncertain item, and received extended discussion by the committee at Washington, as well as by officers and engineers of the Cantonment Division. It was concluded to allow at the cantonments 55 gallons per capita per day, which is equal to a net allowance for the use of the men of about 50 gallons per day, and 15 gallons for each horse and mule, on the assumption that there would be about one animal for every three men. This is about 80 per cent more water, on an average, than is supplied to European army camps, and was considered a reasonable allowance, if care was taken to use it in the manner described in the "Instructions to the constructing quartermasters."

It was assumed that the peak load for a period of one hour might become 2.85 times as great as the average, or say at the rate of 5,000 gallons per minute for 1 hour for a cantonment of 45,000 men. Obviously, this means that water for shower baths, road sprinkling, and animal uses must be on a basis of rotation and not of coincidence, and that great care must be exercised to guard against needless wastage through unclosed or leaky fixtures.

The pressure of the water supply as it entered the mains of the cantonments was intended to be within the range of 60 to 85 pounds per square inch. Fire protection was kept in mind concerning the lower limits, and the higher limit was restricted to the figure stated, because of the necessity of using wood-stave pipe, in the interests of speed and economy. The main feeders, 10 or 12 inches in diameter, were looped ordinarily, so that in case of fire the water could be drawn from each direction through main lines, and this tended to lessen the size of mains for the given range in pressures, in accordance with the studies of Maj. D. H. Maury, Engineer Reserve Corps; now Quartermaster Reserve Corps; Maj. Clarence Goldsmith, Quartermaster Corps; and Mr. W. M. Johnson. The largest pipes were 16 inches in diameter.

The water supply was taken from neighboring cities where practicable as at Camps Gordon, Jackson, Lee, Pike, Taylor, and Travis.

At Camps Dix and Meade, efforts were made to secure ground water, but without success. At the former, the supply is taken from Rancocas Creek, and sterilized. At Camp Meade the water is taken from the Little Patuxent River, filtered and sterilized. For the remaining camps, the supply was developed generally from driven wells in water-bearing strata in the vicinity of the cantonments.

The cost of the water supplies at the cantonments, including service connections to within 5 feet of the buildings, was less than \$11 per capita, or, roughly, one-fifth of the cost new for the average municipal water-works system. Part of this reduction is explained by the density of the population in the camps and partly by the fact that about 70 per cent of the distribution mains were of wood-stave pipe costing only about 60 per cent of that of cast-iron pipe.

As to plumbing, discussion in Washington was given to self-closing faucets to guard against waste, but this suggestion was not carried out. In fact to get plumbing supplies as promptly as needed, there was apparently, some sacrifice in quality, as it is understood that the plumbing is lighter than would prove desirable in some cases. For instance, the humic acid contained in the swampy waters flowing at times in Rancocas Creek is understood already to have produced serious corrosion of some of the plumbing fixtures at Camp Dix.

It is stated that the water consumption at some of the camps has exceeded 55 gallons per day in instances where gravity supplies in ample quantities are available. The checking of waste, as the advancing season calls for a more general use of shower baths, will make it important to place the use of water on a strictly military basis, as the designers of the system intended when they prepared their basic data as to quantity and this was supplemented by posters displayed in the cantonment lavatories.

In the National Guard camps the water supply was estimated on the basis of 35, as compared with 55 gallons, per capita daily for the cantonments. The guard camps were not begun until about the middle of July and were intended to be completed about the 1st of September. The structures of wood were limited to storehouses, mess halls, kitchens, and showers, and did not warrant so elaborate a water-works system as the cantonments. In the latter, water pipes up to 16 inches in diameter were used, whereas at the guard camps all distribution mains are 6 inches in diameter. At 11 of the southeastern camps the mains were of wrought steel; at 2 near the Birmingham District they were of cast iron; and at those near the Pacific coast they were of wood staves.

It is to be borne in mind that much of the pipe for the distribution mains had been ordered and was on the cars before any construction was done at the camp sites. Storage reservoirs on convenient hills were built where practicable, and of a capacity ranging from about 250,000 to 1,200,000 gallons. Where the topography did not admit of storage reservoirs, elevated wood tanks, of 200,000-gallon capacity, were erected at so favorable elevations as practicable.

Pumping is generally done by electricity, with a gasoline or oil-engine auxiliary as reserve.

Practical elimination of water-borne diseases among American troops, from September, 1917, to March, 1918.—The best credential as to the quality of the water supplied at the Army camps is recorded by the vital statistics of water-borne diseases among the troops, on the well-known basis that “the proof of the pudding is in the eating.” At the end of March, the following statement was issued from the office of the Surgeon General of the Army:

We have had practically no typhoid among troops, except within the first two or three weeks following their entry into the service, and infection in most cases had been contracted prior to their coming to camp. In a general way, we are safe in saying that water-borne diseases are now practically eliminated.

The official statistics show 121 cases and 6 deaths from typhoid fever and 289 cases and 2 deaths from dysentery in the Army camps in the United States for 22 weeks from September 29, 1917, to March 1, 1918, and it is certainly gratifying to know that these two diseases are now eliminated, as far as the responsibility of the public water supply is concerned. It should be pointed out that the annual death rate from typhoid fever approximates 1 per 100,000 as compared with annual rates of from 5 to 15 for the ordinary American city having a good, or fairly good, water supply.

Each week the Surgeon General's office issues statistics showing the prevalence of special disease among all troops in this country, and also the expeditionary forces abroad. A recent statement of the case rate of special diseases is given in Table 2.

TABLE 2.—Annual case rate per 1,000 for special diseases.

	All troops in United States week ending Mar. 22, 1918.	Regulars in United States week ending Mar. 22, 1918.	National Guard, all camps, week ending Mar. 22, 1918.	National Army, all camps, week ending Mar. 22, 1918.	Expeditionary forces, week ending Mar. 14, 1918.
Pneumonia.....	23.5	22.4	11.9	33.3	36.2
Dysentery.....	.1	.....	.....	.3	.7
Malaria.....	1.9	.8	4.5	.9	.....
Venereal.....	78.5	85.9	39.4	95.3	46.0
Paratyphoid.....	.04	.....	.....	.1	.....
Typhoid.....	.1	.....	.....	.3	.2
Measles.....	34.4	37.9	4.0	48.6	16.5
Meningitis.....	1.6	1.6	.6	2.3	2.5
Scarlet fever.....	11.1	13.0	3.6	12.3	30.9

It is hardly necessary to state that in earlier wars, typhoid fever caused the death of large numbers of men. Thus, in the Franco-Prussian War of 1870-71, the total number of cases of typhoid fever among the underofficers and men in the German Army amounted to 73,396, which is equivalent to 9.3 per cent of the average strength of the army. The relation of cases to deaths is not known, but, ordinarily, the latter are about 10 per cent of the former. The ratio naturally varies with numerous local factors.

During the Spanish-American War, in 1898, conditions were unusually distressing in regard to the prevalence of typhoid fever among the American troops.

The figures in Table 3 of the official typhoid fever statistics of the American Army of 1898, are of interest.

TABLE 3.—Typhoid fever record of different corps of American Army in the Spanish-American War, 1898.

	Number of regiments.	Mean strength.	Cases of typhoid fever.		Deaths from typhoid fever.	Deaths from all diseases.
			Certain.	Certain and probable.		
Chickamauga	22	27,380	2,912	5,921	344	397
Do.....	17	20,568	1,741	4,418	417	469
Tampa.....	7	7,507	440	1,498	99	112
Alger.....	18	19,807	1,807	2,226	212	250
Jacksonville.....	9	10,759	1,729	2,663	248	281
Do.....	7	7,990	.....	1,292	120	146
Meade.....	12	13,962	1,799	2,690	150	168
Total.....	92	107,973	10,428	20,738	1,580	1,832

More than 90 per cent of the men who developed typhoid fever had no preceding intestinal disorder. The deaths from typhoid fever were 86.24 per cent of the total deaths. The morbidity, or case rate, from typhoid fever was a little less than one-fifth, or 192.65 per 1,000 of mean strength. The mortality from typhoid fever per 1,000 of mean strength was 14.63.

No citizen, and particularly no sanitary engineer, can view the statistics in Table 3 without a shudder, or without expressing the sincere hope that there will be no cessation during the present war in the effort to provide safe water for the troops, to put in screens promptly, and to see that the present latrines, where in use, are maintained in a sanitary condition, or superseded by sewerage works.

SEWERAGE AND SEWAGE DISPOSAL.

At each cantonment a system of sewers was built for the removal of house sewage only. Surface drainage was not admitted to the sewers intentionally, except perhaps in some special instances. Open ditches were suggested for drainage, with brush or other simple means of protection against erosion, and with corrugated-iron culverts at street crossings.

At each cantonment the house connections, practically to the buildings, were 6 inches in diameter, with the exception of a few 4-inch kitchen connections. Grease traps, 18 inches in diameter, were included in the plumbing arrangements. No special construction features on the sewers are worthy of note, except that in wet soil there was an unusual attempt made to prevent infiltration of ground water, and in the vicinity of trees much care was taken to prevent the intrusion of roots in the pipes.

Ordinary minimum velocities of flow were provided, and much study was given to the effect of maximum flow, especially in its relation to combinations of varying numbers of regimental units.

At the National Guard camps little was done with regard to sewerage systems, but latrines were provided for the most part, as was the case at the Mexican border. Later on sewer systems were authorized for a number of the National Guard camps.

General specifications.—About the middle of June, 1917, general specifications and typical plans as to sewage disposal were provided for inclusion in the general instructions issued to constructing quartermasters, as follows:

1. Where practicable, sewage will be discharged directly into adjoining streams without treatment.

2. Where sewage treatment is required, single-story septic tanks will be used, designed on the basis of a gross capacity of about 10 gallons per capita, the entire capacity below the flow line being considered to be the gross capacity.

3. The arrangement of the tanks will conform in general to the typical plans, but grit chambers will not be provided except in special cases. These plans show both wood and concrete tanks, and the decision will be made at each cantonment as to whether one or the other will be used, preference being given, other things being equal, to the material that will enable the tanks to be completed in ample time for the service requirements.

4. No provision will be made for sludge beds, on account of lack of funds, and also because of lack of immediate need for these beds, which, however, will be required later. The disposal of the sludge may be best accomplished in the interval by machine trenching, or hand trenching if necessary.

5. At Ayer, Mass., and Wrightstown, N. J., sand filtration appears to be necessary, and the decision will be made by the construction quartermaster as to whether or not tankage shall precede sand filtration.

6. Where cantonments are not near large streams, as referred to in paragraph 1, and excepting the locations specified in paragraph 5, trickling filters will form part of the complete installation, although not to be constructed immediately. These filters will have beds 6 feet in depth, designed on a basis of 30,000 persons per acre. In general, the plans for trickling filters will conform to the typical plans; the details, however, must be decided by the construction quartermaster, to suit local conditions.

7. Septic tanks shall be not less than 300 feet from the nearest barrack or other occupied building, and at a greater distance, if practicable.

8. The elevation of the septic tank, with reference to the available outlet for the effluent from the sewage disposal works, should be such that the vertical distance between the flow line in the tank and the outlet of the trickling filter effluent drain is about 15 feet. In places where the effluent discharges into streams which ordinarily contain clear water, or only very little water, it will be necessary to provide in addition small settling tanks to clarify the effluent from the trickling filters, and these will require about 1 foot of additional head. Such tanks should be designed to have a capacity of 3 gallons per capita. Sludge from these tanks will be disposed of on sludge beds later to be provided or in the trenches.

9. Except where sand filters are used, automatic chlorinating apparatus is to be provided at all sewage-treatment plants as part of the original installation, and such apparatus is to be used whenever required. On account of cost, and for other reasons, treatment by ultra-violet rays is not to be considered.

Discussion at Washington last year led promptly to the selection of a single-story tank from 10 to 12 feet deep, as compared with the more customary two-story tank of much greater depth. It was recognized at once that, at sites of unknown conditions as to soil, there would be much greater likelihood of having built by September a shallow as compared with a deep tank, particularly if the excavation were to be in wet running sand or in rock. It was reasoned that a single-story tank actually built would be infinitely superior to a two-story tank unavailable until the following spring. Furthermore, it was recognized by those at Washington that camp sewage would contain much more coarse, uncomminuted suspended matter, such as toilet paper, particles of feces, and débris from the kitchens, than is the case with ordinary city sewage after having had an opportunity to become comminuted by flowing for some miles in a relatively long system of sewers. Grease is also a very large factor in the composition of fresh camp sewage.

Hence, a settling tank at these cantonments would face "flotation" rather than "sedimentation" conditions, to a large extent, when account is taken of what practice reveals as to the influence of grease and the buoyancy of relatively coarse suspended particles commingled with entrained gas. That is to say, with a deep two-story tank, as with a shallow single-story, there is a strong likelihood that most of the solid matter, at times at least, would be in the upper rather than in the lower portion of the tank.

With either type of tank, moderate success is to be expected with adequate and skillful operation, but in neither case, without such operation, is failure surely to be avoided. Efficient operation means adequate labor, and facilities for sludge removal, which can not be put off indefinitely either in tanks as built or in tanks several times as large. See paragraph 4 of the foregoing specifications, showing sludge beds or trenches to have been excluded from the 1917 program.

Much discussion was given to building the tanks of wood where that would be quicker than concrete construction. Wood was used at Camp Dix, where the baffles were omitted except at the ends of the tanks. The purpose of the baffles is to hold back solid matters, especially at times of high-peak flows, which are characteristic of camp sewers.

The trickling filters at Camp Meade, and perhaps at some other camps, were not built in 1917, and will apparently need consideration in 1918, if the arrangements are to approach those required of many municipalities. Grease recovery has been attempted at Camp Dix.

ROADS, WALKS, AND PAVEMENTS.

Specifications were issued for four standard types of roads, namely, water-bound macadam, bituminous macadam, brick, and cement-concrete, and such paragraphs from each specification were utilized as were applicable to the work to be undertaken.

No single type of road construction was adopted for use in all cantonments and camps. Roads constituting main arteries of traffic have in general been paved with brick, concrete, asphaltic concrete, water-bound macadam, and bituminous macadam, the type of construction depending on a number of factors, such as availability of

materials, character of subgrade, type of construction, equipment, and speed of construction. The standard width of pavement adopted was 18 feet, although in some instances pavements 24 feet wide have been constructed.

The construction of walks was not, in general, authorized. Gravel or crushed stone walks have been constructed in a few instances, particularly in the vicinity of hospitals, and, in some cases, around the more important buildings, such as division and brigade headquarters, camp post offices, telegraph offices, etc.

Nearly all the sidewalks in most of the camps are of wooden strips, or boards laid on crosspieces. Cinders, where available, were also used for walks.

LIGHTING.

General.—Electrical energy for all purposes is purchased from public-service electric companies in the form of alternating current. From the main substation feeders distribute the power through the property at 2,200 volts, 3-phase. At intervals there are pole-type transformers, which reduce the voltage to 110 or 220, with single-phase, 3-wire utilization in the buildings.

Exterior lighting.—Series systems are used throughout, with 6.6-ampere, 100-candle power lamps and radial-ray reflectors on gooseneck bracelets attached to poles. The lamps are from 250 to 350 feet apart, according to the requirements. To guard against interruptions covering large areas, the lighting is arranged in groups, each of which is supplied by a pole-type constant-current transformer which is controlled by a pole-type oil switch operated from the ground by ropes.

Interior lighting.—In order to simplify the work and also the purchase of materials, a standard arrangement of 40-watt lamps is in use generally. Places in which lamps of other sizes are used are generally garages and other buildings which necessarily require especially good lighting. The intensity of illumination in the barracks and in buildings of this type is approximately 0.2 watt per square foot of floor area, which corresponds to about 1 foot per watt; in mess rooms and kitchens it is somewhat higher, and in sleeping quarters it is somewhat less.

The systems of wiring, generally, are open cleat, or concealed knob and tube. In garages and laundries the conduit system is used. Buildings are provided as required with a service switch, and, where there are a number of circuits, the fuses are all grouped at one point.

Metal cone reflectors are used generally, with wire lamp guards in lavatories, storerooms, or other places where the lamps are subject to breakage.

HEATING.

At National Army cantonments, with the exception of Camps Devens, Grant, Custer, and Dodge, nearly all buildings are heated by stoves and room heaters. This method is, in general, more successful than was at first anticipated, as it was felt that the heating of barrack buildings of this type with heaters placed in the dormitories was a new departure.

Stoves.—About 45,000 room heaters, or furnaces cased as room heaters, have been purchased, together with about 30,000 cannon stoves.

Steam plants.—In the regimental heating plants, particularly, every detail which was not absolutely essential to the heating of buildings was eliminated in order to conserve time, labor, and material.

In connection with the heating at cantonments, about 300 horizontal tubular boilers, of 150 horsepower, were purchased and erected representing a total of 45,000 horsepower. In addition, there were about 150 large and 1,700 small cast-iron boilers of the sizes ordinarily used in residence heating. For heating at National Army cantonments a total of approximately 4,700,000 square feet of cast-iron radiation was purchased.

HOSPITALS.

1. In accordance with plans submitted by the Office of the Surgeon General, hospitals to accommodate 3 per cent of the personnel of the troops of each camp were constructed simultaneously with the cantonments. One thousand beds at each National Army camp and 500 to 800 at each National Guard camp were the original accommodations provided. In the early part of this year additional two-story ward barracks were built at all camps, thereby increasing the capacity of the hospitals by 960 beds at the National Army cantonments and by 300 to 600 beds at the National Army camps. In addition to the above, projects known as embarkation hospitals were built at ports of embarkation such as Hoboken, N. J., and Newport News, Va.

2. Meanwhile general hospitals, to be used for returned overseas casu- als, primarily, were constructed apart from concentrations of troops and in widely separated districts. Among those were hospitals for the blind, hospitals for tuberculosis patients, and for those suffering from nervous disorders.

3. As the fiscal year closed a project was underway to lease hotels, schools, and existing buildings for hospital purposes, thereby making ready, at very little cost to the Government, additional beds at the rate of 5,000 beds a month to provide for overseas casu- als.

GENERAL FACILITIES.

In addition to housing for personnel of the Army, including barracks for enlisted men and officers, it was necessary in connection with each camp and cantonment to provide the following general facilities:

1. Base hospital.
2. A remount station with capacity for 5,000 animals, and including barracks and shops.
3. Refrigerating plants.
4. Steam laundries.
5. Bakeries.
6. Storehouses with storage warehouses.
7. Railroad sidings.
8. Shoe and clothing repair shops.
9. Schools, including buildings for training in gas defense, etc.

LAUNDRIES.

It was first thought practicable to make contracts with the laundry companies in cities adjacent to the camps, but in many cases this was found impracticable, and steam laundries were built at a number of the cantonments, which were, however, leased to operating companies. The conditions of operation proved to be quite different from what was expected, and it was later found necessary for the camp quartermaster to take over and operate the steam laundry, canceling contracts with the operating companies. The laundries are now operated as a part of the work of the Reclamation Division.

SWAMP DRAINAGE AND MOSQUITO ELIMINATION.

During the construction period some attention was given to these items. At Camp Upton, Yaphank, Long Island, the mosquito situation was serious in the early days of construction, which happened to follow quite an unusual period of rainy weather.

In some instances the camp surgeons detailed to aid the constructing quartermasters were very proficient in handling this phase of the work.

Additional screens have also been recommended, and it is to be expected that they will be forthcoming at all camps where needed and thus lessen the possibilities of transmission of disease of flies. Early provision was made at some of the camps for screening hospitals, kitchens, and mess halls.

FIRE PROTECTION.

The need for rapid construction, and the limitations of cost to provide cantonments for the National Army, made the use of wooden buildings the only practical solution of the problem. The number of such buildings required at each cantonment (about 1,700) resulted in a sizable city of wooden buildings, so that the question of fire protection was of much importance. Early consideration was given to this phase of the cantonment problem, with the aid of Messrs. Clarence Goldsmith and W. M. Johnson, loaned from the engineering staff of the National Board of Fire Underwriters. A general program was adopted, which included the following salient features:

(a) General provision for separating or spacing main buildings so that a fire would ordinarily involve only the one building in which such fire originated. In addition, well-defined clear spaces in which no buildings were to be erected were designed as firebreaks; across these it was reasonable to assume that even a fire involving a considerable number of buildings would not communicate.

(b) Construction requirements which tend to reduce the hazard of fire starting within the buildings, principally in prescribed regulations for setting stoves, ranges, and heaters, and for having all electrical work done in accordance with the National Electrical Code.

(c) A water-supply system designed to deliver water throughout most camps at a sufficient pressure to supply good streams for fire fighting directly from hydrants, and with hydrants placed so that 16

streams could be concentrated on any of the large barrack buildings, with lines of hose, none of which would exceed 500 feet in length.

(d) The distribution of first-aid fire-extinguishing apparatus throughout all buildings, these to include fire pails, chemical extinguishers, water barrels, and hand-pump tanks.

(e) The distribution of hand hose carts, each carrying 500 feet of fire hose and equipment for use of regimental fire brigades. It is thought that, owing to the training and discipline of troops occupying these camps, regimental fire brigades form a powerful auxiliary fire fighting force, and though they may not get into operation as quickly as the technical fire company, they form a large reserve from which units may be drawn in case of serious fires.

(f) A military fire company, recruited from men having training in paid fire departments, this company to be stationed at three or more fire houses, and equipped with motor fire trucks, carrying all the usual equipment of a city fire department. Such companies have been authorized for all the National Army and some of the National Guard camps, and include a personnel of 1 commissioned officer, 7 noncommissioned officers, and 36 men.

(g) Provision for fire-alarm service, consisting of special telephones distributed throughout the camp, and accessible at all times, over which fire alarm can be sent to the telephone exchange from which such alarms are transmitted to the fire stations by telephone, and a special fire-alarm going, direct type. A large siren for general notification of the entire camp was also included.

(h) In division storehouses, additional protection in the way of automatic fire-alarm systems have been provided.

During the construction of the 16 National Army cantonments an engineer of the National Board of Fire Underwriters was detailed to each camp, to act as advisory engineer and fire marshal for constructing quartermasters. Fire prevention regulations were included in the instructions to constructing quartermasters.

Of course, all this protection was not available during the early steps of the construction work, when temporary organizations of fire companies, equipped with motor trucks carrying small fire appliances, were put into service. A thorough system of guard and watch, one feature of which at a number of camps was a watch from an elevated tower overlooking the entire camp site, was also maintained.

Regular inspections for fire prevention were made by members of the temporary fire companies and fire marshal and by the fire-prevention engineers.

The result of this campaign of fire prevention, and the attention given to fire protection during construction, was that no fires of serious consequence occurred in the National Army cantonments during the construction period. The total property loss during the strictly construction period is estimated to be about \$2,000. In the construction of the National Guard camps, there was only one fire of any consequence during the construction period, this involving a loss of about \$15,000.

The cost of the permanent features of fire protection at a typical National Army cantonment, not including cost of water supply, is given in Table 10.

TABLE 10.—*Fire equipment at Camp Grant.*

Fire stations (1-story) for use of men and apparatus.....	3	\$20,000
Automobile fire trucks.....	6	11,000
Cotton rubber-lined fire hose.....feet	25,000	16,250
Hand hose carts, with equipment.....	38	3,230
Extinguisher, 2½ gallons.....	150	1,462
Extinguisher, 1-quart.....	150	750
Hand-pump tanks.....	830	4,150
Fire pails.....	10,300	3,090
Water barrels.....	400	1,000
Fire-alarm gong-signal system.....		1,500
Miscellaneous and sundry equipment.....		3,000
Building hose-reel houses, shelves, and brackets for fire appliances.....		3,000
Total.....		68,432

At the 16 cantonments there were 75 miles of fire hose and 3,550 hydrants.

GARBAGE AND REFUSE DISPOSAL.

At each kitchen all waste material is sorted and placed in separate cans, thereby making a complete separation. By this means, all the various materials, such as garbage, bones, fats, grease, paper, tin cans, and bottles are rendered marketable.

In handling garbage, the two-can system was adopted. When filled cans are removed from the kitchen, they are replaced with clean ones. All cans are provided with close-fitting covers. These cans are placed in Government trucks and removed to a transfer station under the supervision of sanitary inspectors. The contents of the cans are then dumped into the contractor's trucks. The transfer station consists of platforms and storage sheds, together with hot-water facilities, and tanks for sterilizing the cans. There all waste materials are collected and turned over to the contractors, who remove them to a point at least 3 miles from the reservation.

In devising this plan for the sale of waste materials, the fact was recognized that some were more salable than others. Consequently, a plan was developed whereby all waste materials, except manure, are sold at a certain price per capita each month. Manure, in the majority of cases, is sold at a price per animal per month. By this plan all waste materials, at all the National Army cantonments and embarkation camps, have been sold, for a total sum of \$446,394.57; manure, \$198,269.40, or a total for both classes of materials of \$644,663.97. This plan not only shows a substantial return to the Government, but will also result in saving \$700,000, which would be the cost of erecting incinerators having sufficient capacity to dispose of all waste material if burned. It also shows a saving of about 60 cents per ton for fuel required to burn such waste materials as would accumulate at Army cantonments. It is estimated that 40 tons of such wastes accumulate each day at each cantonment. This would cost about \$122,275 per year for incineration.

The hardest problem has been to dispose of the manure to advantage. As there are 12,000 animals at each cantonment, manure would necessarily accumulate in large quantities, estimated at not less than 120 tons per day per camp. The cost to the Government of hauling or incinerating this manure would amount to 60 cents per ton. At the date of Lieut. Col. Ellison's report (Sept. 6, 1917), the manure at 11 cantonments had been sold, in some cases, on the per-animal-per-day basis, and in others on a flat rate per month, resulting in

a net return to the Government of \$240,900. The total returns to the Government, including money derived from sales, together with savings over incineration, amount to \$1,707,838.67. The foregoing statement shows not only a financial gain to the Government, but also an economic advantage in the recovery of valuable products from such wastes.

At practically all the cantonments, contracts have been made with local contractors for the purchase and removal of the camp wastes, which include bones, garbage, waste paper, bottles, miscellaneous scrap metals, and stable manure. The prices paid by the various contractors (each under a \$25 bond) range from 3 to 9 cents per man per month, an average of 5 cents. There are a few exceptions, as at Camp Devens, where a lump sum of \$2,160 per month for all camp wastes is paid by the contractor; and at San Antonio, where the bones bring \$11, garbage \$1.90, and waste paper \$4 per ton.

In the National Guard camps the kitchen wastes are burned in incinerators of the field type. On account of the large number of animals maintained at each camp, the disposal of manure became a serious problem. At some camps it was possible to dispose of the same by sale to farmers. At others it was difficult to induce the farmers to take it away. In some cases, because of the inability to sell or dispose of it in any other way, experiments were made with incinerators, but these proved expensive in operation and where used have been practically abandoned. Further consideration with regard to disposal of such wastes might appropriately be given this matter by the Reclamation Division of the Quartermaster General's Office.

INCREASE OF CONSTRUCTION PROGRAM.

When the cantonment division was organized, it was thought that the work of the division would be ended upon the completion of the camps and possibly a few minor emergency construction projects.

In September, 1917, however, it became apparent that there were a large number of projects, such as quartermaster depots, port terminals, hospitals, etc., which would make it necessary to reorganize the Cantonment Division on a larger scale. In addition it developed that for training purposes, much additional construction had to be undertaken at the various cantonments and camps. In addition to the above, the Secretary of War indicated that all emergency building construction should be consolidated under the Cantonment Division, and this was provided for in letter from the Secretary of War dated October 5, 1917, which reads as follows:

OCTOBER 5, 1917.

From: The Adjutant General of the Army.
To: The Quartermaster General of the Army:
Subject: Emergency construction.

1. The Secretary of War directs that all building and construction rendered necessary in the United States by the present emergency and provided for by existing or pending appropriations shall be executed by the Quartermaster General's Department under the direction of Col. Littell.

2. If any special case seems to any head of a department an exception to this rule, the Secretary of War will pass on it separately.

By order of the Secretary of War:

JOHN S. JOHNSTON,
Adjutant General.

In accordance with this policy, the Cantonment Division was required to take charge of the construction of various projects for the other departments and bureaus of the Army. These include munition plants, proving grounds, aviation fields, port terminals, interior depots and construction work of almost every character and description.

In order to effectively care for the increased work placed upon the Construction Division by the above-mentioned order, the office was reorganized, effective October 5, 1917, by which the construction branch of the office was divided into two sections, one under the immediate supervision of Maj. Philander Betts, Engineer Reserve Corps, now lieutenant colonel, Quartermaster Corps, having charge of the additions and extensions to all of the cantonments and camps, made necessary by the further development of the plans of the General Staff; the other division having supervision over port terminals, supply depots, etc., being put under the immediate supervision of Maj. Warren R. Roberts, Quartermaster Reserve Corps, now lieutenant colonel, Quartermaster Corps.

Up to October 10, 1917, both the Cantonment Division and the Construction and Repair Division were carrying on construction work and these were consolidated by the following:

OCTOBER 10, 1917.

OFFICE ORDERS, No. 106.

In view of the instructions of the Secretary of War of October 5, 1917, directing "that all building and construction rendered necessary in the United States by the present emergency and provided for by existing or pending appropriations shall be executed by the Quartermaster General's Department under the direction of Col. Littell" (now brigadier general), the Construction and Repair Division is hereby abolished as a division and transferred to the Cantonment Division as a branch of that division, with Maj. C. O. Zollars, Quartermaster Corps, in charge. The records, personnel, etc., pertaining to the Construction and Repair Division will be transferred to the Cantonment Division.

HENRY G. SHARPE,
Quartermaster General.

FURTHER INCREASE IN CONSTRUCTION PROGRAM.

Under date of February 18, 1918, Brig. Gen. I. W. Littell was relieved of duty as officer in charge of Construction Division, and Col. R. C. Marshall, jr. (now brigadier general), succeeded him.

Under date of February 19, 1918, memorandum was received from Chief of Staff, calling attention to section 3, paragraph 5, G. O. 14, February 9, 1918, under which the Cantonment Division became a part of the office of the Chief of Staff, reporting to the Division of Operations.

The number of projects has increased in magnitude to such an extent that it became necessary to obtain authority for a special allotment of officers for the carrying through this program of construction, and it became apparent also that the Cantonment Division should be separated from the office of the Quartermaster General in order that it might have more direct contact with the General Staff. Accordingly under date of March 13, The Adjutant General issued the following memorandum under the authority of which the "Cantonment Division" was changed to the "Construction Division of the Army" and set up as a separate organization reporting to the Chief of Staff.

WAR DEPARTMENT,
THE ADJUTANT GENERAL'S OFFICE.
Washington, March 13, 1918.

From: The Adjutant General of the Army.

To: The Officer in Charge of Cantonment Construction, Fifteenth and M Streets NW., Washington, D. C.

Fifteenth and M Streets NW., Washington, D. C.

Subject: Cantonment Division.

1. The memorandum for the Chief of Staff from the officer in charge of the Cantonment Division, dated February 25, 1918, with inclosures thereto, has been retained in the files of the War Plans Division for future reference. It has been considered by the Secretary of War, and the following are his orders in relation thereto:

2. Under authority granted in section 1, of the act of Congress "to authorize the President to increase temporarily the Military Establishment of the United States," approved May 18, 1917, the President directs that the Cantonment Division of the Quartermaster Corps (including as a part thereof the Construction and Repair Division of the Quartermaster Corps), now operating as a part of the Office of the Chief of Staff, shall hereafter be called the Construction Division and shall be temporarily increased during the present emergency, so as to consist of, including commissioned personnel of the Quartermaster Corps, Regular Army, National Guard, National Army and Reserve Corps heretofore authorized, and including officers of other arms, staff corps and departments who may be detailed for duty with the Construction Division other than liaison duty:

Brigadier general	1
Colonels	13
Lieutenant colonels	22
Majors	240
Captains	686
First lieutenants	347
Second lieutenants	98

3. The brigadier general included in the personnel herein authorized is considered to be one of the six brigadier generals heretofore authorized for the Quartermaster Corps, and this authority is not to be construed as creating a new vacancy in that grade. The total herein authorized includes all officers now on duty with the Quartermaster Corps or heretofore authorized under existing law for the performance of duties allotted to the present Cantonment Division, including the operation of utilities and the maintenance and repair of public buildings at military posts, camps, and cantonments. It does not include quartermasters of permanent posts who may operate utilities and supervise maintenance and repair work in addition to their duties as supply officers.

4. The following is hereby authorized as the maximum civilian personnel to be employed by the construction division, including those employed at present:

Technical	479
Stenographers and typists	255
Clerks	250
Messengers	83
Blue printers	17
Accountants	50
Contract clerks	4
Total	1,138

These employees will be taken on and off as needed, in accordance with the requirements of the work in process or in immediate prospect.

5. In view of existing orders of the Secretary of War that all building and construction rendered necessary in the United States by the present emergency shall be executed by the Construction Division unless especially excepted by the Secretary of War, all commissioned and civilian personnel of the Ordnance Department and Signal Corps heretofore employed exclusively on construction work and no longer needed in those corps and departments will be considered available for assignment to the Construction Division as a part of the personnel herein authorized, upon the request of the officer in charge of the Construc-

tion Division, but no officer of the line of the Regular Army, who may be detailed in any of these corps and departments, shall be assigned to the Construction Division under this authority. Such officer and civilians of the present Construction Divisions of these corps and department, who are not transferred or assigned to the Construction Division, and who are no longer needed for construction work in their own corps or departments, will be disposed of by absorption in other branches of their corps or departments, by relief from detail, by discharge, as may be determined by the Chief of Staff under the recommendation of the chief of the corps or department concerned. To this end, upon the completion of the transfer of construction work and personnel to the Construction Division, the chief of each of the corps and departments mentioned above will submit a report to this office, showing the surplus personnel of his construction division available for other duty, together with his recommendation as to the disposition to be made of each officer and civilian concerned.

6. The officer in charge of the Construction Division is hereby authorized to take the necessary steps to secure the additional commissioned and civilian personnel herein authorized, provided that it shall be called only when needed and that the personnel shall be reduced whenever it exceeds the requirements for the amount of work assigned to the Construction Division or in prospect.

7. The additional officers herein authorized will be obtained as provided in the third paragraph of section 1 and by section 9 of the act of May 18, 1917, provided that no vacancies shall be filled by the detail of line officers of the Regular Army in addition to those already assigned to the Construction Division.

By order of the Secretary of War.

(Signed)

J. B. WILSON,
Adjutant General.

In accordance with authority of the memorandum of March 13, and in order to take care of the greatly enlarged program of emergency construction, the office was again reorganized on a much broader plan.

The need for this organization (description of which is shown in Appendix G) is shown when it is recalled that total cost of all cantonments and camps was approximately \$200,000,000, while the other emergency work, consisting of munition factories, storage warehouses, hospitals, port terminals, interior depots, etc., then in prospect, amounted to \$600,000,000.

(A list of all such projects authorized from Oct. 1, 1917, to July 1 is given in Appendix H.)

CONSTRUCTION OTHER THAN CANTONMENTS AND CAMPS.

During the year the construction of various large projects has been commenced and in a number of cases practically completed. These include extensive ammunition storage depots, bag-loading plants, plants for the manufacture of munitions of all sorts including gas and acid-making plants, and nitration plants. A number of large interior Quartermaster, Ordnance, and Signal Corps depots have also been under construction. Many of these projects are permanent in character, although built under emergency conditions.

SHIPPING AND STORAGE FACILITIES.

Extensive shipping facilities, combined with storage, have been located at six locations. These are known as Army supply bases.

At Port Newark, N. J., the Army supply base and terminal is located in the city of Newark, but about 3 miles from the center of the city on Newark Bay, and includes six 1-story warehouses with tile walls, mill construction floors and roofs, with an area of 152,000 square feet, and two open sheds with cinder floors, totaling 384,000 square feet. There are 3,300 linear feet of berthing space for ships, with the necessary railroad yards and connections with the Pennsyl-

vania, Lehigh Valley, and Central Railroad of New Jersey. This project was authorized September 8, 1917, and work commenced about October 23. On June 30 the work was practically complete and was already partly in service.

Army supply base and port terminal at Boston. This project is located on the main ship channel in Boston Harbor, adjacent to Commonwealth Pier No. 6, and consists of a six-story reinforced-concrete warehouse of 1,651,000 square feet of floor area, a two-story wharf shed of 327,000 square feet of floor area, and a three-story pier shed of 554,400 square feet of floor area, having steel frame with reinforced-concrete floors and inclosing wall. There is berthing space amounting to 4,000 linear feet and adequate railroad yard, having connections with the New York, New Haven & Hartford Railroad. The plant includes the necessary heating system, administration buildings, etc. This project was authorized April 9, 1918, work was commenced about the middle of April, and June 30 was about 17 per cent complete. It was expected that one-half of the building would be available for receiving supplies about November 1, 1918.

Army supply base and port terminal, Norfolk, Va. This project is located at Bush Bluff, about 5 miles north of Norfolk, and consists of eight one-story warehouses with tile walls, concrete floors, mill construction, with a total of 2,016,000 square feet. It includes two piers with pier sheds of steel and concrete construction totaling 610,800 square feet. There will be 5,400 linear feet of berthing space for ships, with all the necessary supporting railroad yards having connection with the Norfolk & Southern and Virginian Railway, from which a belt line has operating rights. Connection by means of floats is also made with the Chesapeake & Ohio and F. & N. Railways. Before this project is completed it will be necessary to dredge out about four and a quarter million yards of material. This project was authorized January 4, 1918. On June 30 the work was approximately 25 per cent complete.

Army supply base, Philadelphia, Pa. This project is located at Twenty-second Street and Oregon Avenue. It consists of six one-story buildings, mill construction, with a total of 1,000,000 square feet of storage area. There are also the necessary barrack building, administration buildings, and heating plant. Adequate railroad yard is provided, having connections with both the Pennsylvania and Baltimore & Ohio Railroads. This project was authorized December 13, 1917, and on June 30 the work was practically completed.

Philadelphia expeditionary depot. This project is located on property bounded by McKean Street and Snyder Avenue and Delaware Avenue and the Delaware River. The project consists of four one-story warehouses with tile walls, concrete floors, and mill-construction roofs, totaling 271,000 square feet. Docking facilities are obtained through lease of Municipal Pier No. 78, which is a two-story steel and concrete structure of approximately 400,000 square feet, affording 1,600 linear feet of berthing space. Necessary supporting railroad yards are provided, having connection with the Pennsylvania Railroad. This project was authorized December 14, 1917. Work was commenced approximately February 4, 1918, and was 100 per cent complete on June 30, 1918.

Army supply base and port terminal, Brooklyn, N. Y. This project is located in South Brooklyn, on property bounded by Sixty-third

Street, Second Avenue, Fifty-eighth Street, and New York Bay. The project consists of two eight-story reinforced-concrete warehouses, totaling 3,660,000 square feet, one open pier, and three piers with two-story pier sheds of 375,000 square feet each, or a total of 1,125,000 square feet. The pier sheds have steel frames protected with reinforced concrete. There are 9,800 linear feet of berthing space for ships. Extensive railroad yards have been provided, having connections with the Long Island Railroad and the Brooklyn Rapid Transit Railroad. This project is a very important one and is well laid out. It includes 84 elevators and elevated connections between the storage buildings and the piers, making it possible to transport materials from warehouses to piers without interfering in any way with the movement of cars on the ground level. This project was authorized April 30, 1918, and it is expected that one building and one pier with pier shed will be available for use about December 1, 1918.

Army supply base, St. Louis, Mo. This project is located at Second and Arsenal Streets, and consists of a six-story reinforced-concrete building with a storage capacity of 360,000 square feet. This building has the necessary railroad connections. This project was authorized December 24, 1917, and on June 30 was 70 per cent completed. This work was practically completed by September 1, 1918.

Army Supply Base, Chicago, Ill. This project is located on Thirty-ninth and Winchester Avenue, and consists of two six-story reinforced concrete buildings, with a storage capacity of 1,220,000 square feet. There are the necessary railroad connections and facilities. This project was authorized March 1, 1918, and work started soon thereafter. On June 30, 65 per cent of the work was completed and the project is now practically finished.

Reserve storage depot, Schenectady, N. Y. This project is located in South Schenectady, N. Y., on the New York Central & Hudson River Railroad and Delaware & Hudson Railroad. It consists of six one-story warehouses, mill construction, with a storage area of 1,520,000 square feet. There are the necessary barrack buildings, heating plant, and railroad supporting yards. The work was authorized under date of April 13, 1918; on June 30 the work was 40 per cent completed, and was practically finished by November 1, 1918.

Reserve storage depot, New Cumberland, Pa. This project is located on line of the Northern Central Railway (P. R. R.). It consists in the construction of eight one-story warehouses and two sheds, with a total storage capacity of 1,946,000 square feet. The buildings are one-story, mill construction. In connection with this project there are the necessary barrack buildings and railroad supporting yard. This project was authorized on April 13, 1918, and work started soon thereafter. On June 30 the work was 25 per cent completed, and was practically finished on October 1, 1918.

Reserve storage depot, Columbus, Ohio. This project is located just east of the city limits of Columbus, Ohio, and on line of the Pennsylvania Railroad, Baltimore & Ohio, and Toledo & Ohio Central Railroad. The work consists of six one-story buildings, mill construction, with a storage capacity of 1,479,000 square feet. There are the necessary barrack buildings, administration offices,

sewage disposal plant, and supporting railroad yards. This project was authorized on May 27, 1918, and work started soon thereafter. On June 30 this work was 35 per cent completed, and was practically finished by November 15, 1918.

ICE AND COLD STORAGE PLANTS FOR AMERICAN EXPEDITIONARY FORCES, FRANCE.

At the time when the United States entered the war the total freezer capacity for the holding of frozen beef available in France for the American Expeditionary Forces was 750 tons. During the year the Construction Division has designed and shipped to France the materials and equipment for the construction of a total freezer capacity of approximately 24,000 tons, or an equivalent of 96,000 cattle. Also recommendations of the Construction Division resulted in the construction by the French Government of a total of 4,000 additional tons of freezer storage capacity to be used by the American Expeditionary Forces. The erection of these plants was done principally by representatives of the Construction Division sent during the year, who worked in conjunction with the Engineer Corps in France. The operating personnel, in each case a military unit, for four of the above plants, was organized by the Construction Division. These units consisted of approximately 1,000 men, and were made up of men specially trained and qualified for the duties which they were to perform.

