

322

Section	8
Envelop	7

LIBRARY TRANSPORTATION OF TROOPS AND MATERIEL

BY

LAND.

-----OOO-----

BY

MAJOR CHAUNCEY B. BAKER,

QUARTERMASTER'S DEPARTMENT, UNITED STATES ARMY.

-----OOO-----

Read before the Naval War College,
 Newport, R.I.,
 August 18, 1904.

Transportation.

TRANSPORT OF TROOPS AND MATERIEL

BY LAND.

- I. Introductory - Logistics.
- II. The Final Gap.
- III. Roads, Bridges and Trails.
- IV. Means of Transport - Animals.
 - (a) Mules.
 - (b) Horses.
 - (c) Oxen.
 - (d) Carabao.
 - (e) Coolies.
 - (f) Dogs, and sledges.
 - (g) Means used by other nations.
- V. Means of Transport - Materiel.
 - (a) The Army Wagon.
 - (b) The Escort Wagon.
 - (c) Special vehicles.
 - 1. Mule Cart and Hand Cart for Post Use.
 - 2. Hospital Corps Ambulance.
 - 3. Signal Corps Wire Wagon, Spar Wagon, Dispatch, etc.
 - 4. Engineers' Pontoon Wagon, Spar Wagon, Tool Wagon, etc.
 - 5. Traction Engines and Automobiles.
- VI. Organization of Field Transport.
 - (a) Baggage Wagons or Regimental Trains.
 - (b) Divisional Supply Trains.
 - (c) General Supply Trains.
- VII. Organization of the Train.
- VIII. Operation of Trains - Example from Cuba.
- IX. Variation from the Normal Organization under Special Circumstances.
- X. General Field Transportation Order.

- XI. Relation between Impedimenta and Transport.
- XII. Method of Utilizing Transport when Living on the Country.
Transportation order of General Sherman.
Report of General Easton.
- XIII. Conclusion.
Appendix - Pack Train Order issued in Cuba.

TRANSPORTATION OF TROOPS AND MATERIEL

BY

LAND.

-----oOo-----

BY

MAJOR CHAUNCEY B. BAKER,
QUARTERMASTER'S DEPARTMENT, UNITED STATES ARMY.

-----oOo-----

Read before the Naval War College,

Newport, R.I.,

August 18, 1904.

TRANSPORT OF TROOPS AND MATERIEL
BY LAND.

I.

INTRODUCTORY - LOGISTICS.

Whilst in the discussion of any subject connected with the Art of War the same degree of precision cannot be applied as in dealing with the exact sciences, yet it is to be borne in mind that the more completely the element of chance can be eliminated the greater will be the probability of success in any military undertaking. It is to effect this desirable end that we make studies of the Art of War in all its bearings.

In order to cover the ground which belongs to the subject of Logistics, so far as it relates to the question of transport of troops and supplies, the following questions will be for the commanding general, or the War Department, to determine:

1. The amount and kind of supplies; which will depend upon the number of troops of the various arms of the service, and the character and extent of the expedition or campaign. It will be well to leave to the commanding general of the expedition the determination of these matters.

2. The manner in which such supplies and stores shall be procured, whether by manufacture in the depots and arsenals, or by purchase in the markets as amongst business men, or under proper contracts, will be questions to be decided by the bureau from which the supplies will be drawn.

3. The question of the storage and delivery of such supplies will be one requiring the joint action of the general commanding the forces, and the War Department, and will depend upon the character and extent of the operations, and theatre of war.

4. The commanding general will state his needs and a general outline of the scope of the campaign, and the supply departments will provide the stores in required quantities, which in turn will be forwarded by the transportation branch of the Quartermaster's Department.

These and many other questions concerning supplies and transport will call for decision after consultation between the commanding general and the War Department, the conditions varying as to whether the troops are to be in garrison, cantonment, temporary camp, or in active campaign.

In order then, that one may have a general view of the subject it will be necessary to give a comprehensive outline of the policy of the War Department in furnishing supplies and materiel to the army, so as to meet the needs of the army in active campaign, and to give the commanding general a means of basing his calculations upon a fixed and reliable standard.

The study of military history and campaigns will force upon the student a realization of the careful bonds of union that have held together successful armies, and enabled them to move and camp, and move and fight, and move again, at the will of the commander. The strength of such an army has existed in the

sufficiency of its supply and the certainty of its means of transport.

Before we can intelligently enter upon the consideration of the subject of the transportation of the army and its supplies, it will be necessary to consider the conditions under which armies operate.

During the feudal period the operations and movements of armies were greatly restricted on account of the necessity of living on the country. It was rarely possible to fight a battle at the will of the commander, but rather to do so when the commander found himself in a district well supplied, and engagements most frequently occurred when he found himself more or less by accident in the vicinity of the enemy. With wholly inadequate means of transportation for supplies he found it necessary to distribute his troops over a vast extent of territory with a view to procuring subsistence, and in order to do battle it was necessary to assemble the scattered elements of his army.

History records many instances in which it was necessary for a superior army to disperse in order to subsist, when by remaining assembled it could without doubt have won decisive victories.

A very common device was that of laying waste the enemy's country, thereby destroying his source of supply and hindering his movements, and modern civilization has not wholly ended this

means of crippling a foe.

The armies of today, it is true, when in the field are more or less spread over a wide extent of territory, but not for the same reasons. The supplies are not, as a rule, gathered from the country within the theatre of war, but are rather forwarded from safe magazines and depots at the rear. The object of distributing the force over a large extent of territory is to get suitable and sanitary camp sites, properly provided with water and with such communications with the rear and laterally as will not become choked with the transportation of troops and supplies, and also to occupy such positions as may be necessary to properly restrict the operations of the enemy. The means, however, will be constantly at hand by which prompt concentration can be effected and maintained, and an uninterrupted flow of supplies kept up, so that the forces in a properly organized command can, with a minimum of delay in time, be made available for battle with the maximum degree of certainty as to the supply of the army in any position that the will of the commander may direct it to assume.