The first plant, which was constructed in five months, has a beef-storage capacity of 6,500 tons and an ice-making capacity of 500 tons per day. The refrigerating capacity of the plant is 1,575 tons, the boiler capacity 2,700 horsepower, and electric-generating capacity of 300 kilowatts. The plant is provided with a complete laundry, also a machine shop for the maintenance of the plant equipment. There is also provided a pumping station, one-half a mile from the main plant, which delivers the required amount of water, which is approximately 3,600 gallons per minute, through a 16-inch cast-iron water line from the river upon which the pumping station is located to the storage reservoir, which is located at the plant. Both electric and gasoline engine driven pumps were provided to insure the water supply for the operation of the plant. The materials and equipment for the construction of this plant required shipment of 12,000 tons from the United States to France. The cost of this plant was approximately \$2,500,000. The original beef-storage capacity of this plant has been doubled.

In addition to the first plant two more plants have been sent from this country having a beef-storage capacity each of 5,200 tons and an ice-making capacity of 125 tons per day. The refrigerating capacity for each of these plants is 600 tons and the boiler capacity in each case is 1,125 horsepower. In the construction of these last two plants, also the additions to the first plant, cork board and granulated cork obtained from Spain was used for insulation. The estimated cost of these plants is approximately \$1,800,000 each.

MACHINE SHOPS FOR FRANCE.

September 5, 1917, authorization was given for the expenditure of \$600,000 to cover the purchase and erection of shops for the repair

and upkeep of motor trucks. After careful investigation, buildings of the "knockdown" type were adopted. These are of steel construction as being the most satisfactory. Two types were selected; one known as the Austin No. 3 Monitor and the other a so-called "saw-tooth" type similar to those used at Fort Sam Houston and Fort Bliss. The dimensions of the Austin No. 3 Monitor type is 100 by 200 feet and includes an electric shop, machine shops, blacksmith shop, carpenter and wheelwright shop, harness and shoe shop, clothing and repair shop, tentage and auto trimming shop, laundry, stock rooms, and an engine and axle repair shop.

MAINTENANCE AND REPAIR.

When the original contractors completed their allotted tasks at the various cantonments and camps about December 20, the constructing quartermaster was relieved of such duty and the small additions and extensions were made under the direction of the camp quartermaster.

About March 1, 1918, a new constructing quartermaster was assigned to each cantonment and camp to supervise the construction of numerous additions and extensions. Many new projects were started at about the same time, requiring a large number of officers in the field as well as increasing materially the supervisory work in the Washington office. (Appendix I includes the tabulated statements formerly contained in the report of the old Construction and Repair Division of the Quartermaster General's Office.)

OPERATION OF UTILITIES AT CAMPS.

While the camps were under construction it became apparent, because of the magnitude of these camps, that it would be necessary to develop special organizations to maintain and operate the various utilities. These duties had always been performed at Regular Army posts by the post quartermaster, assisted by, at the most, a limited number of enlisted men.

In accordance with the above conclusions, an organization was planned, consisting of a major with several subordinate officers and a varying number of enlisted men ranging from 120 to 300 men, according to the first estimate. The major, who would report to the camp quartermaster, would have to be an expert in the operation of various utilities, his subordinate officers would likewise be experts in electric lighting, water supply, maintenance and repair of buildings, roads, refrigeration, fire department, heating, etc. In accordance with this plan a major was appointed for duty at each of 12 camps and at the other in some cases a major and in other cases a captain, already on duty was assigned to take charge of this work.

Recommendations were made from time to time by the Cantonment Division with regard to subordinate officers and a plan of organization was developed under which the camp quartermasters proceeded to organize the necessary personnel. The organization authorized provided for a number of men altogether too limited to properly handle the great variety of work and from time to time the allotment of enlisted men was increased. At no time, up to practically the end of the fiscal year, did the organization at any of the camps prove to be sufficient to enable the various officers to properly perform

their duties. As a result of the experience covering a winter's operation, a suitable organization was finally authorized under date of July 2, 1918. This authorization provides for the necessary housing, transportation, and other necessary facilities required for proper and adequate service.

General Orders, No. 72, paragraph 3, of August 6, 1918, provide for the final separation of the utilities organization from that connected with supply, and provides further that the entire maintenance and operation of the camps shall be assumed by the Construction Division. Under this arrangement all the duties formerly exercised by the post quartermaster, except those of supply and finance, are to be performed by the organization reporting to the Construction Division.

In Appendix J will be found charts showing the organization by General Order of July 2. Appendix J also includes a list of the utilities officers on duty November 19, 1917, at which time the maintenance of utilities was being organized.

In recent years much progress has been made in city management. The tendency has been toward the employment of a city manager in place of the organization consisting of boards of aldermen, etc. Under the city manager plan, the responsibility is centered in a single individual who ordinarily is an expert in the management of engineering works. The duties comprise, within the jurisdiction of the officer in charge of utilities at a camp, not only all the ordinary duty of a city manager, but also extend to the heating, maintenance and repair of all buildings, and also the accountability for all the movable property contained within the buildings as well as the buildings themselves.

GENERAL CONCLUSIONS.

1. For approximately \$200,000,000 the Army was provided on schedule time with complete housing facilities, including adequate water supply and full sanitary facilities.

2. For approximately \$600,000,000 certain facilities for storing and placing aboard ships all supplies for the Army have been provided or are under construction.

3. An extensive program of additional construction is now under way, involving at the present time approximately \$500,000,000 additional expenditures. Under this third class are found a number of new training camps for special training in artillery and machine-gun fire and for motor transport service, including also a large number of hospitals with expected capacity of from 90,000 to 100,000 beds.

FUTURE WORK.

The Construction Division, after several stages of development, is now organized to execute construction work of any character or magnitude. The value of this organization and the team work developed should not be lost nor confined. It seems proper to suggest that to the Construction Division should be assigned all construction work outside of the immediate theater of operations.

R. C. MARSHALL, JR.,
Brigadier General, United States Army,
Chief of Construction Division.

APPENDIX A.

CAPACITY OF CAMPS.

DECEMBER 31, 1917.

Approximate total housing capacity for troops at the various military establishments in the United States.

National Army cantonments.....	654, 736
Embarkation camps.....	43, 505
Quartermaster training camps.....	17, 800
Coast Artillery posts (1918 additions only).....	13, 857
Regular Army posts.....	17, 800
1917 additions to Regular Army posts, approximately.....	83, 075
Total.....	100, 000
National Guard camps (mobile troops only, prepared for troops in tents).....	930, 823
Total.....	438, 042
Total.....	1, 368, 865

JULY, 1917.

The following shows the name, location, and capacity of the various camps constructed for the use of the Regular Army, allowing 500 cubic feet of air space per man. These camps are located on Government reservations and target ranges are available, except in the case of Vancouver Barracks.

Name.	Location.	Capacity.	Acreage.
Fort Benjamin Harrison.....	Indiana.....	4, 802	2, 417. 81
Fort Douglas.....	Utah.....	4, 368	2, 995. 00
Leon Springs.....	Texas.....	7, 166	17, 273. 87
Fort Oglethorpe.....	Georgia.....	20, 875	6, 541. 64
Presidio of San Francisco.....	California.....	3, 923	1, 479. 94
Fort Riley.....	Kansas.....	4, 560	19, 446. 73
Fort Sam Houston.....	Texas.....	806	1, 245. 11
Fort Snelling.....	Minnesota.....	4, 181	2, 361. 75
Camp Robinson.....	Sparta, Wis.....	2, 645	14, 111. 00
Vancouver Barracks.....	Washington.....	2, 560	640. 47

RECAPITULATION.

Total capacity of all camps, posts, cantonments, and arsenals.

Name.	Officers.	Men.	Total.
National Army camps.....	22, 465	600	632, 321
National Guard camps.....			438, 042
Coast Artillery posts.....	749	609	20, 706
Coast Artillery cantonments.....			19, 599
Regular Army posts.....	1, 987	587	42, 574
Regular Army cantonments.....			55, 886
Embarkation camps.....			54, 774
Quartermaster camps.....			17, 800
Officers' training camps.....			13, 500
Other training camps.....			5, 690
Aviation training camps and concentration camps.....	1, 963		38, 050
Arsenals.....			1, 510
Total.....	27, 164	1, 196	1, 128, 629
Abandoned mobile Army posts.....	201	73	4, 281
Recruit depots.....			28, 792

Depots:		
Square feet.....	5,399,989	
Cubic feet.....	11,134,421	
Animals.....	1,686	
Hospitals:		Beds.
Mobile Army posts.....	4,161	
Coast Artillery posts.....	850	
National Army cantonments.....	24,570	
National Guard camps.....	15,295	
Miscellaneous.....	6,219	

Capacity of National Army cantonments.

Name.	Officers.	Men	Total
Camp Devens, Mass.....	1,235	34,053	35,288
Camp Upton, Yaphank, Long Island.....	1,427	39,486	40,913
Camp Dix, Wrightston, N. J.....	1,346	39,963	41,309
Camp Meade, Annapolis Junction, Md.....	1,416	39,823	41,309
Camp Lee, Petersburg, Va.....	1,490	44,022	45,512
Camp Jackson, Columbia, S. C.....	1,501	40,997	42,498
Camp Gordon, Atlanta, Ga.....	1,411	38,385	39,796
Camp Sherman, Chillicothe, Ohio.....	1,313	37,080	38,393
Camp Taylor, Louisville, Ky.....	1,497	42,442	43,939
Camp Custer, Battle Creek, Mich.....	1,186	32,859	34,045
Camp Grant, Rockford, Ill.....	1,462	39,847	41,309
Camp Pike, Little Rock, Ark.....	1,461	40,886	42,347
Camp Dodge, Des Moines, Ia.....	1,386	39,140	40,526
Camp Funston, Fort Riley, Kans.....	1,402	40,162	41,564
Camp Travis, Fort Sam Houston, Tex.....	1,428	39,925	41,353
Camp Lewis, American Lake, Wash.....	1,504	43,181	44,685
Total.....	22,165	632,321	654,786

NATIONAL GUARD CAMPS.

Total capacity based on one Pershing division, Dec. 31, 1917.

Name.	Location.	Winter capacity.
Camp Beauregard.....	Alexandria, La.....	27,152
Camp McClellan.....	Anniston, Ala.....	27,152
Camp Hancock.....	Augusta, Ga.....	27,152
Camp Greene.....	Charlotte, N. C.....	27,152
Camp Cody.....	Deming, N. Mex.....	27,152
Camp Doniphan.....	Fort Sill, Okla.....	27,152
Camp Bowie.....	Fort Worth, Tex.....	27,152
Camp Sevier.....	Greenville, S. C.....	27,152
Camp Shelby.....	Hattiesburg, Miss.....	30,762
Camp Logan.....	Houston, Tex.....	27,152
Camp Kearney.....	Linda Vista, Cal.....	27,152
Camp Wheeler.....	Macon, Ga.....	27,152
Camp Sheridan.....	Montgomery, Ala.....	27,152
Camp Fremont.....	Palo Alto, Cal.....	27,152
Camp Wadsworth.....	Spartanburg, S. C.....	27,152
Camp MacArthur.....	Waco, Tex.....	27,152
Total.....		438,042

Mobile troops do not include Hospital, Remount, Bakeries and Ordnance Depots, Utilities, etc.

EMBARKATION CAMPS.

Total capacity, Nov. 17, 1917.

Name.	Location.	Capacity.
Camp Merritt.....	Tenafly, N. J.....	122,376
Camp Stewart.....	Newport News, Va.....	15,465
Camp Hill.....	do.....	4,159
Total.....		142,000

¹ Total, exception hospital, deduction of 3,955 made for camp guard.
² Total exception hospital, deduction of 200 made for camp guard.
³ Total, deduction of 100 men made for camp guard.

QUARTERMASTER CAMPS.

Total capacity, Nov. 17, 1917.

Name.	Location.	Capacity.
Camp Ordway	Washington, D. C.	1 3,800
Camp J. E. Johnston.....	Jacksonville, Fla.	2 14,000
Total		17,800

¹ Total.

² Does not include hospital or remount.

APPENDIX B.

Allotments from July 1, 1917, to June 30, 1918, inclusive.

NATIONAL ARMY CAMPS.

Name.	Place.	Amount.
Camp Custer.....	Battle Creek, Mich.....	\$9,748,694.62
Camp Devens.....	Ayer, Mass.....	11,160,839.50
Camp Dodge.....	Des Moines, Iowa.....	8,178,402.97
Camp Dix.....	Wrightstown, N. J.....	11,687,666.76
Camp Funston.....	Fort Riley, Kans.....	10,715,447.50
Camp Gordon.....	Atlanta, Ga.....	8,944,980.15
Camp Grant.....	Rockford, Ill.....	9,900,238.70
Camp Jackson.....	Columbia, S. C.....	10,723,383.50
Camp Lee.....	Petersburg, Va.....	14,004,093.21
Camp Lewis.....	American Lake, Wash.....	8,319,841.13
Camp Meade.....	Admiral, Md.....	11,848,948.58
Camp Pike.....	Little Rock, Ark.....	9,603,602.50
Camp Sherman.....	Chillicothe, Ohio.....	10,633,476.00
Camp Taylor.....	Louisville, Ky.....	8,057,065.90
Camp Travis.....	San Antonio, Tex.....	7,641,379.88
Camp Upton.....	Yaphank, Long Island, N. Y.....	12,554,994.21
		163,723,055.11

NATIONAL GUARD CAMPS.

Camp Beauregard.....	Alexandria, La.....	\$3,835,218.08
Camp Bowie.....	Fort Worth, Tex.....	3,159,282.71
Camp Cody.....	Deming, N. Mex.....	3,753,088.18
Camp Doniphan.....	Fort Sill, Okla.....	2,796,228.50
Camp Fremont.....	Pala Alto, Cal.....	2,503,554.25
Camp Greene.....	Charlotte, N. C.....	4,033,081.25
Camp Hancock.....	Augusta, Ga.....	3,218,142.25
Camp Kearney.....	Linda Vista, Cal.....	3,660,948.25
Camp Logan.....	Houston, Tex.....	3,026,199.68
Camp MacArthur.....	Waco, Tex.....	3,049,519.25
Camp McClellan.....	Anniston, Ala.....	4,270,516.10
Camp Sevier.....	Greenville, S. C.....	2,949,894.04
Camp Shelby.....	Hattiesburg, Miss.....	4,389,314.25
Camp Sheridan.....	Montgomery, Ala.....	2,900,027.08
Camp Wadsworth.....	Spartanburg, S. C.....	3,761,510.28
Camp Wheeler.....	Macon, Ga.....	3,303,162.72
		54,609,686.87

APPENDIX C.

**WAR DEPARTMENT,
OFFICE OF THE CONSTRUCTION DIVISION OF THE ARMY,
WASHINGTON, D. C.**

Allotments from July 1, 1917, to June 30, 1918, inclusive.

National Army Camps.....	\$163,723,055.11
National Guard Camps.....	54,609,686.87
Embarkation Camps.....	22,007,850.08
Engineer Corps.....	7,192,505.42
Motor Transport Corps.....	3,058,952.50
Artillery Camps.....	3,438,000.00
Coast Defenses.....	8,856,511.10
Medical Corps.....	11,454,974.17
Ordnance.....	19,339,716.40
Quartermaster Corps.....	66,694,804.44
Regular Army Posts.....	9,037,974.14
Miscellaneous Construction.....	15,674,940.56
Maintenance, Repair, and Minor Construction.....	35,150,191.45
	<hr/>
	420,259,162.24

Name.	Location.	Amount.
ARTILLERY CAMP.		
Heavy: Abram Eustis.....	Lee Hall, Va.....	\$3,438,000.00
EMBARKATION CAMPS.		
Troops:		
Merritt.....	Tenafly, N. J.....	9,113,978.39
Mills.....	Mineola, Long Island, N. Y.....	95,000.00
Stuart.....	Newport News, Va.....	12,390,871.69
Animals: Charleston Depot.....	Charleston, S. C.....	405,000.00
		<hr/>
		22,007,850.08
ENGINEER CORPS CAMPS.		
Forrest.....	Fort Oglethorpe, Ga.....	19,876.38
Humphreys.....	Accotink, Va.....	7,165,629.04
Laurel.....	Maryland.....	7,000.00
		<hr/>
		7,192,505.42
MOTOR TRANSPORT CORPS CAMPS.		
Holabird mechanical repair shop No. 306.....	Baltimore, Md.....	2,052,930.00
Jesup mechanical repair shop No. 305.....	Atlanta, Ga.....	1,001,022.50
Normoyle mechanical repair shop No. 304.....	San Antonio, Tex.....	5,000.00
		<hr/>
		3,058,952.50

COAST DEFENSES.

Baltimore.....	Baltimore, Md.....	\$253,351.80
Boston, Fort.....	Boston, Mass.....	1,850.00
Burgess, Fort.....	Pensacola, Fla.....	450.00
Boston.....	Boston, Mass.....	105,000.00
Cape Fear.....	North Carolina.....	584,341.55
Charleston.....	South Carolina.....	350,687.00
Chesapeake.....		1,058,200.13
Columbia.....	South Carolina.....	407,759.58
Delaware.....		270,114.16
Fulton, Fort.....	California.....	3,228.00
Galveston.....	Texas.....	158,750.00

Allotments from July 1, 1917, to June 30, 1918, inclusive—Continued.

COAST DEFENSES—continued.

Name.	Location.	Amount.
Jay, Fort.....	New York Harbor.....	\$51,232.55
Key West.....	Florida.....	168,759.06
Long Island Sound.....	Long Island.....	112,156.31
Los Angeles.....	California.....	455,833.09
Mobile.....	Alabama.....	121,370.00
Morgan, Fort.....	Mobile Bay.....	276.50
New Orleans.....	Louisiana.....	49,760.00
Narragansett.....	Rhode Island.....	284,836.16
New Bedford.....	Massachusetts.....	62,560.00
New York.....	Southern and Eastern.....	2,046,555.48
Pensacola.....	Florida.....	331,250.00
Portland.....	Maine.....	281,198.98
Portsmouth.....	New Hampshire.....	50,044.50
Potomac.....	Virginia.....	87,239.29
Puget Sound.....	.....	449,550.00
San Francisco.....	California.....	359,743.25
Sandy Hook.....	.....	75,200.00
San Diego.....	California.....	230,658.59
Savannah.....	Georgia.....	92,314.25
Slocum, Fort.....	New York.....	71,857.98
St. Philip, Fort.....	New Orleans, La.....	6,304.00
Tampa.....	Florida.....	201,784.16
Washington, Fort.....	Potomac, Va.....	10,000.00
Wood, Fort.....	Chesapeake Bay.....	55,494.24
		8,856,511.10

MEDICAL CORPS.

Debarcation: Hospital No. 2.....	Rose Bank, Staten Island, N. Y.....	\$2,294,730.00
Embarkation.....	Camp Mills, Mineola, Long Island, N. Y.....	110,400.00
General:		
General Hospital No. 1.....	Williams Bridge, N. Y.....	377,948.76
General Hospital No. 2.....	Fort McHenry, Baltimore, Md.....	1,279,013.28
General Hospital No. 3.....	Colonia (Rahway), N. J.....	1,632,200.00
General Hospital No. 5.....	Fort Ontario, N. Y.....	195,699.89
General Hospital No. 6.....	Fort McPherson, Ga.....	23,469.00
General Hospital No. 7.....	Roland Park, Md.....	143,146.55
General Hospital No. 8.....	Otisville, N. Y.....	961,850.00
General Hospital No. 12.....	Billmore, N. C.....	800.00
General Hospital No. 14.....	Fort Oglethorpe, Ga.....	839.00
General Hospital No. 16.....	New Haven, Conn.....	321,475.40
General Hospital No. 17.....	Markleton, Pa.....	43,530.00
General Hospital No. 18.....	Waynesville, N. C.....	6,227.59
General Hospital No. 26.....	Fort Des Moines, Iowa.....	180,000.00
Letterman General Hospital.....	San Francisco, Cal.....	13,995.00
Walter Reed.....	Washington, D. C.....	956,489.70
Tuberculosis hospitals:		
General Hospital.....	Fort Bayard, N. Mex.....	256,617.00
General Hospital No. 19.....	Azalia, N. C.....	1,129,875.00
General Hospital No. 21.....	Denver, Colo.....	1,510,500.00
Camp Greenleaf.....	Fort Oglethorpe.....	16,168.00
		11,454,974.17

ORDNANCE.

Charleston depot.....	Charleston, S. C.....	\$15,455,000.00
Curtis Bay depot.....	Curtis Bay, Md.....	1,700,000.00
Lakehurst Proving Grounds.....	Lakehurst, N. J.....	10,350.00
Mobile Ordnance School.....	Kenosha, Wis.....	14,488.40
Pig Point depot.....	Pig Point, Va.....	729,833.00
Raritan River depot.....	Metuchen, N. J.....	1,309,090.00
Springfield Arsenal.....	Springfield, Mass.....	25,000.00
Springfield joint depot.....	do.....	95,595.00
Watertown Arsenal.....	Watertown, Mass.....	450.00
		19,339,716.40

Allotments from July 1, 1917, to June 30, 1918, inclusive—Continued.

QUARTERMASTER CORPS.

Name.	Location.	Amount.
ARMY SUPPLY BASES.		
Army supply base.....	Boston, Mass.....	\$10,030,000.00
Army supply base.....	Brooklyn, N. Y.....	5,022,950.00
Army supply base.....	Norfolk, Va.....	13,267,789.38
CAMPS.		
Johnston.....	Jacksonville, Fla.....	5,582,797.59
Meigs (Ordway).....	Washington, D. C.....	575,500.00
DEPOTS AND WAREHOUSES.		
Atlanta depot.....	Atlanta, Ga.....	48,620.65
Baltimore depot.....	Baltimore, Md.....	980,282.29
Boston temporary warehouse.....	Boston, Mass.....	75,400.00
Bush terminal.....	Brooklyn, N. Y.....	104,852.48
Permanent depot warehouse.....	Chicago, Ill.....	3,616,300.00
EXPEDITIONARY DEPOTS.		
Expeditionary depots.....	Baltimore, Md.....	513,781.00
Expeditionary depots.....	Hoboken, N. J.....	448,150.62
Expeditionary depots.....	Philadelphia, Pa.....	879,500.00
INTERIOR STORAGE DEPOTS.		
Quartermaster interior storage depot.....	Chicago, Ill.....	1,732,000.00
Quartermaster interior storage depot.....	Columbus, Ohio.....	1,948,000.00
Quartermaster interior storage depot.....	Jeffersonville, Ind.....	920,825.00
Quartermaster interior storage depot.....	New Cumberland, Pa.....	1,950,000.00
Quartermaster interior storage depot.....	Philadelphia, Pa.....	3,331,123.00
Quartermaster interior storage depot.....	Pittsburgh, Pa.....	597,220.45
Quartermaster interior storage depot.....	Schenectady, N. Y.....	1,700,000.00
Quartermaster interior storage depot.....	St. Louis, Mo.....	950,000.00
TERMINALS.		
Terminals.....	Newark Port, N. J.....	12,419,711.62
Total.....		66,694,804.44

REGULAR ARMY POSTS.

Alcatraz Pacific branch.....	Alcatraz Island, Cal.....	\$4,109.00
Brownsville.....	Texas.....	4,950.00
Benjamin Harrison, Fort.....	Indianapolis, Ind.....	1,891,489.43
Bliss, Fort.....	Texas.....	86,053.46
Clark, Fort.....	do.....	179,223.98
Columbus Barracks.....	Columbus, Ohio.....	11,000.00
Des Moines, Fort.....	Iowa.....	300.00
Douglas, Fort.....	Utah.....	421,220.49
Ethan Allen, Fort.....	Vermont.....	7,400.00
Gibbons, Fort.....	Alaska.....	25,000.00
Jefferson Barracks.....	St. Louis, Mo.....	317,098.39
Keogh, Fort.....	Montana.....	12,000.00
Leavenworth, Fort.....	Kansas.....	265,383.25
Logan, Fort.....	Colorado.....	2,000.00
Logan H. Roots.....	Arkansas.....	12,455.00
Madison Barracks.....	Sacketts Harbor, N. Y.....	38,927.99
McDowell, Fort.....	San Francisco, Cal.....	129,580.00
McIntosh, Fort.....	Texas.....	31,065.45
McPherson, Fort.....	Georgia.....	384,965.08
Myer, Fort.....	Virginia.....	46,885.00
Niagara, Fort.....	New York.....	28,165.50
Nogales, Fort.....	Arizona.....	28,679.93
Oglethorpe, Fort.....	Georgia.....	3,579,014.40
Ontario, Fort.....	Oswego, N. Y.....	78,250.00
Potomac Park.....	Washington, D. C.....	38,660.00
Presidio.....	San Francisco, Cal.....	109,250.03
Reno, Fort.....	Oklahoma.....	5,650.00
Riley, Fort.....	Kansas.....	711,535.92
Ruger, Fort.....	Hawaii Territory.....	100.80
Russell, Fort.....	Wyoming.....	417.95
Shafter, Fort.....	Hawaii Territory.....	321.75
Sam Houston, Fort.....	Texas.....	59,416.30
Sill, Fort.....	Oklahoma.....	57,250.88
Snelling, Fort.....	Minnesota.....	313,459.10
Thomas, Fort.....	Kentucky.....	43,086.00
Vancouver Barracks.....	Washington.....	94,611.42
Washington Barracks.....	Washington, D. C.....	38,997.64
Total.....		9,057,974.14

Allotments from July 1, 1917, to June 30, 1918, inclusive—Continued.

MISCELLANEOUS CONSTRUCTION.

Name.	Location.	Amount.
Alfred Vail, Camp.....	Little Silver, N. J.....	\$273,342.22
Alentown.....	Pennsylvania.....	155,595.88
American University.....	Washington, D. C.....	105,565.04
Ancon.....	Canal Zone.....	653.00
Bartlett, Camp.....	.....	2,057.17
Belleville.....	Illinois.....	4,905.00
Boston headquarters N. E. depot.....	Boston, Mass.....	195,595.00
Chicago race track.....	Chicago, Ill.....	49,317.00
Colt, Camp.....	Gettysburg, Pa.....	491,356.00
Del Rio, Camp.....	Texas.....	242,473.00
Douglas, Camp.....	Arizona.....	29,231.63
Eagle Pass.....	Texas.....	5,700.00
France, quartermaster depot.....	.....	3,900,000.00
France, quartermaster repair shop.....	.....	664,040.00
Galveston.....	Texas.....	2,021.55
Governors Island, quartermaster depot.....	.....	1,493,842.00
Las Casas, Camp.....	Porto Rico.....	1,039,186.35
Long Island City.....	.....	40,060.00
Lumber depot.....	Gilmerton, Va.....	500,000.00
Manhattan.....	New York.....	53,000.00
Marfa.....	Texas.....	5,447.22
Mobile Ordnance Station.....	.....	23,280.00
Newport News.....	.....	213,471.47
Newport News Ordnance School.....	.....	30,000.00
New York port of embarkation.....	.....	10,000.00
New York, 43 Broadway.....	.....	480,000.00
Norfolk Barracks.....	.....	100,000.00
Philadelphia, Schuylkill Arsenal.....	.....	70,290.00
Robinson, Camp.....	Sparta, Wis.....	309,500.00
San Francisco, quartermaster depot.....	.....	2,000.00
San Ysidro, Camp.....	California.....	2,700.00
Seattle Guard quarters.....	.....	1,500.00
Seattle.....	Washington.....	1,500.00
Sill, Fort.....	Oklahoma.....	871,872.70
Stanley, Camp.....	Leon Springs, Tex.....	1,291,752.30
Syracuse, Camp.....	Syracuse, N. Y.....	283,500.00
Washington depot.....	.....	4,943.19
Washington, D. C.....	.....	15,838.78
Do.....	Animal house.....	715.00
Do.....	Twenty-fourth and M Streets.....	20,599.00
Do.....	Ford Building.....	40,000.00
Do.....	Quartermaster depot.....	1,326,350.00
Do.....	Temporary office building.....	2,377,500.00
		15,674,940.56

* Credits or deductions.

APPENDIX D.

SECOND EDITION CONTRACT FOR EMERGENCY WORK.

CONSTRUCTION OF —

Contract made and concluded this — day of — 191—, by and between —, a corporation organized under the laws of the State of —, represented by —, its president, party of the first part (hereinafter called contractor), and the United States of America by — (hereinafter called contracting officer), acting by authority of the Secretary of War, party of the second part.

Whereas the Congress having declared by joint resolution approved April 6, 1917, that war exists between the United States of America and Germany, a national emergency exists and the United States urgently requires the immediate performance of the work hereinafter described, and it is necessary that said work shall be completed within the shortest possible time; and

Whereas it is advisable, under the disturbed conditions which exist in the contracting industry throughout the country, for the United States to depart from the usual procedure in the matter of letting contracts, and adopt means that will insure the most expeditious results; and

Whereas the contractor has had experience in the execution of similar work, has an organization suitable for the performance of such work, and is ready to undertake the same upon the terms and conditions herein provided:

Now, therefore, this contract witnesseth, That in consideration of the premises and of the payments to be made as hereinafter provided, the contractor hereby covenants and agrees to and with the contracting officer as follows:

ARTICLE I.

Extent of the work.—The contractor shall, in the shortest possible time, furnish the labor, material, tools, machinery, equipment, facilities, and supplies, and do all things necessary for the construction and completion of the following work

in accordance with the drawings and specifications to be furnished by the contracting officer, and subject in every detail to his supervision, direction, and instruction.

The contracting officer may, from time to time, by written instructions or drawings issued to the contractor, make changes in said drawings and specifications, issue additional instructions, require additional work, or direct the omission of work previously ordered, and the provisions of this contract shall apply to all such changes, modifications, and additions with the same effect as if they were embodied in the original drawings and specifications. The contractor shall comply with all such written instructions or drawings.

The title to all work completed or in course of construction shall be in the United States; and upon delivery at the site of the work, and upon inspection and acceptance in writing by the contracting officer, all machinery, equipment, hand tools, supplies, and materials, for which the contractor shall be entitled to be reimbursed under paragraph (a) of Article II hereof, shall become the property of the United States. These provisions as to title shall not operate to relieve the contractor from any duties imposed hereby or by the contracting officer.

ARTICLE II.

Cost of the work.—The contractor shall be reimbursed in the manner hereinafter described for such of its actual net expenditures in the performance of said work as may be approved or ratified by the contracting officer and as are included in the following items:

(a) All labor, material, machinery, hand tools not owned by the workmen, supplies, and equipment, necessary for either temporary or permanent use for

the benefit of said work; but this shall not be construed to cover machinery or equipment mentioned in section (c) of this article. The contractor shall make no departure from the standard rate of wages being paid in the locality where said work is being done, without the prior consent and approval of the contracting officer.

(b) All subcontracts made in accordance with the provisions of this agreement.

(c) Rental actually paid by the contractor, at rates not to exceed those mentioned in the schedule of rental rates hereto attached, for construction plant in sound and workable condition, such as pumps, derricks, concrete mixers, boilers, clamshell or other buckets, electric motors, electric drills, electric hammers, electric hoists, steam shovels, locomotive cranes, power saws, engineers' levels and transits, and such other equipment as may be necessary for the proper and economical prosecution of the work.

Rental to the contractor for such construction plant or parts thereof as it may own and furnish, at the rates mentioned in the schedule of rental rates hereto attached, except as hereinafter set forth. When such construction plant or any part thereof shall arrive at the site of the work, the contractor shall file with the contracting officer a schedule setting forth the fair valuation at that time of each part of such construction plant. Such valuation shall be deemed final, unless the contracting officer shall, within five days after the machinery has been set up and is working, modify or change such valuation, in which event the valuation so made by the contracting officer shall be deemed final. When and if the total rental paid to the contractor for any such part shall equal the valuation thereof, no further rental therefor shall be paid to the contractor and title thereto shall vest in the United States. At the completion of the work, the constructing officer may at his option purchase for the United States any part of such construction plant then owned by the contractor by paying to the contractor the difference between the valuation of such part or parts and the total rentals theretofore paid therefor.

Rates of rental as substitutes for such scheduled rental rates may be agreed upon in writing between the contractor and the contracting officer, such rates to be in conformity with rates of rental charged in the particular territory in which the work covered by this contract is to be performed. If the contracting officer shall furnish or supply any such equipment, the contractor shall not be allowed any rental therefor and shall receive no fee for the use of such equipment.

(d) Loading and unloading such construction plant, the transportation thereof to and from the place or places where it is to be used in connection with said work, subject to the provisions hereinafter set forth, the installation and dismantling thereof, and ordinary repairs and replacements during its use in the said work.

(e) Transportation and expenses to and from the work of the necessary field forces for the economical and successful prosecution of the work, procuring labor and expediting the production and transportation of material and equipment.

(f) Salaries of resident engineers, superintendents, timekeepers, foremen, and other employees at the field offices of the contractor in connection with the said work. In case the full time of any field employee of the contractor is not applied to said work but is divided between said work and other work, his salary shall be included in this item only in proportion to the actual time applied to this work.

(g) Buildings and equipment required for necessary field offices, commissary, and hospital and the cost of maintaining and operating said offices, commissary, and hospital, including such minor expenses as telegrams, telephone service, expressage, postage, etc.

(h) Such bonds, fire, liability and other insurance as the contracting officer may approve or require; and such losses and expenses, not compensated by insurance or otherwise, as are found and certified by the contracting officer to have been actually sustained (including settlements made with the written consent and approval of the contracting officer) by the contractor in connection with said work, and to have clearly resulted from causes other than the fault or neglect of the contractor. Such losses and expenses shall not be included in the cost of the work for the purpose of determining the contractor's fee. The cost of reconstructing and replacing any of the work destroyed or damaged shall be included in the cost of the work for the purpose of reimburse-

ment to the contractor, but not for the purpose of determining the contractor's fee, except as hereinafter provided.

(4) Permit fees, deposits, royalties, and other similar items of expense incidental to the execution of this contract, and necessarily incurred. Expenditures under this item must be approved in advance by the contracting officer.

(j) Such proportion of the transportation, traveling, and hotel expenses of officers, engineers and other employees of the contractor as is actually incurred in connection with this work.

(k) Such other items as should in the opinion of the contracting officer be included in the cost of the work. When such an item is allowed by the contracting officer, it shall be specifically certified as being allowed under this paragraph.

The United States reserves the right to pay directly to common carriers any or all freight charges on material of all kinds, and machinery, furnished under this contract, and certified by the contracting officer as being for installation or for consumption in the course of the work hereunder; the contractor shall be reimbursed for such freight charges of this character as it shall pay and as shall be specifically certified by the contracting officer; but the contractor shall have no fee based on such expenditures. Freight charges paid by the contractor for transportation of construction equipment, construction plant, tools and supplies of every character, shall be treated as part of the cost of the work upon which the contractor's fee shall be based; provided that charges for transportation of such construction equipment, construction plant and tools over distances in excess of five hundred miles shall require the special approval of the contracting officer.

No salaries of the contractors' executive officers, no part of the expense incurred in conducting the contractor's main office, or regularly established branch office, and no overhead expenses of any kind, except as specifically listed above, shall be included in the cost of the work; nor shall any interest on capital employed or on borrowed money be included in the cost of the work.

The contractor shall take advantage to the extent of its ability of all discounts available, and when unable to take such advantage shall promptly notify the contracting officer of its inability and its reasons therefor.

All revenue from the operations of the commissary, hospital or other facilities, or from rebates, refunds, etc., shall be accounted for by the contractor and applied in reduction of the cost of the work.

ARTICLE III.

Determination of fee.—As full compensation for the services of the contractor, including profit and all general overhead expense, except as herein specifically provided, the contracting officer shall pay to the contractor in the manner hereinafter prescribed a fee to be determined at the time of completion of the work from the following schedule, except as hereinafter otherwise provided:

If the cost of the work is under \$100,000 a fee of ten per cent (10%) of such cost.

If the cost of the work is over \$100,000 and under \$125,000 a fee of \$10,000.

If the cost of the work is over \$125,000 and under \$250,000 a fee of eight per cent (8%) of such cost.

If the cost of the work is over \$250,000 and under \$266,666.67 a fee of \$20,000.

If the cost of the work is over \$266,666.67 and under \$500,000 a fee of seven and one-half per cent (7½%) of such cost.

If the cost of the work is over \$500,000 and under \$535,714.29 a fee of \$37,500.

If the cost of the work is over \$535,714.29 and under \$3,000,000 a fee of seven per cent (7%) of such cost.

If the cost of the work is over \$3,000,000 and under \$3,500,000 a fee of \$210,000.

If the cost of the work is over \$3,500,000 a fee of six per cent (6%) of such cost.

Provided, however, that the fee upon such part of the cost of the work as is represented by payments to subcontractors, under subdivision (b) above, shall in each of the above contingencies be five per cent (5%) and no more of the amount of such part of the cost.

The cost of materials purchased or furnished by the contracting officer for said work, exclusive of all freight charges thereon, shall be included in the

cost of the work for the purpose of reckoning such fee to the contractor, but for no other purpose.

The fee for reconstructing and replacing any of the work destroyed or damaged shall be such percentage of the cost thereof—not exceeding seven per cent (7%)—as the contracting officer may determine.

The total fee to the contractor hereunder shall in no event exceed the sum of \$250,000.00, anything in this agreement to the contrary notwithstanding.

ARTICLE IV.

Payments.—On or about the seventh day of each month the contracting officer and the contractor shall prepare a statement showing as completely as possible: (1) The cost of the work up to and including the last day of the previous month, (2) the cost of the materials furnished by the contracting officer up to and including such last day, and (3) an amount equal to three and one-half per cent ($3\frac{1}{2}\%$), except as herein otherwise provided, of the sum of (1) and (2) on account of the contractor's fee; and the contractor at such time shall deliver to the contracting officer original signed pay-rolls for labor, original invoices for materials purchased, and all other original papers not theretofore delivered supporting expenditures claimed by the contractor to be included in the cost of the work. If there be any item or items entering into such statement upon which the contractor and the contracting officer can not agree, the decision of the contracting officer as to such disputed item or items shall govern. The contracting officer shall then pay to the contractor on or about the ninth day of each month the cost of the work mentioned in (1) and the fee mentioned in (3) of such statement, less all previous payments. When the statement above mentioned includes any work of reconstructing and replacing work destroyed or damaged, the payment on account of the fee in (3) for such reconstruction and replacement work shall be computed at such rate, not exceeding three and one-half per cent ($3\frac{1}{2}\%$), as the contracting officer may determine. The statement so made and all payments made thereon shall be final and binding upon both parties hereto, except as provided in Article XIV hereof. The contracting officer may also make payments at more frequent intervals for the purpose of enabling the contractor to take advantage of discounts at intervals between the dates above mentioned or for other lawful purposes. Upon final completion of said work the contracting officer shall pay to the contractor the unpaid balance of the cost of the work and of the fee as determined under Articles II and III hereof.

ARTICLE V.

Inspection and audit.—The contracting officer shall at all times be afforded proper facilities for inspection of the work and shall at all times have access to the premises, to the work and material, and to all books, records, correspondence, instructions, plans, drawings, receipts, vouchers, and memoranda of every description of the contractor pertaining to said work; and the contractor shall preserve for a period of two years after its completion or cessation of work under this contract, all the books, records, and other papers just mentioned. Any duly authorized representative of the contractor shall be accorded the privilege of examining the books, records, and papers of the contracting officer relating to said work for the purpose of checking up and verifying the cost of said work. The system of accounting to be employed by the contractor shall be such as is satisfactory to the contracting officer.

If at any time the contracting officer shall find that bills for labor, material, or other bills legitimately incurred by the contractor hereunder, are not promptly paid by the contractor, the contracting officer may, in his discretion, refuse to make further payments to the contractor until all such obligations past due shall have been paid. Should the contractor neglect or refuse to pay such bills within five days after notice from the contracting officer so to do, then the contracting officer shall have the right to pay such bills directly, in which event such direct payments shall not be included in the cost of the work.

ARTICLE VI.

Special requirements.—The contractor hereby agrees that it will:

(a) Begin the work herein specified at the earliest time practicable, and diligently proceed so that such work may be completed at the earliest possible date.

(b) Promptly pay for all labor, material or other service rendered.

(c) Procure and thereafter maintain such insurance in such forms and in such amounts and for such periods of time as the contracting officer may approve or require.

(d) Procure all necessary permits and licenses, and obey and abide by all laws, regulations, ordinances, and other rules applying to such work, of the United States of America, of the State or Territory wherein such work is done, of any subdivision thereof, or of any duly constituted public authority.

(e) Unless this provision is waived by the contracting officer, insert in every contract made by it for the furnishing to it of services, materials, supplies, machinery and equipment, or the use thereof, for the purposes of the work hereunder, a provision that such contract is assignable to the United States; will make all such contracts in its own name, and will not bind or purport to bind the United States or the contracting officer thereunder.

(f) In every subcontract made in accordance with the provisions hereof, require the subcontractor to agree to comply fully with all the undertakings and obligations of the contractor herein, excepting such as do not apply to such subcontractor's work.

(g) At all times keep at the site of the work a duly appointed representative who shall receive and execute on the part of the contractor such notices, directions and instructions as the contracting officer may desire to give.

(h) At all times use its best efforts in all its acts hereunder to protect and subserve the interest of the contracting officer and the United States.

ARTICLE VII.

Right to terminate contract.—Should the contractor at any time refuse, neglect, or fail in any respect to prosecute the work with promptness and diligence, or default in the performance of any of the agreements herein contained, the contracting officer may, at his option, after five days' written notice to the contractor, terminate this contract, and may enter upon the premises and take possession, for the purpose of completing said work, of all materials, tools, equipment, and appliances, and all options, privileges, and rights, and may complete or employ any other person or persons to complete said work. In case of such termination of the contract the contracting officer shall pay to the contractor such amounts of money on account of the unpaid balance of the cost of the work and of the fee as will result in fully reimbursing the contractor for the cost of the work up to the time of such termination, plus a fee computed thereon at the rate or rates for monthly payments set forth in Article IV hereof; and the contracting officer shall also pay to the contractor compensation, either by purpose or rental, at the election of the contracting officer, for any equipment retained; such compensation, in the event of rental, to be in accordance with paragraph (c) of Article II, and in the event of purchase to be based upon the valuation determined by the contracting officer as of the time of his taking such possession. The contractor hereby agrees that such payments when made shall constitute full settlement of all claims of the contractor against the contracting officer and the United States or either of them for money claimed to be due to the contractor for any reason whatsoever. In case of such termination of the contract the contracting officer shall further assume and become liable for all such obligations, commitments, and unliquidated claims as the contractor may have theretofore in good faith undertaken or incurred in connection with said work, and the contractor shall, as a condition of receiving the payments mentioned in this article, execute and deliver all such papers, and take all such steps as the contracting officer may require for the purpose of fully vesting in him the rights and benefits of the contractor under such obligations or commitments. When the contracting officer shall have performed the duties incumbent upon him under the provisions of this article, the contracting officer shall thereafter be entirely released and discharged of and from any and all demands, actions, or claims of any kind on the part of the contractor hereunder or on account hereof.

ARTICLE VIII.

Abandonment of work by contracting officer.—If conditions should arise which in the opinion of the contracting officer make it advisable or necessary to cease work under this contract, the contracting officer make it advisable or necessary to cease work under this contract, the contracting officer may abandon

the work and terminate this contract. In such case the contracting officer shall assume and become liable for all such obligations, commitments, and unliquidated claims as the contractor may have theretofore, in good faith, undertaken or incurred in connection with said work; and the contractor shall, as a condition of receiving the payments mentioned in this article, execute and deliver all such papers, and take all such steps as the contracting officer may require for the purpose of fully vesting in him the rights and benefits of the contractor under such obligations or commitments. The contracting officer shall pay to the contractor such an amount of money on account of the unpaid balance of the cost of the work and of the fee, as will result in the contractor receiving full reimbursement for the cost of the work up to the time of such abandonment, plus a fee to be computed in the following manner: To the cost of the work up to the time of such abandonment shall be added the amount of the contractual obligations or commitments assumed by the contracting officer, and such total shall be treated as the cost of the work, upon which the fee shall be computed in accordance with the provisions of Article III hereof. When the contracting officer shall have performed the duties incumbent upon him under the provisions of this article, the contracting officer and the United States shall thereafter be entirely released and discharged of and from any and all demands, actions or claims of any kind on the part of the contractor hereunder or on account hereof.

ARTICLE IX.

Bond.—The contractor shall prior to commencing the said work furnish a bond, with sureties satisfactory to the contracting officer, in the sum of dollars, conditioned upon its full and faithful performance of all the terms, conditions and provisions of this contract, and upon its prompt payment of all bills for labor, material, or other service furnished to the contractor.

ARTICLE X.

Convict labor.—No person or persons shall be employed in the performance of this contract who are undergoing sentence of imprisonment at hard labor imposed by the courts of any of the several States, Territories, or municipalities having criminal jurisdiction.

ARTICLE XI.

Hours and conditions of labor.—No laborer or mechanic doing any part of the work contemplated by this contract, in the employ of the contractor or any subcontractor contracting for any part of said work contemplated, shall be required or permitted to work more than eight (8) hours in any one calendar day upon such work, such prohibition being in accordance with the act approved June 19, 1912, limiting the hours of daily service of mechanics and laborers on work under contracts to which the United States is a party. For each violation of the requirements of this article a penalty of five dollars (\$5.00) shall be imposed upon the contractor for each laborer or mechanic for every calendar day in which said employee is required or permitted to labor more than eight (8) hours upon said work, and all penalties thus imposed shall be withheld for the use and benefit of the United States; Provided, that this paragraph shall not be enforced nor shall any penalty be exacted in case such violation shall occur while there is in effect any valid Executive order suspending the provisions of said act approved June 19, 1912, or waiving the provisions and stipulations thereof with respect to either this contract or any class of contracts in which this contract shall be included, or when the violation shall be due to any extraordinary events or conditions of manufacture, or to any emergency caused by fire, famine, or flood, by danger to life or property, or by other extraordinary events or conditions on account of which, by subsequent Executive order, such past violation shall have been excused.

In the event of any dispute with reference to wages, hours, or other conditions appertaining to said work, between the contractor or any subcontractor and labor employed by him on said work, the contractor or subcontractor shall immediately notify the contracting officer of the existence of such dispute and the reasons therefor. The contracting officer may, at his option, in-

struct the contractor or subcontractor involved in such dispute as to the method or steps which the contractor or subcontractor should follow with reference thereto, and the contractor or subcontractor shall thereupon comply with such instructions.

ARTICLE XII.

Right to transfer or sublet.—Neither this contract, nor any interest therein, shall be assigned or transferred. The contractor shall not enter into any subcontract for any part of the work herein specified without the consent and approval in writing of the contracting officer. In case of such assignment, transfer, or subletting without the consent and approval, in writing, of the contracting officer, the contracting officer may refuse to carry out this contract either with the transferor or transferee, but all rights of action for any breach of this contract by the contractor are reserved to the United States.

ARTICLE XIII.

No participation in profits by Government officials.—No Member of, or Delegate to, Congress, or Resident Commissioner, nor any other person belonging to or employed in the military service of the United States, is or shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom, but this article shall not apply to this contract so far as it may be within the operation or exception of section 116 of the act of Congress approved March 4, 1909 (35 Stats., 1109).

ARTICLE XIV.

Settlement of disputes.—This contract shall be interpreted as a whole and the intent of the whole instrument, rather than the interpretation of any special clause, shall govern. If any doubts or disputes shall arise as to the meaning or interpretation of anything in this contract, or if the contractor shall consider himself prejudiced by any decision of the contracting officer made under the provisions of Article IV hereof, the matter shall be referred to the officer in charge of cantonment construction for determination. If, however, the contractor shall feel aggrieved by the decision of the officer in charge of cantonment construction, it shall have the right to submit the same to the Secretary of War, whose decision shall be final and binding upon both parties hereto.

ARTICLE XV.

This contract shall bind and insure to the contractor and its successors. It is understood and agreed that wherever the words "contracting officer" are used herein, the same shall be construed to include his successor in office, any other person to whom the duties of the contracting officer may be assigned by the Secretary of War, and any duly appointed representative of the contracting officer.

Witness the hands of the parties hereto the day and year first above written, all in triplicate.

Witnesses:

President.

(2)-----} P
 (1)-----}

Witnesses:

UNITED STATES OF AMERICA,

(2)-----} By
 (1)-----}

Contracting Officer.

SCHEDULE OF RENTAL RATES.

(The rates mentioned are per day.)

Automobiles-----	\$5.00
Adding and listing machines-----	.20
Buckets, tippie and bottom dump-----	.25
Boring machine, pneumatic-----	.50
Boring machine, electric-----	.50
Buckets, orangepeel, 1 yard-----	3.50

Buckets, orangepeel, less than 1 yard	\$2.00
Bucket, clamshell	2.00
Boiler, and 3-drum engine	3.50
Boiler, and 2-drum engine	3.00
Boiler, and 1-drum engine	2.50
Boiler only, 30 horsepower and smaller	1.50
Boiler only, larger than 30 horsepower	2.00
Block machine, concrete	1.50
Cars, skip, 1½ yards	.25
Cars, skip, 3 yards	.50
Cars, steel, 1 yard and smaller	.15
Cars, 4 yards, wooden	.25
Cars, 6 yards, wooden	.75
Cars, 12 yards, wooden	2.00
Cars, 1 hopper, radial gate	.25
Crushers only	2.00
Crushers, with elevator and screen	3.00
Conveyor, gravity, per 100 feet	1.00
Compressor, 10 by 10, with steam engine	2.50
Compressor, 8 by 8, belt driven	1.00
Compressor, with gasoline engine on wheels	5.00
Compressor, Westinghouse, 9½-inch	1.00
Cableways, without engine	4.00
Drill, auto traction	5.00
Dump wagons	.25
Diving outfit with pumps	10.00
Derricks, 60 feet to 85 feet	2.00
Derricks, 30 feet to 59 feet	1.50
Derricks, less than 30 feet	1.00
Derricks, breast	.25
Derricks, circle swing	.25
Elevators, platform or bucket	.25
Elevators, with bins for concrete	.50
Engines, skeleton, 3-drum	2.00
Engines, skeleton, 2-drum	1.50
Engines, skeleton, 1-drum	1.00
Engines, steam, horizontal, 11 to 40 horsepower	1.50
Engines, steam, upright, to 10 horsepower	.50
Engines, gasoline, to 8 horsepower	.50
Engines, 2-drum, with electric motor	4.00
Engines, gasoline, 10 horsepower	1.00
Engines, derrick, swinging	.50
Hammers, riveting	.25
Hod elevator machine	1.00
Levelling instruments, engineers'	.25
Locomotive, 36-inch gauge	5.00
Locomotive, standard gauge	10.00
Mixers, with boiler, side loader	4.00
Mixers, with electric motors, 1 yard	4.00
Mixers, without boiler, less than 1 yard	2.00
Mixers, without boiler, 1 yard and larger	3.50
Mixers, with gasoline engine	3.00
Motor cycles	1.00
Motors, 2 horsepower	.15
Motors, 5 horsepower	.25
Motors, 10 horsepower	1.50
Motors, 25 horsepower	1.00
Motors, 50 horsepower	2.00
Pumps, centrifugal, 10-inch, belt driven	3.00
Pumps, centrifugal, 10-inch, with motor attached	4.00
Pumps, centrifugal, 8-inch, steam connected	2.00
Pumps, centrifugal, 6-inch, steam connected	1.50
Pumps, centrifugal, 4-inch, steam connected	1.00
Pumps, duplex and triplex, to 3-inch	.50
Pumps, pulsometer, to 4-inch	1.55
Pumps, diaphragm	1.20
Pumps, diaphragm, with gas engine	1.05
Pumps, triplex, with belt drive	1.20
Pile drivers, drop	1.50
Pile drivers, drop, with single-drum engine and boiler	3.50
Pile hammers, steam, up to 2,500 pounds	3.00
Pile hammers, steam, larger than 2,500 pounds	5.00
Roll, per ton	.08
Roller, horse	1.00
Steam drills	1.00
Small air drills	.50
Steam roller	8.00
Steam shovel	30.00
Sprinkling cart	1.00
Saw benches	.25
Saw benches, with motor or gasoline engine	.50
Scale boxes	.25
Scraper, wheel	.50
Transits	.50
Typewriter	10

Fuel and lubricants not included in these prices.

Subcontracts.—Subcontracts were made on the same form as the principal contracts, and were subject to the same terms with regard to rates of profit, but in connection with the original cantonments and camps did not include a limitation in maximum profit which could be earned. On all later contracts, however, the maximum profit was limited in subcontracts, as well as in the main contracts.

Revision of contract form.—The general form of the contract has remained as originally drawn. Changes have been made, however, in two important features: The schedule of the profits allowed has been changed so as to provide a maximum of 7 per cent, gradually reducing in accordance with the table which follows, and the schedule of machinery rentals has been altered somewhat and made less specific, in this way giving an opportunity for adjustment of these rentals to the particular situation. This was made necessary because of the great variation in character of projects now under construction. The schedule of rentals in the latter form of contract is as follows:

Determination of fee.—As full compensation for the services of the contractor, including profit and all general overhead expense, except as herein specifically provided, the contracting officer shall pay to the contractor in the manner hereinafter prescribed a fee to be determined at the time of completion of the work from the following schedule, except as hereinafter otherwise provided:

If the cost of the work is \$100,000 or under, a fee of 7 per cent of such cost.

If the cost of the work is over \$100,000 and under \$125,000, a fee of \$7,000.

If the cost of the work is over \$125,000 and under \$450,000, a fee of 6½ per cent.

If the cost of the work is over \$450,000 and under \$500,000, a fee of \$29,250.

If the cost of the work is over \$500,000 and under \$1,000,000, a fee of 6 per cent.

If the cost of the work is over \$1,000,000 and under \$1,100,000, a fee of \$60,000.

If the cost of the work is over \$1,100,000 and under \$1,500,000, a fee of 5½ per cent.

If the cost of the work is over \$1,500,000 and under \$1,650,000 a fee of \$82,500.

If the cost of the work is over \$1,650,000 and under \$2,200,000, a fee of 5 per cent.

If the cost of the work is over \$2,200,000 and under \$2,450,000, a fee of \$110,000.

If the cost of the work is over \$2,450,000 and under \$2,850,000, a fee of 4½ per cent.

If the cost of the work is over \$2,850,000 and under \$3,250,000, a fee of \$128,250.

If the cost of the work is over \$3,250,000 and under \$4,000,000, a fee of 4 per cent.

If the cost of the work is over \$4,000,000 and under \$4,250,000, a fee of \$160,000.

If the cost of the work is over \$4,250,000 and under \$4,775,000, a fee of 3½ per cent.

If the cost of the work is over \$4,775,000 and under \$5,175,000, a fee of \$179,062.50.

If the cost of the work is over \$5,175,000 and under \$5,725,000, a fee of 3½ per cent.

If the cost of the work is over \$5,725,000 and under \$6,225,000, a fee of \$200,375.

If the cost of the work is over \$6,225,000 and under \$6,825,000, a fee of 3½ per cent.

If the cost of the work is over \$6,825,000 and under \$7,400,000, a fee of \$221,812.50.

If the cost of the work is over \$7,400,000 and under \$7,750,000, a fee of 3 per cent.

If the cost of the work is over \$7,750,000 and under \$8,350,000, a fee of \$235,000.

If the cost of the work is over \$8,350,000 and under \$8,800,000, a fee of 2½ per cent.

If the cost of the work is over \$8,800,000 and under \$9,650,000, a fee of \$242,000.

If the cost of the work is over \$9,650,000 and under \$10,000,000, a fee of 2½ per cent.

If the cost of the work is over \$10,000,000, a fee of \$250,000.

Provided, however, That the fee upon such part of the cost of the work as is represented by payments to subcontractors, under subdivision (b) of Article II hereof, shall in each of the above contingencies be two and one-half per cent ($2\frac{1}{2}$ per cent) and no more of the amount of such part of the cost.

The cost of materials purchased or furnished by the contracting officer for said work, exclusive of all freight charges thereon, shall be included in the cost of the work for the purpose of reckoning such fee to the contractor, but for no other purpose.

The fee for reconstructing and replacing any of the work destroyed or damaged shall be such percentage of the cost thereof—not exceeding seven per cent (7 per cent)—as the contracting officer may determine.

The total fee to the contractor hereunder shall in no event exceed the sum of _____, anything in this agreement to the contrary notwithstanding.

APPENDIX E.

CONTRACTORS AND CONSTRUCTING QUARTERMASTERS—SUPERVISING ENGINEERS, TOWN PLANNERS, AND AUDITORS.

LIST OF CONTRACTORS AND CONSTRUCTING QUARTERMASTERS.

The contractors who built the several Army camps, and the constructing quartermasters in charge of the work in behalf of the Government, were as follows:

NATIONAL ARMY CANTONMENTS.

Seventy-sixth Division.—Camp Devens, Ayer, Mass. Contractor, Fred T. Ley & Co., Springfield, Mass. Constructing quartermaster, Capt. Edward Canfield, jr.

Seventy-seventh Division.—Camp Upton, Yaphank, N. Y. Contractor, Thompson Starrett Co., New York City. Constructing quartermaster, Maj. O'Kelly Myers.

Seventy-eighth Division.—Camp Dix, Wrightstown, N. J. Contractor, Irwin & Leighton, Philadelphia, Pa. Constructing quartermaster, Maj. Harry O. Williams, Capt. T. H. Skinner, Q. M. R. C.

Seventy-ninth Division.—Camp Meade, Annapolis Junction, Md. Contractor, Smith, Hauser & MacIsaacs, New York City. Constructing quartermaster, Maj. Ralph F. Proctor.

Eightieth Division.—Camp Lee, Petersburg, Va. Contractor, Rhinehardt & Dennis, Charlottesville, Va. Constructing quartermasters, Maj. F. B. Edwards, Maj. E. K. Coe, and Maj. E. H. Abadie.

Eighty-first Division.—Camp Jackson, Columbia, S. C. Contractor, Hardaway Constructing Co., Columbus, Ga. Constructing quartermaster, Maj. William Couper.

Eighty-second Division.—Camp Gordon, Atlanta, Ga. Contractor, Arthur Tufts Co., Atlanta, Ga. Constructing quartermaster, Maj. James N. Pease.

Eighty-third Division.—Camp Sherman, Chillicothe, Ohio. Contractor, The A. Bentley Co., Toledo, Ohio. Constructing quartermaster, Capt. Ward Dabney, Capt. Theodore E. Rhoades, Eng. R. C.

Eighty-fourth Division.—Camp Taylor, Louisville, Ky. Contractor, Mason & Hanger, Richmond, Ky. Constructing quartermaster, Maj. F. E. Lamphere.

Eighty-fifth Division.—Camp Custer, Battle Creek, Mich. Contractor, Porter Bros., Detroit, Mich. Constructing quartermaster, Maj. Earl B. Morden.

Eighty-sixth Division.—Camp Grant, Rockford, Ill. Contractor, Bates Rogers Construction Co., Chicago, Ill. Constructing quartermaster, Maj. D. H. Sawyer.

Eighty-seventh Division.—Camp Pike, Little Rock, Ark. Contractor, James Stewart & Co., New York City. Constructing quartermaster, Maj. John R. Fordyce.

Eighty-eighth Division.—Camp Dodge, Des Moines, Iowa. Contractor, Charles Weitz & Sons, Des Moines, Iowa. Constructing quartermaster, Col. M. A. Butler.

Eighty-ninth Division.—Camp Funston, Fort Riley, Kans. Contractor, George A. Fuller Co., New York City. Constructing quartermaster, Capt. F. J. Herman.

Nineteenth Division.—Camp Travis, Fort Sam Houston, San Antonio, Tex. Contractor, Stone & Webster Corporation, Boston, Mass. Constructing quartermaster, Capt. G. E. Thorne.

Ninety-first Division.—Camp Lewis, American Lake, Wash. Contractor, Hurley Mason Co., Tacoma, Wash. Constructing quartermaster, Capt. D. L. Stone.

NATIONAL GUARD MOBILIZATION CAMPS.

Twenty-sixth Division.—Camp Greene, Charlotte, N. C. Contractor, Consolidated Engineering Co., Baltimore, Md. Constructing quartermaster, Maj. C. H. Green.

Twenty-seventh Division.—Camp Wadsworth, Spartanburg, S. C. Contractor, Fiske-Carter Construction Co., Greenville, S. C. Constructing quartermaster, Lieut. Col. J. D. Kilpatrick.

Twenty-eighth Division.—Camp Hancock, Augusta, Ga. Contractor, T. O. Brown Co., Augusta, Ga. Constructing quartermaster, Maj. Gratz B. Strickler.

Twenty-ninth Division.—Camp McClellan, Anniston, Ala. Contractor, John O. Chisolm & Co., New Orleans, La. Constructing quartermaster, Col. L. C. Dulin.

Thirtieth Division.—Camp Sevier, Greenville, S. C. Contractor, Gallivan Building Co., Greenville, S. C. Constructing quartermaster, Maj. A. G. Doyle.

Thirty-first Division.—Camp Wheeler, Macon, Ga. Contractor, W. Z. Williams, Macon, Ga. Constructing quartermaster, Lieut. Col. Walter L. Henwood.

Thirty-second Division.—Camp MacArthur, Waco, Tex. Contractor, Fred A. Jones Construction Co., Dallas, Tex. Constructing quartermaster, Maj. Matthew Hanson.

Thirty-third Division.—Camp Logan, Houston, Tex. Contractor, American Construction Co., Houston, Tex. Constructing quartermaster, Capt. W. P. Rothrock.

Thirty-fourth Division.—Camp Cody, Deming, N. Mex. Contractor, J. W. Thompson Co., St. Louis, Mo. Constructing quartermaster, Maj. Charles H. Miller.

Thirty-fifth Division.—Camp Doniphan, Fort Sill, Okla. Contractor, Selden Breck Construction Co., St. Louis, Mo. Constructing quartermaster, Lieut. Col. George D. Guyer.

Thirty-sixth Division.—Camp Bowle, Fort Worth, Tex. Contractor, J. W. Thompson, Dallas, Tex. Constructing quartermasters, Maj. T. J. Van Zuben and Lieut. Col. H. S. Baker.

Thirty-seventh Division.—Camp Sheridan, Montgomery, Ala. Contractor, Algernon Blair, Montgomery, Ala. Constructing quartermaster, Maj. A. W. Reynolds.

Thirty-eighth Division.—Camp Shelby, Hattiesburg, Miss. Contractor, T. S. Moody & Co., Chattanooga, Tenn. Constructing quartermaster, Lieut. Col. W. J. Howard.

Thirty-ninth Division.—Camp Beauregard, Alexandria, La. Contractor, Stewart McGehee Construction Co., Little Rock, Ark. Constructing quartermaster, Maj. A. M. Shaw.

Fortieth Division.—Camp Kearney, Linda Vista, Cal. Contractor, W. E. Hampton Co., Los Angeles, Cal. Constructing quartermasters, First Lieut. Charles Rogers and Maj. C. H. Nichols.

Forty-first Division.—Camp Fremont, Palo Alto, Cal. Contractor, The Lindgren Co., San Francisco, Cal. Constructing quartermasters, Lieut. Col. W. G. Fleischauer and Maj. J. B. Chaffey.

Names of contractors and date camp sites were approved, contracts executed, and work started.

Location.	Name of camp.	Name of contractor.	Address.	Date camp sites were approved.	Date contracts were executed.	Date work was started.
National Army camps:						
American Lake, Wash.	Camp Lewis	Hurley, Mason & Co.	Tacoma, Wash.	May 31	June 15	June 14
Annapolis Junction, Md.	Camp Meade	Smith, Hauser & McIsaac	New York City	June 23	June 23	July 2
Atlanta, Ga.	Camp Gordon	Arthur Tufts Co.	Atlanta, Ga.	June 2	June 21	June 18
Ayer, Mass.	Camp Devens	F. T. Ley & Co.	Springfield, Mass.	May 31	June 11	June 13
Battle Creek, Mich.	Camp Custer	Porter Bros.	Detroit, Mich.	June 11	June 19	June 19
Chillicothe, Ohio	Camp Sherman	A. Bentley Sons Co.	Toledo, Ohio	June 21	June 21	July 6
Columbia, S. C.	Camp Jackson	Hardaway Construction Co.	Columbus, Ga.	June 2	June 11	June 15
Des Moines, Iowa.	Camp Dodge	Charles Weitzs Sons.	Des Moines, Iowa.	June 27	June 22	June 19
Fort Riley, Kans.	Camp Funston	George A. Fuller Co.	New York City	June 13	June 20	June 28
Fort Sam Houston, Tex.	Camp Travis	Stone & Webster	Boston, Mass.	June 11	do	June 14
Little Rock, Ark.	Camp Pike	James Stewart & Co.	New York City	do	June 23	June 17
Louisville, Ky.	Camp Taylor	Mason & Hanger	Richmond, Ky.	do	June 20	June 22
Petersburg, Va.	Camp Lee	Rhinehart & Dennis Co. (Inc.)	Charlottesville, Va.	June 8	June 18	June 20
Rockford, Ill.	Camp Grant	Bates & Rogers Construction Co.	Chicago, Ill.	June 21	June 21	June 24
Wrightstown, N. J.	Camp Dix	Irwin & Leighton Co.	Philadelphia, Pa.	June 2	June 14	June 12
Yaphank, L. I.	Camp Upton	Thompson-Starrett Co.	New York, N. Y.	June 18	June 23	June 21
National Guard camps:						
Alexandria, La.	Camp Beauregard	Stewart-McGhee Construction Co.	Little Rock, Ark.	July 12	July 17	July 23
Anniston, Ala.	Camp McClellan	J. O. Chisholm & Co.	New Orleans, La.	June 21	June 18	July 20
Augusta, Ga.	Camp Hancock	T. P. Brown & Son	Augusta, Ga.	do	July 18	July 19
Charlotte, N. C.	Camp Greene	Consolidated Engineering Co.	Baltimore, Md.	July 12	do	July 20
Deming, N. Mex.	Camp Cody	J. W. Thompson	St. Louis, Mo.	June 11	do	Do.
Fort Sill, Okla.	Camp Doniphan	Seldon-Brack Construction Co.	do	do	July 17	July 25
Fort Worth, Tex.	Camp Bowie	J. W. Thompson	St. Louis, Mo.	do	July 18	July 24
Greenville, S. C.	Camp Sevier	Gallivan Building Co.	Greenville, S. C.	June 21	do	July 16
Hattiesburg, Miss.	Camp Shelby	T. S. Moudy & Co.	Chattanooga, Tenn.	July 12	do	July 21
Houston, Tex.	Camp Logan	American Construction Co.	Houston, Tex.	June 11	do	July 24
Linda Vista, Cal.	Camp Kearney	W. E. Hampton & Co.	Los Angeles, Cal.	May 24	July 17	July 23
Macon, Ga.	Camp Wheeler	W. Z. Williams Co.	Macon, Ga.	June 21	July 18	July 18
Montgomery, A. a.	Camp Sheridan	A. Blair	Montgomery, Ala.	do	do	July 20
Palo Alto, Cal.	Camp Fremont	Lindgren & Co.	San Francisco, Cal.	June 30	July 26	July 24
Spartanburg, S. C.	Camp Wadsworth	Fisk, Carter Construction Co.	Greenville, S. C.	June 21	July 17	July 19
Waco, Tex.	Camp MacArthur	Fred. A. Jones Construction Co.	Dallas, Tex.	June 11	do	July 20
Embarkation camps:						
Newport News, Va.	Camp Stuart	Westinghouse, Church, Kerr & Co.	New York, N. Y.	Aug. 3	Aug. 16	do
Tenafly, N. J.	Camp Merritt	McArthur Bros.	do	Aug. 1	Aug. 1	Aug. 18
Quartermaster training camp:						
Black Point, Jacksonville, Fla.		A. Bentley Sons & Co.	Toledo, Ohio		Sept. 25	Oct. 1
Miscellaneous points:						
Repair shop units, Camp Ordway, Washington, D. C.		P. F. Gormley & Co.	Washington, D. C.		Sept. 24	Sept. 27

NOTE.—Camp Fremont temporarily abandoned when construction work was 70 per cent completed.

SUPERVISING ENGINEERS AND TOWN PLANNERS—THEIR DUTIES, AUTHORITY, AND COMPENSATION.

At the outset it should be made plain that the jurisdiction of the engineers at the cantonments was somewhat more restricted than would be thought at first glance. Typical arrangements had already been designed in Washington, and further typical plans as needed came from the same source. The contractors on the ground carried an engineering organization of their own. They were handicapped by not knowing what had been done and what was wanted at Washington, and they were seriously in the dark in regard to the availability of commandeered materials and of the nonavailability of materials as they knew of them prior to the war.

The committee on engineering reported that engineering work at the cantonments might be done in one of three methods, as follows:

1. By utilizing existing engineering organizations with competent staffs capable of ready expansion, through which all the engineering services required at the cantonment would be rendered. The head of this organization would become supervising engineer, or superintendent of construction, acting under the general direction of the constructing quartermaster resident on the work.

2. By the organization of the entire local engineering force de novo from top to bottom under the immediate supervision rather than direction of the constructing quartermaster resident on the work. The engineers thus drawn to the aid of the constructing quartermaster would then be compensated on a salary basis, in some cases as Reserve Corps officers.

3. By a combination of methods 1 and 2; that is, by the organization of a local engineering force under the direction of the constructing quartermaster supplemented by the utilization of existing engineering organizations in special branches of the work, such as waterworks, sewerage, site, and city planning, etc.

The committee recommended that the first of these plans was best and cheapest on the basis that it would save time for organization, promote increased efficiency, and allow existing engineering organizations to be strengthened rather than impaired—to the present and future advantage of the country. Under this plan it was proposed to pay the engineering organization the actual cost of its assistants, with traveling and other expenses, plus a percentage on the entire cost of a cantonment of three-quarters of 1 per cent. It is understood that two or three engineering contracts of this type were executed, but with a lump sum maximum fee stipulated as, perhaps, from \$30,000 to \$40,000, as in June it was thought that the cantonments would not cost more than about \$5,000,000 each.

The third method; that is, the constructing quartermaster building up his own staff from engineers of the Reserve Corps and other civilian engineers, reinforced by an experienced waterworks engineer, was the one which was apparently most popular. The engineers who looked after waterworks and sewerage matters received for their own services and the disturbances which this Government work produced in their private offices fees of about \$7,500 or perhaps 1½ per cent, or a little more, of the then estimated cost of such construction work. In some instances engineers supervised not only waterworks, sewers, and sewage disposal, but did a good deal of surveying work, laying out of roads, and the like. Some of the fees approached \$15,000, and hence represented an intermediate class between those described under methods 1 and 3. In a majority of cases the engineers did considerably more work than their contracts called for.

The fees paid to supervising engineers for their services at the National Guard camps ranged from \$2,500 to \$4,000. No town planner was assigned for the National Guard camps. The general layout plan formulated in the Washington office was adapted to the topography by the supervising engineer.

The committee at Washington fully realized the importance of having experienced practical construction men on this work, and recommended that salaries be paid according to a schedule, as follows:

	Per month.
Principal assistant engineers, up to.....	\$850
Assistant engineers and designers, up to.....	250
Instrument men and draftsmen, up to.....	175
Junior draftsmen and secretarial assistants, up to.....	125
Assistants, up to.....	90

SUPERVISING ENGINEERS AND TOWN PLANNERS.

Within the past few years much has been heard of correct town planning. It is interesting to note that the planners were given ample opportunity to offer practical advice in securing preliminary information as to the best way of adapting the various portions of the cantonments to the widely varying topographical conditions found at the different sites. The town planners also were retained to advise on the permanent camp layouts.

The personnel of the supervising engineers and town planners is given in Table 6.

TABLE 6.—List of supervising engineers and planners.

Camp.	Supervising engineers.	Town planners.
National Army camps:		
Devens.....	Frank A. Barbour.....	H. J. Kellaway.
Upton.....	Walter E. Spear, Frank Sutton, Walter S. Timmis.	Charles D. Leavitt, jr.
Dix.....	Allen Hazen, John D. Kilpatrick.....	Owen Brainard.
Meade.....	Morris Knowles.....	James L. Greenleaf.
Lee.....	H. R. Messer, Allen J. Saville.....	Richard Schermerhorn, jr.
Jackson.....	P. H. Norcross.....	A. F. Brinckerhoff, Charles N. Lowrie.
Gordon.....	James N. Hazlehurst, Robert E. Barnwell.....	George E. Kessler, L. V. Sheridan.
Pike.....	E. B. Black.....	Warren H. Manning.
Sherman.....	R. Winthrop Pratt, William H. Dittoe, J. W. Ellms, Clarence Hoover.	Harlan P. Kelsey.
Taylor.....	James B. Wilson.....	Thomas W. Sears.
Custer.....	Samuel A. Greeley, Neiler, Rich & Co.....	E. H. Bennett.
Grant.....	John W. Alvord.....	Robert Wheelwright.
Dodge.....	Louis P. Wolff, A. D. Leach, Max Toltz.....	J. S. Pray, S. Herbert Hare.
Funston.....	Wynkoop Kiersted.....	George E. Kessler, E. N. Noyes.
Travis.....	.....	C. F. Pilat.
Lewis.....	William J. Roberts.....	
National Guard camps:		
Greene.....	J. L. Ludlow.....	
Wadsworth.....	J. E. Sirrime.....	
Hancock.....	Nesbit Wingfield.....	
McClellan.....	Morris Knowles.....	
Sevier.....	J. E. Sirrime.....	
Wheeler.....	G. R. Solomon.....	
MacArthur.....	J. B. Hawley.....	
Logan.....	E. E. Sands.....	
Cody.....	Black and Veatch.....	
Doniphan.....	do.....	
Bowie.....	F. J. Van Zuben.....	
Sheridan.....	G. G. Earle, Geo. F. Porter.....	
Shelby.....	Twombly and Hemphill.....	
Beauregard.....	W. R. Goss.....	
Kearney.....	Louis C. Hill.....	
Fremont.....	G. A. M. Elliott.....	

AUDITING AND CHECKING PROCEDURE FOR CONTROL OF DISBURSEMENTS.

To protect the Government in the expenditure of the vast sums involved, in such a short period of time, it was considered necessary to establish at each camp a Government field auditor, and operating under him an organization charged with the responsibility of approving all bills for material, labor, and expenses, before a Government check was issued to the contractors.

All materials received on the grounds were checked as to quality by the Government checkers and inspectors. The invoices for such materials were compared with the original orders, as approved by constructing quartermasters, and a verification was made of prices and extensions.

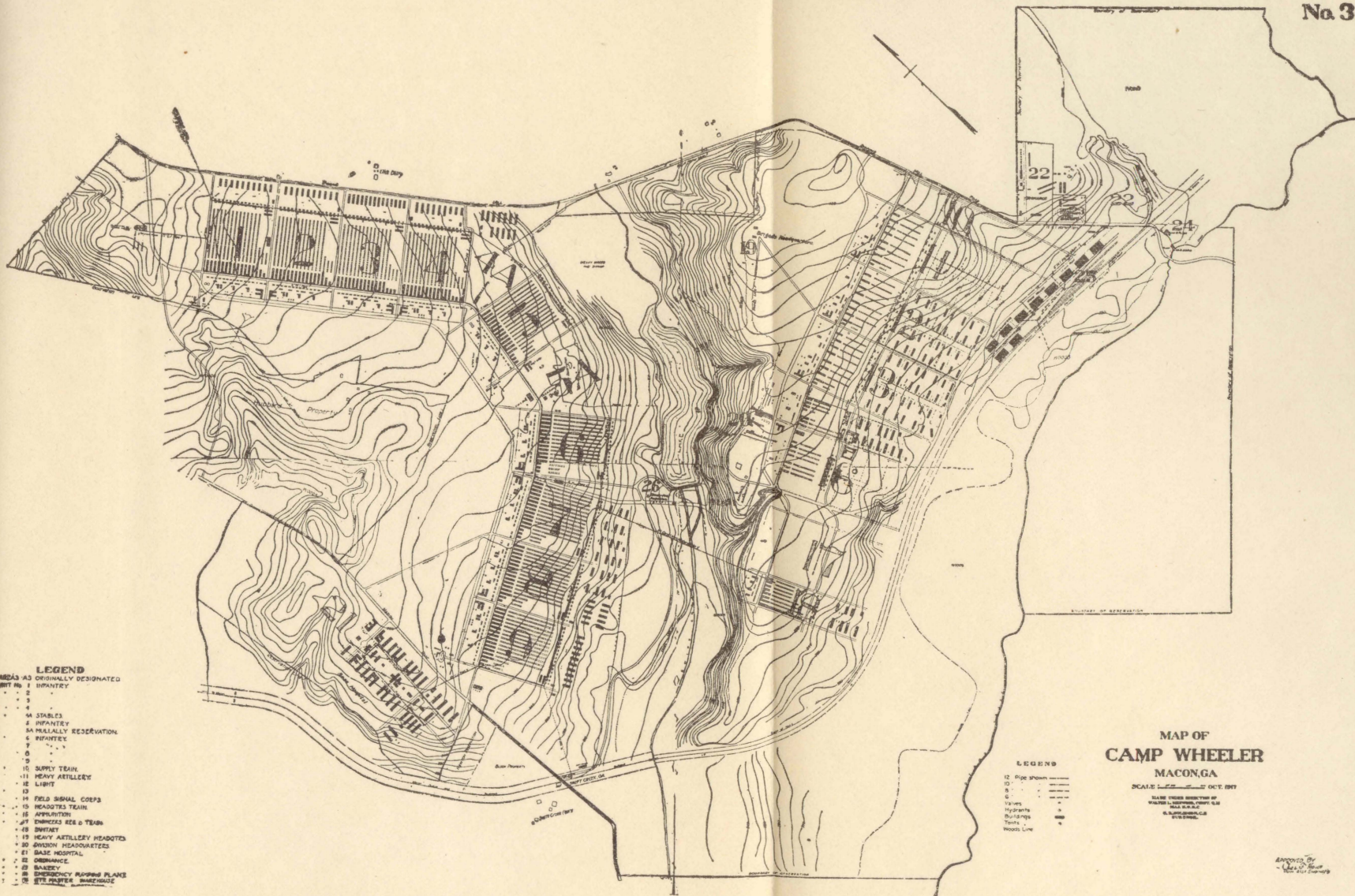
The Government time checkers made a complete check of all the men working on the job two or more times every day, and from such reports as were made, a check of the contractor's pay rolls was effected. The pay rolls were further completely examined as to rates, extensions and additions. The payment of wages was witnessed by Government representatives, and receipts were taken from the men in all cases.

A close supervision was maintained of rented equipment, its condition on arrival, and if at any time the total rental paid to the contractor equaled or approximated the value thereof, the equipment was taken possession of by

CAMP WHEELER, MACON, GA.

Tent camp capacity, 43,011 persons; 1,229 buildings. Area of camp, 3,909 acres; total reservation, 21,480 acres.

No 3



- LEGEND**
 AREAS AS ORIGINALLY DESIGNATED
 UNIT No. 1 INFANTRY
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- LEGEND**
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**MAP OF
 CAMP WHEELER
 MACON, GA.**

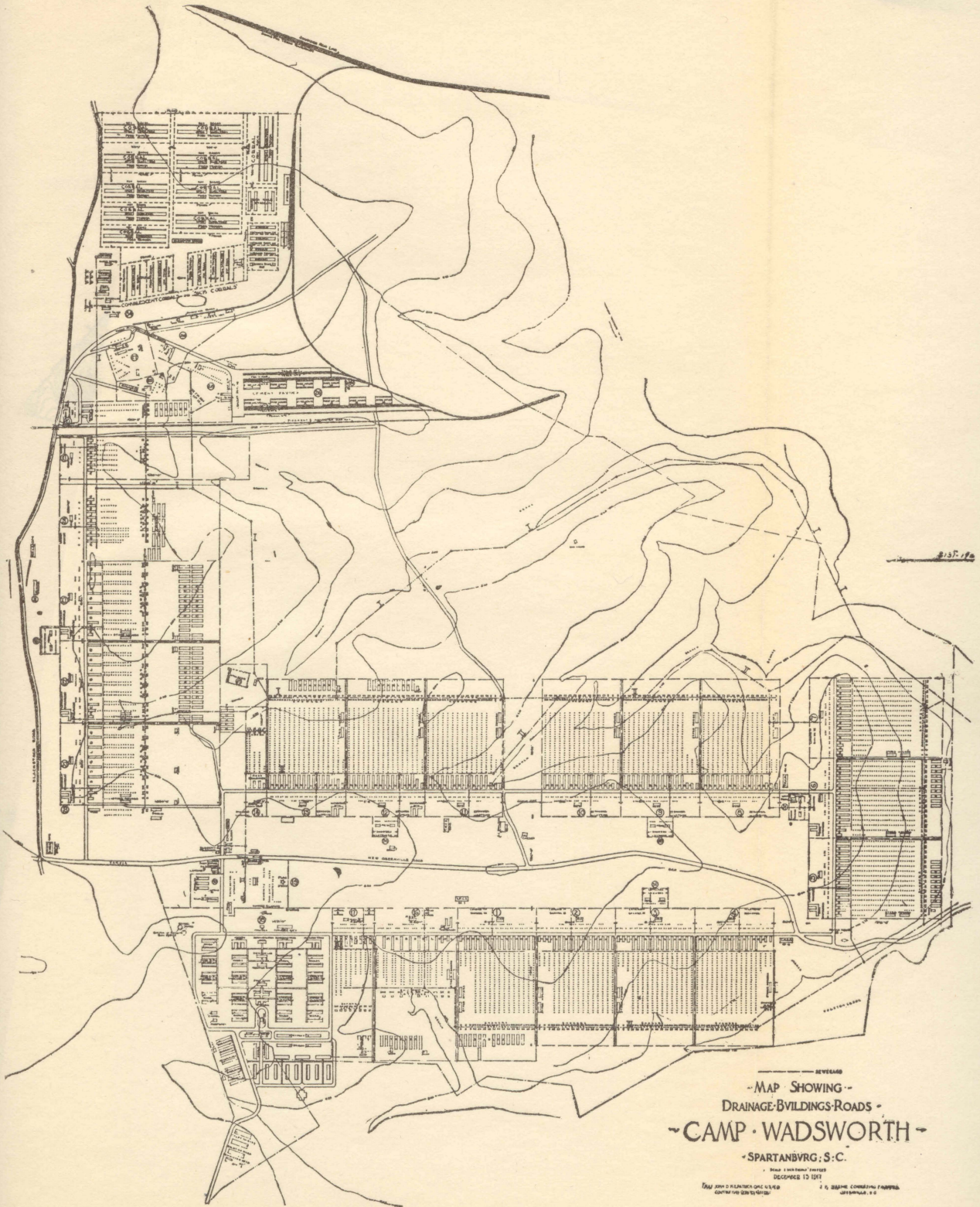
SCALE: 1:50,000 OCT. 1917

THIS MAP DESIGNED BY
 WALTER L. HARRIS, CAPT. U.S.A.
 MACON, GA.
 DRAWN BY
 WALTER L. HARRIS, CAPT. U.S.A.
 MACON, GA.

Approved by
 - Walter L. Harris
 Capt. U.S.A.