In order to accomplish the supply of the army in the most satisfactory manner possible, the forces that are to be placed regularly on the fighting line should be independent of those charged with procuring and forwarding supplies. The stores, supplies, and munitions of war are provided in our service by the various supply departments of the army and forwarded by

the transportation branch of the Quartermaster's Department.

The problems of supply and transport for an army are features that rarely appear upon the pages of history, yet they cause more anxiety and perplexity to Governments and generals than does anything else short of the the outcome of the battle itself, for in nearly every campaign the questions of supply and transport cut so large a figure, that upon the efficient working out of these problems the results often depend.

Perhaps the best illustration of the sufferings of an army on account of the lack of organization in its transport is to be found in that of the British before Sebastopol; where they remained on account of insufficient land transport, although their objective was not more than one good day's march distant.

Colonel C. R. Sherinton of the British Army thus describes the conditions of the transport provided to serve that Army:

"A heterogeneous rabble recruited in the purlieus of our cities, while muleteers and drivers ignorant alike of the British tongue and European requirements arrived from every quarter. Mules from Spain, Italy and Asia Minor, bullocks from Egypt, camels from Arabia, poured in without stint and regardless of cost; while vehicles of every class and character that the world could produce or ingenuity devise were landed at Balaklara.

"Such was the land transport corps of the Crimea."

Ample in materiel and personnel but without in the beginning any organization whatever. As a result the army was always

hungry and always ill supplied.

A hungry army is sure to lose its discipline and esprit, and too often will find in its necessities the license to plunder and loot. If, in addition to lack of food and clothing, the ammunition supply is not kept up, the army cannot fight and the campaign is lost. Once the supplies are exhausted, the time is short that will convert an army into a disorganized, disheartened mob.

In the case of the two great armies now in conflict we are sure to be told when explanations are made of the reasons of defeat, that the ultimate cause was the inadequate means of transport; and this will be the case no matter which of the contestants suffers defeat.

It is believed that the present conflict is in reality a battle of transport.

The absolute necessity then of constantly forwarding recruits, supplies, and munitions of war and of withdrawing the sick and wounded, and broken materiel, is as great as the existence of the army itself. To accomplish these ends the staunchest means, the most direct and simple system, and the most careful organization, coupled with energetic action and keen eye for looking into the future, are essential.

We have followed the army, its materiel and supplies, and had a glance at the manner in which this function is performed upon the water, and again over the great systems of our rail-

roads reaching to the limits of our seacoast and frontier in every direction.

II.

THE FINAL GAP.

The final gap, however, between the temporary depots and the army itself will always be closed by means of land transportation; either by wheeled vehicles, wagons or carts, or by pack animals of one variety or another - in our service chiefly by mules, or, as in the East, by use of coolie bearers.

The details of the operation of the ocean transport service will necessarily be left to those familiar with steam vessels; the details of operating the railroads and care of the railway equipment will be left to those versed in railway matters; instructions and orders emanating from military authority on these classes of service will be of such character as will supplement the operation of the vessel or the road, and furnish a means of arriving at a full and definite understanding of the ends to be attained, and the manner and means of attaining them without friction and by the most direct methods, and cannot enter into the details of a service which is a class of its own. When, however, it becomes a matter of land transportation by wagons or pack trains, a subject is reached which it is believed the American army has solved more completely than any other service in the world.

III.

ROADS, BRIDGES AND TRAILS.

On the Continent of Europe military operations overland will be carried forward along well made roads as a rule, and comparatively little difficulty will be experienced on account of these.

In this country, however, no matter where the operations are carried forward the roads will be at best indifferent, and from that to exceedingly bad or to those that are practically impassable in bad weather.

It not only becomes the business of the Department to organize and operate the trains but to build and repair roads, and to keep the bridges in condition for crossing streams and rivers. All the devices of road and bridge building are employed to accomplish this purpose. The most difficult road is that through a marsh or slough and the favorite method of treating it is by laying corduroy, i. e. placing the bodies of small saplings across the road. They are held in position by means of stringers, which in turn are held in place by being pinned to the saplings. Brush may underlay the corduroy and other brushwood may be placed on top and covered with earth. In the march of Sherman's Army to the sea many days' march in succession were provided for in this manner. The time was always insufficient to do more than to provide for temporary means of progress.

Bridges may be built or repaired by the means to be found on the ground, or as has in some instances occurred, they may be sent complete from the base.

The bridge train of the engineer troops will afford an immediate means of crossing a stream or ravine and of temporarily closing a gap in a broken bridge. Its legitimate use, however, is to move forward with the army and increase its mobility. Therefore upon the line of communication bridges of a more permanent character will take its place.

For the satisfactory building and repair of roads and bridges a special service will be required. This service has usually been organized from civilians under military supervision, as the occasion in war has arisen.

IV.

MEANS OF TRANSPORT - ANIMALS.

(a) THE MULE. - The principal motive power upon which the army depends for the transport of its stores, supplies, and munitions of war in active campaign is the mule. And a more reliable, trustworthy animal for the purpose does not exist. In peace times these animals are purchased under contract after due advertisement and according to specifications which read as follows:

"Mules purchased for the Army by the Quartermaster's Department should conform to the following conditions: They

should be strong, compact, sound, and kind; they should be free from defects in every particular; four to nine years old, 850 to 1200 pounds in weight, fourteen to sixteen hands high and suitable in all respects for the transportation service of the Army. If for draft purposes, they will be well broken to harness; pack mules need not be broken, and may be not less than thirteen and half hands high, if otherwise suitable."

Animals fulfilling these specifications will be very perfect for the accomplishment of the purposes for which they are purchased. The great advantages possessed by the mule over other animals used for similar purposes, are his great endurance, his capacity for hard work, on scant rations, his great recuperative powers, his quick response to fair treatment, his susceptibility to thorough training, and his willingness to always do his best. A team of mules will keep their load moving for hour after hour until one would think them ready to drop from exhaustion, and then if taken from their harness, given a nibble of grass or brush, and an opportunity to roll over and over, they can be put back in the harness and will move off almost as fresh as in the beginning of their journey.

(b) HORSES. - The use of the horse for draught purposes in our service is confined almost exclusively to the artillery arm in furnishing draught power for the guns and caissons. They are quicker in action, less likely to be stampeded under fire, but they require more careful attention and more forage than the

mule. They are never now used for military draught purposes, other than those above indicated.

(c) OXEN. - Formerly oxen were in great favor in our service for draught animals. They were especially used in the great supply trains that crossed the plains to our frontier posts one or two generations ago. In those days there was ample grass to be found along the trails, and in the neighborhood of the watering and camping places. These animals lives wholly on grass gathered along the trails, and were therefore valuable on account of their low ration bill; as the grass grew scant they were gradually forced out of their occupation, and have now given way to the mule. They are very slow, making not more than two or two and a half miles per hour. They were largely used in the Boer War in South Africa when they were yoked in teams of thirty-two animals, and hauled one principal wagon and two or three trailers.

(d) CARABAO. - The carabao was much used in the supply trains in the Philippine Islands before an ample amount of transportation and sufficient number of mules had been sent out from the United States.

These animals were very slow, from 1-1/2 to 2 miles per hour being their maximum speed on good roads, and about five miles per day being their limit. They were attached to the native two-wheel cart; and possessed the advantage of being

easily cared for as they could live wholly upon the country. They possessed the disadvantage of having but little endurance; it is necessary to unyoke them every three or four hours and give them an opportunity to wallow in the mud and water, to refresh themselves; and if no water is to be had in which to wallow, mud and water must be thrown over their bodies. If not treated in this manner they become crazed and incapable of being restrained will plunge madly through the jungle, until death ensues. As an illustration of the adaptability to local conditions, Captain Sawtelle relates an incident of these animals having been used as pack animals and loaded with ammunition; when crossing a stream they were completely submerged for several minutes, but continued in motion and reappeared on the opposite bank apparently improved in temper by their experience. The skin of the carabao, however, is too tender to permit their being used habitually as pack animals.

(e) COOLIES. - Chinese bearers were used for a time in the Philippines, and at one time were attached to companies. Colonel C. P. Miller has the following to say of them:

"Four coolies for each company were allowed. During action, these men were of great use in carrying off the dead and wounded, and in bringing up ammunition, and, considering their class and small pay, showed commendable courage in their work. While they would hug the ground and shake with fear during an

action, when ordered forward for work which they recognized as theirs, with rare exceptions were up and off, intent upon their duties; their fear forgotten. When the active campaigning with large bodies of troops was over there was a tendency in the companies to require these 'Chinos' to do all the dirty work about the kitchen and camp, handle all supplies, etc., thus tending to make the men think they could be called upon to do nothing but march and fight. Hence it was then thought best by the Major General Commanding to discharge all Chinos with companies."

Especially good results followed from the use of these men at hospitals. In the advance on Pekin coolies were very largely used both as laborers and wharf men, and for pack purposes.

When used as a means of transport or for any other purpose, they should be organized as carefully as one would organize a pack train or wagon train. Gangs should not number above twenty as that is the number that one man can properly overlook. One man, a superintendent, can then supervise four or five of these gangs. An officer will find it practicable to direct the operations of five or six such units, i. e. a total of five or six hundred men.

(f) DOGS AND SLEDGES. - Dogs are used in the Arctic regions both as pack animals and draught animals, principally for drawing

sledges. And without this valuable means of transport those regions would be wholly uninhabitable. Mules are also packed in this region when the trails can be properly broken.

(g) MEANS USED BY OTHER NATIONS. - The English make much use of camels and elephants in their Indian and African service. The elephant is used both as a pack and draught animal. The Japanese in addition to an army of coolie carriers make use of a light strong cart ordinarily drawn by a pony led by a man. This cart is frequently used as a hand cart, and can, if occasion require, be picked up with its load and carried over rough places by a number of men; a very useful feature in the present campaign if reports are to be believed. Another simple means of transportation said to be used by the Japanese in the present campaign is the mud sledge, which it is said is made use of in the transportation of their artillery, and has rendered it possible for them to reach their present positions with their guns.

V.

MEANS OF TRANSPORT - MATERIEL.

(a) THE ARMY WAGON. - Long before the outbreak of the Civil War the six-mule army wagon had demonstrated its serviceability and utility in the transportation of supplies and munitions of war for the army to the remote stations on the frontier. This wagon was found to be alike suitable for service on rough mountain

roads, the sandy plains, and in crossing the shifting and uncertain beds of western rivers. This wagon was used throughout the Civil War for heavy transport and is still in use in our Army for like service; and it is not believed that for the services to which it is put there is any vehicle superior to it. It has been criticised for various reasons and improvements, so called, have been attempted but usually to discover after trial that the improvement has resulted in destroying some essential feature. Certainly no pattern that is used by any other army in the world would equally meet our requirements. It is strong, capacious, easily repaired and its parts are interchangeable, so that no matter what accident may happen the wagon can be promptly placed in a state of serviceability by the addition of spare parts which are always carried with the train. If additional repairs are necessary the traveling forge will accomplish them when the train parks for the night. The harness is equally strong and simple. Its load will be from 3,000 to 4,000 pounds, according to the character of the roads and the necessities for rapid communication.