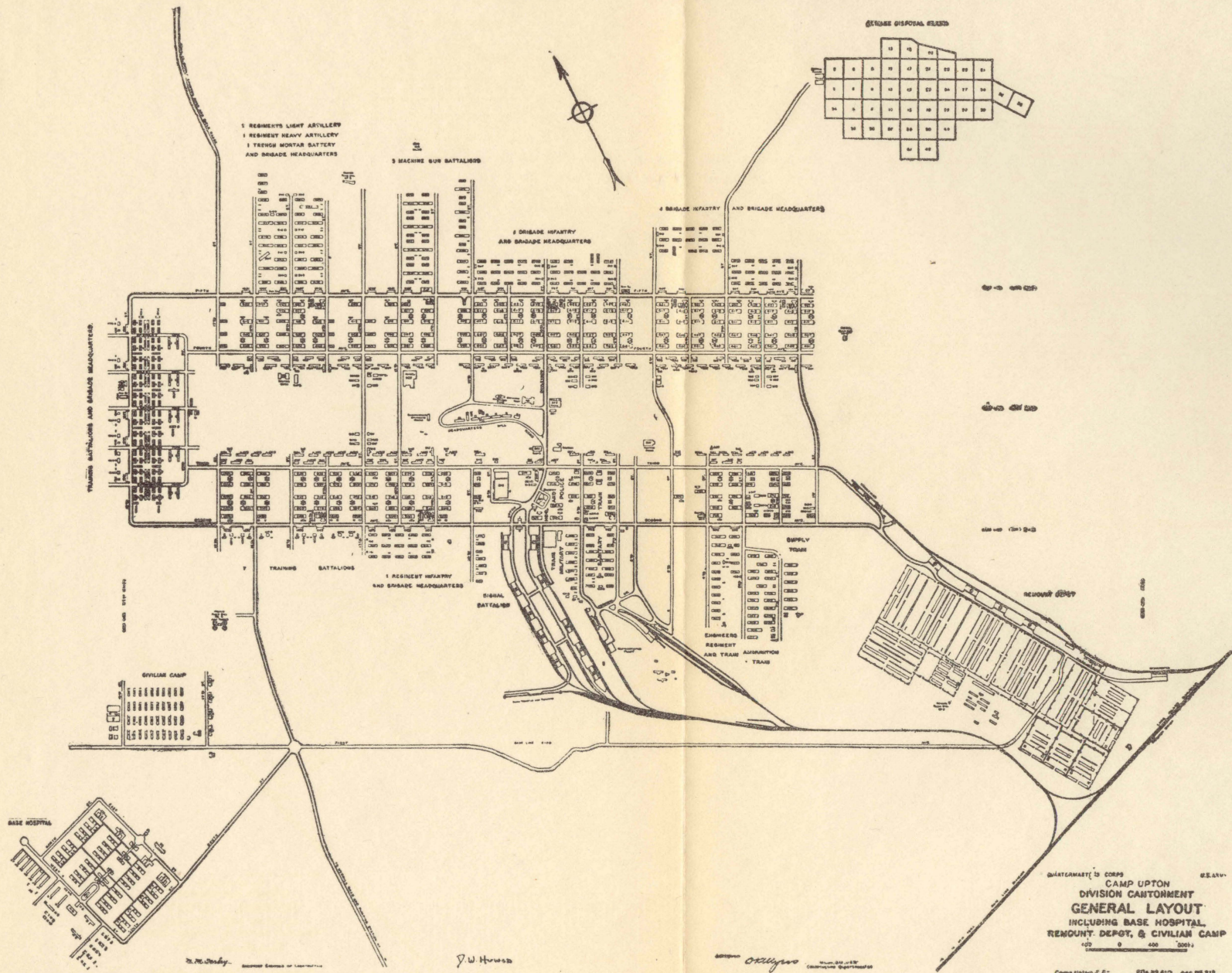
CAMP WADSWORTH, SPARTANBURG, S. C.

Tent camp capacity, 56,249 persons; 1,414 buildings. Area of camp, 1,776 acres; total reservation, 16,553 acres.



CAMP UPTON, YAPHANK, LONG ISLAND.

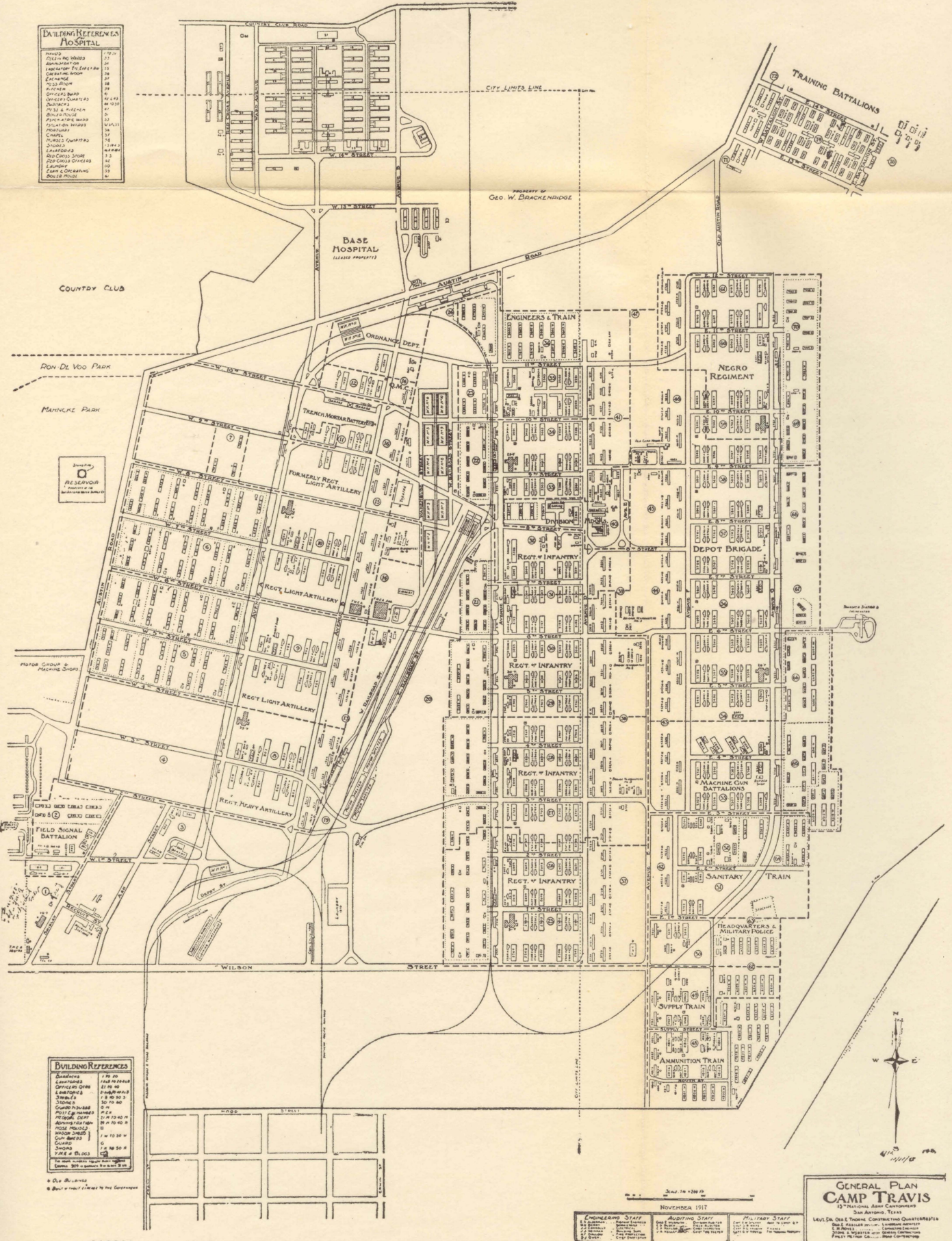
Cantonment capacity, 43,567 persons; 1,486 buildings. Area of camp, 4,000 acres; total reservation, 15,198 acres.



QUARTERS OF THE
 CAMP UPTON
 DIVISION CANTONMENT
 GENERAL LAYOUT
 INCLUDING BASE HOSPITAL
 REHABILITATION DEPOT, & CIVILIAN CAMP

CAMP TRAVIS, SAN ANTONIO, TEX.

Cantonment capacity, 42,809 persons; 1,449 buildings. Area of camp, 5,730 acres; total two reservations, 18,290 acres



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RECREATION
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GENERAL PLAN
CAMP TRAVIS
13th NATIONAL ARMY CANTONMENT
SAN ANTONIO, TEXAS

LEVEL BY COL. E. TRAVIS, COMMISSIONED QUARTERSMASTER
AND MAJOR GEN. W. L. GIBSON, CHIEF ENGINEER
PLANNED BY MAJOR GEN. W. L. GIBSON, CHIEF ENGINEER
DESIGNED BY MAJOR GEN. W. L. GIBSON, CHIEF ENGINEER
DRAWN BY MAJOR GEN. W. L. GIBSON, CHIEF ENGINEER

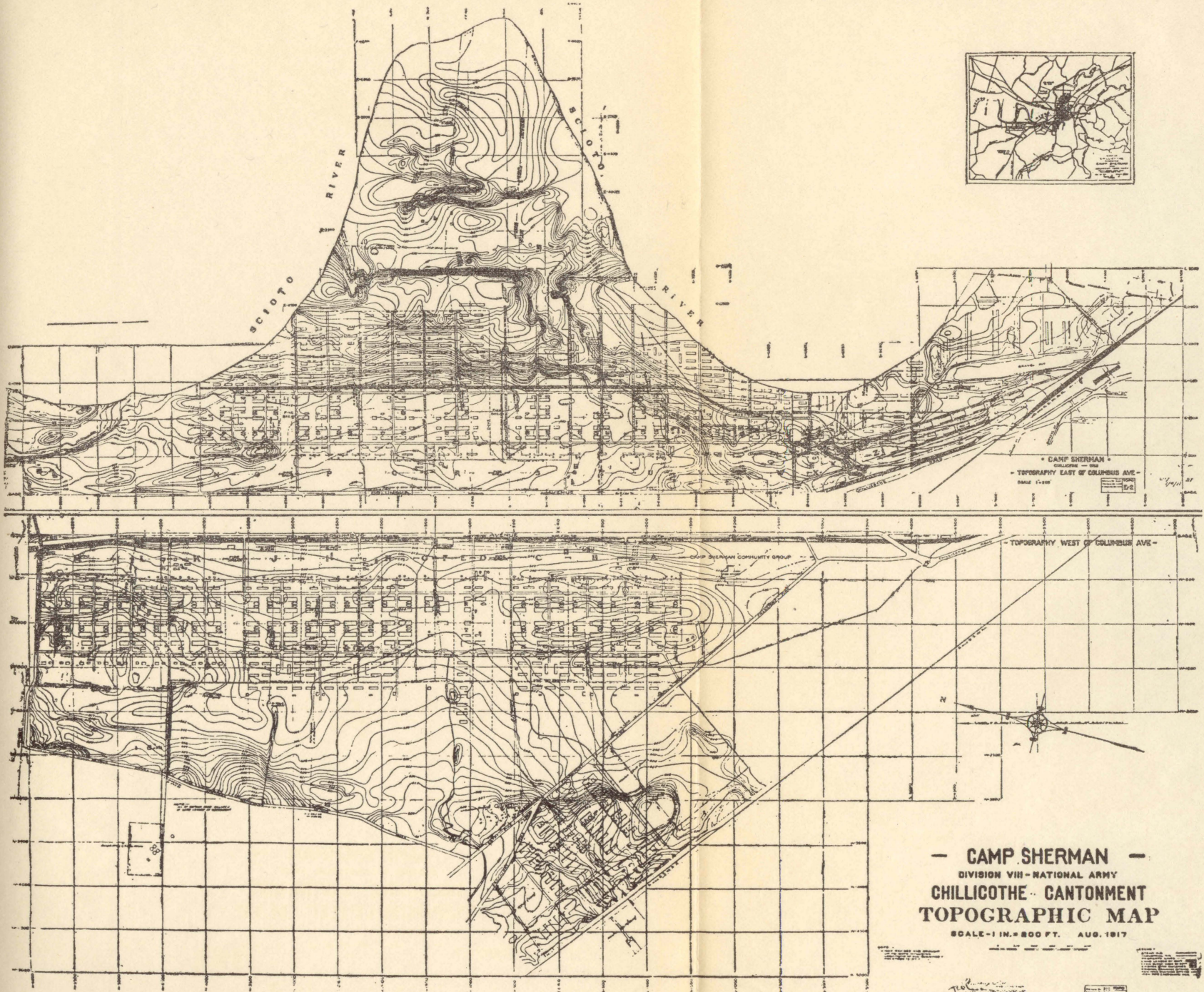
CAMP TAYLOR, LOUISVILLE, KY.

Cantonment capacity, 45,424 persons; 1,563 buildings. Area of camp, 2,660 acres; total four reservations, 23,621 acres.



CAMP SHERMAN, CHILlicothe, OHIO.

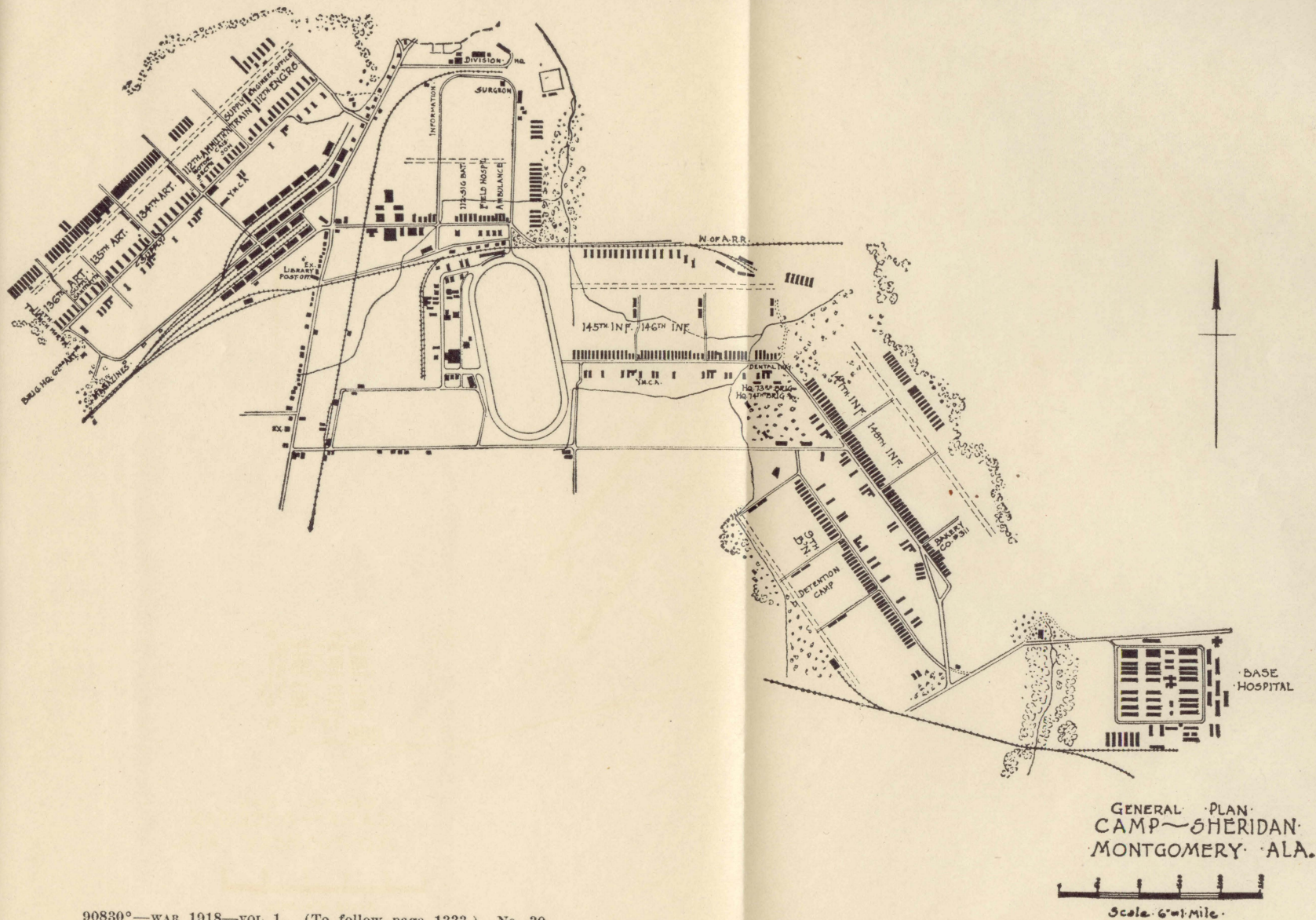
Cantonment capacity, 39,904 persons; 1,378 buildings. Area of camp, 2,002 acres; total reservation, 11,802 acres.



CAMP SHERMAN
DIVISION VIII - NATIONAL ARMY
CHILlicothe CANTONMENT
TOPOGRAPHIC MAP
SCALE - 1 IN. = 800 FT. AUG. 1917

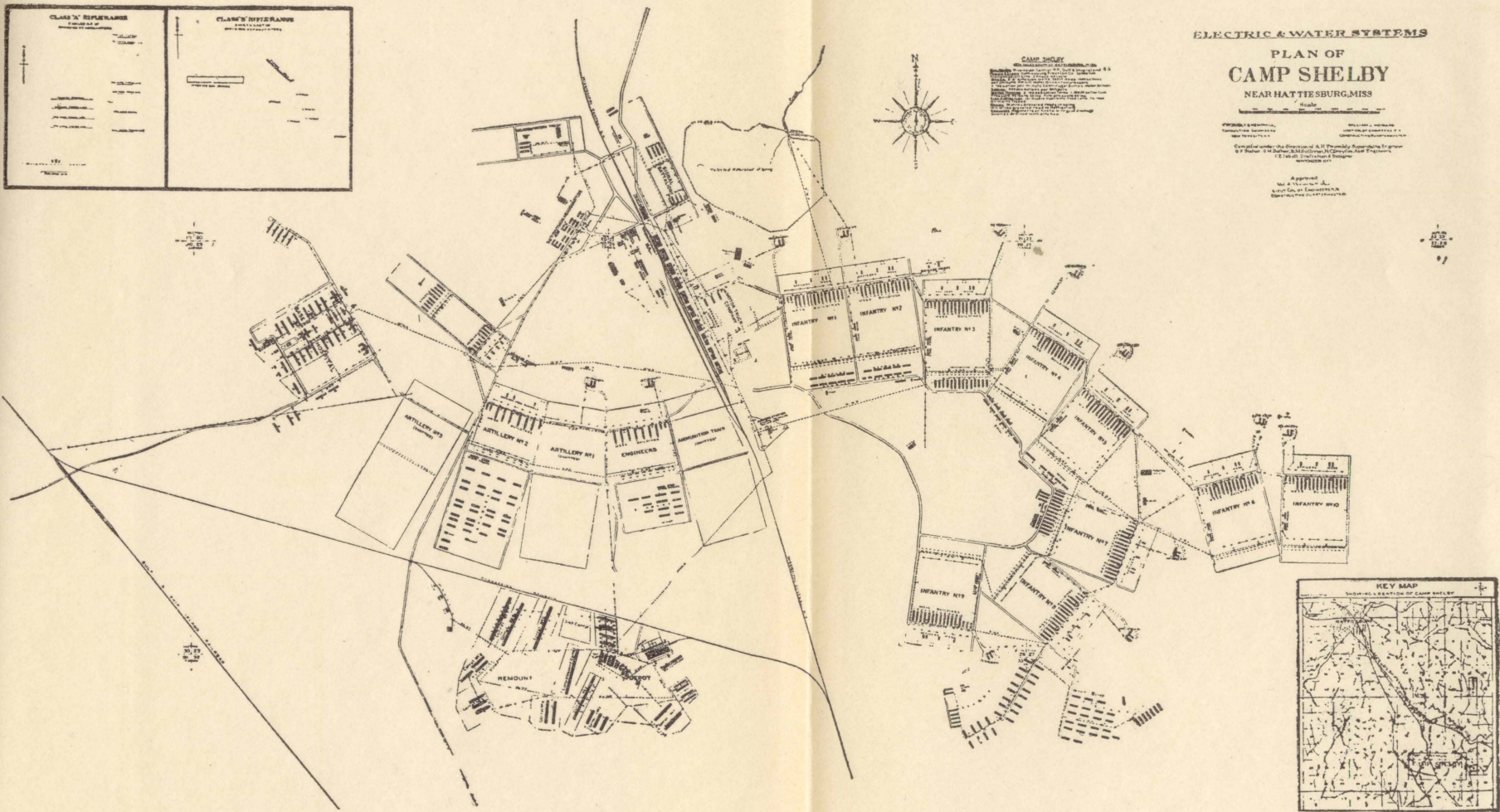
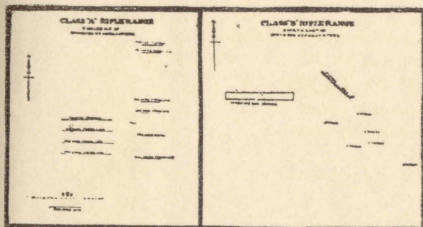
CAMP SHERIDAN, MONTGOMERY, ALA.

Tent camp capacity, 41,593 persons; 1,277 buildings. Area of camp, 3,440 acres; total reservation, 10,600 acres.



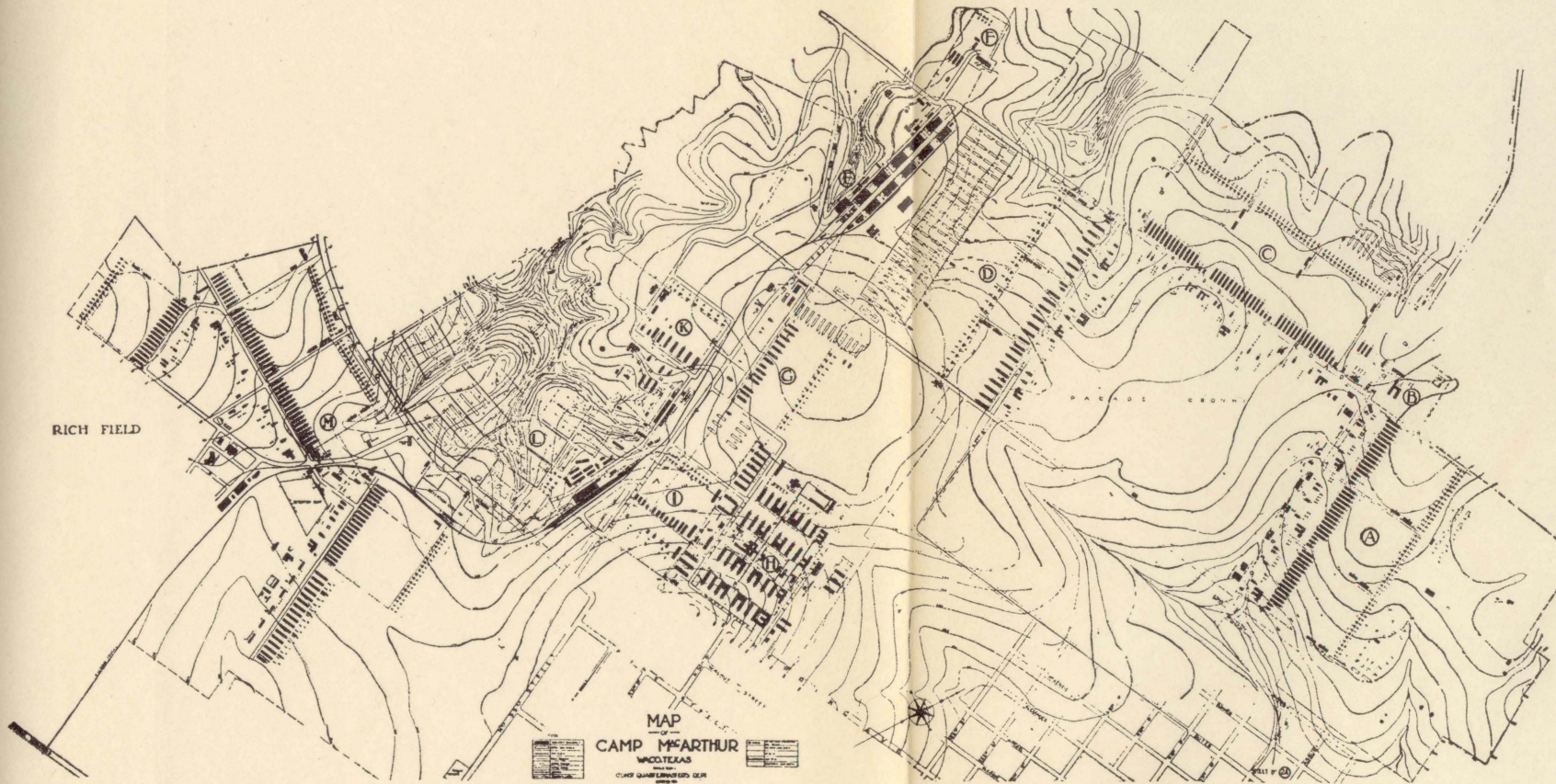
CAMP SHELBY, HATTIESBURG, MISS.

Tent camp capacity, 36,010 persons; 1,206 buildings. Area of camp, 3,260 acres; total reservation, 12,960 acres.



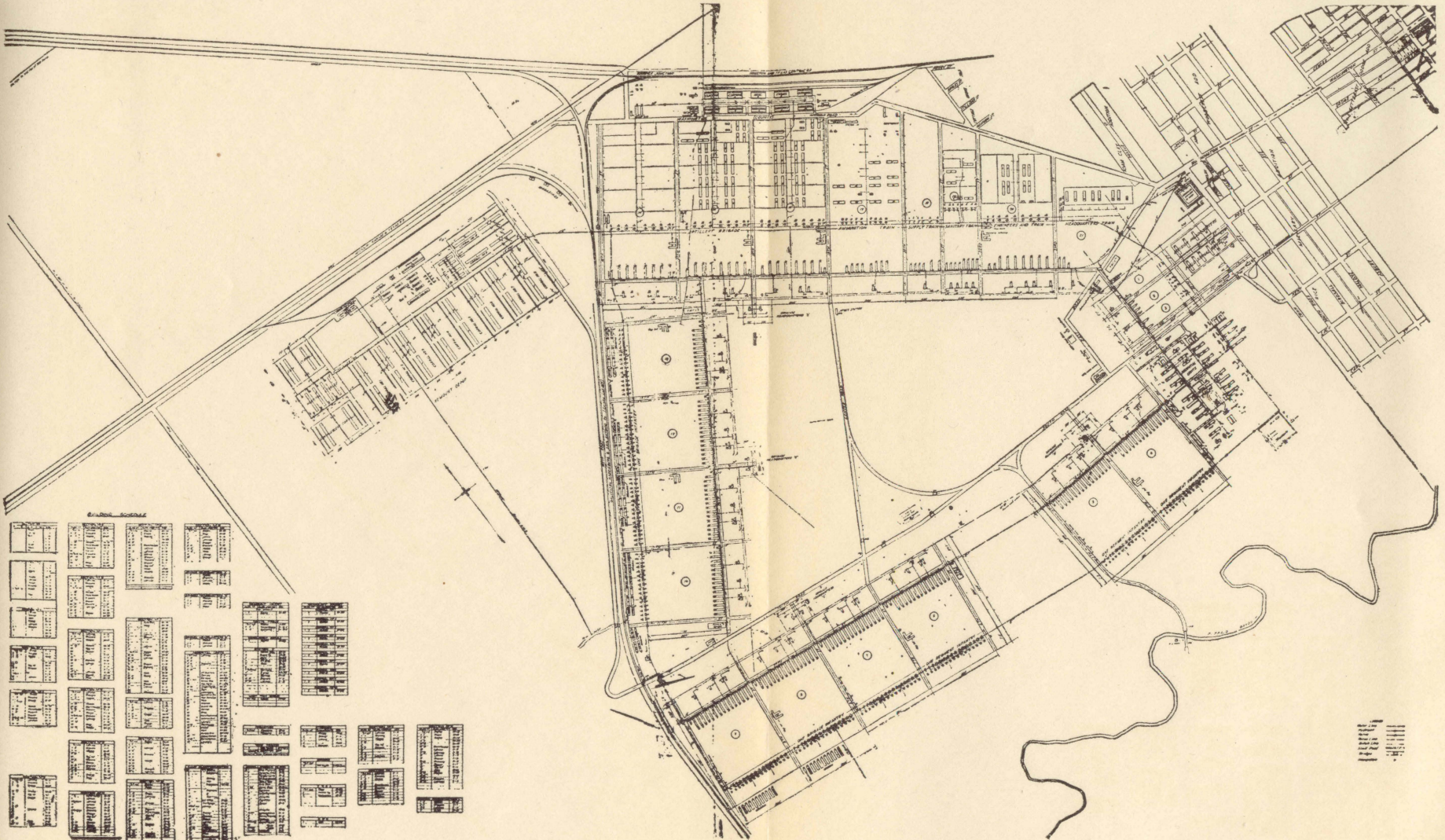
CAMP MacARTHUR, WACO, TEX.

Tent camp capacity, 45,074 persons; 1,284 buildings. Area of camp, 1,373 acres; total reservation, 10,669 acres.



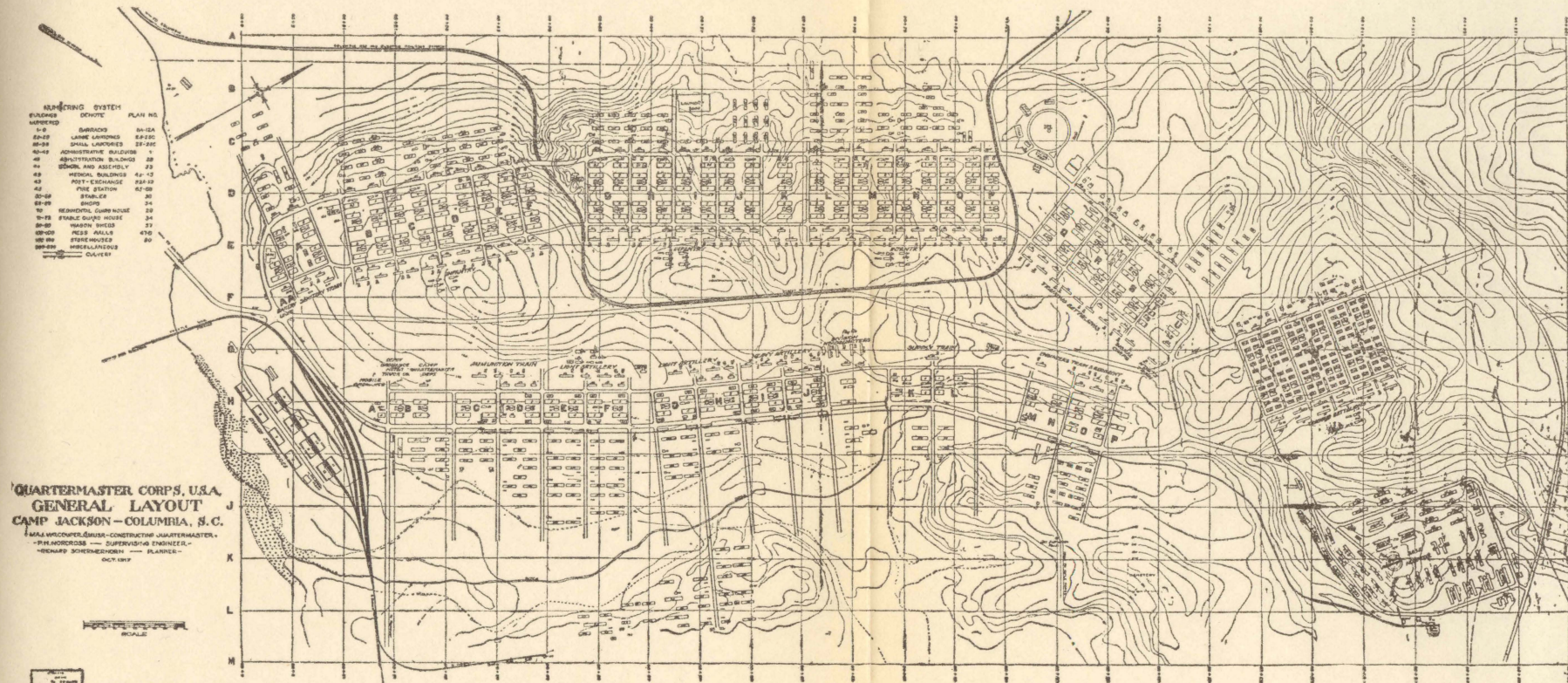
CAMP LOGAN, HOUSTON, TEX.

Tent camp capacity, 44,899 persons; 1,329 buildings. Area of camp, 3,002 acres; total reservation, 9,560 acres.



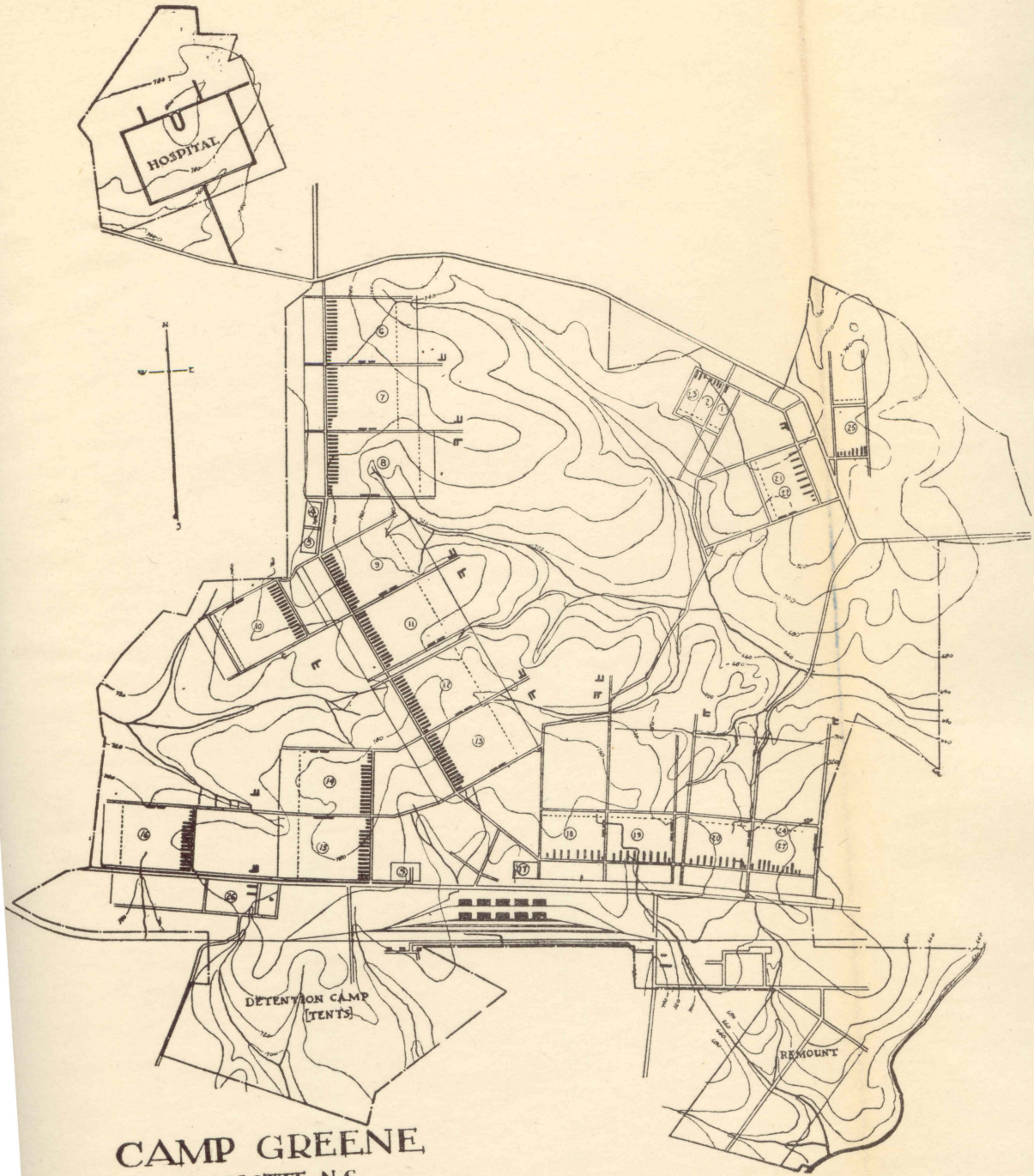
CAMP JACKSON, COLUMBIA, S. C.

Cantonment capacity, 44,009 persons; 1,554 buildings. Area of camp, 2,737 acres; total reservation, 12,804 acres.



CAMP GREENE, CHARLOTTE, N. C.

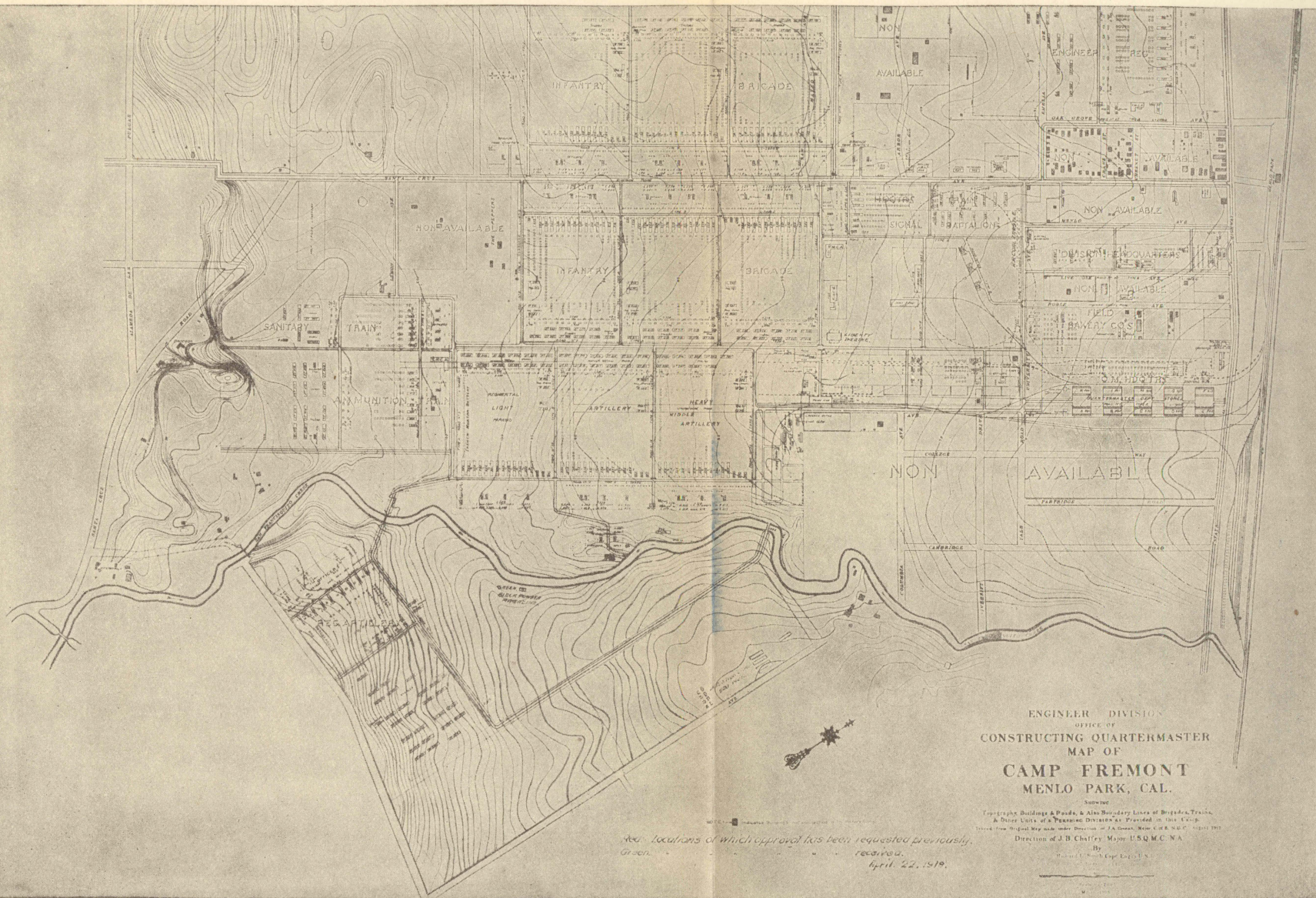
Tent camp capacity, 48,305 persons; 1,125 buildings. Area of camp, 2,100 acres; total reservation, 6,000 acres.



CAMP GREENE CHARLOTTE, N. C.

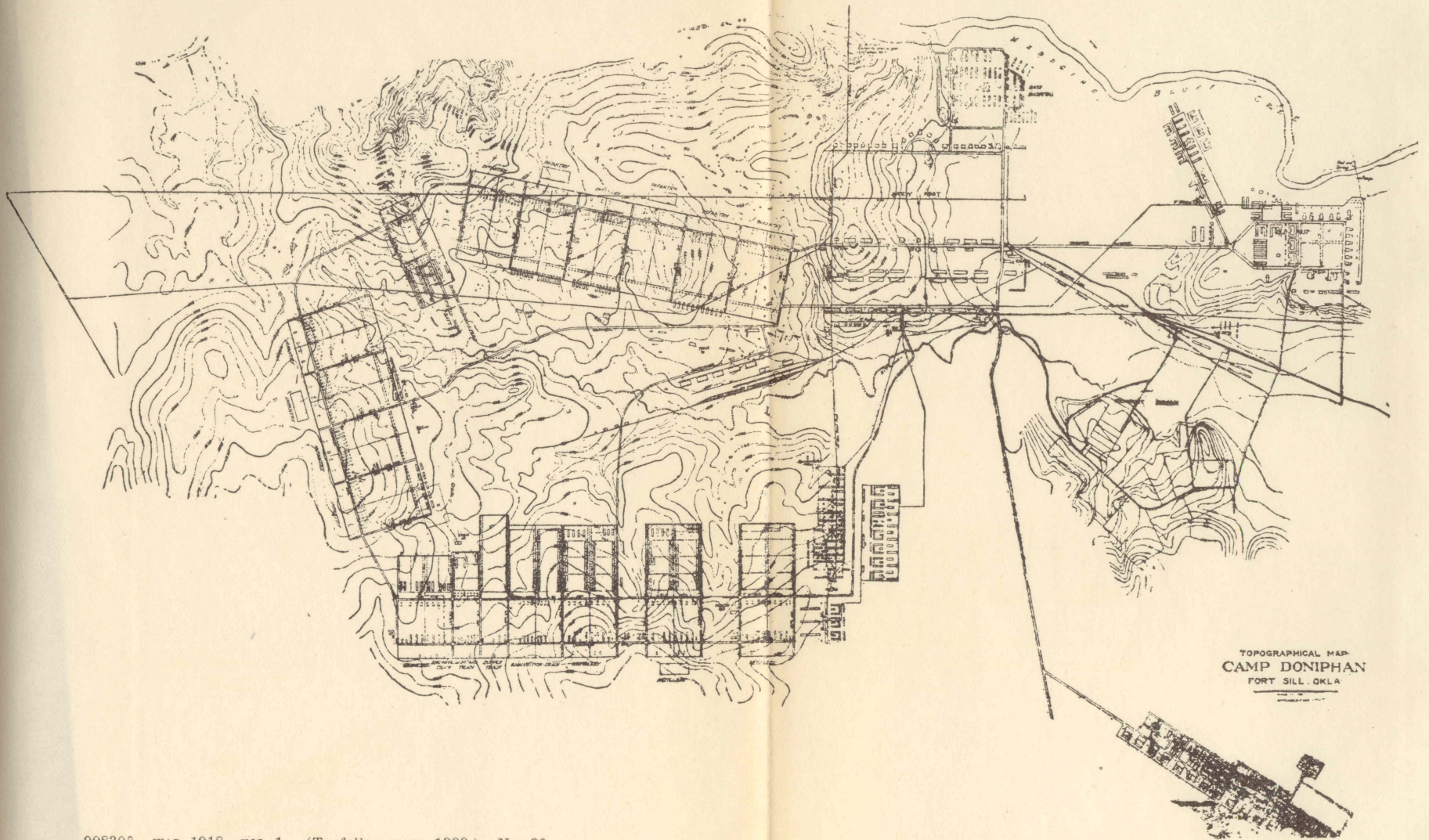
CAMP FREMONT, PALO ALTO, CAL.