(b) THE ESCORT WAGON. - The escort wagon is lighter in its construction, is drawn by four mules, and carries a load of from 2,000 to 3,000 pounds, according to the character of the roads and other conditions. This vehicle has grown into great popularity during the war with Spain and subsequent thereto,

especially in the Philippine Islands, where it has been given a most thorough test. When seen in China by the troops of other nations, rigged with four mules, guided by a single driver, always at the heels of the advancing troops, ready to supply them with camp necessities, and even luxuries, it was looked upon by foreigners as something amazing. And when they were told that this was our light form of vehicle and that a heavier one drawn by six animals, driven by a single teamster, was used for the heavier classes of service they listened with politeness but with very evident incredulity. The four-mule wagon as recently modified, with broad tire, wooden wheel, reinforced body, flaring sideboards, and other minor improvements that give the full capacity of the bed for carrying the load, and with stores put up in convenient packages for completely and solidly loading the bed of the wagon, is believed to be almost perfect for military purposes on fair roads. It is not considered necessary to further discuss the classes of wagons provided by the Quartermaster's Department, further than to state that it is the experience of more than a generation that the six-mule army wagon for hard rough work, has met all the requirements of the most severe campaigns ever engaged in by an army; and that the new four-mule wagon for active operations and quick work is superior to any similar transport known to any service. These wagons can properly be referred to under the head of supply

wagons. The two classes of vehicles here described are those upon which the army will almost wholly depend for forwarding supplies and stores from the terminal railroad station, or wharves, and distributing them to the troops. The six-mule wagon will be used on the lines of communications and the four-mule wagon for regimental transport with the troops. Any increase in the variety of wagons for transport service should not be thought of, owing not only to the perfection of those now in use, but also to the difficulties always encountered in supplying spare parts to a multiplicity of varieties of wagons, even though differing very slightly. This was markedly exemplified during the Spanish-American war, when it was necessary to procure practically at a moment's notice all vehicles approximately suitable for the purpose, that there were on the market. Even expert wagon men were greatly confused in assorting at depots the various spare parts, and requisitions coming in were almost never sufficiently precise in their descriptions to enable intelligent compliance.

(c) SPECIAL VEHICLES. -

1. For use at posts mule carts and small hand carts are provided. These, however, are never taken into the field. Also water wagons, sanitary carts, and other necessary means are furnished for post purposes.

2. For hospital uses there is provided the ambulances equipped with stretchers for carrying the sick and wounded; also a form of travois is used for this purpose.

3. The Signal Corps is equipped with special wagons to accomplish the needs of that service. They consist of wire wagons, spar wagons, balloon wagons, dispatch wagons, etc.

4. The Engineer Corps is provided with a special transport of pontoon wagons, chess wagons, spar wagons, tool wagons, etc. In addition to these special wagons it is necessary to furnish supply wagons to these special corps for providing extra forage, rations and other supplies.

Wagons of other armies in addition to those named also provide in some cases for special wagons to be used as the company kitchens, the bakery, soup cart, etc.; also a special cart is used in some cases for supply of ammunition.

5. TRACTION ENGINES. - Many military writers on the subject of transportation in foreign armies highly commend the use of traction engines, and automobiles. Our own observers in the South African campaigns urgently recommend the use of automobiles and mechanical traction instead of herds of slow draft animals which require food and rest. In an official report it is stated that "In Natal traction engines are used with the moving army on all kinds of roads, crossing drifts in low water without difficulty. I believe (the report says) traction engines, automobiles, and portable railways to be the most essential part

of the transport equipment of an army." Our limited experience does not support this view. We have made but a single experiment with traction engines, over a road recommended as suitable by the manufacturer. The engine used was of the gasoline automobile truck variety, and the experiment was made in the vicinity of Fort Ringgold, Texas. The machine was put together and operated by an expert sent for the purpose. Although unloaded it stalled at less than thirty yards from the railway station, where it started, and there remained defying all efforts to induce it to proceed, throwing up earth and filling the machinery with sand and dirt. It was finally hauled to the station and shipped by rail to West Point, where it was given further trial on the excellent roads of that post. It was found to operate satisfactorily on the level, and over slight grades, but the stiff grades leading from the river it was unable to ascend. In addition, a vehicle of this character would be impracticable of use in passing deep fords, muddy places, and weakly constructed culverts and bridges, such as abound on our country roads.

It is not understood under these circumstances how traction engines or automobile trucks can possibly be made the chief reliance of an army. The electric wagon must obviously be excluded as facilities will not exist for its recharging. The steam machine can only be used under favorable circumstances, viz:

1. Where the water is pure and will not cause deterioration in the boilers.

2. Where the gradients are not too great, the road bed good, the culverts and bridges strong, and where muddy and marshy stretches of road can be avoided.

In military operations in this country these favorable conditions are only occasionally met with. Undoubtedly if along the lines of communications, such conditions exist, suitable use will be made of traction engines and automobile trucks. The main reliance of the army, however, between terminal station and the front, will always be upon animal transport.

VI.

ORGANIZATION OF FIELD TRANSPORT.

The transport of supplies and materiel for our army in the field, exclusive of that carried by the special vehicles of the staff corps and of that which the soldier carries with him for immediate use, is accomplished normally by the four and six mule wagons with such auxiliary transport as may from time to time be hired or chartered under the pressure of special conditions. It has always been our policy in active campaigns to make use of purely military transport in contact with the troops and if necessary to employ auxiliary transport on the lines of communications and at remote points.

Pack trains are only used under circumstances when it is

impossible to operate wheel vehicles over very rough ground, mountain trails and through marshy ground impassable for wheels.

In the consideration of the method of organization, so as to produce the best results, the wheel transportation provided for an army falls naturally into three general divisions:

1. The baggage wagons attached to regiments and other organizations, which carry the baggage of the troops to which they are attached, and only sufficient supplies of commissaries and ammunition for immediate use. Usually one ambulance is also attached. This will be called regimental transport.

2. The supply trains that march with the army, and which may be organized as brigade, division or corps trains, to carry the supplies and materiel needed by the army, and periodically distribute them. This class of transport will be called the divisional supply train, no matter whether it follows a corps, a division, a brigade, a regiment or an independent detachment operating alone.

3. The general supply trains which operate along the lines of communications and forward the supplies from the depot, or terminal rail station, which will always be a temporary depot, to the advance or flying depot, where they can be reached by the divisional supply trains operating with the army. This class of transport will be called general supply trains.

The usual organization for the supply trains will be by

division. The general repair shops for the field should also be by division, with a minor shop with each brigade. The division shops should carry a full supply of spare parts, together with means of repairing all breaks.

Tools, of course, will be carried for repair of woodwork, iron work, and harness, and employees to effect the repairs will constitute a portion of the personnel.

There will also be a well equipped repair shop at the terminal rail station for effecting repairs for the general supply trains and if the line of communications is long intermediate shops will be established for the same purpose.

The duties of these three classes of transport are fixed and definite and provide for the complete mobility of the army, with the least confusion and the greatest certainty and expedition.

The regimental transport marches with the army and carries such impedimenta and stores as are required in making camp at night; this will include such camp equipage, baggage and cooking utensils and rations as may be authorized by proper authority, and, under certain circumstances, an additional supply of ammunition.

The divisional supply trains will march in rear of the army or organization to which attached in the order directed by the commanding general, and in general at the distances prescribed

by the same authority. They will constitute the flying depot and will conform to the movements of the army, and serve the regimental trains with the stores, supplies, ammunition, etc., according to the orders of the commanding general, and will carry the surplus ammunition to be distributed on the eve of and during the battle.

The general supply trains will operate along the lines of communications carrying forward the supplies and materiel from the temporary depot at the terminal station to the advance depot, where they are transferred to the divisional supply trains which place them in the hands of the regimental trains for distribution to the troops.

The foregoing is a description of the method of supplying an army on the march. Under such conditions, only so many of the loads of the divisional supply train will be delivered to the regimental train as the latter can carry for the ensuing day. Similarly the general supply column will deliver only what can be carried by the divisional trains. If necessary the loaded general supply trains may temporarily join the divisional supply columns until their loads are required.

If the army halts in a position secure from attack, the general supply trains and the divisional supply trains may perform one service, that of general supply, and advance depots may be established in the vicinity of the troops within reach

of the regimental transport. This arrangement divides the work equally and gives all transport concerned an opportunity to rest.

It may be that the troops will be encamped in the immediate vicinity of the rail station, when the functions of both general supply and divisional supply may disappear.

Again, in the event of a detached organization on an independent expedition, as for example, a raid for a definite period of time, it will be necessary to allot so much of the divisional or general supply transport to the expedition as will be necessary to carry the supplies for the entire period, unless other provision is made for the supply of the detachment.

Again, upon the change of the terminal station and establishment of a new temporary depot, or the establishment of a new base the entire transport will for the time being conform to the movements of the army.

All of these cases, however, are apparent modifications of the one proposed wherein the three lines of transport are provided; and on the other hand, circumstances can easily be conceived when an additional line would seemingly be desirable. Yet for the maximum of mobility, with the minimum of confusion and friction, the three lines are necessary. The responsibilities of each class are fixed and definite, and there can be no excuse for failure.

(a) BAGGAGE WAGONS OR REGIMENTAL TRAINS. - The regimental train for infantry under our revised regulation consists of 17 escort wagons, 3 ammunition wagons, and 1 ambulance. This allows for 850 pounds for tentage, 250 pounds for officers' baggage, 350 pounds for cooking utensils, with two days' rations, and grain for the animals; giving a load of about 2,300 pounds. With beef on the hoof, no tentage, scant vegetables, one escort loaded will supply a company for ten days. The provision for a cavalry regiment is 29 escort wagons, and 1 ambulance. For a battery of artillery 3 escort wagons. These figures whilst they are given in the regulations, may be increased or diminished according to circumstances, an increase being permitted, however, only under authority of the Secretary of War. The conditions of service vary so greatly that it will almost always be necessary for the commanding general of an expeditionary force, a separate army, or an independent organization, to fix the allowance of baggage and transportation for the occasion.

It is believed that the regulation allowance above cited will be, as a rule, in excess of the needs of the regiment in active operations; and when the command is large will be more than be kept with the regiment without unduly hampering the free movement of its own and other troops. The object of the regimental train is to provide for carrying everything that will be immediately needed on going into camp, and preceding an action.

The regimental train may be called the first line.

(b) DIVISIONAL SUPPLY TRAINS. - The second line would be the divisional supply column, which will carry the necessary rations, forage, ammunition and other supplies for the early needs of the command.

AMMUNITION COLUMN. - The supplies and materiel carried in the divisional supply trains will not include what is known as the reserve supply of ammunition, which will be carried in a separate ammunition column, attached to the divisional supply train, and which will not be distributed **except** on the eve of action. This train will be under the command of an officer who will keep in constant communication with the chief of artillery. During an engagement he will maintain a conspicuous place with his train, carrying a designating flag in order that he may be readily located. All interested commanders should be notified of this location.

The divisional trains will consist of such number of teams and wagons as will be necessary to carry the reserve supply of ammunition, rations for not less than three days, division hospital equipment, the ambulances of the divisional ambulance companies, etc.

This number will vary with the conditions of the campaign and with the size and composition of the command.

(c) GENERAL SUPPLY TRAINS. - The general supply trains will consist of such numbers of teams and wagons and ambulances as may be necessary to carry forward to the division trains the supplies required and to return to the base the sick and disabled.

VII.

ORGANIZATION OF THE TRAIN.

The most satisfactory and most mobile organization for wagon trains in our service is as follows:

For each train:

27 wagons and teamsters,
 1 wagonmaster,
 2 assistant wagonmasters,
 1 watchman,
 1 cook,
 1 extra teamster.

Where trains operate separately a blacksmith-farrier will be added to the personnel.

Where a number of trains operate together, they will be under the general supervision and control of a trainmaster, who will be responsible, under the orders of the quartermaster, for their conduct and operation.

This organization of the train gives a unit which is suitable, with a slight reduction, for the full field service of a regiment of infantry, and ample for carrying the necessary equipage and supplies on a march of ten days duration. It is susceptible of being divided into minor units of three parts,

each one of which can be assigned, if desired, to a battalion when operating independently, and each one of which will have a wagonmaster, or assistant wagonmaster, in charge. The number of wagons to each train can be increased or reduced if temporarily desired, without destroying the organization and integrity of the train. In the increased condition the train can be subdivided into three sections for use according to local needs and constantly changing conditions.