Tent camp capacity, 30,000 persons; 1,124 buildings. Area of camp, 1,203 acres; total reservation, 7,203 acres.



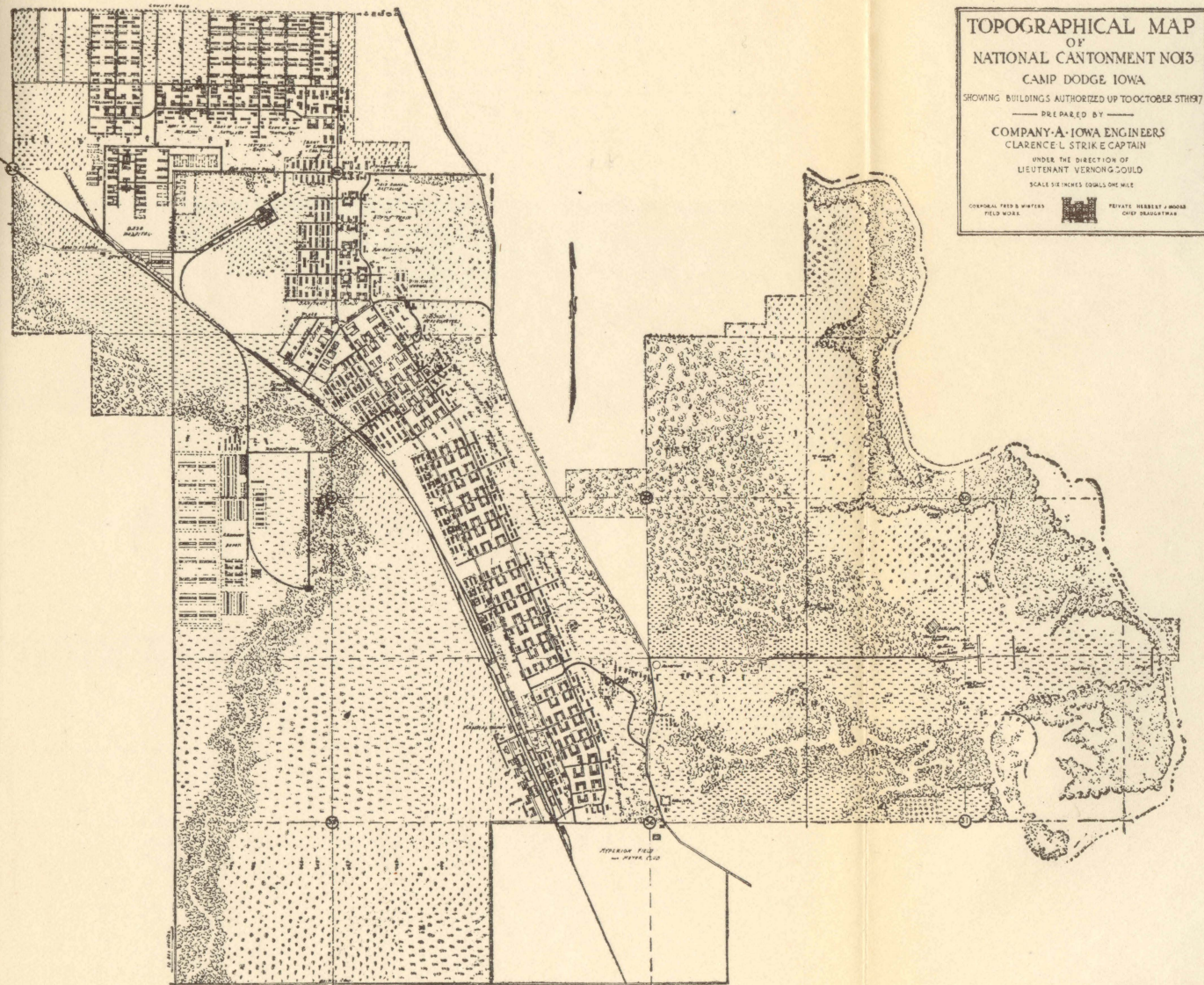
CAMP DONIPHAN, FORT SILL, OKLA.

Tent camp capacity, 46,183 persons; 1,267 buildings. Area of camp, 2,000 acres; total reservation, 67,713 acres.



CAMP DODGE, DES MOINES, IOWA.

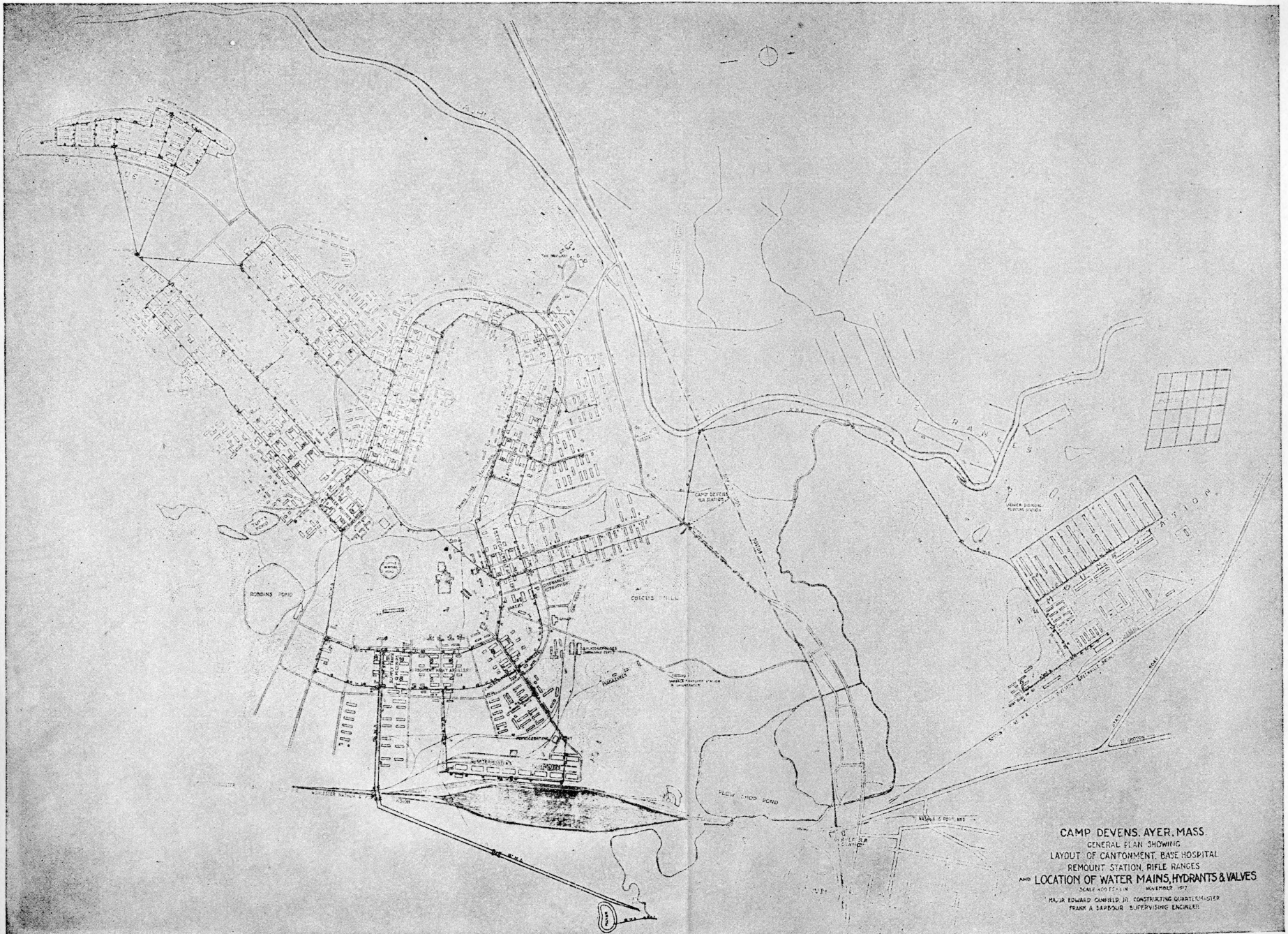
Cantonment capacity, 42,227 persons; 1,409 buildings. Area of camp, 3,354 acres; total reservation, 5,209 acres.



TOPOGRAPHICAL MAP
OF
NATIONAL CANTONMENT NO. 3
CAMP DODGE, IOWA
SHOWING BUILDINGS AUTHORIZED UP TO OCTOBER STREET
PREPARED BY
COMPANY A, IOWA ENGINEERS
CLARENCE L. STRIKE, CAPTAIN
UNDER THE DIRECTION OF
LIEUTENANT VERNON GOULD
SCALE SIX INCHES EQUALS ONE MILE
CORPORAL FRED B. WINTERS
FIELD WORK
PRIVATE HERBERT J. MOORE
CHIEF DRAUGHTSMAN

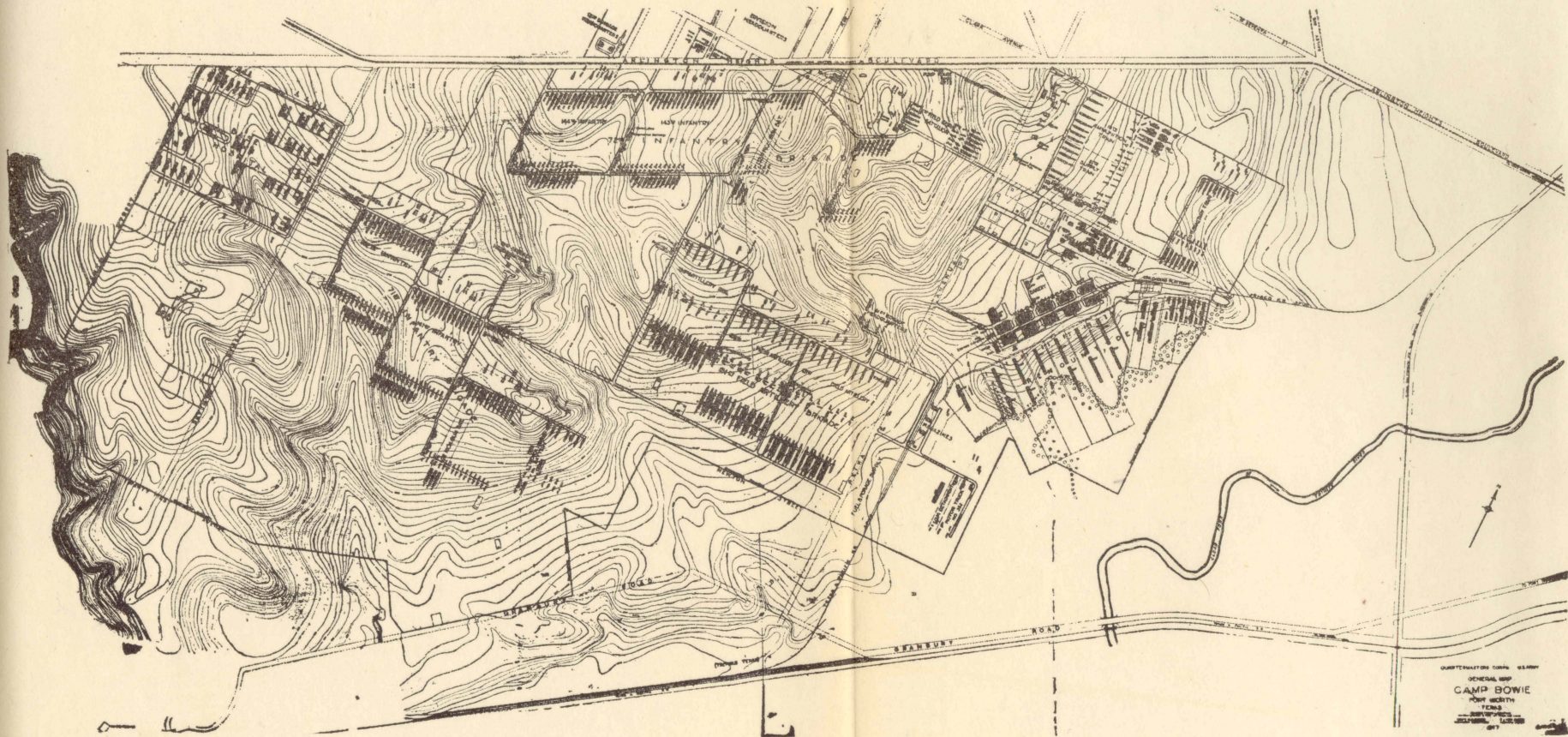
CAMP DEVENS, AYER, MASS.

Cantonment capacity, 36,832 persons; 1,334 buildings. Area of camp, 1,800 acres; total reservation, 10,607 acres.



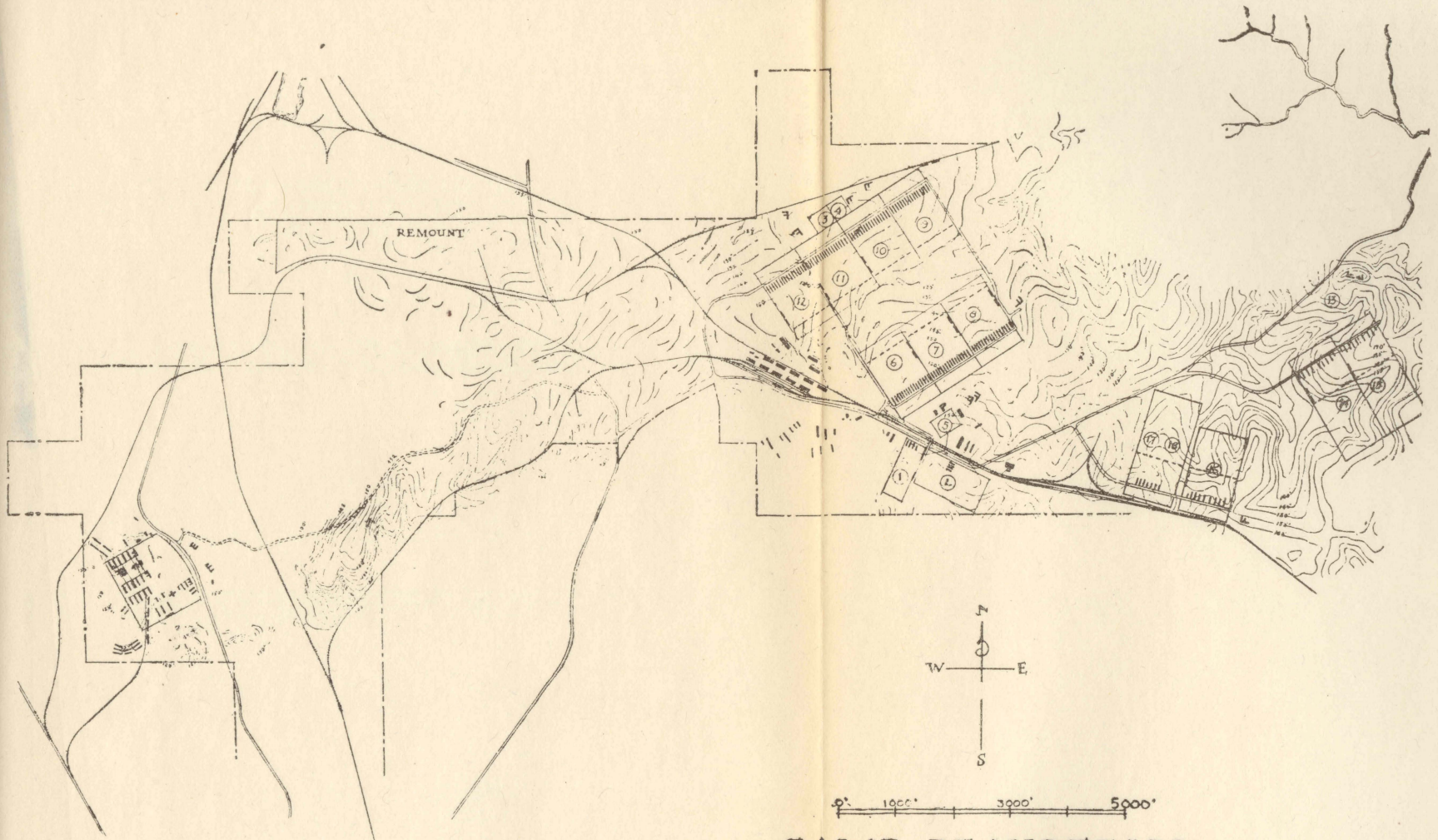
CAMP BOWIE, FORT WORTH, TEX.

Tent camp capacity, 41,879 persons; 1,313 buildings. Area of camp, 1,410 acres; total reservation, 2,186 acres.



CAMP BEAUREGARD, ALEXANDRIA, LA.

Tent camp capacity, 29,121 persons; 1,068 buildings. Area of camp, 5,300 acres; total reservation, 21,600 acres.



CAMP BEAUREGARD ALEXANDRIA LA.

APPENDIX G.

ORGANIZATION OF THE CONSTRUCTION DIVISION OF THE ARMY.

ORGANIZATION OF THE CONSTRUCTION DIVISION OF THE ARMY.

CONSTRUCTION DIVISION OF THE ARMY.

(March 18, 1918.)

This division is in charge of Col. R. C. Marshall, jr., Quartermaster Corps, National Army. It has control over and is charged with all matters in connection with the construction work of the Army in the United States, the Hawaiian Islands, Porto Rico, and the Canal Zone, including the surveying and other necessary preliminary work on the sites selected; preparation of plans; procuring, inspecting, and expediting of materials; actual construction work; putting in place equipment of all sorts; construction of roads, wharves, sewer, systems, and water systems; attention to the matter of rentals and leases; the maintenance of all construction projects, and the operation of public utilities on such projects. It also has charge of the allotment of funds to cover the expenditures incident to these activities; it cooperates with other departments and bureaus of the War Department for which or at whose request it has been authorized to proceed with construction work; and generally has control over all matters connected with or arising out of its general operations and activities.

The division includes the following branches:

- Engineering branch.
- Contracts branch.
- Administrative branch.
- Constructing branch.
- Maintenance and repair branch.
- Accounting branch.
- Materials branch.

ENGINEERING BRANCH.

Col. F. M. Gunby, Quartermaster Corps, National Army, in charge; assistant in charge, Lieut. Col. L. Bush, Quartermaster Corps, National Army; executive officer, Lieut. Col. C. C. Wright, Quartermaster Corps, National Army, and Maj. G. R. Solomon, member American Society of Civil Engineers, Engineer Reserve Corps, assisting. It has supervision over the preparation of all plans and specifications for cantonment and other emergency construction, including buildings, water and sewer systems, roads, walks, wharves, drainage, heating, lighting, power, plumbing, railroads, docks, and other elements entering into this construction; has charge of the preparation of estimates of cost for the same and the preparation of bills of material entering into all the construction outlined above.

(a) *Architectural work section.*—Lieut. Col. F. B. Wheaton, Quartermaster Corps, National Army, in charge.

(b) *Estimates section.*—Maj. H. S. French, Quartermaster Corps, National Army, in charge.

(c) *Camp-planning section.*—Maj. George Gibbs, jr., Quartermaster Corps, National Army, in charge.

(d) *Water-supply section.*—Lieut. Col. D. H. Maury, member American Society of Civil Engineers, Quartermaster Corps, National Army, in charge.

(e) *Fire-protection section.*—Mr. H. E. Newell in charge.

(f) *Electric-equipment section.*—Maj. N. J. Neall, Quartermaster Corps, National Army, in charge.

(g) *Illumination section.*—Mr. A. L. Pearson in charge.

(h) *Heating and plumbing section.*—Maj. L. H. Tripp, Quartermaster Corps, National Army, in charge.

(i) *Expediting section.*—Maj. H. J. Burt, member American Society of Civil Engineers, Quartermaster Corps, National Army, in charge.

(j) *Roads and sanitation.*—Maj. L. S. Doten, member American Society of Civil Engineers, Quartermaster Corps, National Army, in charge.

(k) *Schedules section.*—Mr. G. G. Will in charge.

(l) *Refrigeration section.*—Mr. L. R. Phillips in charge.

(m) *Special-studies section.*—Mr. J. M. North in charge.

(n) *Mechanical-engineering section.*—Mr. J. B. Blake in charge.

(o) *Civil engineer and track-work section.*—Capt. A. F. Dershimer, Quartermaster Corps, National Army, in charge.

ADMINISTRATIVE BRANCH.

Col. J. H. Alexander, Quartermaster Corps, National Army, in charge. Handles all matters pertaining to supervising, developing, and perfecting administration and operation in the construction division and in coordinating the activities of the various branches and sections thereof; has supervision over clerical routine, records, files, mail, and messenger service; handles routine and miscellaneous correspondence; settles matters of office policy; attends to the issuing of travel orders for officers and civilians, assignments to and relief from duty, keeps records of the officers assigned to duty under the direction of the officer in charge of construction division; handles all matters connected with the employment, pay, and separation from service of civilian employees of the office; has supervision and control over stenographic and mimeographic service; attends to the purchase and distribution of office supplies and equipments, and conducts a general information bureau. Also has supervision over coordination of labor rates and conditions at all construction points carried on under the construction division, and passes upon agreements in connection therewith. Deals with all union officials and with the cantonment adjustment commission of the War Department; supervises compilation and records of all labor rates, conditions, and agreements; secures and prepares all required statistics covering cost and other special matters required in connection with reports to other branches of the War Department. Its sections are:

(a) *Personnel section.*—Maj. G. H. Thompson, Quartermaster Corps, National Army, in charge.

(b) *Mail and record and miscellaneous section.*—Capt. W. G. Maupin, Quartermaster Reserve Corps, in charge.

(c) *Information section.*—Capt. A. H. Erck, United States Infantry, in charge.

(d) *Labor and statistic section.*—Maj. H. F. Mayer, Quartermaster Corps, National Army, in charge.

(e) *Stenographic and property section.*—Mr. A. B. Moreland, chief clerk, in charge.

CONSTRUCTING BRANCH.

Col. M. J. Whitson, Quartermaster Corps, National Army, in charge, and Col. Peter Junkersfeld, Quartermaster Corps, National Army, assisting. Lieut. Col. W. R. Roberts, Quartermaster Corps, National Army, executive officer. This branch has charge of the construction of all sorts in connection both with permanent and temporary work; carrying out the plans prepared by the engineering branch; it appoints supervising constructing quartermasters and constructing quartermasters, coordinating the supervision, expedition, and completion of construction; it issues requisitions for the necessary principal materials, and designates what part of the same shall be mobilized or purchased through this office and what part shall be purchased from local stock. It expedites and follows up the work under way, and maintains progress charts and statistical data pertaining to the same; it maintains close relation with constructing quartermasters in the field, regarding all questions pertaining to work in progress, and supervises all relations with the contractors carrying out construction projects. It conducts the necessary correspondence pertaining to all work under its supervision and keeps in close touch with such work until its completion and its turnover. This branch is divided into the following sections:

(a) *Section A.*—Lieut. Col. O. P. Chamberlain, Quartermaster Corps, National Army, in charge. Has control over construction work of all kinds in connection with National Army cantonments, National Guard camps, miscellaneous cantonments, hospital and quartermaster repair shops.

(b) *Section B.*—Lieut. Col. R. M. White, Quartermaster Corps, National Army, in charge. Has supervision over construction of storage and traffic facilities, terminals, lighters, and warehouses.

(c) *Section C.*—Lieut. Col. G. F. D. Trask, Quartermaster Corps, National Army, in charge, assisted by Maj. B. B. Lathbury, Member American Society Civil Engineers, Ordnance Reserve Corps. Has supervision over construction of ordnance depots, ordnance manufacturing, and proving plants.

(d) *Section D.*—Lieut. Col. G. B. Walbridge, Quartermaster Corps, National Army, in charge. Has supervision of construction of Signal Corps plants and depots, housing, and miscellaneous projects.

(e) *Section E.*—Maj. H. W. Lockett, Engineer Reserve Corps, National Army, in charge, and Maj. J. B. Coleman, Quartermaster Corps, National Army, assisting. Supervises construction at Coast Artillery and Interior Army posts.

(f) *Protection and investigation section.*—Lieut. Col. Philander Betts, Quartermaster Corps, National Army, in charge.

(g) *Government equipment and material section.*—Lieut. Col. E. C. Stockdale, Quartermaster Corps, National Army, in charge.

MATERIALS BRANCH.

Col. J. N. Willcutt, Quartermaster Corps, National Army, in charge. Lieut. Col. J. M. Pease, Quartermaster Corps, National Army, assistant in charge. Has supervision over the procurement, inspection, expediting, and delivery of all materials mobilized through the construction division, for use in construction work which it has in hand; cooperates with the various committees and organizations which have been formed with a view to stabilizing prices and keeping in touch with the entire market throughout the country for the procurement of materials and articles which are required. Confers with the officers of the Director General of Railroads and transportation officials and organizations with a view to securing rolling equipment for the rapid movement of material and expediting the movement of cars. It is divided into sections as follows:

(a) *Procurement section.*—Maj. O. F. Noss, Quartermaster Corps, National Army, in charge. Has control of the procurement and mobilizing of building material of all natures, plumbing, lighting, power, heating and cooking fixtures and equipment, sand, gravel, cement, steel, and all articles of material necessary for use in construction work or incident thereto.

The procurement section is divided into departments as follows:

1. *Building materials department.*—Capt. A. S. Dorsey, Quartermaster Reserve Corps, in charge.
2. *Steel department.*—Capt. H. C. Bissell, Quartermaster Reserve Corps, in charge.
3. *Steam heating department.*—Capt. W. H. Riblet, Quartermaster Reserve Corps, in charge.
4. *Electrical equipment department.*—Capt. J. E. Erickson, Quartermaster Corps, National Army, in charge.
5. *Plumbing supplies department.*—Capt. J. C. McCubbin, Quartermaster Corps, National Army, in charge.
6. *Water supply department.*—Capt. M. O. Pinkham, Quartermaster Corps, National Army, in charge.
7. *Mechanical equipment department.*—Capt. A. C. Neill, Quartermaster Corps, National Army, in charge.
8. *Stove and special equipment department.*—Capt. E. W. Case, Quartermaster Corps, National Army, in charge.
9. *Fire protection department.*—Capt. G. Litchfield, Quartermaster Corps, National Army, in charge.
10. *Hardware department.*—Mr. A. P. Chandler in charge.
11. *Paints and refrigeration department.*—Mr. J. H. Prentiss in charge.

(b) *Delivery section.*—Lieut. Col. H. S. Durant, Quartermaster Corps, National Army, in charge; assistants, Capt. J. M. Ritchie, Association American Society Civil Engineers, Quartermaster Reserve Corps; Capt. A. B. Nash, Quartermaster Corps, National Army. Follows up production, manufacture, inspection, and transportation of all materials purchased and procured through the procurement section. This section is divided into the following departments:

1. *Transportation department.*—Mr. C. E. Denney in charge, assisted by Capt. F. M. Palmer, Quartermaster Reserve Corps.

2. *Inspection department*.—Capt F. W. Hatten, Quartermaster Corps, National Army, in charge.
3. *Expediting department*.—Mr. S. G. Stouch in charge.

ACCOUNTING BRANCH.

Lieut. Col. Charles Neville, Quartermaster Corps, National Army in charge, assisted by Mr. William Whitfield. Is concerned with all accounting and financial matters pertaining to the construction division; interprets such parts of contracts as relate to accounts; acts in an advisory capacity for Government accounting forces on the various jobs in course of construction; sends out traveling accountants to the jobs; maintains records relating to appropriations, authorizations, allotments, and transfers of fund in connection therewith; allots to operating branches funds which have been allotted for the purpose of the construction division; assembles cost data and financial statistics relative to all jobs. This branch has the following sections:

- (a) *Traveling accountants section*.—Mr. William Whitfield, C. P. A., in charge.
- (b) *Cost accounting section*.—Capt. C. A. Duff, Quartermaster Reserve Corps, in charge.
- (c) *Funds section*.—First Lieut. R. E. Dudley, Quartermaster Corps, National Army, in charge.
- (d) *Field accounting section*.—Mr. C. D. Block in charge.
- (e) *Prior construction section*.—Mr. E. F. Cassel in charge.
- (f) *Personnel section*.—Mr. C. D. Black in charge.
- (g) *Miscellaneous section*.—Mr. N. W. Phillips in charge.

MAINTENANCE AND REPAIR BRANCH.

Lieut. Col. C. D. Hartman, Quartermaster Corps, National Army, in charge; Maj. Paul Doty, Quartermaster Corps, National Army, assisting. Is concerned with all work of maintenance and repair at permanent and temporary Army posts and camps, and at other places where Government construction work has been done, carrying out plans prepared by the engineering branch and by itself, connected with matters of maintenance and repair. It corresponds with local officers in charge of maintenance work in regard to plans and all matters incident to the same and to the work of the branch, and allots funds in connection with its activities. It is divided into sections as follows:

- Land and lease section*.—, officer in charge.
- Building repair section*.—Maj. D. S. Clinton, associate member American Society Civil Engineers, officer in charge.
- General maintenance and repair section*.—Capt. G. A. Knight, officer in charge.
- Utilities, operation, and maintenance section*.—Capt. J. C. Donald, officer in charge.
- Technical service section*.—, officer in charge.
- Procurement section*.—Capt. E. M. Aten, officer in charge.
- Statistical section*.—Capt. E. E. Whiting, officer in charge.

CONTRACTS BRANCH.

Col. Evan Shelby, Quartermaster Corps, National Army, in charge. Has general supervision over all documents in the nature of contracts and leases pertaining to or in connection with the work of the construction division; determines what matters shall be submitted to the Judge Advocate General for opinion; attends to all matters relating to surety bonds, fire insurance, workmen's compensation, and employer's liability insurance, and all questions arising in connection therewith. This branch is divided into sections as follows:

- (a) *Contract section*.—Col. Evan Shelby, Quartermaster Corps, National Army, in charge.
- (b) *Insurance section*.—Mr. Lee J. Wolfe in charge.

Casey 24

OUTLINE SKETCH
OF THE
FIELD ORGANIZATION
WAR DEPARTMENT
CONSTRUCTION DIVISION OF THE ARMY
WASHINGTON, D. C.

PREPARED BY
ORGANIZATION & METHODS SECTION
ADMINISTRATIVE DIVISION
CONSTRUCTION DIVISION OF THE ARMY
AUGUST 1910



RESPONSIBLE FOR FIELD ECONOMY - FINANCIALLY ACCOUNTABLE



GENERAL CONTRACTOR

GENERAL SUPERINTENDANT

OFFICE FORCE

FIELD FORCE

SUB CONTRACTORS

APPENDIX H.

Record of jobs handled by the Construction

Corrected to

Location.	Request.		Authorization.		Authorized name.	Handled by--
	Source.	Date.	Date.	No.		
Port Newark terminal.	Quartermaster	1917. July 20	1917. Oct. 16	1	Port Newark terminal.	Capt. R. W. Beal..
Baltimore animal depot.	Ordnance.....	Oct. 17	Oct. 26	2	Animal quarantine, Ordnance depot, Baltimore, Md.	Capt. F. S. Marlow
Coast Artillery posts	Coast Artillery	Sept. 29	Nov. 6	3	Coast Artillery posts.	Lient. Rogers.....
Kenosha, Wis.....	Ordnance.....	Aug. 28	Oct. 25	4	Mobile Ordnance School barracks, Kenosha, Wis.	Capt. F. S. Marlow
Clintonville, Wis.....	.....do.....	.....do.....	.....do.....	5	Mobile Ordnance School barracks, Clintonville, Wis.	.....do.....
Peoria, Ill.....	.....do.....	.....do.....	.....do.....	6	Mobile Ordnance School barracks, Peoria, Ill.	.....do.....
Columbia University	Surgeon General.	Oct. 4	Oct. 27	7	Extension of General Hospital No. 1, New York City.	Capt. J. H. Clark..
Curtis Bay, Baltimore.	Ordnance.....	Oct. 27	Nov. 6	8	Curtis Bay Ordnance depot.	Capt. F. S. Marlow
Raritan River, N. J.	.....do.....	.....do.....	.....do.....	9	Raritan River ordnance depot.	.....do.....
Pig Point, Va.....	.....do.....	.....do.....	.....do.....	10	Pig Point ordnance depot.	.....do.....
Baltimore depot....	Quartermaster	Oct. 19	Nov. 10	11	Baltimore depot warehouses.	Mr. J. A. Tarbell..
Newport News animal depot.	.....do.....	Oct. 13	Nov. 16	12	Addition to animal embarkation depot, Newport News, Va.	Capt. R. W. Beal.
Fort McHenry Hospital.	Surgeon General.	Oct. 9	Nov. 29	13	Hospital, Fort McHenry, Md.	Capt. J. H. Clark..
Fort Worth Experimental Station.	Signal Corps..	Oct. 23	Dec. 1	14	Fort Worth Experimental Station.	Mr. J. A. Tarbell.
Philadelphia interior depot.	Quartermaster	Dec. 10	Dec. 13	15	General quartermaster interior depot, Philadelphia. Pa.	.....do.....
Fort Des Moines Hospital.	Surgeon General.	Sept. 11	.....do.....	16	Fort Des Moines Hospital.	Capt. J. H. Clark..
Philadelphia expeditionary depot.	Quartermaster	Nov. 15	.....do.....	17	Philadelphia expeditionary storage, quartermaster depot.	Mr. J. A. Tarbell..
Chicago interior depot.	.....do.....	Dec. 1	Dec. 15	18	Chicago quartermaster interior storage depot.	.....do.....
Fort Leavenworth..	.....do.....	Nov. 3	.....do.....	19	Fort Leavenworth U. S. Disciplinary Barracks.	Capt. R. W. Beal..
St. Louis interior depot.	.....do.....	Oct. 17	Dec. 22	20	St. Louis quartermaster interior storage depot.	Mr. J. A. Tarbell..
Pittsburgh interior depot.	.....do.....	Sept. 5	.....do.....	21	Pittsburgh quartermaster interior storage depot.	.....do.....

1 Appendices.

APPENDIX H.

Division of the War Department.

July 1, 1918.

Contractor.		Name.	Contract dated.	Quartermasters.	
Approval by Secretary of War.				Supervising.	Constructing.
Requested	Received				
1917. Sept. 23	1917. Oct. 2	MacArthur Bros. Co.; Mason Hanger Co.	1918. Jan. 26	Maj. L. L. Calvert..	Lieut. Col. Lamphere.
Oct. 15	Oct. 15	H. D. Watts Co., Baltimore, Md.	Oct. 15	Maj. Pritchard.....	Lieut. Aldrich.
(1)	(1)	Various contractors.....	(1)	Maj. Lockett.....	Various.
Oct. 21	Nov. 5	Paschen Bros., Chicago, Ill.	1917. Nov. 9	Capt. Farrington....	Lieut. F. E. Farwell.
...do....	...do....	Henry G. Sengstock, Clintonville, Wis.	Nov. 7	...do.....	Lieut. E. F. Baumgartner.
...do....	Nov. 3	F. B. Hasbrouck, Peoria, Ill.	Nov. 5	...do.....	Lieut. W. H. Cady.
Nov. 16	Nov. 24	Wm. Crawford, New York City.	Nov. 24	Maj. Nichols.....	Maj. H. E. Kebbon.
Oct. 18	Oct. 26	Smith-Hauser & McIsaac Co., New York City.	Nov. 6	Maj. Pritchett.....	Maj. R. G. Proctor.
...do....	Oct. 30	Snare & Trieste Co., New York City.	...do....	...do.....	Maj. G. K. Conrad.
...do....	Oct. 26	James Stewart Co., New York City.	...do....	...do.....	Maj. W. R. Peasley.
Dec. 19	Dec. 26	Sanford & Brooks, Baltimore, Md.	Dec. 27	Lieut. Col. Sawyer..	Maj. E. B. Strickler.
Aug. 5	Aug. 15	Westinghouse-Church-Kerr, New York City.	Aug. 16	Maj. L. L. Calvert...	Maj. H. K. Love.
Dec. 7	Dec. 12	J. Henry Miller (Inc.), Baltimore, Md.	Dec. 13	Maj. Nichols.....	Capt. N. A. Hockman.
Nov. 27	Nov. 28	Bryce Building Co., Fort Worth, Tex.	Dec. 4	Maj. Werth.....	Capt. W. P. Rethrock.
Dec. 29	1918. Jan. 1	Wm. Steele & Sons, Philadelphia, Pa.	1918. Jan. 10	Lt. Col. Sawyer....	Lt. Col. Morden.
Dec. 5	1917. Dec. 8	Chas. Weitz & Sons, Des Moines, Iowa.	1917. Dec. 12	Lt. Col. Betts.....	Capt. Montgomery.
Dec. 13	Dec. 18	Wm. Steele & Sons, Philadelphia, Pa.	Dec. 19	Lt. Col. Sawyer.....	Lt. Col. Morden.
Dec. 8	Dec. 11	Central Manufacturing District, Chicago, Ill.	Dec. 12	...do.....	Capt. A. H. MoComb.
Dec. 15	Dec. 18	R. D. Yoakum, Leavenworth, Kans.	Dec. 19	Maj. Werth.....	Capt. Farrington.
Dec. 13	Dec. 15	Westlake Construction Co., St. Louis, Mo.	...do....	Lt. Col. Sawyer.....	Maj. Fordyce.
Dec. 10	Dec. 12	The Austin Co., Cleveland, Ohio.	Dec. 13	...do.....	Capt. J. M. Taylor.

Record of jobs handled by the Construction

Corrected to

Location.	Request.		Authorization.		Authorized name.	Handled by—
	Source.	Date.	Date.	No.		
San Juan, P. R.....	Quartermaster	1917. Dec. 13	1917. Dec. 27	22	Camp Las Casas, San Juan, P. R.	Capt. R. W. Beal..
Belvoir, Va.....	Engineer Corps.	Dec. 15	...do....	23	Camp A. A. Humphreys, Belvoir, Va.	...do.....
Scows and lighters..	Quartermaster	Dec. 20	Dec. 29	24	Construction of scows and lighters.	Mr. J. A. Tarbell..
Charleston, W. Va..	Ordinance....	Dec. 27	1918. Jan. 2	25	Charleston (W. Va.) ordnance powder plant.	Capt. F. S. Marlow.
Leon Springs, Tex..	Quartermaster	Dec. 21	1917. Dec. 31	26	Leon Springs Training Camp, Tex.	Mr. J. A. Tarbell..
Norfolk terminal....	...do.....	Dec. 15	1918. Jan. 3	27	Norfolk quartermaster terminal.	Capt. R. W. Beal.
Atlanta (Ga.) repair shop.	...do.....	Dec. 17	Jan. 4	28	Fort McPherson, Atlanta, Ga., Mechanical Repair Shop Unit 305.	Mr. J. A. Tarbell..
Vancouver, Wash..	...do.....	1918. Mar. 11	Mar. 22	29	Vancouver Barracks, Wash.	...do.....
Baltimore repair shop.	...do.....	1917. Dec. 19	Jan. 7	30	Mechanical Repair Shop Unit 306, Baltimore, Md.	...do.....
Fox Hill Clearing Hospital.	Surgeon General.	Dec. 26	Jan. 9	31	Clearing hospital, Fox Hill, N. Y.	Capt. J. H. Clark..
War and Navy telephone building.	President's fund.	Dec. 28	...do....	32	Telephone switchboard building, Washington, D. C.	Mr. J. A. Tarbell..
Otisville Hospital..	Surgeon General.	Oct. 24	...do....	33	Tuberculosis Hospital, Otisville, N. Y.	Capt. J. H. Clark..
New Britain, Conn.	Ordinance....	1918. Jan. 7	...do....	34	Assembly Building, New Britain, Conn.	Capt. F. S. Marlow.
Augusta Arsenal depot.	...do.....	Jan. 9	Jan. 12	35	Augusta Arsenal depot.	...do.....
Saybrook Proving Grounds.	...do.....	Jan. 7	Jan. 15	36	Saybrook Proving Grounds.	...do.....
Colonia (N. J.) Hospital.	Surgeon General.	1917. Dec. 2	...do....	37	General Hospital No. 3, Colonia, N. J.	Capt. J. H. Clark.
Rockwell Field.....	Signal Corps..	Dec. 22	Jan. 25	38	Rockwell Field, San Diego, Cal.	Capt. Dunbar....
Petrolia, Tex.....	...do.....	1918. Jan. 23	Jan. 26	39	Gas plant No. 3, Petrolia, Tex.	...do.....
Hoboken expeditionary depot.	Quartermaster.	1917. Nov. 2	Jan. 29	40	Hoboken quartermaster expeditionary storage depot.	Capt. R. W. Beal.
Sandy Hook ordnance depot.	Ordinance....	1918. Jan. 28	Jan. 31	41	Sandy Hook ordnance depot.	Capt. F. S. Marlow.
Middletown ordnance depot.	...do.....	Jan. 29	Feb. 1	42	Middletown ordnance depot.	...do.....
Governors Island...	Quartermaster	1917. Dec. 16	Feb. 2	43	Extension of Governors Island, quartermaster depot, New York City.	Mr. J. A. Tarbell..

¹ Constructed by day labor under chief quartermaster.

Division of the War Department—Continued.

July 1, 1918.