VIII.

OPERATION OF TRAINS.

EXAMPLE FROM CUBA.

In a large general corral established in Havana in 1898 for the transportation of supplies and materiel from the wharves and depots in Havana, to the troops of the 7th Army Corps, and other organizations in and about the city of Havana, an organization similar to that above mentioned was in effect.

This corral was made up of eleven wagon trains, each organized practically as above outlined. In the organization of a body of transportation of such magnitude it was necessary to employ a system as complete as that which regulates the organization of a regiment.

The wagons were numbered consecutively from one up, except that all wagons in excess of 25 in each train took the consecutive letters of the alphabet, i. e. 25 A, 25 B, 50 A, etc.

If trains were reduced below twenty-five the vacant numbers were omitted. This method simplified identification of any wagon, team, or driver, and at the same time provided an easy means of designating trains which were called train twenty-five, train one hundred and fifty, etc., using the highest number in the train. If the trains were loaded with mixed supplies the corresponding wagons were always loaded with the same class of supplies, e. g. one to ten, twenty-six to thirty-four, etc., with commissaries. The next ten with ammunition; the lettered wagons with forage, etc.

The regimental trains should be numbered and marked with the designation of the regiment.

The corral, and all the personnel, supplies and materiel connected therewith, as well as the operation of the trains, were controlled by a superintendent of corrals, who was intrusted with the immediate administration of the service. His working staff consisted of:

1st. A corral master, responsible for the orderly arrangement of the corral, and for the discipline and general arrangement and management of the animals and men of the trains while within its limits. In addition to these duties the corral master had charge of the men's mess.

2d. A superintendent of transportation was in charge of the outside work of the trains. He had general supervision over all teams at work, and was responsible for their performance of the

required duty with the greatest possible degree of efficiency, and that the wagon masters and assistant wagonmasters understood and carried out their orders and maintained proper discipline within their trains. He was also responsible for the operation, equipment and efficiency of all trains.

In each train the wagonmaster was responsible for its condition, discipline and operations; he had for his assistants two assistant wagonmasters to whom he could delegate certain portions of his duties. Each teamster was made responsible for the condition of his team and wagon, and its equipment, and for all property placed in his possession, and supplies entrusted to him for transportation. Each teamster, as his wagon was loaded, received a dray ticket for which he was responsible to his wagonmaster. The latter in turn was charged with these tickets receipted upon delivery of the load, and finally depositing them with the shipping clerk.

3d. The foragemaster was responsible upon signed receipts for all forage brought to the corral, for its issue, and for its proper feeding.

4th. A superintendent of shops directed the work of repairs of the blacksmith's, wheelwright's, saddler's, painter's and other shops, and within each of these shops there was a foreman who was wholly responsible for the character of work performed.

5th. A foreman of laborers was made responsible for the unskilled labor.

6th. A property clerk kept the individual property account of each employee, and for all property in the corral and trains, for which the quartermaster was responsible. This employee was required to give ^a property clearance slip before payment was made to discharged employees. He also made requisitions for supplies and materials required for repairs, and kept the storehouse record of all property required for, expended, and on hand, within the corrals. Each of these employees had well defined duties to perform, and no conflict of authority could arise.

These wagon trains, operating over a distance of eleven or twelve miles of rough road, were able to carry a great quantity of supplies in a far more satisfactory manner than could be transported by a single line of railroad in operation on a parallel line; and in its state of reduced numbers was finally disbanded on May 20, 1902, after handling many hundreds of millions of pounds of stores, during nearly four years of operations, without the loss of a single article, except, in the beginning a few minor items of commissary supplies, for which the teamsters responsible for the loss promptly paid the value in each case.

These wagon trains were organized for the class of service

that we have called general supply. They were so organized, however, that without more confusion than would occur in ordering a company on the parade ground for a drill, they were able to leave the corral at a given hour, for any class of service required, for a period of a few hours to many days or weeks, and with the feeling on the part of the responsible officer that whatever their operations might be they could be safely relied upon to do their work in an entirely satisfactory manner.

Without doubt the best form of transport is an enlisted personnel, well provided with noncommissioned officers, and a materiel of uniform pattern owned by the Government. Yet all our wars except that of the Revolution have been fought with a civilian personnel in the transport.

The army teamster as a class, whether white or black, deserves well of the fighting forces. He is, as a rule, fearless, cool, devoted to his duty, and wholly indifferent to the comforts of life. Long after the camp is wrapped in sleep he is to be found whispering soft words of encouragement to his long-eared friends, and providing those small comforts that only the driver that is on speaking terms with his team can understand. Even his strange oaths and the blows from his whip are accepted as caresses.

Whilst the army still slumbers, he is out in the raw cold of the morning, feeding his team, fitting his harness, and

preparing for the work of the day. His wagon is his castle, and mounted on the near wheeler, or seated on the top of his load, he is king in his little realm and his team his willing subjects.

IX.

VARIATION FROM THE NORMAL ORGANIZATION UNDER SPECIAL CIRCUMSTANCES.

It will rarely be found that the provisions of the regulations for regimental transport will exactly suit the conditions and environment. It will in some cases be found desirable to increase the regimental transport at the expense of the divisional and general transport. In other cases it will without doubt be found desirable to reduce the regimental transport and increase the other forms.

During the Civil War the regimental transport varied from thirteen wagons in the beginning to one at the close for each regiment. The conditions that will influence the commanding general in reducing the regimental transport below the figure fixed by regulations or current order will be (1) From necessity by reason of inability to procure the full amount; (2) On account of the ground taken up on the march and consequent encumbering of the ground needed for movement of troops; (3) On account of close proximity to the enemy and consequent danger of damage or capture; (4) The consideration of economy, or

necessity for limiting expenditure for lack of means.

As a concrete example of such adaption, and as an illustration of a system capable of expansion or contraction as desired, the following order was recommended in a recent camp of maneuver. So much of the order was published as covered the case in point.

X.

GENERAL FIELD TRANSPORTATION ORDER.

The figures given in this order may not seem, in some cases, to be adequate. However, the endeavor has been to cover all reasonable points of requirement, on the subject of wheel and pack transportation, leaving it to special circumstances to determine the practicability of adopting or altering the figures recited. It is believed that such requirements in some form are essential for a mobile army.

" General Orders.

" No.

Headquarters Provisional Division.

" The following orders prescribing the means of transportation, and camp and garrison equipage for the Provisional Division, supersede all former orders with which they are in conflict."

The subject of this order is to fully cover all points connected with the subject of organization of wheel and pack transportation.

The first paragraph of the order reads as follows:

"1. The wagon and pack trains attached to the Division will be concentrated in central corrals. Those of the cavalry brigade at such point near the eastern boundary of the camp as will be indicated by the Chief Quartermaster of the Division. Those for all infantry organizations, and such other organizations as may be designated under the orders of the Division Commander, at a point to be indicated by the Chief Quartermaster near the western boundary of the camp.

"The trains of the Engineer Corps, the Signal Corps, and the Hospital Corps, will be placed in camp with their respective organizations.

"So much of the transportation of the artillery as may be required for camp use, under the approval of the Division Commander, will be held in the camp for that organization. The remainder will be placed in park in the general infantry corral.

"All trains will be parked in the central corrals according to directions to be given by the Chief Quartermaster of the Division."

"The object of providing for this means of parking the trains in this particular case is that the ground does not lend itself acceptably to the parking of the various trains in camp with the organizations to which they are attached. In view of the limited amount of space, the compactness of the camp is pro-

vided for by this method of parking. In addition it is often found desirable to detach a certain amount of transportation from the organizations in camp, and assign it to other organizations arriving without transportation in order to equalize the transportation. While this may not seem acceptable to regimental commanders in all cases, yet it is believed to be for the good of the whole establishment.

The trains of the Signal Corps, Engineer Corps, and Hospital Corps, will remain with their respective organizations for the reason that this transportation is of a distinctive character, and mainly useful only to the organizations to which it is attached.

The second paragraph of the order reads as follows:

"2. The organization of the transport service for regiments, squadrons, batteries, and other organizations assembled in camp of maneuver will be as follows as far as possible:

"Each regiment of infantry will have seven wagons set aside for its use; each squadron of cavalry will have five wagons set aside for its use. These wagons will be under the immediate orders of the regimental or squadron quartermasters. Each battery of artillery will have two wagons set aside for its use. Nine wagons in excess of the regimental wagons will be subject to the orders of the brigade quartermaster, forming a supply train for each brigade. All wagons in excess of this

number, remaining after allotment to brigades and regiments, will be subject to the orders of the Chief Quartermaster of the Division, and will be organized into a separate Division train for the service of ammunition, commissary supplies, forage, and reserve medical supplies and equipment. In addition to this the Chief Quartermaster will have a separate general supply train for the service of storehouses, depots, and for the exceptional services required in a camp of this character.

"The police train of contract wagons will perform the service of policing the kitchens.

"Regimental transportation should be assigned for infantry on the march as follows:

"One wagon to two companies, and one wagon to regimental headquarters, field and staff.

"For cavalry, one wagon to each troop, and one to squadron headquarters.

"For artillery, two wagons for each battery, and one for battalion headquarters.

"For brigades operating independently, the transportation for brigade headquarters and supplies will not exceed nine wagons, which will be subject to the orders of the brigade quartermaster. Regimental quartermasters will call upon brigade quartermasters for any transportation needed in camp for special purposes. Should the brigade quartermaster not have it available he should call upon the Division Quartermaster for such

transportation. Requests for transportation should not reach the Division Quartermaster until all the resources of the regiments and brigades have been exhausted."

"The object of organizing the trains in this fashion is to provide for an equitable distribution of all the transportation assembled and to provide at least a nucleus for all classes of transportation in order to exhibit the system upon which the transportation of the command would operate, and the uses to which all is put. The liberal allowance provided in general orders of the War Department is not available with the transportation assembled.

"By the provisions of this order it is proposed that each regiment of infantry, squadron of cavalry, and battery of artillery shall have a certain amount of transportation available for its immediate use in camp, and a similar amount on the march and in bivouac. In addition to this a certain additional amount is set aside under the orders of the brigade quartermaster, who will be able to carry for his brigade a small amount of stores in case the brigade acts separately, and he will be able to provide for its needs from these supply wagons for a limited length of time; or, in case a regiment is detached with instructions to act separately for a longer period of time, the supplies can be furnished by the brigade wagons temporarily assigned to the regiment. Or should a brigade take the field for a longer period of time than supplies can be carried by the brigade wagons,

the division trains may be drawn upon to furnish supplementary transportation.

The Division train provides for additional supplies for the Division should it take the field; and the general supply train provides for the keeping up of the continual forwarding of the supplies to points where they can be picked up by the Division trains, and, in case it is desired to do so, go forward and substitute with the Division trains, all of which will have an organization similar to the organization of the general supply trains.

This organization, it is believed, will also be found useful in the service of the camp, inasmuch as it provides for all proper camp services, all in consecutive order, in such a way that the service should be had without confusion; and should an organization find itself insufficiently supplied with transportation for any special purpose, a ready means is indicated as to how the difficulty may be remedied.

Paragraphs 3, 4, 5, 6 and 7 read as follows:

"3. For the transportation of headquarters of the Major General Commanding, and such officers as are attached thereto, such wagons and light spring wagons, saddle horses and camp equipage will be allotted as may be deemed necessary from time to time, to be assigned by the Chief Quartermaster at Division Headquarters.

"4. For the headquarters of a brigade, one escort wagon,

which will be part of the brigade train, two extra saddle horses for contingent wants, one hospital tent for the office of the brigade commander, one wall tent for the brigade commander, and one for each officer of the brigade staff.