Approval by Secretary of War.		Contractor. Name.	Contract dated.	Quartermasters.	
Requested.	Received.			Supervising.	Constructing.
1918. Jan. 10	1918. Jan. 12	Purdy & Henderson, New York and Havana. P. F. Gormley Co., Washington, D. C.	1918. Jan. 19	Maj. Nichols.....	Maj. Steward.
Jan. 4	Jan. 9		Jan. 9	.....do.....	Maj. Kebbon.
1917. Dec. 17	1917. Dec. 22	Various contractors.....	1917. Dec. 29	Lt. Col. Couper.....	Various.
1918. Jan. 12	1918. Jan. 12	Thompson-Starrett, New York City.	1918. Jan. 18	Maj. Morava.....	Maj. McConnel.
Jan. 10	...do....	Weston & Kroeger Co., San Antonio, Tex.	Jan. 12	Maj. Nichols.....	Capt. Douglas.
Jan. 19	Jan. 21	Porter Bros., Detroit, Mich.	Jan. 22	Maj. L. L. Calvert..	Col. M. A. Butler.
Jan. 17	Jan. 19	Mackie Construction Co., Atlanta, Ga.	Jan. 20	Maj. Abadie.....	Maj. A. M. Shaw.
(1)	(1)	(1)	(1)	Maj. Lockett.....	Capt. Edwards.
Jan. 18	Jan. 23	Edw. L. Scheidhelm Co., Baltimore, Md.	Jan. 24	Maj. Abadie.....	Maj. Ward Arnold.
Feb. 1	Feb. 5	Thompson-Starrett, New York City.	Feb. 7	Maj. Nichols.....	Maj. Simmons.
Jan. 4	Jan. 6	Frank L. Wagner, Washington, D. C.	Jan. 7	Maj. Werth.....	Capt. Sweeney.
Jan. 11	Jan. 16	R. H. Howes Construction Co., New York City.	Jan. 21	Maj. Nichols.....	Maj. Radcliffe.
Jan. 17	Jan. 21	Aberthaw Construction Co., Boston, Mass.	Jan. 22	Maj. Lockett.....	Maj. Conklin.
...do....	...do....	McKenzie Building Co., Augusta, Ga.	Jan. 21	Maj. Abadie.....	Maj. Munoz.
Feb. 1	Feb. 5	Sperry Engineering Co., New Haven, Conn.	Feb. 7	Maj. Lockett.....	Maj. Conklin.
Jan. 16	Jan. 19	Caldwell-Wingate Co., New York City.	Jan. 21	Maj. Nichols.....	Maj. L. M. Lang.
Feb. 1	Jan. 21	Wm. E. Hampton Co., San Diego, Cal.	.....	Lieut. Col. Walbridge	Lieut. C. G. Spencer.
...do....	Feb. 7	Deiter & Wenzel Construction Co., Wichita, Kans.	Mar. 2	Maj. Werth.....	Maj. W. P. Rothrock.
Feb. 8	Feb. 18	Barney-Hooke-Ahlers Construction Corporation, New York City.	Feb. 23	Lieut. Col. Sawyer..	Lieut. W. B. Ashby.
Feb. 9	...do....	Amsterdam Building Co., (Inc.), New York City.	Feb. 18	Maj. Lockett.....	Capt. Lockwood.
Feb. 13	Feb. 19	Jas. Black Masonry & Construction Co., St. Louis, Mo.	Feb. 23	Maj. Prichett.....	Maj. W. B. Gray.
Feb. 9	Feb. 18	Whitney Co., New York City.	.....	Post quartermaster..	Maj. Malthy.

Record of jobs handled by the Construction

Corrected to

Location.	Request.		Authorization.		Authorized name.	Handled by—
	Source.	Date.	Date.	No.		
San Antonio, Tex..	Signal Corps..	1918. Dec. 28	1918. Feb. 5	44	Fort Sam Houston, (Tex.), Signal Corps warehouses.	Capt. Dunbar.....
Americus, Ga.....	do.....	1918. Jan. 18	do.....	45	Southern Field, Americus, Ga.	do.....
West Point, Miss.....	do.....	do.....	do.....	46	Payne Field, West Point, Miss.	do.....
Rochester, N. Y.....	do.....	1917. Dec. 28	do.....	47	Rochester Aerial Photographic School.	do.....
Middletown (S. C.) warehouses.	do.....	1918. Jan. 21	Feb. 7	48	Middletown Signal Corps warehouses, Middletown, Pa.	do.....
Fort Sill Aerial School.	do.....	Jan. 16	Feb. 6	49	Fort Sill School for Aerial Observers.	do.....
Food Administration Building.	Emergency....	1917. Dec. 19	Feb. 8	50	Building No. 2, U.S. Food Administration, Washington, D. C.	Mr. J. A. Tarbell..
Overseas storage and ice depot.	Pershing.....	1918. Jan. 26	Feb. 9	51	Meat storage and ice making plants 2, 3, 4, France.	Mr. Phillips.....
Aberdeen Proving Grounds.	Ordnance.....	Jan. 19	Jan. 26	52	Aberdeen Proving Grounds.	Capt. F. S. Marlow
Jeffersonville, Ind..	Quartermaster	do.....	Feb. 13	53	Jeffersonville quartermaster interior storage depot.	Mr. J. A. Tarbell..
Bush Terminal Barracks.	Director of storage.	Jan. 30	Feb. 14	54	Bush Terminal Barracks.	Capt. R. W. Beal..
National Army hospital increases.	Surgeon General.	1917. Dec. 26	Feb. 15	55	Additional hospital construction at National Army cantonment.	Capt. J. H. Clark..
National Guard hospital increases.	do.....	do.....	do.....	56	Additional hospital construction at National Guard camps.	do.....
Nashville, Tenn....	Ordnance.....	1918. Feb. 9	do.....	57	Nashville (Tenn.) ordnance powder plant.	Capt. F. S. Marlow
Tullytown, Pa.....	do.....	Feb. 15	Feb. 23	58	Tullytown bag-loading plant.	do.....
Camp Stanley, Leon Springs.	Quartermaster	Jan. 21	do.....	59	Camp Stanley.....	Capt. R. W. Beal..
Camp Kelly, San Antonio.	Signal Corps..	Jan. 30	do.....	60	Camp Kelly (S. C.) warehouses.	Capt. Dunbar.....
Newport News, Va..	Quartermaster	Jan. 4	Feb. 28	61	Newport News (Va.) temporary housing.	Capt. R. W. Beal..
Fort Oglethorpe, Ga.	Surgeon General.	1917. Dec. 26	do.....	62	Fort Oglethorpe (Ga.) addition to base hospital.	Capt. J. H. Clark..
Chicago, Ill.....	Quartermaster	1918. Feb. 8	Feb. 8	63	Permanent Chicago depot warehouses.	Mr. J. A. Tarbell..
Saltville, Va.....	Ordnance.....	1917. Dec. 27	Mar. 1	64	Chemical plant No. 4	Capt. F. S. Marlow
Montgomery, Ala...	Signal Corps...	1918. Feb. 12	Mar. 2	65	Montgomery (Ala.) Signal Corps plane and engine repair shop.	Capt. Dunbar.....

Division of the War Department—Continued.

July 1, 1918.

Contractor.		Contract dated.	Quartermasters.	
Approval by Secretary of War.			Supervising.	Constructing.
Requested.	Received.	Name.		
1918.	1918.	1918.		
		Thomas Herman Co., Fort Sam Houston, Tex.	Maj. Hyland	Capt. Ed. Burns.
Feb. 6	Feb. 8	Hardaway Construction Co., Columbus, Ga.	do.	Lieut. Felix Roche.
do.	Feb. 7	Geo. J. Glover, New Orleans, La.	do.	Lieut. J. MacInerny.
		A. W. Hopeman & Sons, Rochester, N. Y.	do.	Mr. Nason.
Feb. 13	Feb. 21	Wells Bros. Co., Chicago, Ill.	Mar. 13	Capt. J. W. Cramer.
		Selden-Breck Co., St. Louis, Mo.	do.	Lieut. G. M. Foster.
		Geo. A. Fuller, Washington, D. C.		Maj. W. A. Starrett.
		Engineer Corps, France	Mr. Phillips	Engineer Corps, France.
		Maryland Dredging Co.	Maj. Wallace	Col. Philips.
Feb. 20	Feb. 26	Caldwell & Marshall Co., Columbus, Ind.	Feb. 27	Lieut. Col. Sawyer..
				Maj. H. Montgomery.
Feb. 16	Feb. 23	Wm. Crawford, New York City.	Feb. 21	Maj. Lockett
				Capt. Whitelaw.
do.	do.	Various contractors	Feb. 20	Maj. Nichols
				Various.
do.	do.	do.	do.	Do.
		Dupont Engineering Co., Wilmington, Del.	Jan. 29	Maj. Morava
				Maj. W. M. Wood.
Feb. 12	Feb. 13	The Foundation Co., New York City.	Jan. 21	Capt. Bracken
				Maj. Barry.
Jan. 10	Jan. 12	Weston & Kroeger Co., San Antonio, Tex.	Jan. 11	Maj. Nichols
				Capt. Douglas.
		Stone & Webster, Boston, Mass.		Maj. Hyland
				Capt. Ed. Burns.
Feb. 14	Feb. 18	Hampton Roads Engineering & Construction Co., Hampton, Va.	Feb. 28	Maj. L. L. Calvert
				Maj. H. K. Love.
Feb. 25	Mar. 1	Park-Grimes Co., Chattanooga, Tenn.	Feb. 23	Maj. Lalst
				Maj. M. H. Shute.
		Central Manufacturing District, Chicago, Ill.	Mar. 1	Lieut. Col. Sawyer..
				Maj. Nelson.
Mar. 6	Mar. 11	Frazer Brace Co., New York City.	Feb. 25	Maj. Werth
				Maj. Widdicombe.
		J. H. Alexander Co., Memphis, Tenn.		Maj. Hyland
				Lieut. J. McInerney.

Record of jobs handled by the Construction

Corrected to

Location.	Request.		Authorization.		Authorized name.	Handled by—
	Source.	Date.	Date.	No.		
Fort McPherson, Ga	Surgeon General.	1918. (1)	1918. Mar. 2	66	Fort McPherson, Ga.	Capt. J. H. Clark..
Fort Riley, Kans....	.....do.....	(1)	Mar. 5	67	Fort Riley, Kans....	.....do.....
Takoma Park, Washington, D.C.	.....do.....	(1)	.....do.....	68	Walter Reed General Hospital.	.....do.....
Allesandro, Cal.....	Signal Corps..	Jan. 28	Mar. 3	69	March Field, Allesandro, Cal.	Capt. Dunbar.....
Mills Station, Sacramento, Cal.	.....do.....	Feb. 11	.....do.....	70	Mather Field, Mills Station, Sacramento, Cal.	.....do.....
Florence Field, Fort Omaha, Nebr.	.....do.....	Feb. 14	Mar. 4	71	Florence Field, Fort Omaha, Nebr.	.....do.....
Woodbury, N. J.....	Ordinance.....	Feb. 26	Mar. 4	72	Woodbury bag loading plant.	Capt. F. S. Marlow
National Army cantonments.	Quartermaster.	(1)	(1)	73	National Army cantonments.	Lieut. Rogers.....
National Guard camps.	.....do.....	(1)	(1)	74	National Guard camps.	Capt. R. W. Beal..
Fort Bliss, Tex.....	.....do.....	(1)	(1)	75	Fort Bliss, Tex.....	Mr. J. A. Tarbell..
Springfield, Mass...	Ordinance.....	Feb. 26	Mar. 6	76	Springfield Armory, Mass.	Capt. F. S. Marlow
Azalea, N. C.....	Surgeon General.	Feb. 19	Mar. 7	77	Azalea (N. C.) Tuberculosis Hospital.	Capt. J. H. Clark..
Cape May, N. J.....	.....do.....	Feb. 16	.....do.....	78	General Hospital No. 11, Cape May, N. J.	.....do.....
Mineola, L. I.....	Signal Corps..	Feb. 14	.....do.....	79	Signal Corps Aviation Field, Mineola, L. I.	Capt. Dunbar.....
Mount Clemens, Mich.	.....do.....	.....do.....	.....do.....	80	Signal Corps Aviation Field, Mount Clemens, Mich.	.....do.....
Rantoul, Ill.....	.....do.....	.....do.....	.....do.....	81	Signal Corps Aviation Field, Rantoul, Ill.	.....do.....
Belleville, Ill.....	.....do.....	.....do.....	.....do.....	82	Signal Corps Aviation Field, Belleville, Ill.	.....do.....
Fairfield, Ohio.....	.....do.....	.....do.....	.....do.....	83	Signal Corps Aviation Field, Fairfield, Ohio.	.....do.....
Fort Bayard, N. Mex.	Surgeon General.	Feb. 19	.....do.....	84	Fort Bayard (N. Mex.) General Hospital.	Capt. J. H. Clark..
Roland Park, Md...	.....do.....	Mar. 1	Mar. 12	85	General Hospital No. 7, Roland Park, Md.	.....do.....
Near Fort Monroe, Va.	Coast Artillery and Signal Corps.	Feb. 15	Mar. 19	86	Camp Abraham Eustis.	Capt. R. W. Beal..
Edgewood, Md.....	Ordinance.....	Mar. 14	Mar. 20	87	Gunpowder Reservation power plant.	Capt. F. S. Marlow.
Do.....	.....do.....	.....do.....	.....do.....	88	Gunpowder Reservation chlorine and caustic soda plant.	.....do.....
Rock Island, Ill.....	.....do.....	Mar. 18	.....do.....	89	Additional construction, Rock Island Arsenal.	.....do.....
Asheville, N. C.....	Surgeon general.	Mar. 16	Mar. 22	90	General Hospital No. 19.	Capt. J. H. Clark.
Various.....	Signal Corps..	Feb. 12	Mar. 29	91	Signal Corps training camps, general.	Capt. Dunbar.....

Appendices.

Division of the War Department—Continued.

July 1, 1918.

Contractor.		Name.	Contract dated.	Quartermasters.	
Approval by Secretary of War.				Supervising.	Constructing.
Requested.	Received.				
1918.	1918.	Southern Ferro Concrete Co., Atlanta, Ga.	1918.	Maj. Laist.....	Capt. H. G. Palmer.
		Gray Construction Co.		do.....	Maj. F. T. Herman.
		Skinker & Garrett.....		Maj. Nichols.....	Depot Quartermaster, Washington, D. C.
Feb. 7	Feb. 7	Twohy Bros.....		Maj. Hyland.....	Capt. Carruthers.
Feb. 28	Mar. 13	McDonald & Kahn, San Francisco, Cal.		do.....	Lieut. Burnham.
		E. A. Wilkinson & Co.....		do.....	Lieut. H. C. McNeil.
Feb. 12	Feb. 13	McArthur Bros. Co., New York City.	Feb. 13	Capt. Bracken.....	Maj. C. N. Green.
		Various contractors.....		Various.....	Various.
		do.....		Majs. Cook and Laist	Do.
		Jennings Construction & Engineering Co., El Paso, Tex.		Maj. Lockett.....	Capt. Dascomb.
		Casper Ranger Co., Holyoke, Mass.		Maj. Lathbury.....	C. O. Springfield
Mar. 8	Mar. 12	Gudge & Co., Atlanta Ga.	Mar. 13	Maj. Abadie.....	Armory. Maj. Jenkins.
		M. & R. Division.....		M. & R. Division...	Capt. Starr.
		Cloug Bourne Corporation..		Maj. Hyland.....	Capt. McMath.
		Walbridge Aldinger Co.....		do.....	Mr. Kingsbury.
		English Bros.....		do.....	Mr. Schenk.
		Unit Construction Co.....		do.....	Mr. F. L. Brown.
		Dayton Lumber & Manufacturing Co., Dayton, Ohio.		do.....	Mr. J. K. Grannis.
Mar. 19	Mar. 22	V. E. Vare, El Paso, Tex.		Maj. Lockett.....	Capt. Dillon.
		J. Henry Miller (Inc.), Baltimore, Md.		Maj. Nichols.....	Capt. Hockman.
Mar. 19	Mar. 22	Winston & Co., Richmond, Va.	Mar. 26	Maj. Lockett.....	Maj. A. H. Lloyd.
		The Foundation Co., New York City.	Mar. 14	Maj. Wallace.....	Maj. Ellicott.
		do.....	do.	do.....	Do.
Feb. 5	Feb. 6	Walsh Construction Co., Davenport, Iowa.		Maj. Lathbury.....	Commanding officer, Rock Island Arsenal.
		No contractor.....		Maj. Abadie.....	None.
		Various contractors.....		Maj. Hyland.....	Various.

Record of jobs handled by the Construction

Corrected to

Location.	Request.		Authorization.		Authorized name.	Handled by—
	Source.	Date.	Date.	No.		
San Antonio, Tex..	Signal Corps..	1918. Feb. 26	1918. Mar. 29	92	Camp John Wise....	Capt. Dunbar.....
Do.....	do.....	Mar. 25	do.....	93	Camp Kelly No. 1 School for Bak- ers.	do.....
Denver, Colo.....	Surgeon gen- eral.	Mar. 21	Apr. 2	94	Denver (Colo.) Tu- berculosis Hospi- tal.	Capt. J. H. Clark..
Lakehurst, N. J....	Ordinance.....	Apr. 1	do.....	95	Gunpowder Reser- vation experi- mental grounds.	Capt. F. S. Mar- low.
Dunwoody Instit- ute.	Signal Corps..	Mar. 29	do.....	96	Aviation Mechan- ics' Training School, St. Paul, Minn.	Capt. Dunbar.....
Boston, Mass.....	Quartermaster..	do.....	Apr. 6	97	Boston quartermas- ter terminal.	Capt. R. W. Beal..
San Antonio, Tex..	do.....	May 15	June 1	98	Mechanical Repair Shop Unit 304.	do.....
Jefferson Barracks, Mo.	do.....	Apr. 2	Apr. 13	99	Jefferson Barracks, Mo.	do.....
Columbus, Ohio....	do.....	Apr. 13	Apr. 25	100	Columbus quartermas- ter interior storage depot.	do.....
Schenectady, N. Y.	do.....	Apr. 4	Apr. 13	101	Schenectady quar- termaster interior storage depot.	do.....
New Cumberland, Pa.	do.....	do.....	do.....	102	New Cumberland quartermaster in- terior storage de- pot.	do.....
Washington, D. C..	War Depart- ment.	Apr. 3	Apr. 16	103	Temporary office building, Wash- ton, D. C.	do.....
Dayton, Ohio.....	Signal Corps..	Mar. 28	Apr. 18	104	Final testing field No. 1, Dayton, Ohio.	Capt. Dunbar.....
Buffalo, N. Y.....	do.....	do.....	do.....	105	Final testing field No. 2, Buffalo, N. Y.	do.....
Detroit, Mich.....	do.....	do.....	do.....	106	Final testing field No. 3, Detroit, Mich.	do.....
Elizabeth, N. J....	do.....	do.....	do.....	107	Final testing field No. 4, Elizabeth, N. J.	do.....
Markleton, Pa.....	Surgeon Gen- eral.	Apr. 6	Apr. 19	108	General Hospital No. 17, Markleton, Pa.	Mr. Strong.....
Watervliet Arsenal, N. Y.	Ordinance.....	Apr. 16	do.....	109	Watervliet Arsenal, N. Y.	Capt. Marlow.....
Savanna, Ill.....	do.....	Apr. 18	do.....	110	Savanna Proving Grounds, Ill.	do.....
New Haven, Conn..	Surgeon Gen- eral.	Apr. 6	do.....	111	General Hospital No. 16, New Haven, Conn.	Mr. Strong.....
Charleston, S. C....	Quartermaster.	Apr. 12	Apr. 20	112	Charleston (S. C.) animal embarka- tion depot.	Capt. R. W. Beal..
Erie, Pa.....	Ordinance.....	Apr. 20	Apr. 23	113	Housing project for the American Brake-Shoe & Foundry Co.	Capt. Marlow.....
New York Arsenal..	do.....	Apr. 18	do.....	114	New York Arsenal..	do.....

¹ Not required by this office.

Division of the War Department—Continued.

July 1, 1918.

Approval by Secretary of War.		Contractor. Name.	Contract dated.	Quartermasters.	
Requested	Received.			Supervising.	Constructing.
1918.	1918.	Stone & Webster, Boston, Mass.	1918.	Maj. Hyland.....	Capt. Ed. Burns.
		do.....		do.....	Do.
Apr. 2		C. S. Lambie Co., Denver, Colo.		Maj. Abadie.....	Maj. Wm. J. Camroa.
		Chas. R. Hedden, Newark, N. J.	Mar. 26	Maj. Wallace.....	Capt. W. S. Bacon.
		Geo. J. Grant Construction Co., St. Paul; Pike & Cook Co.; Belden, Porter & Gray (plumbing).		Maj. Hyland.....	Lieut. Nason.
		W. F. Kearns, Boston, Mass.		Maj. L. L. Calvert.....	Maj. Chas. R. Gow.
				Maj. Abadie.....	
		Wm. Sutherland Building & Construction Co., St. Louis, Mo.		Maj. Lockett.....	Capt. T. B. Motz.
		Hunkin-Conkey Construction Co., Cleveland, Ohio.		Lieut. Col. D. H. Sawyer.	Maj. Quilty.
Apr. 5	Apr. 9	Feeny & Sheehan Building Co.	Apr. 11	do.....	Maj. R. C. Smith.
Apr. 26	May 2	Bates & Rogers Construction Co., Chicago, Ill.; J. A. J. Black Masonry & Construction Co., St. Louis, Mo.	Apr. 26	do.....	Maj. W. Morava.
(1)	(1)	Day labor.....		Col. Walbridge.....	Maj. Carlton, Capt. F. M. Weller.
(1)	(1)	do.....		Maj. Hyland.....	Mr. J. K. Grannis.
Apr. 16	Apr. 25	John W. Cowper Co. (Inc.), Buffalo, N. Y.	Apr. 29	do.....	Maj. McCaulley.
Apr. 29	May 2	Walbridge, Aldinger Co., Detroit, Mich.	May 2	do.....	Lieut. R. K. Vinton.
(1)	(1)	Edw. M. Waldron (Inc.), Newark, N. J.	May 18	do.....	Lieut. Lindalney.
Apr. 20	Apr. 25	Dawson Construction Co., Pittsburgh, Pa.	Apr. 25	Maj. Nichols.....	Capt. Paterno.
(1)	(1)	Fred. T. Ley Co.....		Maj. Lathbury.....	C. O., Watervliet Arsenal.
Apr. 26	May 2	Walsh Construction Co., Davenport, Iowa.		Maj. J. W. Cerny.....	Capt. C. C. Chase.
Apr. 22	Apr. 24	Sperry Engineering Co., New Haven, Conn.	Apr. 24	Maj. Nichols.....	Capt. F. C. Starr.
Apr. 5	Apr. 17	1, Mason & Hanger; 2, Dronon Contracting Co., subcontractor.		Maj. Calvert.....	Maj. J. W. Lee.
(1)	(1)	Henry Shenk Co., Erie, Pa.		Maj. Mavor.....	Maj. E. Bradbury.
(1)	(1)	Northeastern Construction Co.		Maj. Lathbury.....	K. O., New York Arsenal.

Record of jobs handled by the Construction

Corrected to

Location	Request		Authorization		Authorized name.	Handled by—
	Source.	Date.	Date.	No.		
Dayton, Ohio.....	Signal Corps..	1918. May 4	1918. June 11	141	Aviation general supply depot, Dayton, Ohio.	Capt. Dunbar.....
Lake Charles, La.....	do.....	May 10	June 13	142	Gerstner field, Lake Charles, La.	do.....
Essington, Pa.....	do.....	May 11	June 18	143	Chandler Field, Essington, Pa.	do.....
Houston, Tex.....	do.....	May 21	do.....	144	Ellington Field, Houston, Tex.	do.....
New York, N. Y....	Quartermaster	June 13	June 25	145	Provost guard quarters, New York City.	Capt. Beal.....
Long Island.....	Gas Defense...	June 18	June 26	146	Gas defense plant, Long Island.	do.....
Little Rock, Ark...	Signal Corps..	Mar. 4	do.....	147	Aviation general warehouse, Little Rock, Ark.	Capt. Dunbar.....
Brunswick, Ga.....	Ordnance.....	June 29	July 1	148	Brunswick plant of the Butterworth Judson Corporation.	Capt. Marlow.....
Boston, Mass.....	Quartermaster	June 26	July 5	149	Boston temporary warehouse.	Capt. Beal.

Division of the War Department—Continued.

July 1, 1918.

Contractor.		Name.	Contract dated.	Quartermasters.	
Approval by Secretary of War.				Supervising.	Constructing.
Requested	Received.				
1918.	1918.	None.....	1918.	Maj. Hyland.....	Lieut. E. G. Engbretson.
		American Construction Co.....		do.....	
				do.....	
				do.....	
July 15	Aug. 5	Rangely Construction Co.....		Maj. Werth.....	Maj. Simmons.
		Barney-Ahlers Co.....		do.....	Do.
June 26	July 6	Geo. W. Donaghy Co.....		Maj. Hyland.....	Capt. H. M. Armstrong.
			July 8		
		W. F. Kearns Co.....	July 6	Maj. Fiske.....	Maj. Gow.

APPENDIX I.

MEXICAN BORDER—REFRIGERATORS—ANNUAL REPAIRS TO BUILDINGS, ETC.—SPECIAL REPAIRS, ALTERATIONS, AND IMPROVEMENTS—RENTALS AND LODGINGS—PURCHASE OF LANDS—REVO-CABLE LICENSES, LEASES, ETC.—LOSSES BY FIRE, STORM, FLOODS, ICE, ETC.

MEXICAN BORDER.

On the Mexican border the following amounts have been expended under the various appropriations during the fiscal year 1918 for construction work for the Army:

Barracks and quarters-----	\$228,607.90
Construction and repair of hospitals-----	1,676.43
Roads, walks, wharves, and drainage-----	3,613.00
Supplies, services, and transportation-----	61,613.82
Supplies, services, and transportation (purchase of fire apparatus)-----	10,000.60

REFRIGERATORS.

During the fiscal year 1918 purchases of refrigerators were made, including those contracted for in large lots for distribution to posts, camps, and cantonments on approved requisition, from the appropriation barracks and quarters in the amount of \$233,841.07.

ANNUAL REPAIRS TO BUILDINGS, ETC.

Based on the estimates of March 1, 1917, received from military posts and depots, apportionments were made to departments and independent stations at the beginning of the fiscal year 1918 for annual repairs to buildings and systems. From the apportionments to departments, allotments were made to each post by the department commanders within the limits of the funds available. The total amount apportioned for annual repairs from each appropriation of the fiscal year 1918, not including the Philippine Island, was approximately as follows:

Barracks and quarters: General repairs to buildings-----	\$665,297.00
Military post exchanges: Repairs to post exchanges, gymnasiums, bowling alleys, gymnastic apparatus, etc-----	7,965.00
Supplies, services, and transportation, Quartermaster Corps:	
Repairs to reservation fences, lighting and heating plants, exterior lighting and heating systems, lighting and heating within buildings, bakery buildings, bake ovens and equipment, ice and refrigerating plants, and laundry buildings--	\$182,516
Repairs to water systems and pump houses, sewer systems, sewage disposal plants and crematories, plumbing in buildings and fire apparatus-----	153,133
Repairs to flagstaffs, picket lines, and electric bell systems--	10,221
Railroad equipment-----	10,054
	360,924.00
Roads, walks, wharves, and drainage: Repairs to roads, walks, curbs, gutters, railroad tracks, wharves, sea walls, retaining walls, drains and drainage; also improvement of grounds-----	196,261.00
Shooting galleries and ranges: Repairs to buildings on target ranges, etc--	12,111.00
Construction and repair of hospitals: Repairs to hospital buildings-----	151,396.00
Quarters for hospital stewards: Repairs to hospital stewards' quarters----	14,429.00

Special repairs, alterations, and improvements.—In addition to the annual appointments for repairs as stated above, expenditures were authorized in the course of the past fiscal year for special repairs, including the Mexican Border expenditures (the necessity for which could not be anticipated when the annual estimates were prepared), and for alterations and improvements in buildings, exterior systems, and grounds of the various military posts and stations.

The approximate amount expended for special repairs, alterations, etc., for each appropriation was as follows:

Barracks and quarters (including screening, storm doors, etc.....)	\$522,430.75
Military post exchanges.....	35,367.44
Construction and repair of hospitals.....	142,801.10
Quarters for hospital stewards.....	669.41
Supplies, services and transportation, Quartermaster Corps.....	614,962.70
Roads, walks, wharves, and drainage.....	190,821.59
Shooting galleries and ranges.....	5,794.99
Civilian military training camps.....	3,531.65
Inland and port storage and shipping facilities.....	144.10
Seacoast defenses, Philippine Islands and Hawaii.....	400.00
Transportation of the Army.....	330.00
Vocational training for the soldiers.....	300.00
Total.....	1,518,083.73

The approximate amount expended for special repairs, alterations, etc., at camps, cantonments, and miscellaneous stations, for each appropriation was as follows:

Barracks and quarters (including screening in amounts less than \$500 only).....	\$563,258.86
Military post exchanges.....	18,335.89
Construction and repair of hospitals.....	136,063.86
Supplies, services, and transportation, Quartermaster Corps.....	862,661.44
Roads, walks, wharves, and drainage.....	169,730.66
Shooting galleries and ranges.....	18,741.10
Civilian military training camps.....	317.87
Inland and port storage and shipping facilities.....	6,000.00
Total.....	1,774,109.68

RENTALS AND LODGINGS.

The total amount expended for rental of camp sites, storage space, offices, hospitals, artillery ranges, stables, recruiting offices, quarters, lodgings for recruiting parties, etc., for the fiscal year 1918 was approximately \$5,855,666.43 from the appropriation for barracks and quarters, \$100,698.90 from appropriation for supplies, services and transportation, \$494,059.13 from appropriation for shooting galleries and ranges, \$291,389.79 from appropriation for construction and repair of hospitals.

	B. & Q.	S. G. & R.	S. S. & T.	C. & R. of H.
Rental of quarters for officers.....	\$19,887.69			
Rental of barracks.....	138,871.63			
Rental of quarters for N. C. C. and enlisted men.....	115,845.63			
Rental of cantonment and camp sites.....	1,255,889.71			
Rental of artillery ranges.....		\$494,059.13		
Rental of grounds for other military purposes.....	131,087.86			
Rental of stables.....	21,770.34			
Rental of storehouses.....	2,654,742.63			
Rental of offices.....	716,421.46			
Rental of grounds and buildings for hospital purposes.....				\$291,388.79
Rental of buildings for miscellaneous purposes.....	603,279.27			
Rental of recruiting stations.....			\$21,940.29	
Rental of light for recruiting stations.....			10,094.63	
Rental of lodgings for recruiting parties.....			68,663.98	
Total.....	5,855,666.43	494,059.13	100,698.90	291,388.79

PURCHASE OF LAND.

The following is a list of land purchased (by M. and R. branch) during the fiscal year, together with acreage and cost to the Government:

Place.	Acres.	Cost.	Appropriation.
Vancouver Barracks, Wash.....	3,040	\$100,000.00	Special, approved May 12, 1917.
Fort Logan H. Roots, Ark.....	40	2,525.00	Barracks and quarters, 1918.
Schofield Barracks, Hawaii.....	249	20,000.00	Special.
Fort Benjamin Harrison, Ind.....	284	35,500.00	Barracks and quarters, 1917-18.
Fort Bliss T. R., N. Mex.....	600	28,660.00	Special.
Tobyhanna, Pa.....	1,691	5,757.67	Arming, equipping, and training the National Guard, 1918.
Tobyhanna, Pa., right of way.....		1.00	Do.

NATIONAL ARMY CAMPS.

Approximate acreage and annual rental paid therefor.

(Compiled Nov. 15, 1917.)

	Acreage.	Total annual rental.			Annual rental per acre.			Average annual rental for 5-year period.	Average rental per acre per year for 5-year period.	Remarks
		First year.	Second year.	After second year.	First year.	Second year.	After second year.			
Northeastern Department:										
Camp Devens, Ayers, Mass.....	9,622	\$55,264	\$55,264	\$55,264	\$5.74	\$5.74	\$5.74	\$55,264	\$5.74	
Eastern Department:										
Camp Upton, Yaphank, L. I.....	15,646	13,857	13,857	13,857	.88	.88	.88	13,857	.88	
Camp Dix, Wrightstown, N. J.....	8,185	118,566	38,565	38,565	14.48	4.71	4.71	54,175	6.62	High rental first year in lieu of damage to crops.
Camp Meade, Admiral, Md.....	9,669	145,477	72,518	72,518	15.04	7.50	7.50	87,109	9.00	
Camp Lee, Petersburg, Va.....	8,600	109,500	109,500	109,500	12.74	12.74	12.74	109,500	12.74	
Southeastern Department:										
Camp Jackson, Columbia, S. C.....	2,737	7,725	7,725	7,725	2.82	2.82	2.82	7,725	2.82	
Camp Gordon, Atlanta, Ga.....	2,453	14,813	14,813	14,813	6.03	6.03	6.03	14,813	6.03	
Camp Pike, Little Rock, Ark.....	2,800									
Central Department:										
Camp Sherman, Chillicothe, Ohio.....	1,729	25,935	25,935	25,935	15.00	15.00	15.00	25,935	15.00	Crop damage not to exceed \$25,935; additional acreage under condemnation, 600.
Camp Taylor, Louisville, Ky.....	3,651	12,074	12,074	36,282	3.30	3.30	9.93	23,078	6.32	Crop damage, \$90,257
Camp Custer, Battle Creek, Mich.....	5,996	89,940	59,960	59,960	15.00	10.00	10.00	65,956	11.00	Crop damage not to exceed \$4 per acre; additional acreage under negotiation, 2,000.
Camp Grant, Rockford, Ill.....	5,635	112,700	112,700	112,700	20.00	20.00	20.00	112,700	20.00	
Camp Dodge, Des Moines, Iowa.....	2,914	27,359	33,143	33,143	9.38	11.37	11.37	31,967	10.97	Crop damage not fully determined.
Camp Funston, Fort Riley, Kans.....	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
Southern Department:										
Camp Travis, Fort Sam Houston, Tex.....	18,104	53,016	53,016	53,016	2.93	2.93	2.93	53,016	2.93	
Western Department:										
Camp Lewis, American Lake, Wash.....	70,000									Donated by Pierce County.
Total.....	167,741	786,226	609,070	633,278	4.60	3.63	3.77	40,945	3.93	
Average.....										

¹ Located on Government reservation

NATIONAL ARMY CAMPS.

Approximate acreage and annual rental paid therefor.

(Compiled Nov. 15, 1917.)

Name of camp.	Location.	Acreage.	Annual rental.			Average annual rental per acre.			Remarks.
			First year.	Second year.	After second year.	First year.	Second year.	After second year.	
Southeastern Department:									
Camp Green.....	Charlotte, N. C.....	2,407	\$17,826	\$17,826	\$17,826	\$7.40	\$7.40	\$7.40	(Camp site proper rented for only 2 years. Hospital site \$1 for first and second years, \$4,000 for third year. Remount site, \$304 per year for 5 years.
Camp Wadsworth.....	Spartansburg, S. C.....	1,776	1,521	1,521	1,521	.85	.85	.85	
Camp Sevier.....	Greenville, S. C.....	1,900	1	1	1				
Camp Hancock.....	Augusta, Ga.....	1,777	7,305	306		4.11	.17		
Camp Wheeler.....	Macon, Ga.....	2,418	1,328	1,328	1,328	.54	.54	.54	
Camp McClellan.....	Anniston, Ala.....	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	
Camp Sheridan.....	Montgomery, Ala.....	3,760	3,801	3,801	3,801	1.01	1.01	1.01	
Camp Shelby.....	Hattiesburg, Miss.....	3,275	1	1	1				
Camp Beauregard.....	Alexandria, La.....	3,000	1	1	1				
Southern Department:									
Camp MacArthur.....	Waco, Tex.....	1,845	11,411	11,411	11,411	6.18	6.18	6.18	Artillery range of approximately 8,400 acres leased at \$2.39 per acre. Artillery range of approximately 6,000 acres being leased at \$18,000 per year. Lease for rifle range being completed. Lease for artillery range of 28,800 acres being handled.
Camp Logan.....	Houston, Tex.....	3,775	22,179	22,179	22,179	5.87	5.87	5.87	
Camp Bowie.....	Fort Worth, Tex.....	2,186	1	1	1				
Camp Cody.....	Deming, N. M.....	13,520	1	1	1				
Camp Doniphan.....	Fort Sill, Okla.....	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	
Western Department:									
Camp Kearney.....	Linda Vista, Cal.....	12,000	1	1	1				
Camp Fremont.....	Palo Alto, Cal.....	25,000	53,664	53,664	53,664	.15	2.14	2.14	
Total.....		78,639	69,041	112,042		.85	1.42		
Average.....									

¹ Located on Government reservation.

REVOCABLE LICENSES, LEASES, ETC.

Revocable licenses, permits, and leases granted by the War Department during the fiscal year 1918 (so far as shown by the records of this office) were made as follows:

Aqueduct Bridge.—Revocable license, dated November 8, 1917, to the Washington-Virginia Railway Co., to erect a temporary passenger station at the south end of the Government reservation at Rosslyn, Va., and to make water and sewer connections with the Government mains.

Camp Beauregard, La.—Revocable license, dated April 12, 1918, to the Brotherhood of St. Andrew in the United States to erect for social and fellowship purposes, a temporary building.

Fort Crockett, Tex.—Permit: Letter May 29, 1918, from The Adjutant General of the Army to the commanding officer, Fort Crockett, Tex. "You are informed that the committee on training camp activities has approved the application of the Knights of Columbus' request to erect a building at Fort Crockett * * *."

Fort Crook, Nebr.—Permit, January 29, 1918, "Memorandum for Gen. Littell: Confirming our conversation of yesterday, I am directed by the Secretary of War to say that, in view of his assurances to the representatives of the Knights of Columbus, the erection of huts at Fort Crook should go forward as expeditiously as practicable. It should be understood, however, that the decision in the case of these two forts does not in any way constitute a precedent for posts of that character, and that further applications for the erection of such huts are not likely to receive favorable consideration." Respectfully, F. D. Kepple, Secretary's office.

Revocable license, dated March 7, 1918, to the Knights of Columbus to erect for social and fellowship purposes a temporary building in such location as shall be designated by the commanding officer of the post upon certain conditions. (This license was issued in connection with permit January 29, 1918.)

Lease, dated March 19, 1918, for 1.10 acres of the reservation to Henry Platt at \$4.60 per acre.

Fort Des Moines Iowa.—Lease, dated May 14, 1918, to Hal M. Winslow, of Fort De Moines, Iowa, for cutting hay, pasturing stock, and cultivation purposes on the reservation. Consideration: Lessee shall deliver to the quartermaster granary at Fort Des Moines, Iowa, one-half of all the grain, one-half of all the hay cut upon the target range reservation, and two-fifths of all the hay cut upon the military reservation, hay to be delivered by lessee to the quartermaster hay sheds at the post.

Lease, dated May 14, 1918, to C. J. Durrie, of Des Moines, Iowa, a portion of the military reservation, said lessee to deliver to the Government cribs five-eighths of all the corn harvested on the said south half of the southeast quarter of section 33, and one-half of all the corn harvested on the said south half of the southwest quarter of section 34, and shall have the privilege of pasturing such portions of said section as are not suitable for growing corn. Lessee shall mow all the weeds on that part of the latter described tract to be occupied by him for a pasture, on or before September 15, 1918.

Revocable license, dated June 17, 1918, to the Y. M. C. A. to erect and maintain a temporary building on the reservation.

Fort Douglas, Utah.—Revocable license, December 7, 1917, to the Denver & Rio Grande R. R. Co., to construct and maintain a spur track on the Fort Douglas (Utah) Military Reservation leading from its Park City branch to the Army post thereon.

Revocable licenses, permits, and leases granted by the War Department during the fiscal year 1918 (so far as shown by the records of this office) were made as follows:

Fort D. A. Russell.—Revocation of lease dated July 11, 1917, to Hirsig Bros. of Cheyenne, Wyo., for the period from April 1, 1917, to November 1, 1917, for the purpose of raising stock, and cutting hay thereon (\$162.). Lease was dated April 13, 1917.

Camp Forrest, Ga.—License, dated May 17, 1918, to Knights of Columbus, to erect two buildings on the military reservation. Authority on April 25, 1918, The Adjutant General of the Army requested the Commanding General, Southeastern Department, to have this license prepared by the Judge Advocate, Sixth Division, Camp Forrest, Ga.

Camp Funston, Kans.—Revocable license, November 30, 1917, to the Union Light & Power Co., of Junction City, Kans., to construct a 33,000-volt transmission line across the Fort Riley Military Reservation.

Revocable license, December 5, 1917, to the Riverside Light, Power & Gas Co. (See 675.1, Fort Riley, Kans.)

Fort Huachuca, Ariz.—Revocable license, July 3, 1917, F. U. Dunkin, operate and maintain a garage and automobile repair shop with the privilege of handling gasoline and repair parts for automobiles.

Camp Lee, Va.—Revocable license, dated November 10, 1917, to J. L. Vaughn, of Petersburg, Va., to tap the Government water main at the remount depot for use of Lakemont Park. License revoked, effective June 30, 1918, on account of shortage of water supply.

Camp Logan, Tex.—Lease, dated December 20, 1917, to C. E. Schaff, receiver of Missouri, Kansas & Texas Railroad Co. of Texas, for a temporary right of way across certain land leased by the Chamber of Commerce, Houston, Tex., to the Government, under date of July 20, 1917.

Fort Mackenzie.—Lease, dated July 9, 1917, to Bentley & Cooley of Sheridan, Wyo., for 5,440 acres of the military reservation for a period of five years beginning July 1, 1917, at a yearly rental of \$2,750. Renewable for an additional five-year period if approved.

Fort McIntosh, Tex.—License (revocable) dated August 17, 1917, to the Y. M. C. A. to erect and maintain a temporary building (or buildings) on the military reservation of Fort McIntosh, Tex. during the period of the present war. (Pursuant to G. O. No. 70, W. D. 1917.)

Permit dated August 28, 1917 (8th Ind., A. G. O. to Commanding General, Southern Department) in which authority was given to sell mess and club buildings at Fort McIntosh and remove the same when no longer needed by the officers of the Thirty-seventh Infantry.

Fort McPherson, Ga.—Revocable license dated July 25, 1917, to Georgia Railway & Power Co. of Atlanta, Ga., to maintain its electric light line already installed on the Fort McPherson Military Reservation for the purpose of supplying electric lighting to the officers' training camp on the reservation.

Revocable license, dated September 19, 1917, to Central of Georgia Railway Co., to maintain its sidetrack now in existence on the Fort McPherson, (Ga.) Military Reservation.

Revocable licenses, permits, and leases granted by the War Department during the fiscal year 1918 (so far as shown by the records of this office) were made as follows:

Fort Moultrie, S. C.—Revocable license, September 29, 1917, to the Young Men's Christian Association, Charleston, S. C., to repair and improve the building it is now occupying on the Fort Moultrie (S. C.) Military Reservation.

Permit, dated April 16, 1918, to the Coast Guard Station at Fort Moultrie, S. C., to connect with Fort Moultrie water system.

Revocable license, dated August 19, to the Young Men's Christian Association to construct and occupy as an annex to the present building which it is occupying on the reservation an auditorium 40 feet wide by 80 feet long.

Fort Macomb.—Renewal of lease to the Motor League of Louisiana (revocable) the United States Military Reservation at Fort Macomb, La., for a period of five years from the 1st day of July, 1917, at a yearly rental of \$360 payable in advance on the 30th day of June during the continuation of this lease.

Fort Mcade, S. Dak.—Lease dated April 1, 1918, to Gregor Cruickshank, 2,560 acres of the reservation known as the south tract for stock grazing purposes, for cutting hay thereon, or both, as the lessee should desire, for the term of eight months from the 1st day of April, 1918. Consideration \$640 payable eight equal installments on the 1st day of each month during the continuance of this lease.

Mercedes, Tex.—Revocable license, dated November 8, 1917, to Samuel H. Emerson, of Mercedes, Tex., to erect a temporary building at Mercedes, Tex., within the ground leased by the United States for a military cantonment and now occupied by United States troops, and to install and conduct therein a laundry for the accommodation of the said troops.

Fort Missoula.—Lease dated May 11, 1918, to John H. McGuffy, of Missoula, Mont., to lease a portion (120 acres) of the reservation, consideration being one-fifth of all the crops harvested. Lease not accepted by lessee, on account of insufficient supply of water.

Permit ——— to University of Montana to use certain buildings on Fort Missoula Reservation, for intensive training of enlisted men. On May —, 1918, telegram from The Adjutant General gave Chancellor, University of Montana, State Capitol, Helena, Mont., permission to make certain minor altera-

tions in some of the buildings occupied, also use of lockers, ice boxes, certain furniture, and sawmills.

Revocable license, date May 7, 1918, to the county of Missoula, Mont., to occupy and use for the purpose of confining violators of the law therein, the guard house on the Fort Missoula Military Reservation, Mont.

Lease, dated May 31, 1918, to Mallory N. Stickney, of Missoula, Mont., for approximately 40 acres of the military reservation, for a period of 1 year from May 15, 1918. Consideration, lessee is to deliver one-fifth of all crops harvested to such representative of the United States as the post commander may designate.

Fort Monroe, Va.—Revocation of license to John B. Kimberly to conduct, operate, and maintain a general grocery, fish, oyster, and ice business on reservation in the buildings constructed by the late William Baulch under licenses of February 26, 1897, March 17, 1892, September 5, 1894, and May, 1897, which licenses expired with the death of the said William Baulch. On December 14, 1914, the said John Kimberly was granted a license to maintain on the military reservation an automobile garage in a building maintained for such purpose by George F. Adams. License revoked September 11, 1917.

Revocable license permits, and leases granted by the War Department during the fiscal year 1918 (so far as shown by the records of this office) were made as follows:

Fort Monroe, Va.—Revocable license, dated March 12, 1918, to the Adams Express Co., to erect and maintain a temporary building on the main wharf at Fort Monroe, the exact location thereon to be determined by the commanding officer of the post.

Fort Oglethorpe, Ga.—Permit, by telegram dated January 3, 1918, as follows: "Authority granted American Library Association to construct building on Fort Oglethorpe Reservation without expense to Government. McCAIN."

Permit, by telegram dated December 27, 1917, as follows: "Commanding Officer Fort Oglethorpe, Ga., reference letter dated December 6 from Commandant, Medical Officers' Training Camp, Camp Greenleaf, his request for construction without cost to Government of an auditorium for use of Medical Officers' training camp is approved with understanding that upon completion such structure becomes property of United States Government. McCAIN."

(War Department, J. A. G. O., January 8, 1918,—to The A. G.).—"The Chattanooga Railway & Light Co. was granted a license under date of May 19, 1913, to construct, operate, and maintain a railway through the Fort Oglethorpe Military Reservation, this route to be occupied thereby being shown on a blue print attached to the license. This license revoked a former license relative to rates is the general one that the rates for passenger, freight, and express service shall be as low as is consistent with a first-class service."

Fort Omaha, Nebr.—Permit, January 29, 1918, "Memorandum for Gen. Littell: Confirming our conversation of yesterday, I am directed by the Secretary of War to say that, in view of his assurances in the matter to the representatives of the Knights of Columbus, the erection of huts at Fort Omaha and Fort Crook should go forward as expeditiously as practicable. It should be understood, however, that the decision in the case of these two forts does not in any way constitute a precedent for posts of that character, and that further applications for the erection of such huts are not likely to receive favorable consideration." Respectfully, F. D. Keppel, secretary's office.

Camp Pike, Ark.—Revocable license, dated October 6, 1917, to the Belmont Development Co., of Little Rock, Ark., to tap the Government main supplying Camp Pike and to take surplus water therefrom, not exceeding 25,000 gallons per day, for supplying its hotel near Camp Pike (680.44 Camp Pike).

Presidio of San Francisco.—License, October 29, 1917, to the Pacific Gas & Electric Co. to extend its gas mains on Fort Mason Military Reservation.

Radnor Heights, Va.—Revocable license, dated May 16, 1918, to the Potomac Electric Power Co., of Washington, D. C., to string wires across the military road at Radnor Heights, Va., upon the poles of the Washington-Virginia Railway Co., and that the wires shall be carried over the said military road at a height so as to provide a clearance, but less than that under the existing trolley wires of the said railway company.

Fort Riley, Kans.—Revocable license, December 5, 1917, to the Riverside Light, Power & Gas Co., of Abilene, Kans., to construct and maintain an electric transmission line on the Fort Riley Military Reservation, Kans.

Camp Robinson, Wis.—Revocable license, dated December 10, 1917, to the Chicago, Milwaukee & St. Paul Railway Co. to maintain its trackage upon the Camp Robinson (Sparta target range) Military Reservation, Wis.

Fort Stevens, Oreg.—Revocable license, dated June 26, 1918, to the Knights of Columbus to erect and maintain a temporary building for the period of the existing war, unless revoked prior to the termination thereof.

Revocable license, permits, and leases granted by the War Department during the fiscal year 1918 (so far as shown by the records of this office) were made as follows:

St. Louis depot.—License, July 12, 1917, to the Manufacturers' Railway Co. to extend a spur railway track on the St. Louis Arsenal grounds along the west side, extending for a distance of approximately 1,200 feet for the purpose of handling Government supplies in and out of the St. Louis quartermaster depot.

Schofield Barracks.—Revocable license, dated July 16, 1917, to Chaplain Ignatius Fealy, First Field Artillery, to construct a frame building for gymnasium purposes, located approximately 1,100 feet westerly of general library, on south side of road leading from main building of post to cantonment buildings, and construction to be without expense to the United States, and on completion shall be turned over free of debt to the Government and shall become its property.

Fort St. Michael, Alaska.—License, September 21, 1917, to the Northern Commercial Co. to continue its commercial business now being constructed on the St. Michael, Alaska, Military Reservation.

Fort Sam Houston, Tex.—Permission, dated August —, 1917, to the county commissioner, court of Bexar County, Tex., for extension through reservation and use for highway purposes of certain streets upon conditions.

San Diego, Cal.—License to O. S. T. Meyerhoffer (formerly Janus Bros.) to occupy and use wharf lot until December 31, 1917, for harboring and launching flying boats has been canceled—August 6, 1917.

Fort Shafter.—Lease, November 13, 1917 (executed by lessee Oct. 4, 1917), to Chock Look for 35 acres of rice land between the Well Fish Pond and King Street, on the Fort Shafter Military Reservation, in Kona District, Island of Oahu, for a period of five years from July 28, 1917. Terms of lease: Lessee is to deliver to the post quartermaster, Fort Shafter, Hawaii, on King Street, one-fifth of all the proceeds and crops produced on said land.

Fort Sheridan, Ill.—License, August 3, 1917, to the American National Red Cross to erect and occupy for the storage of Red Cross supplies, a building to be constructed of noninflammable material that will occupy about 13,000 square feet of space upon the reservation.

Fort Slocum, N. Y.—Committee on training camp activities approved the application of the Knights of Columbus' request to erect a building on May 29, 1918.

Fort Thomas, Ky.—License, July 16, 1917, to international committee of Y. M. C. A. to erect temporary building for the period of the war on conditions.

Revocable license, dated March 5, 1918, to the Pennsylvania State highway department to locate a stone-crushing plant for the purpose of crushing rock for the State highway extending through the said reservation.

Fort Totten, N. Y.—Revocable license, dated December 12, 1917, to Y. M. C. A. to erect and maintain a temporary building at Fort Totten, N. Y., to be used by this association for the period of the existing war, unless revoked prior to the termination thereof.

Fort Walla Walla, Wash.—Permission, July 3, 1917, to the Militia Bureau for the use of certain buildings at Fort Walla Walla for use of the National Guard of the State of Washington.

West Point, N. Y.—Lease, July 1, 1917, to Helen H. Denton to use restaurant property for a period of one year for \$250 per annum, to be paid quarterly in advance.

Fort William Henry Harrison, Mont.—Lease, dated March 12, 1918, to John Tobin, of Helena, Mont., for sections 1 and 2 in township 10 north, range 5 west, of the Montana principal meridian, in Lewis and Clark County, \$220 per year. Subject to renewal for four consecutive years if approved by the Secretary of War.

Revocable license, permits, and leases granted by the War Department during the fiscal year 1918 (so far as shown by the records of this office) were made as follows:

Fort William Henry Harrison, Mont.—Lease, dated June 12, 1918, to H. W. Child, of Helena, Mont., for a portion of the reservation known as the pasture for the term of one year from March 15, 1918, with the understanding that the lease may be renewed at the option of the Secretary of War. Yearly rental, \$60, payable in advance on the 15th day of March of the present year.

Lease, dated June 12, 1918, to H. W. Child, of Helena, Mont., for a part of the reservation known as the head ranch, comprising approximately 740 acres, at a yearly rental of \$2,000, payable in two equal installments on the 15th day of September and the 15th ———, 1918, for the term of one year. Bond submitted.

Fort Winfield Scott, Cal.—"Authority is hereby given for granting a license, revocable at will by the Secretary of War, to the Y. M. C. A. for the erection and maintenance at Fort Winfield Scott, Cal., of a temporary building in which to carry on the work of the association; this license to be for the period of the existing war, unless revoked prior to the termination thereof." (680.44 Fort Winfield Scott, A. G. O., 11th Ind., Mar. 2, 1918.)

Fort Wingate, N. Mex.—Revocable license, dated May 22, 1918, to the Atchison, Topeka & Santa Fe Railway Co. to change the channel of a branch of the Rio Puerco of the West near Wingate Station upon the Fort Wingate Military Reservation, N. Mex., by the construction of a new channel in the location as shown on the blue print hereto attached.

Wyanet, Ill.—Revocation of lease by Walter Bowan for the use of small tract of land containing 0.09 of an acre and being a part of plat No. 87 of right of way, eastern section, Illinois & Mississippi Canal, situated in the northeast quarter of section 19, Illinois, said tract of land to be used as a boathouse site. Lease dated June 2, 1914. Revoked September 3, 1917.

Losses by fire, storm, floods, ice, etc., during the fiscal year 1918.

LOSSES, BY MONTHS.

Month.	Loss occasioned by—		Total.
	Fire.	Storms, floods, ice, etc.	
1917.			
July.....	\$10,933.84	.....	\$10,933.84
August.....	150.00	\$1,150.00	1,300.00
September.....	8,315.00	.....	8,315.00
October.....	46,731.50	2,315.00	49,046.50
November.....	15,697.86	.....	15,697.86
December.....	112,452.68	1,500.00	113,952.68
1918.			
January.....	76,562.39	24,981.00	101,543.39
February.....	10,000.00	8,550.00	18,550.00
March.....	50,937.95	950.00	51,887.95
April.....	108,378.61	2,947.62	111,326.23
May.....	99,916.85	27,000.00	126,916.85
June.....	19,836.97	1,400.00	21,236.97
Total.....	559,973.65	70,793.62	630,767.27

MISCELLANEOUS LOSSES.

Army posts and barracks.....	\$185,105.72	\$29,746.00	\$214,851.72
National Army camps.....	116,716.45	36,000.00	152,716.45
National Guard camps.....	148,913.48	1,550.00	150,463.48
Miscellaneous camps and stations (Engineers Corps, Signal Corps, etc.).....	27,969.24	2,347.62	30,316.86
Hospitals.....	165.00	.....	165.00
Depots.....	75,496.77	.....	75,496.77
Canal Zone.....	2,500.00	.....	2,500.00
Philippine Islands.....	3,106.99	1,150.00	4,256.99
Total.....	559,973.65	70,793.62	630,767.27

Losses by fire, storm, floods, ice, etc., during the fiscal year 1918—Continued.

POSTS AND BARRACKS.

Month.	Loss occasioned by—		Total.
	Fire.	Storms, floods, ice, etc.	
Apache, Fort, Ariz.....	\$3,500.00		\$3,500.00
Armistead, Fort, Md.....		\$1,200.00	1,200.00
Barrancas, Fort, Fla.....			
Benjamin Harrison, Fort, Ind.....	75.89	950.00	1,025.89
Bliss, Fort, Tex.....	14,868.84		14,868.84
D. A. Russell, Fort, Wyo.....	262.64		262.64
Douglas, Fort, Utah.....	125.00	14,781.00	14,906.00
Ethan Allen, Fort, Vt.....	750.00		750.00
Geo. Wright, Fort, Wash.....	3,000.00		3,000.00
Hamilton, Fort, N. Y.....	(1)		
H. G. Wright, Fort, N. Y.....		1,500.00	1,500.00
Howard, Fort, Md.....		9,000.00	9,000.00
Jay, Fort, N. Y.....	9,910.79		9,910.79
Jefferson Barracks, Mo.....	251.00		251.00
MacArthur, Fort, Cal.....	25.00		25.00
Missoula, Fort, Mont.....	1,800.00		1,800.00
Monroe, Fort, La.....	500.00		500.00
Niagara, Fort, N. Y.....	1,000.00		1,000.00
Oglethorpe, Fort, Ga.....	8,991.00		8,991.00
Ontario, Fort, N. Y.....	450.00		450.00
Plattsburg Barracks, N. Y.....	1,950.00		1,950.00
St. Philip, Fort, La.....	(2)		
Sam Houston, Fort, Tex.....	26,650.82		26,650.82
Sheridan, Fort, Ill.....	2,500.00		2,500.00
Sill, Fort, Okla.....	6,280.00		6,280.00
Slocum, Fort, N. Y.....	52.74	2,315.00	2,367.74
Story, Fort, Va.....	1,700.00		1,700.00
Terry, Fort, N. Y.....	17,000.00		17,000.00
Washington Barracks, D. C.....	21,000.00		21,000.00
Wetherill, Fort, R. I.....	1,000.00		1,000.00
Williams, Fort, Me.....	55,917.00		55,917.00
Wood, Fort, N. Y.....	245.00		245.00
Yellowstone, Fort, Wyo.....	5,000.00		5,000.00
Total.....	185,105.72	29,746.00	214,851.72

¹ Of no value.

² No extra expense.

NATIONAL ARMY CAMPS.

Camp Custer, Mich.....	\$10,500.00	\$34,000.00	\$44,500.00
Camp Devens, Mass.....	66,587.95		66,587.95
Camp Dix, N. J.....	3,975.00		3,975.00
Camp Dodge, Iowa.....	7,360.00		7,360.00
Camp Gordon, Ga.....	3,000.00		3,000.00
Camp Lewis, Wash.....	90.00		90.00
Camp Pike, Ark.....	2,300.00		2,300.00
Camp Taylor, Ky.....	200.00		200.00
Camp Travis, Tex.....	203.50	2,000.00	2,203.50
Camp Upton, N. Y.....	22,500.00		22,500.00
Total.....	116,716.45	36,000.00	152,716.45

NATIONAL GUARD CAMPS.

Camp Beauregard, La.....	\$7,475.00		\$7,475.00
Camp Bowie, Tex.....	6,900.00		6,900.00
Camp Cody, N. Mex.....	12,320.00		12,320.00
Camp Greene, N. C.....	2,500.00		2,500.00
Camp Logan, Tex.....	2,061.93		2,061.93
Camp MacArthur, Tex.....	42,088.50		42,088.50
Camp McClellan, Ala.....	15,200.05	\$1,550.00	16,750.05
Camp Sevier, S. C.....	15,100.00		15,100.00
Camp Shelby, Miss.....	950.00		950.00
Camp Sheridan, Ala.....	42,450.00		42,450.00
Camp Wheeler, Ga.....	1,868.00	1,400.00	3,268.00
Totals.....	148,913.48	2,950.00	151,863.48

Losses by fire, storm, floods, ice, etc., during the fiscal year 1918—Continued.

MISCELLANEOUS CAMPS AND STATIONS.

Month.	Loss occasioned by—		Total.
	Fire.	Storms, floods, ice, etc.	
Alfred Vail Camp, Little Silver, N. J. (Signal Corps).....	\$3,500.00	.....	\$3,500.00
Chickamauga Park, Ga. (Quartermaster Corps).....	5,200.00	.....	5,200.00
Crane Camp, Allentown, Pa. (Medical Corps).....	6,626.80	.....	6,626.80
Furlond Camp, Columbus, N. Mex. (Mexican border).....	172.27	.....	172.27
Jos. E. Johnston Camp, Fla. (Quartermaster Corps training camp).....	1,850.00	.....	1,850.00
Love Field, Dallas, Tex. (Signal Corps).....	60.00	.....	60.00
Mercedes Camp, Mercedes, Tex. (Mexican border).....	.....	\$947.62	947.62
Merritt Camp, N. J. (port of embarkation).....	(¹)	.....	.....
Nichols Camp, La. (C. D. of New Orleans).....	1,500.00	.....	1,500.00
Robinson Camp, Sparta, Wis.	1,800.00	.....	1,800.00
Scott Field, Belleville, Ill. (Signal Corps).....	(²)	.....	.....
Stanley Camp, Leon Springs, Tex.	7,000.00	.....	7,000.00
Tuckahoe, N. J. (ordnance depot).....	260.17	.....	260.17
Total	27,966.24	947.62	28,916.86

HOSPITALS.

Bayard, Fort, N. Mex. (Army General Hospital).....	\$150.00	.....	\$150.00
Detroit, Mich. (Base Hospital No. 36).....	15.00	.....	15.00
Total	165.00	.....	165.00

DEPOTS.

Baltimore Depot, Md.	\$1,837.00	.....	\$1,837.00
Boston Depot, Mass.	425.00	.....	425.00
Chicago, Ill., medical supply depot.	69,134.77	.....	69,134.77
Front Royal Remount Depot, Va.	(²)	.....	.....
Philadelphia Depot, Pa.	4,000.00	.....	4,000.00
Total	75,496.77	.....	75,496.77

CANAL ZONE, AND PHILIPPINE ISLANDS.

Gatun, Canal Zone.	\$2,500.00	.....	\$2,500.00
Manila, P. I.	50.00	.....	50.00
Stotsenburg Camp, P. I.	3,056.99	\$1,150.00	4,206.99
Total	5,606.99	1,150.00	6,756.99

¹No Government loss.²Of no value.

LOSSES BY FIRE AND STORM IN DETAIL.

The losses by fire and storm during the fiscal year 1918 were as follows (cost given where reported) :

Fort Douglas, Utah.—July 11, 1917, noncommissioned officers' quarters No. 33 damaged by fire to the extent of \$125.

Fort Bliss, Tex.—July 14, 1917, machine shops damaged by fire to the extent of \$10,868.84.

Fort Bayard, N. Mex.—August 17, 1917, hospital building No. 101 damaged by lightning. Estimated cost of repairs, \$150.

Fort Benjamin Harrison, Ind.—August 28, 1917, cantonment building used as kitchen damaged by fire.

Chickamauga Park, Ga.—September 14, 1917, mess hall and one dormitory unit, machine gun company, Fifty-fifth Infantry, destroyed by fire. Estimated cost of reconstruction, \$4,000.

Base hospital No. 36, Detroit, Mich.—September 2, 1917, hospital cook tent damaged by fire to the extent of \$15.

Fort Missoula, Mont.—September 21, 1917, old officers' quarters No. 3 and No. 4 partially destroyed by fire. Estimated cost of repairs, \$1,800.

Gatun, Canal Zone.—September 26, 1917, wagon shed damaged by fire. Estimated cost of reconstruction, \$2,500.

Camp MacArthur, Tex.—October 1, 1917, hay corral damaged by fire to the extent of \$8,304.

Fort Sam Houston, Tex.—October 3, 1917, paint shop, trim shop, and wheelwright shop in quartermaster mechanical repair shop No. 304 damaged by fire. Estimated cost of repairs, \$5,800.

Fort Wright, Wash.—October 10, 1917, field officers' quarters No. 3 damaged by fire to the extent of \$3,000.

Camp Dodge, Iowa.—October 11, 1917, barracks building No. 360 damaged by fire.

Fort Wood, N. Y.—October 13, 1917, public buildings and property damaged by fire to the extent of \$245.

Fort Apache, Ariz.—October 18, 1917, company barracks destroyed by fire.

Camp Cody, N. Mex.—October 19, 1917, quartermaster warehouse No. 9 damaged by fire to the extent of \$1,662.

Camp Devens, Mass.—October 21, 1917, receiving ward, building No. 1122, base hospital, was destroyed by fire. Estimated cost of reconstruction, \$19,660.

Belleville, Ill.—*Signal Corps aviation school.*—October 24, 1917, one small outbuilding of no commercial value on leased ground destroyed by fire.

Fort Slocum, N. Y.—October 24, 1917, porches to barracks buildings No. 83 and No. 85 and doors to guardhouse damaged by storm.

Camp Bowie, Tex.—October 28, 1917, mess halls and several tents of Companies L and M, One hundred and forty-second Infantry, destroyed by fire. Estimated cost of reconstruction, \$1,400.

Camp Dix, N. J.—October 29, 1917, building formerly used as farmhouse destroyed by fire.

Camp Dix, N. J.—October 30, 1917, building in course of construction intended for use as division exchange storehouse slightly damaged by fire.

Camp Nicholls, La.—November 9, 1917, quartermaster office building damaged by fire to the extent of \$1,500.

Fort Ethan Allen, Vt.—November 10, 1917, waiting station, building No. 56, destroyed by fire. Estimated cost of repairs, \$750.

Fort Story, Va.—November 12, 1917, Serebee cottage, used as storeroom and officers' mess, damaged by fire to the extent of \$1,700.

Jefferson Barracks, Mo.—November 15, 1917, examining barracks, building No. 68, damaged by fire. Estimated cost of repairs, \$251.

Camp MacArthur, Tex.—November 16, 1917, one stable entirely destroyed by fire. Estimated cost of reconstruction, \$250.

Camp Shelby, Miss.—November 19, 1917, headquarters mess hall destroyed by fire. Estimated cost of reconstruction, \$950.

Camp Dix, N. J.—November 18, 1917, officers' quarters, section B, Twenty-sixth Engineers, damaged by fire. Estimated cost of repairs, \$125.

Oceanport, N. J.—November 21, 1917, Oskaleta Hall, building leased by Government, damaged by fire to the extent of \$3,500.

Camp Stotsenburg, P. I.—August 29, 1917, buildings and roads damaged by storm. Estimated cost of repairs, \$1,150.

Fort Wetherill, R. I.—November 26, 1917, mess hall of Sixteenth Company damaged by fire to the extent of \$1,000.

Fort Hamilton, N. Y.—October 27, 1917, wooden latrine in old fort, in use as a storehouse by the quartermaster department, destroyed by fire.

Plattsburg Barracks, N. Y.—November 28, 1917, gymnasium building No. 41 totally destroyed by fire.

Washington Barracks, D. C.—December 5, 1917, building No. 42A, used as shooting gallery, destroyed by fire. Estimated cost of reconstruction, \$1,000.

Camp Sevier, S. C.—December 8, 1917, mess halls of Headquarters and Supply Companies A, B, C, and D of the One hundred and nineteenth Infantry completely destroyed and mess hall of regimental infirmary partly burned.

Fort Monroe, Va.—December 9, 1917, attic of section D, building No. 100, damaged by fire to the extent of \$500.

Fort D. A. Russell, Wyo.—December 13, 1917, officers' quarters No. 21, bachelors' building, damaged by fire. Estimated cost of repairs, \$862.64.

Fort H. G. Wright, N. Y.—December 14, 1917, entire porch roof of barracks building No. 9 destroyed by storm. Estimated damage, \$1,500.

Camp Merritt, N. J.—December 23, 1917, Y. M. C. A. auditorium slightly damaged by fire. No Government property injured or destroyed.

Camp Wheeler, Ga.—December 29, 1917, partial loss of one mess shack by fire to the extent of \$868.

Camp Greene, N. C.—December 30, 1917, complete destruction of the operating building and laboratory building, base hospital, by fire.

Fort Barrancas, Fla.—January 1, 1918, building No. 54 damaged slightly in basement by fire.

Camp Devens, Mass.—January 1, 1918, building No. 1023 entirely destroyed by fire and some damage occurred to the lavatory connected with same. Estimated cost of reconstruction, \$13,280.

Camp Custer, Mich.—December 8, 1917, barracks building No. 1144 and adjoining buildings damaged by fire to the extent of \$9,000.

Camp Travis, Tex.—January 4, 1918, building No. 3001A, bathhouse, damaged by fire to the extent of \$203.50.

Camp Beauregard, La.—November 23, 1917, mess shack No. 53 destroyed by fire. Estimated cost of reconstruction, \$575.

Fort Sam Houston, Tex.—January 4, 1918, quarters No. 8, staff post, was partially damaged by fire. Estimated cost of repairs, \$9,500.

Fort Oglethorpe, Ga.—January 7, 1918, officers' building, No. 411, Cavalry cantonment destroyed by fire.

Camp Furlong, N. Mex.—December 4, 1917, bachelor building damaged by fire to the extent of \$172.27.

Camp Stotsenburg, P. I.—November 17, 1917, building No. 403, captains' quarters, damaged by fire to the extent of \$3,056.99.

Camp Wheeler, Ga.—January 12, 1918, Ordnance repair depot partially destroyed by fire to the extent of \$1,000.

Fort Howard, Md.—January 11, 1918, boathouse building No. 66 and wharf building No. 51 were damaged by storm and ice. Small boats, including distribution box No. 33, motor yawl No. 18 and yawl No. 42 were damaged by collapse of boathouse.

Fort Armistead, Md.—January 11, 1918, wharf building No. 8 damaged by storm and ice.

Camp Lewis, Wash.—December 14, 1917, latrine building No. 66A damaged by fire. Estimated cost of reconstruction, \$90.

Camp Pike, Ark.—January 5, 1918, building No. 403, officers' quarters, damaged by fire to the extent of \$500.

Fort Terry, N. Y.—December 4, 1917, building No. 14 damaged by fire to the extent of \$17,000.

Washington Barracks, D. C.—January 14, 1918, building No. 28, used as a storehouse for clothing commissary and ordnance, seriously damaged by fire.

Fort Douglas, Utah.—January 14, 1918, three war-prison barracks buildings were destroyed by snow breaking roofs; estimated damage \$10,500. Other roofs damaged, \$4,281.

Chickamauga Park, Ga.—January 17, 1918, officers' quarters and bath buildings No. 1833 and No. 1836 of the Eleventh Infantry cantonment were destroyed by fire. Estimated cost of reconstruction, \$1,200.

Fort Oglethorpe, Ga.—January 17, 1918, noncommissioned officers' quarters known as Scott House destroyed by fire. Estimated cost of reconstruction, \$4,500.

Camp McClellan, Ala.—December 16, 1917, three mess halls and kitchens of the One hundred and fifteenth Infantry were damaged by fire to the extent of \$1,850.

Camp Gordon, Ga.—January 1-2, 1918, lavatory of headquarters company was damaged by fire. Estimated cost of repairs, \$3,000.

Camp McClellan, Ala.—November 14 and 29, 1917, mess sheds Nos. 9, 10, and 11, in camp site of One hundred and fifteenth Infantry, damaged by fire to the extent of \$89.87.

Baltimore Depot, Md.—January 21, 1918, McClean's wharf and warehouse partially destroyed by fire. Estimated damage, \$962.

Camp Bowie, Tex.—January 23, 1918, warehouse No. 2, building No. 1301, destroyed by fire.

Camp Custer, Mich.—January 29, 1918, building No. 571 damaged by fire. Estimated cost of repairs, \$1,500.

Fort St. Philip, La.—January 5, 1918, old hospital building slightly damaged by fire.

Medical supply depot, Chicago, Ill.—December 8, 1917, medical supply depot, No. 3951 Federal Street, damaged by fire to the extent of \$69,134.77.

Camp Dodge, Iowa.—February 1, 1918, building No. 32, camp quartermaster garage and temporary repair shop were partially destroyed by fire. Damage to building estimated at \$200.

Fort Sill, Okla.—January 13, 1918, building No. 10, quarters No. 18, old post, were damaged by fire to the extent of \$1,000.

Camp Stanley, Tex.—January 20, 1918, headquarters building destroyed by fire. Damage estimated at \$7,000.

Camp Dix, N. J.—January 25, 1918, building No. 4008, officers quarters of the Three hundred and fiftieth Field Artillery, damaged by fire to the extent of \$1,050.

Mulberry, N. J.—January 27, 1918, property destroyed by fire.

Fort Sam Houston, Tex.—January 23, 1918, saddler room, supply company, Nineteenth Infantry stables, damaged by fire to the extent of \$675.

Camp Bowenbeirne, Tex.—February 7, 1918, seven mess shacks were destroyed by fire.

Camp Sevier, S. C.—February 9, 1918, mess hall No. 2100, Fifth Engineers, destroyed by fire. Estimated cost of reconstruction, \$2,000.

Camp Sheridan, Ala.—February 11, 1918, ward building, base hospital, damaged by fire to the extent of \$2,000.

Camp McClellan, Ala.—February 13, 1918, regimental warehouses Nos. 1649, 1650, 1749, 1750, and 2549, blown down by wind storm. Estimated cost of raising and repairing, \$1,550.

Fort Benjamin Harrison, Ind.—January 23, 1918, barracks occupied by Company G, Tenth Infantry, damaged by fire.

Boston, Mass.—December 2, 1917, South Armory, Irvington Street, damaged by fire to the extent of \$425.

Camp Custer, Mich.—February 14, 1918, building No. 1337 destroyed by storm. Estimated cost of repairs, \$7,000.

Manila, P. I.—December 15, 1917, building No. 1, garage, and quartermaster steam laundry damaged by fire to the extent of \$50.

Philadelphia Depot, Pa.—February 22, 1918, building No. 134 South Street, was damaged by fire to the extent of \$4,000.

Camp Devens, Mass.—March 2, 1918, repair shop, motor truck company, totally destroyed by fire. Estimated loss, \$33,647.95.

Fort Sill, Okla.—March 6, 1918, building B6, school of fire, damaged by fire to the extent of \$5,280.

Camp Sevier, S. C.—March 9, 1918, mess hall, headquarters company, One hundred and seventeenth Infantry, totally destroyed by fire; also mess hall pertaining to machine gun company and supply company damaged slightly. Estimated cost of reconstruction and repairs, \$4,100.

Fort Benjamin Harrison, Ind.—March 9, 1918, wagon shed W81T, blown down and 12 other sheds blown out of plumb. Estimated cost of repairs, \$950.

Baltimore, Md.—March 4, 1918, tool house No. 1, at mechanical repair shop, unit No. 1, was destroyed by fire to the extent of \$975.

Fort MacArthur, Cal.—March 10, 1918, building No. 11H, was damaged by fire to the extent of \$25.

Front Royal, Va.—April 6, 1918, old house on reservation destroyed by fire. It was of no value.

Camp Dodge, Iowa.—April 6, 1918, building No. 2600, nurses' quarters, base hospital, was totally destroyed by fire. Estimated cost of damage, \$5,000.

Camp Pike, Ark.—April 4, 1918, building No. 1904, four officers' quarters, Three hundred and forty-eighth Infantry, partially destroyed by fire, damage amounting to \$1,800.

Love Field, Dallas, Tex.—March 16, 1918, quarters No. 49D, damaged by fire to the extent of \$60.

Fort Sam Houston, Tex.—April 2, 1918, Nineteenth Infantry stables and live stock belonging to headquarters company and machine gun company, were partially destroyed by fire. Estimated cost of repairs, \$10,675.82.

Camp Upton, N. Y.—April 16, 1918, buildings Nos. 422 and 424 (two barracks and one lavatory), destroyed by fire. Estimated cost of reconstruction, \$22,500.

Kansas City, Mo.—April 4, 1918, wholesale warehouses swept by fire. Quartermaster subsistence stores slightly damaged.

Camp Sheridan, Ala.—May 1, 1918, building in fuel and forage yard destroyed by fire. Estimated damages, \$39,500.

Camp Travis, Tex.—April 29, 1918, fences and eight paddocks boarding on Salado Creek at remount No. 2, washed away by flood. Estimated cost of reconstruction, \$2,000.

Fort Jay, N. Y.—April 18, 1918, building No. 53 damaged by fire.

Fort Williams, Me.—April 6, 1918, barracks building No. 29, destroyed by fire.

Camp Joseph E. Johnston, Fla.—March 30, 1918, building No. A12 was partially destroyed by fire.

Camp Cody, N. Mex.—April 12, 1918, target range house, latrine, frame work and revetment at target range destroyed by fire. Estimated cost of reconstruction, \$2,500.

Camp McClellan, Ala.—May 4, 1918, three mess shacks destroyed and four additional damaged by fire. May 5, 1918, one mess shack completely destroyed and two additional partially damaged. Estimated cost of reconstruction and repairs, \$6,800.

Fort Bliss, Tex.—January 10, 1918, building No. 91 (officers' mess and club building) damaged by fire to the extent of \$4,000.

Fort Yellowstone, Wyo.—March 17, 1918, building No. 68 totally destroyed by fire. Loss, \$5,000.

Mercedes, Tex.—April 7, 1918, quartermaster storehouse damaged by storm. Estimate to repair, \$947.62.

Fort Benjamin Harrison, Ind.—April 26, 1918, building No. 60, officers' quarters, damaged by fire to extent of \$75.

Camp Taylor, Ky.—May 4, 1918, building No. K70, damaged by fire, \$200.

Camp McClellan, Ala.—May 4, 1918, damaged by fire, building No. 1404, partially destroyed, \$630.80; building No. 1405, completely destroyed, \$1,210.43; building No. 1406, partially destroyed, \$184.08. Two mess halls damaged by fire to extent of \$2,409.87. May 5, one mess shack totally destroyed by fire, loss \$1,500; one mess shack damaged by fire to extent of \$525.

Camp Logan, Tex.—May 6, 1918, building No. 19, mess hall, totally destroyed by fire with contents. Loss, \$1,961.93.

Fort Ontario, N. Y.—May 6, 1918, building No. 10, damaged by fire to extent of \$450.

Camp Custer, Mich.—May 9, 1918, storm caused damage to buildings to extent of \$27,000 (estimated).

Camp Cody, N. Mex.—May 10, 1918, estimated damage by fire to stables property and animals therein, \$8,158.

Fort Slocum, N. Y.—May 10, 1918, building No. 15 damaged by fire to extent of \$52.74.

Fort Niagara, N. Y.—May 15, 1918, bake shop damaged by fire. Estimated to be \$1,000.

Camp MacArthur, Tex.—May 16, 1918, hay shed filled to capacity with hay and straw destroyed by fire. Loss, \$33,534.

Camp Robinson, Sparta, Wis.—May 27, 1918, regimental warehouse No. 129 struck by lightning and completely destroyed. Estimated damage, \$1,800.

Camp Beauregard, La.—June 4, 1918, mess building No. 525 totally destroyed by fire, and two adjoining mess buildings badly damaged.

Camp Shelby, La.—June 7, 1918, building No. 62 (pumping station at Springs) destroyed by fire.

Camp Beauregard, La.—June 8, 1918, the Army Y. M. C. A. building, base hospital, damaged by fire.

Camp Logan, Tex.—June 9, 1918, building No. 49, base hospital, damaged to extent of \$100 by fire.

Fort Sherman, Ill.—June 9, 1918, crematory building No. 41 destroyed by fire.

Fort Oglethorpe, Ga.—June 12, 1918, barracks 26 and 26A seriously damaged by fire.

Camp Sheridan, Ala.—June 12, 1918, fire partially destroyed old brick building on camp reservation at night during thunderstorm.

Centaur, Ga.—June 17, 1918, wind storm wrecked one wagon train stable also part of shelter shed. Approximate damage, \$1,400.

Allentown, Pa.—June 20, 1918, amusement building (on Government property) on camp grounds, destroyed by fire.

Tuckahoe, N. J.—June 27, 1918, barracks destroyed by fire.

UTILITIES OFFICER.

MAJOR, Q. M. C.

Administration.

1 Executive Officer..... 1st Lieut. Q. M. C.
1 Officer in Charge service orders... 2d Lieut. Q. M. C.

1 Supply Sgt..... Q. M. Sgt	1 Chf. Clerk..... Sgt., 1st Cl.
4 Clerks..... Sgts.	6 Clerks..... Corps.
3 Stenogs..... Sgts.	6 Stenogs..... Corps.
3 Tel. Ord..... Sgts.	6 Ord..... Pvts., 1st Cl.
1 Chf. Qrs. Insp..... Sgt., 1st Cl.	4 Qrs. Insp..... Sgts.
12 Room Ord..... Pvts.	1 Chf. Mess Sgt..... Sgt., 1st Cl.
4 Mess Sgts..... Sgts.	12 Cooks..... Sgts.
	2 Exchange Sgts.

2 Officers, 66 Enlisted.

MAINTENANCE BRANCH.

Buildings and Shops Section.

1 Officer in Charge... Capt. Q. M. C.
1 Chief Draftsman... Q. M. Sgt. S. G.
7 Draftsmen..... Sgts.
1 Blueprinter..... Sgt.
2 Bldg. Foremen..... Sgts., 1st Cl.
3 Materials Checkers. Sgts.
26 Carpenters..... Sgts.
35 Carpenters..... Pvts., 1st Cl.
5 Painters..... Sgts.
1 Mason..... Sgt.
1 Mason's helper... Pvt., 1st Cl.
19 Pipe fitters..... Sgts.
6 Pipe fitters helpers. Pvts.
4 Machinists..... Sgts.
4 Machinists helpers. Pvts.
1 Blacksmith..... Sgt.
3 Blacksmiths..... Pvts., 1st Cl.
4 Blacksmiths..... Pvts.
6 Stove and range repairmen..... Sgts.
10 Stove and range repairmen..... Pvts.
5 Tanners..... Sgts.
1 Clerk..... Sgt.
2 Stenog..... Sgts.
1 Officer, 127 Enlisted.

Roads Section.

1 Officer in Charge... 1st Lieut. Q. M. C.
3 Supervisors..... Sgts., 1st Cl.
11 Foremen..... Sgts.
1 Stenog-Clerk..... Sgt.
1 Officer, 15 Enlisted.

OPERATION BRANCH.

Electrical Section.

1 Officer in Charge... 2d Lieut. Q. M. C.
1 Master electrician... Q. M. Sgt. S. G.
1 Line Foreman... Sgt., 1st Cl.
6 Linemen..... Sgts.
6 Linemen..... Corporals.
1 Inside Wire Foreman... Sgt., 1st Cl.
12 Inside Wiremen... Sgts.
12 Inside Wiremen... Pvts., 1st Cl.
1 Sub-station Foreman... Sgt., 1st Cl.
2 Motor repairmen... Sgts.
1 Estimator..... Sgt.
1 Stock keeper..... Sgt.
1 Officer, 44 Enlisted.

Water and Sewer Section.

1 Officer in Charge... Capt. Q. M. C.
1 Foreman plumber... Sgt., 1st Cl.
16 Plumbers..... Sgts.
2 Plumbers..... Corps.
11 Plumbers..... Pvts., 1st Cl.
1 Water Insp..... Sgt., 1st Cl.
1 Pipe Foreman... Sgt.
1 Pipeman..... Corp.
1 Sewer Insp..... Sgt., 1st Cl.
6 Skilled laborers... Pvts.
1 Stenog-Clerk..... Sgt.
1 Officer, 41 Enlisted.

Pumping Section.

1 Officer in Charge... 2d Lieut. Q. M. C.
1 Foreman Engineer. Sgt., 1st Cl.
3 Opt. Engineers... Sgts.
3 Oilers..... Corps.
1 Officer, 7 Enlisted.

Refrigeration Section.

1 Officer in Charge... 1st Lieut. Q. M. C.
1 Foreman Engineer. Sgt., 1st Cl.
6 Opt. Engineers... Sgts.
1 Overseer..... Sgt.
3 Ice Foremen..... Corps.
13 Ice handlers..... Pvts., 1st Cl.
1 Clerk..... Sgt.
3 Clerks..... Corps.
1 Officer, 28 Enlisted.

Fire Protection Section.

1 Officer in Charge... 1st Lieut. Q. M. C.
1 Supply Sgt..... Q. M. Sgt.
3 Station Chfs... Sgts., 1st Cl.
3 Asst. Station Chfs. Sgts.
12 Firemen..... Pvts., 1st Cl.
24 Fire Dept. Reserves..... Pvts.
1 Officer, 43 Enlisted.

HEATING BRANCH.

Central Plants Section.

1 Officer in Charge... Capt. Q. M. C.
5 Foremen Engineers..... Sgts., 1st Cl.
31 Engineers..... Sgts.
2 Foremen Boiler Cleaners..... Sgts.
2 Boiler makers... Sgts.
4 Masons..... Sgts.
1 Coal dispatcher... Sgt.
1 Stenog-Clerk... Sgt.
226 Firemen..... Pvts., 1st Cl.
10 Boiler cleaners... Pvts., 1st Cl.
2 Boiler maker's helpers..... Pvts., 1st Cl.
4 Mason's helpers... Pvts., 1st Cl.
18 Firemen's helpers. Pvts.
1 Officer, 306 Enlisted.

Isolated Plants Section.

1 Officer in Charge... 2d Lieut. Q. M. C.
2 Engineers..... Sgts.
36 Firemen..... Pvts., 1st Cl.
1 Officer, 38 Enlisted.

NATIONAL ARMY CAMPS
WITH
CENTRAL HEATING PLANTS
(CUSTER, DEVENS, FUNSTON, GRANT)

AUGUST 12, 1918

UTILITIES OFFICER.

MAJOR, Q. M. C.

Administration.

1 Executive Officer. 1st Lieut. Q. M. C.
1 Officer in Charge service orders. . . 2d Lieut. Q. M. C.

1 Supply Sgt. Q. M. Sgt.	1 Chf. Clerk. Sgt., 1st Class.
4 Clerks. Sergeants.	6 Clerks. Corporals.
3 Stenogs. Sergeants.	6 Stenogs. Corporals.
3 Tel. Ord. Sergeants.	6 Ord. Pvts., 1st Class.
1 Chf. Qrs. Insp. Sgt., 1st Class.	4 Qrs. Insp. Sergeants.
12 Room Ord. Privates.	1 Chf. Mess Sgt. Sgt., 1st Class.
4 Mess Sgts. Sergeants.	12 Cooks. Sergeants.
	2 Exchange Sergeants.

2 Officers, 66 Enlisted.

MAINTENANCE BRANCH.

Buildings and Shops Section.

1 Officer in Charge. . . Capt., Q. M. C.
1 Chf. Draftsman. . . . Q. M. Sgt. S. G.
7 Draftsmen. Sergeants.
1 Blueprinter. Sergeant.
2 Bldg. Foremen. . . . Sgts., 1st Class.
3 Materials Checkers. Sergeants.
25 Carpenters. Sergeants.
16 Carpenters. Pvts., 1st Class.
6 Painters. Sergeants.
1 Mason. Sergeant.
1 Mason's helper. . . . Pvt., 1st Class.
19 Pipefitters. Sergeants.
6 Pipefitters' helpers. Privates.
4 Machinists. Sergeants.
4 Machinist's helpers. Privates.
1 Blacksmith. Sergeant.
3 Blacksmiths. Pvts., 1st Class.
4 Blacksmiths. Privates.
6 Stove and range
 repairs. Sergeants.
10 Stove and range
 repairs. Privates.
5 Tiners. Sergeants.
1 Clerk. Sergeant.
2 Stenogs. Sergeants.
1 Officer, 127 Enlisted.

Roads Section.

1 Officer in Charge. . . 1st Lieut. Q. M. C.
3 Supervisors. Sgts., 1st Class.
11 Foremen. Sergeants.
1 Stenog-Clerk. Sergeant.
1 Officer, 15 Enlisted.

OPERATION BRANCH.

Electrical Section.

1 Officer in Charge. . . 2d Lieut. Q. M. C.
1 Master Electrician. Q. M. Sgt. S. G.
1 Line Foreman. Sgt., 1st Class.
6 Linemen. Sergeants.
6 Linemen. Corporals.
1 Inside Wire
 Foreman. Sgt., 1st Class.
12 Inside Wiremen. . . Sergeants.
12 Inside Wiremen. . . Pvts., 1st Class.
1 Sub-station
 Foreman. Sgt., 1st Class.
2 Motor repairs. . . . Sergeants.
1 Estimator. Sergeant.
1 Stock keeper. Sergeant.
1 Officer, 44 Enlisted.

Water and Sewer Section.

1 Officer in Charge. . . Capt., Q. M. C.
1 Foreman plumber. . . Sgt., 1st Class.
16 Plumbers. Sergeants.
2 Plumbers. Corporals.
11 Plumbers. Pvts., 1st Class.
1 Water Insp. Sgt., 1st Class.
1 Pipe foreman. Sergeant.
1 Pipeman. Corporal.
1 Sewer inspector. . . . Sgt., 1st Class.
6 Skilled laborers. . . . Privates.
1 Stenog-Clerk. Sergeant.
1 Officer, 41 Enlisted.

Pumping Section.

1 Officer in Charge. . . 2d Lieut. Q. M. C.
1 Foreman Engineer. . . Sgt., 1st Class.
3 Opt. Engineers. . . . Sergeants.
3 Oilers. Corporals.
1 Officer, 7 Enlisted.

Refrigeration Section.

1 Officer in Charge. . . 1st Lieut. Q. M. C.
1 Foreman Engineer. Sgt., 1st Class.
6 Opt. Engineers. . . . Sergeants.
1 Overseer. Sergeant.
3 Ice foremen. Corporals.
13 Ice Handlers. Pvts., 1st Class.
1 Clerk. Sergeant.
3 Clerks. Corporals.
1 Officer, 28 Enlisted.

Fire Protection Section.

1 Officer in Charge. . . 1st Lieut. Q. M. C.
1 Supply Sgt. Q. M. Sgt.
3 Station Chfs. Sgts., 1st Class.
3 Asst. Station Chfs. Sergeants.
12 Firemen. Pvts., 1st Class.
24 Fire Dept. Reserves. Privates.
1 Officer, 43 Enlisted.

HEATING BRANCH.

Isolated Plants Section.

1 Officer in Charge. . . 2d Lieut. Q. M. C.
2 Engineers. Sergeants.
36 Firemen. Pvts., 1st Class.
1 Officer, 38 Enlisted.

NATIONAL ARMY CAMPS WITHOUT

CENTRAL HEATING PLANTS

(DIX, DODGE, GORDON, JACKSON
LEE, LEWIS, MEADE, PIKE, SHERMAN
TAYLOR, TRAVIS, UPTON)

AUGUST 12, 1918

UTILITIES OFFICER.

MAJOR, Q. M. C.

Administration.

- 1 Executive Officer... 1st Lieut. Q.M.C.
- 1 Officer in Charge Service Orders... 2d Lieut. Q.M.C.
- 1 Supply Sgt. Q. M. Sergeant.
- 1 Chief Clerk..... Sgt., 1st Class.
- 2 Clerks..... Corporals.
- 9 Clerks..... Pvts., 1st Class.
- 7 Stenographers..... Corporals.
- 3 Tele. Ords..... Sergeants.
- 6 Ords..... Privates.
- 1 Chf. Qrs. Insp. Sgt., 1st Class.
- 3 Room Ords..... Privates.
- 1 Chf. Mess Sgt. Sgt., 1st Class.
- 1 Mess Sergeant..... Sergeant.
- 4 Cooks.
- 2 Officers, 39 Enlisted.

MAINTENANCE BRANCH.

Buildings and Shop Section.

- 1 Officer in Charge... Capt., Q. M. C.
- 1 Supply Sgt. Q. M. Sergeant.
- 1 Chf. Draftsman... Q. M. Sgt. S. G.
- 2 Draftsmen..... Sergeants.
- 2 Bldg. Foreman.... Sgts., 1st Class.
- 1 Materials Checker. Sergeant.
- 11 Carpenters..... Sergeants.
- 3 Carpenters..... Corporals.
- 7 Carpenters..... Pvts., 1st Class.
- 3 Painters..... Sergeants.
- 1 Mason..... Sergeant.
- 1 Mason's helper... Pvt., 1st Class.
- 3 Pipefitters..... Sergeants.
- 3 Pipefitters..... Pvts., 1st Class.
- 6 Pipefitters..... Privates.
- 2 Machinists..... Sergeants.
- 3 Machinist's helpers. Pvts., 1st Class.
- 1 Blacksmith..... Sergeant.
- 3 Blacksmiths..... Pvts., 1st Class.
- 2 Blacksmiths..... Privates.
- 4 Stove and range repairmen..... Sergeants.
- 9 Stove and range repairmen..... Pvts., 1st Class.
- 1 Tinner..... Sergeant.
- 4 Tanners..... Pvts., 1st Class.
- 1 Officer, 75 Enlisted.

Roads Section.

- 1 Officer in Charge... 1st Lieut. Q.M.C.
- 3 Supervisors..... Sgts., 1st Class.
- 5 Foremen..... Sergeants.
- 3 Insp..... Corporals.
- 1 Officer, 11 Enlisted.

OPERATION BRANCH.

Electrical Section.

- 1 Officer in Charge... 2d Lieut. Q.M.C.
- 1 Master Electrician. Q. M. Sgt. S. G.
- 1 Yine Foreman.... Sgt., 1st Class.
- 4 Linemen..... Sergeants.
- 4 Linemen..... Corporals.
- 2 Linemen..... Pvts., 1st Class.
- 1 Inside Wire Foreman..... Sgt., 1st Class.
- 4 Inside Wiremen... Sergeants.
- 8 Inside Wiremen... Pvts., 1st Class.
- 1 Sub-station Foreman..... Sgt., 1st Class.
- 1 Motor repairman... Sergeant.
- 1 Estimator..... Corporal.
- 1 Stock keeper..... Corporal.
- 1 Officer, 29 Enlisted.

Water and Sewer Section.

- 1 Officer in Charge... Capt., Q. M. C.
- 1 Foreman plumber. Sgt., 1st Class.
- 8 Plumbers..... Sergeants.
- 8 Plumbers..... Pvts., 1st Class.
- 1 Water Insp..... Sgt., 1st Class.
- 1 Pipe foreman.... Sergeant.
- 1 Pipeman..... Corporal.
- 1 Sewer inspector... Sgt., 1st Class.
- 6 Skilled laborers... Pvts., 1st Class.
- 1 Officer, 27 Enlisted.

Pumping Section.

- 1 Officer in Charge... 2d Lieut. Q.M.C.
- 1 Foreman Engineer. Sgt., 1st Class.
- 3 Opt. Engineers... Sergeants.
- 3 Oilers..... Pvts., 1st Class.
- 1 Officer, 7 Enlisted.

Refrigeration Section.

- 1 Officer in Charge... 1st Lieut. Q.M.C.
- 1 Foreman Engineer Sgt., 1st Class.
- 3 Opt. Engineers... Sgt., 1st Class.
- 3 Oilers..... Pvts., 1st Class.
- 1 Overseer..... Sergeant.
- 3 Ice foremen..... Corporals.
- 13 Ice Handlers..... Pvts., 1st Class.
- 1 Officer, 24 Enlisted.

Fire-Protection Section.

- 1 Officer in Charge... 1st Lieut. Q.M.C.
- 1 Supply Sgt. Q. M. Sgt.
- 3 Station Chfs..... Sgts., 1st Class.
- 3 Asst. Station Chfs. Sergeant.
- 12 Firemen..... Pvts., 1st Class.
- 24 Fire Dept. Reserves..... Privates.
- 1 Officer, 43 Enlisted.

HEATING BRANCH.

Isolated Plants Section.

- 1 Officer in Charge... 2d Lieut. Q.M.C.
- 2 Engineers..... Sergeants.
- 30 Firemen..... Pvts., 1st Class.
- 6 Firemen..... Privates.
- 1 Officer, 38 Enlisted.

NATIONAL GUARD CAMPS

AUGUST 12, 1918

UTILITIES OFFICER.

MAJOR, Q. M. C.

Administration.

1 Executive Officer . . . 1st Lieut. Q.M.C.
1 Officer in Charge
Service Orders 2d Lieut. Q.M.C.
2 Supply Sgts. Q. M. Sgts.
2 Chf. Clerks Sgts., 1st Class.
2 Clerks Sergeants.
2 Clerks Corporals.
12 Clerks Pvts., 1st Class.
1 Stenographer Sergeant.
6 Stenographers Corporals.
1 Chf. Qrs. Insp. Sgt., 1st Class.
1 Qrs. Insp. Sergeants.
1 Chf. Mess Sgt. Sgt., 1st Class.
1 Mess Sgt. Sergeant.
6 Tels. Ords. Sergeants.
6 Room Ords. Privates.
10 Ords. Privates.
8 Cooks.
2 Officers, 61 Enlisted.

MAINTENANCE BRANCH.

Buildings and Shops Section.

1 Officer in Charge. . . Capt. Q. M. C.
1 Chief Draftsman . . . Sgt., 1st Cl.
4 Bldg. Foremen . . . Sgts., 1st Cl.
3 Draftsmen Sergeants.
3 Draftsmen Corporals.
2 Materials Checkers. Sergeants.
4 Painters Sergeants.
2 Foremen Blksmiths. Sgts., 1st Cl.
8 Blksmiths Pvts., 1st Cl.
8 Blksmiths' Hlprs. . Privates.
28 Carpenters Sergeants.
20 Carpenters' Hlprs. Pvts., 1st Cl.
2 Masons Sergeants.
9 Mason's Helpers . . Pvt., 1st Cl.
9 Pipefitters Sergeants.
9 Pipefitters' Hlprs. Pvts., 1st Cl.
4 Machinists Sergeants.
5 Machinists' Hlprs. Pvts., 1st Cl.
8 Machinists' Hlprs. Privates.
4 Stove and Range
Repairs Sergeants.
20 Stove and Range
Repairs Pvts., 1st Cl.
2 Tanners Sergeants.
8 Tanners Pvts., 1st Cl.
1 Officer, 156 Enlisted.

Roads Section.

1 Officer in Charge. . . 1st Lieut. Q.M.C.
4 Supervisors Sgts., 1st Cl.
5 Foremen Sergeants.
6 Inspectors Corporals.
1 Officer, 15 Enlisted.

OPERATING BRANCH.

Electrical Section.

1 Officer in Charge. . . 2d Lieut. Q.M.C.
1 Master Electrician. Q. M. Sgt. S. G.
2 Line Foremen Sgts., 1st Cl.
2 Sub-sta. Foremen. Sgts., 1st Cl.
4 Inside Wire Fore-
men Sgts., 1st Cl.
16 Inside Wiremen . . . Sergeants.
26 Inside Wiremen's
Helpers Pvts., 1st Cl.
6 Linemen Sergeants.
7 Linemen's Helpers. Corporals.
12 Linemen's Helpers. Pvts., 1st Cl.
2 Motor repairmen. . Sergeants.
1 Estimator Corporal.
2 Stock keepers Corporals.
1 Officer, 81 Enlisted.

Water and Sewer Section.

1 Officer in Charge. . . Capt. Q. M. C.
2 Foremen Plumbers. Sgts., 1st Cl.
18 Plumbers Sergeants.
10 Plumbers Corporals.
27 Plumber's Helpers. Pvts., 1st Cl.
1 Water Inspector . . Sgt., 1st Cl.
2 Sewer Inspector . . Sgts., 1st Cl.
1 Pipeman Corporal.
6 Skilled laborers. . . Pvts., 1st Cl.
1 Pipe Foreman Sgt., 1st Cl.
1 Officer, 68 Enlisted.

Pumping Section.

1 Officer in Charge. . . 2d Lieut. Q.M.C.
2 Foremen Engineers Sgts., 1st Cl.
6 Opt. Engineers. . . Sgts., 1st Cl.
6 Oilers Corporals.
1 Officer, 14 Enlisted.

Refrigeration Section.

1 Officer in Charge. . . 1st Lieut. Q.M.C.
2 Foremen Engineers Sgts., 1st Cl.
2 Opt. Engineers. . . Sgts., 1st Cl.
4 Opt. Engineers . . . Sergeants.
2 Overseers Sergeants.
6 Ice Foremen Corporals.
20 Ice Handlers Pvts., 1st Cl.
6 Oilers Pvts., 1st Cl.
1 Officer, 42 Enlisted.

Fire Protection Section.

1 Officer in Charge. . . 1st Lieut. Q.M.C.
1 Supply Sergeant. . . Q. M. Sergeant.
3 Station Chiefs . . . Sgts., 1st Cl.
3 Asst. Station Chfs. Sergeants.
12 Firemen Pvts., 1st Cl.
24 Fire Dept. Reserves Privates.
1 Officer, 43 Enlisted.

HEATING BRANCH.

Isolated Plants Section.

1 Officer in Charge. . . 2d Lieut. Q.M.C.
4 Engineers Sergeants.
46 Firemen Pvts., 1st Cl.
14 Firemen's Helpers. Privates.
1 Officer, 64 Enlisted.

EMBARKATION CAMPS

AUGUST 12, 1918

APPENDIX—J.

ORGANIZATION OF UTILITIES.

WAR DEPARTMENT,
THE ADJUTANT GENERAL'S OFFICE,
Washington, July 2, 1918.

[Confidential.]

From: The Adjutant General of the Army.

To: The Commanding General, Camp Upton, N. Y.

Subject: Authorization of personnel for Quartermaster Corps activities in camps and cantonments.

1. Inclosed herewith, for your information and guidance, is one copy each of Tables of Organization Nos. 339 and 425, and a copy of chart showing the proposed organization of the utilities service. The chart gives in detail the plan in which it is proposed to organize the different activities of the old Quartermaster Corps at your camp.

2. These activities have been placed under the following heads: The Quartermaster Corps, which has to do with supply, conservation, and reclamation, and the Construction Division, which now takes over the operation and maintenance of all utilities through the Camp Quartermaster.

3. The enlisted personnel, Quartermaster Corps, now employed in the operation and maintenance of utilities, will be turned over to the Construction Division as a part of the personnel which has been authorized for that division. The operation and maintenance of utilities, however, will be performed under the direction of the Camp Quartermaster who, in addition to his other duties, is hereby placed under the Construction Division for this purpose.

4. It is to be noted that the fire-protection section, as given in the chart for the organization of utilities, has already been provided for by the authorization of a fire-truck and hose company.

5. It is not contemplated that all the sections of these different services will be established at any camp or cantonment, except where the necessities of the case demand.

By order of the Secretary of War.

F. W. LEWIS,
Adjutant General.

National Guard Camps, August 6, 1918.

1	Units.	2	3	4	5	6	7	8	9	10	11										
												Administration.	Maintenance branch.		Operating branch.					Heating branch.	Total.
													Buildings and shops section.	Roads section.	Electrical section.	Water and sewer section.	Pumping section.	Refrigeration section.	Fire protection section.			Isolated plants section.
2	Major	1										1									
3	Captains		2			2						2									
4	First lieutenants	3		2				2	2			4									
5	Second lieutenants	4			2		2			2		4									
6	Total commissioned	3	1	1	1	1	1	1	1	1		11									
7	Quartermaster sergeants, senior grade		5		6							2									
8	Quartermaster sergeant	7	7						7			3									
9	Sergeants, first class	8	2	10	11	12	13	14	15			22									
10	Sergeants	16	17	18	19	20	21	22	23	24		66									
11	Corporal	25	26	27	28	29		30				25									
12	Cook	4										4									
13	Private, first class	31	32	33	34	35	36	37	38	39	40	124									
14	Privates	38	39					40	41	42	43	47									
15	Total enlisted	39	75	11	29	27	7	24	43	38		293									
16	Aggregate	42	76	12	30	28	8	25	44	39		304									

- 1 Utilities officer.
- 2 In charge of section.
- 3 Executive officer.
- 4 In charge service orders.
- 5 Chief draftsman.
- 6 Master electrician.
- 7 Supply sergeant.
- 8 1 chief clerk, 1 chief quarters inspector, 1 chief mess sergeant.
- 9 Building foremen.
- 10 Supervisors.
- 11 1 line foreman, 1 inside wire foreman, 1 substation foreman.
- 12 1 foreman plumber, 1 water inspector, 1 sewer inspector.
- 13 Foreman engineer.
- 14 1 foreman engineer, 3 operating engineers.
- 15 Station chiefs.
- 16 3 telephone orderlies, 1 mess sergeant.
- 17 3 draftsmen, 1 materials checker, 3 painters, 11 carpenters, 1 mason, 3 pipe fitters, 2 machinists, 1 blacksmith, 4 stove and range repairmen, 1 tinner.
- 18 Foremen.
- 19 4 linemen, 4 inside wiremen, 1 motor repairman.
- 20 8 plumbers, 1 pipe foreman.
- 21 Operating engineers.
- 22 Overseer.
- 23 Assistant station chiefs.
- 24 Engineers.
- 25 2 clerks, 7 stenographers.
- 26 Carpenters.
- 27 Inspectors.
- 28 4 linemen, 1 estimator, 1 stockkeeper.
- 29 Pipeman.
- 30 Ice foreman.
- 31 Clerks.
- 32 7 carpenter's helpers, 1 mason's helper, 3 pipe fitter's helpers, 3 machinist's helpers, 3 blacksmiths, 9 stove repair helpers, 4 tinner.
- 33 2 lineman's helpers, 8 inside wireman's helpers.
- 34 8 plumber's helpers, 6 skilled laborers.
- 35 Oilers.
- 36 3 oilers, 13 ice handlers.
- 37 Firemen.
- 38 3 room orderlies, 6 orderlies.
- 39 6 pipe fitter's helpers, 2 blacksmith's helpers.
- 40 Fire department reserves.
- 41 Firemen's helpers.

NOTE.—The enlisted personnel of the different sections will be organized as the necessities of the service demand, not to exceed the maximum authorization in each grade.

Camps having central heating plants (Custer, Devens, Funston and Grant), August 6, 1918.

1	Units.	2	3	4	5	6	7	8	9	10		11	12							
										Maintenance branch.				Operating branch.					Heating branch.	
										Administration.	Buildings and shops section.			Roads section.	Electrical section.	Water and sewers section.	Pumping section.	Refrigeration section.	Fire protection section.	Central plants section.	Isolated plants section.	Total.
2	Major.....	1											1							
3	Captains.....		1								1		3							
4	First lieutenants.....	1		1					1	1			4							
5	Second lieutenants.....	1			1		1					1	4							
6	Total commissioned....	3	1	1	1	1	1	1	1	1	1	1	12							
7	Quartermaster sergeants, senior grade.....		1		1								2							
8	Quartermaster sergeants.....	1			1					1			2							
9	Sergeants, first class.....	1	1	1	1	1	1	1	1	1	1	1	24							
10	Sergeants.....	15	20	16	80	17	12	18	22	19	18	20	3	209						
11	Corporals.....	25	12			26	6	27	3	28	3	29	6	30						
12	Cooks.....	12												12						
13	Privates, first class.....	30	6	21	20			33	11			34	13	352						
14	Privates.....	37	12	38	24					39	6	40	24	84						
15	Total enlisted.....	66	127	15	44	41	7	28	43	306	38		715							
16	Aggregate.....	69	128	16	45	42	8	29	44	307	39		772							

- 1 Utilities officer.
- 2 In charge of section.
- 3 Executive officer.
- 4 In charge service orders.
- 5 Chief draftsman.
- 6 Master electrician.
- 7 Supply sergeant.
- 8 1 chief clerk, 1 chief of quarters inspector, 1 chief mess sergeant.
- 9 Building foremen.
- 10 Supervisors.
- 11 1 line foreman, 1 inside wire foreman, 1 substation foreman.
- 12 1 foreman plumber, 1 water inspector, 1 sewer inspector.
- 13 Foreman engineer.
- 14 Station chiefs.
- 15 3 telephone orderlies, 4 quarters inspectors, 4 mess sergeants, 2 exchange sergeants, 4 clerks, 3 stenographers.
- 16 3 materials checkers, 5 painters, 25 carpenters, 1 mason, 19 pipe fitters, 4 machinists, 1 blacksmith, 6 stove and range repairmen, 5 tanners, 7 draftsmen, 1 blueprinter, 1 clerk, 2 stenographers.
- 17 11 foremen, 1 stenographer-clerk.
- 18 6 linemen, 12 inside wiremen, 1 stockkeeper, 2 motor repairmen, 1 estimator.
- 19 1 pipe foreman, 16 plumbers, 1 stenographer-clerk.
- 20 Operating engineers.
- 21 6 operating engineers, 1 overseer, 1 clerk.
- 22 Assistant station chief.
- 23 31 engineers, 2 foremen boiler cleaners, 2 boiler makers, 4 masons, 1 coal dispatcher, 1 stenographer-clerk.
- 24 Engineers.
- 25 6 clerks, 6 stenographers.
- 26 Linemen's helpers.
- 27 1 pipeman, 2 plumbers.
- 28 Oilers.
- 29 3 ice foremen, 3 clerks.
- 30 Orderlies.
- 31 16 carpenters' helpers, 1 mason's helper, 3 blacksmiths.
- 32 Inside wiremen's helpers.
- 33 Plumber's helpers.
- 34 Ice handlers.
- 35 Firemen.
- 36 226 firemen, 10 boiler cleaners, 2 boiler-maker's helpers, 4 mason's helpers.
- 37 Room orderlies.
- 38 6 pipe-fitter's helpers, 4 machinist's helpers, 4 blacksmith's helpers, 10 stove-repairmen's helpers.
- 39 Skilled laborers.
- 40 Fire department reserves.
- 41 Firemen's helpers.

Note.—The enlisted personnel of the different sections will be organized as the necessities of the service demand, not to exceed the maximum authorization in each grade.

Camp Las Casas, August 8, 1918.

	1	2	3	4	5	6	7	8	9	10	11	
1	Units.	Administration.	Maintenance branch.		Operating branch.					Heating branch.	Total.	
			Buildings and shops section.	Roads section.	Electrical section.	Water and sewer section.	Pumping section.	Refrigeration section.	Fire-protection section.	Isolated plants section.		
2	Major.....	11										1
3	Captain.....	1	1			1						2
4	First lieutenants.....	1	1	1				1	1			4
5	Second lieutenants.....	1	1		1		1					4
6	Total commissioned.....	3	2	1	1	1	1	1	1			11
7	Quartermaster sergeants, senior grade.....											
8	Quartermaster sergeants.....	1			1				1			3
9	Sergeants, first class.....	3	3	10	11	12	12	14	15			23
10	Sergeants.....	16	17	30	18	19	20	14	21	22	23	69
11	Corporals.....	24	25	3	26	5	27	8	28	3		27
12	Cooks.....	4										4
13	Privates, first class.....	12	11	46	22	24	18	24	3	12		131
14	Privates.....	12	12	12					12	24		48
15	Total enlisted.....	45	94	13	43	36	7	24	43			305
16	Aggregate.....	48	96	14	44	37	8	25	44			316

- 1 Utilities officer.
- 2 In charge of section.
- 3 Executive officer.
- 4 In charge service orders.
- 5 In charge of shops.
- 6 Supply sergeant.
- 7 Master electrician.
- 8 1 chief clerk, 1 chief quarters inspector, 1 chief mess sergeant.
- 9 2 building foremen, 1 chief draftsman.
- 10 Supervisors.
- 11 1 line foreman, 1 inside wire foreman, 1 substation foreman.
- 12 1 foreman plumber, 1 water inspector, 1 sewer inspector.
- 13 Foreman engineer.
- 14 1 foreman engineer, 3 operating engineers.
- 15 Station chiefs.
- 16 3 telephone orderlies, 1 mess sergeant.
- 17 3 draftsmen, 1 materials checker, 3 painters, 11 carpenters, 1 mason, 3 pipe fitters, 2 machinists, 1 blacksmith, 4 stove and range repairmen, 1 tinner.
- 18 Foremen.
- 19 4 linemen, 4 inside wiremen, 1 motor repairman.
- 20 7 plumbers, 1 pipe foreman, 6 operating engineers.
- 21 Operating engineers.
- 22 Overseer.
- 23 Assistant station chiefs.
- 24 2 clerks, 7 stenographers.
- 25 Carpenters.
- 26 Inspectors.
- 27 4 linemen, 1 estimator, 1 stockkeeper.
- 28 Pipeman.
- 29 Ice foremen.
- 30 Clerks.
- 31 12 carpenter's helpers, 2 mason's helpers, 6 pipe fitter's helpers, 6 machinist's helpers, 5 blacksmiths, 9 stove repair helpers, 6 tinner's.
- 32 6 lineman's helpers, 16 inside wireman's helpers, 2 motor repairman's helpers.
- 33 8 plumber's helpers, 4 oilers, 6 skilled laborers.
- 34 Oilers.
- 35 3 oilers, 13 ice handlers.
- 36 Firemen.
- 37 4 room orderlies.
- 38 6 pipe fitter's helpers, 4 machinist's helpers, 2 blacksmith's helpers.
- 39 Fire department reserves.

NOTE.—The enlisted personnel of the different sections will be organized as the necessities of the service demand, not to exceed the maximum authorization in each grade.

Embarkation camps, Aug. 8, 1918.

1	Units.	2	3	4	5	6	7	8	9	10	11									
												Administration.	Maintenance branch.		Operating branch.				Heating branch.	Total.
													Buildings and shops section.	Roads section.	Electrical section.	Water and sewer section.	Pumping section.	Refrigeration section.	Fire-protection section.		Isolated plants section.
2	Major.....	1										1								
3	Captains.....		1				1					2								
4	First lieutenants.....	1		1				1	1			4								
5	Second lieutenants.....	1			1			1		1		4								
6	Total commissioned.....	3	1	1	1	1	1	1	1	1		11								
7	Quartermaster sergeants, senior grade.....				1							1								
8	Quartermaster sergeants.....	2							1			3								
9	Sergeants, first class.....	4	7	4	8	6	8		4	3		44								
10	Sergeants.....	11	58	15	24	18		6	3		4	129								
11	Corporals.....	8	3	6	10	11	6		6			50								
12	Cooks.....	8										8								
13	Privates, first class.....	12	72		38	33		26	12		46	239								
14	Privates.....	16	16						24		14	70								
15	Total enlisted.....	61	156	15	81	68	14	42	43		64	544								
16	Aggregate.....	64	157	16	82	69	15	43	44		65	555								

- 1 Utilities officer.
- 2 In charge of section.
- 3 Executive officer.
- 4 In charge service orders.
- 5 Master electrician.
- 6 Supply sergeants.
- 7 2 chief clerks, 1 chief quarters inspector, 1 chief mess sergeant.
- 8 1 chief draftsman, 4 building foremen, 2 foremen blacksmiths.
- 9 Supervisors.
- 10 2 line foremen, 4 inside wire foremen, 2 substation foremen.
- 11 2 foremen plumbers, 1 water inspector, 2 sewer inspectors, 1 pipe foreman.
- 12 2 foremen engineers, 6 operating engineers.
- 13 2 foremen engineers, 2 operating engineers.
- 14 Station chiefs.
- 15 6 telephone orderlies, 1 quarters inspector, 1 mess sergeant, 2 clerks, 1 stenographer.
- 16 2 materials checkers, 4 painters, 23 carpenters, 2 masons, 9 pipe fitters, 4 machinists, 4 stove and range repairmen, 2 tinnors, 3 draftsmen.
- 17 Foremen.
- 18 6 linemen, 16 inside wiremen, 2 motor repairmen.
- 19 Plumbers.
- 20 4 operating engineers, 2 overseers.
- 21 Assistant station chiefs.
- 22 Engineers.
- 23 2 clerks, 6 stenographers.
- 24 Draftsmen.
- 25 Inspectors.
- 26 7 lineman's helpers, 1 estimator, 2 stock keepers.
- 27 1 pipeman, 10 plumbers.
- 28 Oilers.
- 29 Ice foremen.
- 30 Clerks.
- 31 20 carpenter's helpers, 2 mason's helpers, 9 pipe fitter's helpers, 5 machinist's helpers, 8 blacksmiths, 20 stove and range repairmen, 8 tinnors.
- 32 12 linemen's helpers, 26 inside wireman's helpers.
- 33 27 plumber's helpers, 6 skilled laborers.
- 34 6 oillers, 20 ice handlers.
- 35 Firemen.
- 36 6 room orderlies, 10 orderlies.
- 37 8 machinist's helpers, 8 blacksmith's helpers.
- 38 Fire department reserves.
- 39 Fireman's helpers.

NOTE.—The enlisted personnel of the different sections will be organized as the necessities of the service demand, not to exceed the maximum authorization in each grade.

National Army camps, except those having central heating plants (Dix, Dodge, Gordon, Jackson, Lee, Lewis, Meade, Pike, Sherman, Taylor, Travis, Upton), Aug. 6, 1918.

1	Units.	2	3	4	5	6	7	8	9	10	11								
												Administration.	Maintenance branch.		Operating branch.				Heating branch.
													Buildings and shops section.	Roads section.	Electrical section.	Water and sewer section.	Pumping section.	Refrigeration section.	Fire-protection section.	Isolated plants section.	Total.
2	Major.....	1									1								
3	Captains.....		2			2					2								
4	First lieutenants.....	3	2					2	2		4								
5	Second lieutenants.....	4	5		2		2			2	4								
6	Total commissioned.....	3	2	1	1	1	1	1	1	1	11								
7	Quartermaster sergeants, senior grade.....		5		6						2								
8	Quartermaster sergeants.....	1							1		2								
9	Sergeants, first class.....	8	2	3	3	3	3	3	3		19								
10	Sergeants.....	15	80	17	22	19	18	20	3	22	168								
11	Corporals.....	2	12		6	2	3	7	6		30								
12	Cooks.....	12									12								
13	Privates, first class.....	29	20		12	11		13	12	12	110								
14	Privates.....	35	24			6			24	36	66								
15	Total enlisted.....	66	127	15	44	41	7	28	43	38	409								
16	Aggregate.....	69	128	16	45	42	8	29	44	39	420								

- 1 Utilities officer.
- 2 In charge of section.
- 3 Executive officer.
- 4 In charge service orders.
- 5 Chief draftsman.
- 6 Master electrician.
- 7 Supply sergeant.
- 8 1 chief clerk, 1 chief quarters inspector, 1 chief mess sergeant.
- 9 Building foremen.
- 10 Supervisors.
- 11 1 line foreman, 1 inside wire foreman, 1 substation foreman.
- 12 1 foreman plumber, 1 water inspector, 1 sewer inspector.
- 13 Foreman engineer.
- 14 Station chiefs.
- 15 3 telephone orderlies, 4 quarters inspectors, 4 mess sergeants, 2 exchange sergeants, 4 clerks, 3 stenographers.
- 16 3 materials checkers, 5 painters, 25 carpenters, 1 mason, 19 pipe fitters, 4 machinists, 1 blacksmith, 6 stove and range repairmen, 5 tanners, 7 draftsmen, 1 blue printer, 1 clerk, 2 stenographers.
- 17 11 foremen, 1 stenographer-clerk.
- 18 6 linemen, 12 inside wiremen, 1 stockkeeper, 2 motor repairmen, 1 estimator.
- 19 1 pipe foreman, 16 plumbers, 1 stenographer-clerk.
- 20 Operating engineers.
- 21 6 operating engineers, 1 overseer, 1 clerk.
- 22 Assistant station chiefs.
- 23 Engineers.
- 24 6 clerks, 6 stenographers.
- 25 Linemen's helpers.
- 26 1 pipeman, 2 plumbers.
- 27 Oilers.
- 28 3 ice foremen, 3 clerks.
- 29 Orderlies.
- 30 16 carpenter's helpers, 1 mason's helper, 3 blacksmiths.
- 31 Inside wireman's helpers.
- 32 Plumber's helpers.
- 33 Ice handlers.
- 34 Firemen.
- 35 Room orderlies.
- 36 6 pipe fitter's helpers, 4 machinist's helpers, 4 blacksmith's helpers, 10 stove repairman's helpers.
- 37 Skilled laborers.
- 38 Fire department reserves.

NOTE.—The enlisted personnel of the different sections will be organized as the necessities of the service demand, not to exceed the maximum authorization in each grade.

APPENDIX K.

MARCH 15, 1918.

Lieut. Col. R. C. MARSHALL,
*Quartermaster Corps, National Army,
In Charge of Cantonment Division.*

SIB: The committee invited to advise in regard to methods of executing construction work under the direction of the Cantonment Division begs to report as follows:

The committee has not felt that a study of the details as to form and content of the contract form proposed is embraced in the scope of the invitation presented, and it has therefore limited its consideration to the purchase and hire method and to the various schemes of contractual relations which might be established for emergency construction work between the Government, on the one hand, and the constructing agencies, on the other.

Broadly speaking there is but one alternative to the usual method of executing work through the process of letting it under some one of the various forms of contract, and that is by purchase and hire, which means in effect the forming of the operating organization, the purchasing of all material, and the hiring of all labor by the Government itself. The main objections to this method may be summarized as follows:

The most vital prerequisite to the successful and speedy prosecution of emergency construction work is an efficient field organization. This takes time and experience to assemble, and such organizations must be tried out to insure efficiency, and it seems apparent that the valuable time lost in such process is insuperable objection to this method. The committee believes existing contractors' organizations should be maintained and fostered, as they constitute, in the opinion of the committee, important factors in the economic life of the Nation and of exceeding importance to its progress when the war is over. These organizations have been built up through the course of many years and they should not be disrupted or destroyed if their services may be utilized in the work proposed. Serious embarrassment is likely to arise from placing employees on the construction work under the rules and regulations imposed on all Government employees. The difficulty of adapting such rules and regulations to the character and conditions of the work in the various sections of the country would be a very serious drawback in the judgment of the committee:

The administration of work under this method would create an unwieldy organization in Washington. The vast amount of the work proposed and its varying character, and the fact that it is so widely scattered over the country, would make it almost impracticable to attempt to administer it all through a central office, and if it is attempted to decentralize it by transferring final authority to each piece of work it practically becomes an agency contract.

Such a system might be applicable to a project of colossal magnitude under conditions in which time is not of the essence of the contract, and might conceivably be a sheer necessity where sanitation, policing, and other governmental functions could not be adequately provided for in any of the usual contractual forms.

The committee finding none of the conditions which would recommend this method of procedure present in the emergency construction work contemplated, and finding on the contrary many serious objections, advises that the "purchase and hire" method be not used.

The committee advises therefore that the projected work be executed under some form of contract with existing contracting organizations, and the committee has weighed carefully the advantages and disadvantages of the various methods in common use, with reference to the particular problems presented by the type of projects and the conditions imposed by their emergency nature as well as the abnormal conditions of the labor and material market produced by war conditions.

A few years ago the lump-sum contract was the one most commonly employed, and for it were claimed many advantages for both parties thereto which are to-day found to exist in all the contractual instruments which are equitably drawn. There could be no possible objections to the "lump-sum" contract were the Government dealing with clearly delineated problems to be executed under stable peace conditions always provided that the bidders be selected for their fitness and capabilities to properly perform the work, but the committee finds the following vital defects to which it begs to call your attention.

No steps may be taken until drawing and specifications are complete, the bids taken and the contract awarded, and thus would be lost those precious months which may be measured not in dollars but in lives.

The history of war-emergency construction shows the development of many projects originally small by comparison into works of great magnitude and importance, and for such development the "lump-sum" plan is too inflexible to operate satisfactorily; administration costs must increase in adjusting important changes, while inequities and dissatisfaction are bound to arise. In such an unstable market as exists costs must be figured by the contractor high enough to provide a margin to cover unforeseen and uncontrollable changes in the prices of material or labor, which would result in a speculative price which would be disadvantageous to the Government.

Your committee advises, therefore, that the "lump-sum" method be not used.

There is a variant to the foregoing which provides for a lump-sum contract to cover the original project, with a cost-plus remuneration for changes and extensions, but since the main objections inherent in the straight lump-sum method are present here also the committee advises that it be not used.

On an emergency contract of indeterminate extent an admirable method in normal times is an agreed fixed price on such units of construction as per yard of concrete in place, per thousand bricks in the wall, etc., but here again the committee finds that existing conditions and the extreme variations in scope of the work rob it of its sole advantage—exact adjustment by final survey. A fairly complete knowledge in advance of the conditions under which concrete is to be poured, and steel fabricated and erected, obviously controls a close estimate for the establishment of equitable unit prices, and so this method acquires many of the objections advanced against the "lump-sum" method. For these reasons the committee advises that the "unit-price" method be not used.

One other type of contract should be mentioned before presenting the scheme the committee unanimously advises, and that is the agency form of contract. The agency contract must be founded upon, and its successful use depends upon securing those absolutely essential conditions of mutual trust and confidence which grow alone from long and satisfactory association in the position of owner and contractor; its principal use is confined to undertakings of such magnitude as to be beyond the financial capacities of the strongest contracting organizations and unless contemplated projects embrace work of so extraordinary a character we deem its use unwise, particularly as an agent could involve the Government in onerous obligations.

Having advised therefore that these various forms be not used, and for the reasons stated, the committee unanimously concurs in advocating what may be termed the cost plus a sliding scale fee scheme of contract for both general contracts and subcontracts. In its general application it enjoys the same confidence in the building world as to the equities as does the lump-sum contract, as is evidenced by its very extensive use. Its essential features are its applicability to projects great and small—its extreme flexibility with automatic adjustment of all variations in plan and scope. Under its terms the rates of pay for labor are known to be more equitable than under other methods—it requires for its successful application a painstaking review of the records, and standing of contractors just as is now made under existing methods to insure the selection of an organization which measures up to the requirements of the contemplated project but without working any hardship since no one can escape the axiom that in the final analysis each job can go only to one contractor. The committee believes that one of the objections charged to this form of contract is that it encourages extravagance and holds open temptations to increase costs because such increase is accompanied by increased compensation. The general form of contract now in use by the Cantonment Division, in which the percentage decreases as the cost increases and is broken by fixed fees at intervals, seems calculated to effectually check, if not prevent, this tendency. Moreover, under the contract proposed the Government retains the right to control the

prices of most materials and of labor. Under these circumstances, it does not seem to the committee that such an objection would have any force in relation to this form of contract. No reasonable objection can be pointed out by anyone possessing a full understanding of its equitable operation in practice, and finally this scheme appeals to the committee as possessing one qualification which must commend it to all thinking men—it permits starting actual work weeks and even months before the details are completely worked out and delineated and permits the Government to push the job at any speed it may elect, changing at will its plan and scope but paying only what the work actually costs plus a fee which is so reasonable as to be above the reach of fair-minded criticism.

The committee therefore advises for emergency construction work by the Cantonment Division the scheme of contract known as "cost of the work plus a sliding scale percentage with a maximum upset fee."

Respectfully submitted.

A. M. TALBOT, *Chairman.*
 JOHN LAWRENCE MAURAN, *Secretary.*
 JOHN R. ALPINE.
 FREDERICK L. CRANFORD.
 CHARLES T. MAIN,
 OSCAR A. REUM.
 R. G. RHETT.
 E. W. RICE, *p.*

NOTE.—The committee invited to advise in regard to methods of executing construction work under the direction of the Cantonment Division was as follows:

John R. Alpine, general president United Association of Plumbers and Steam Fitters, representing the American Federation of Labor.

Frederick L. Cranford, president general Contractors Association of New York, Brooklyn, N. Y.

Charles T. Main, president American Society of Mechanical Engineers, Boston, Mass.

John Lawrence Mauran, president American Institute of Architects, St. Louis, Mo.

Oscar A. Reum, representative of the president of the Building Construction Employers Association, Chicago, Ill.

R. G. Rhett, president Chamber of Commerce, U. S. A., Charleston, S. C.

E. W. Rice, president American Institute of Electrical Engineers, Schenectady, N. Y.

A. N. Talbot, president American Society of Civil Engineers, Urbana, Ill.



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