"5. For a regiment of infantry, squadron of cavalry, battery of artillery, and other organizations in permanent camp, the camp equipage will be as prescribed in existing orders. The transportation for camp service will be as prescribed in paragraph 2 of this order.

"6. The allowance of baggage wagons and pack mules for officers when on temporary detached service will be as follows: To every three officers, one pack mule; to every twelve company officers, one wagon, or four pack mules. This transportation to be drawn from regimental or brigade transportation, or if not available there, application will be made to the Chief Quartermaster of the Division.

"7. For camp service and for bivouac the transportation for the troops will be as follows: For each regiment of infantry, one wagon for every two companies, one wagon for field and staff; for cavalry, one wagon for each troop, one wagon for each squadron headquarters; for artillery, two wagons for each battery, one wagon for headquarters artillery battalion."

As it is contemplated that part or all of the command will be from time to time in bivouac, it is deemed desirable that the amount of transportation for such bivouac be prescribed, in order

that it may be uniform throughout the Division.

"8. When the Division bivouacs the following will be the maximum amount of tentage allowed:

"For division and brigade headquarters, one wall tent for division and brigade commanders, and one for every two staff officers.

"To each full regiment of infantry, for the colonel, field and staff, 3 wall tents.

"For all other commissioned officers, one shelter tent each.

"For every two noncommissioned officers, privates, teamsters, etc., as far as they can be supplied from the tentage on hand in the organization to which they belong, one shelter tent. All other tentage than the above will remain standing in camp.

"For each cavalry squadron, one wall tent for headquarters and staff. Other tentage as prescribed for a regiment of infantry."

It is believed that an order should set forth with a good deal of preciseness what will be expected of the officers and organizations in the way of tentage in bivouac, and that none of this should be left to the discretion of the officers concerned.

"9. The allowance of officers' baggage in bivouac will be limited to a bedding roll, not to exceed 60 pounds in weight, and one small valise and reasonable mess kit. The men going into bivouac will carry no baggage except blankets and shelter tents."

This prescribes the maximum allowance of baggage for bivouac which it is believed should also be set forth in orders.

"10. The foregoing wagons and pack mules will include transportation for all personal baggage, mess chests, cooking utensils, field rations for immediate use, desks, papers, etc.

"All transportation, and camp and garrison equipage in excess of this order will be immediately reported to the Chief Quartermaster of the Division, who will indicate the disposition to be made thereof.

"The brigade supply train will, on the march, carry the necessary supplies for the brigade.

"The Division supply train will, on the march, carry the necessary supplies for the Division.

"The general supply train will place the stores where they can be reached by the Division supply train, and, under certain circumstances will be interchangeable with the division supply train."

The foregoing paragraph indicates the difference between what can properly be called baggage wagons for the regiments and squadrons, etc., and the supply trains which carry the supplies required, such as ammunition, subsistence, forage, etc.

"11. The division supply trains, and general supply trains will each uniformly consist of 27 wagons to each train; each wagon will be completely equipped with proper extra parts, and will be supplied with the usual necessary accompanying tools,

wagon cover, etc.

"Each train will be under the control of a wagonmaster, assisted by two assistant wagonmasters, and will be provided with one extra teamster, one cook and one watchman."

The foregoing paragraph gives, it is believed, the ideal wagon train organization; thoroughly effective as a whole, easily divisible into three effective units if desired, equal, or unequal in size, and equipped in every way for producing the best results for the service.

"12. For the artillery and small arms ammunition train, transportation will be furnished as follows:

"For fifty rounds of ammunition for each piece of field artillery; two wagons for battery of six guns. One hundred rounds per man, each for infantry and cavalry; three wagons per 1000 men. Reserve revolver ammunition, 60 rounds per man, for 1000 men; one wagon lightly loaded.

"Necessary wagons to carry this amount of ammunition will be provided from the division trains whenever the commanding general shall direct.

"13. In estimating weights to be carried on wagons and pack mules, they will be figured as follows:

Weight of 1 field ration,	4 lbs.
1000 rounds ammunition, infantry and cavalry,	80 "
1000 rounds ammunition, revolver,	37-1/2 lbs.
100 rounds shrapnel,	2000 lbs.
1 ration, grain, mule,	9 "
1 do horse	12 "

"The usual load for a pack mule is 200 lbs.; under the most favorable conditions and the greatest necessity, this may be increased to 250 lbs.

"The load for an army wagon varies from 3,000 to 4,000 lbs. The load for an escort wagon varies from 2,000 to 3,000 lbs., according to the condition of the roads.

"Commanding officers will be held responsible that the regimental baggage wagons are not overloaded. Quartermasters in charge of trains will be held responsible that supply trains are not overloaded. Hay will not be carried on the march in baggage or supply wagons."

The two preceding paragraphs give all the data necessary for estimating the number of wagons required for the transportation of any desired quantity of subsistence, ammunition and forage. It is deemed desirable to give this in orders as it will not always be found convenient to search the manuals for these figures. Figures are given in round numbers, as it may often happen that wagonmasters, or even teamsters, may be called upon to figure the weights of their loads.

"14. For the general brigade and division supply trains, to carry sufficient subsistence supplies for five days for every 1000 men, cavalry and infantry, and short forage for the teams will require seven escort wagons.

"To the cavalry division, and for the artillery brigade, should be allowed when in active campaign, the necessary number

of wagons to carry the weight of forage, rations and other supplies for the period that is contemplated that it shall be in active operations away from depot."

The preceding paragraph shows the number of wagons required for supplies for certain numbers of troops for fixed periods, and provides that for cavalry, artillery and other organizations when detached, transportation shall be furnished depending upon the period for which they will be detached.

"15. The unit of organization for the transportation of subsistence, ordnance, and general supplies will be by division. The Chief Quartermaster of the Division will be responsible for the conduct and discipline of the supply trains. Brigade quartermasters will be responsible for the conduct and discipline of the brigade trains. Regimental quartermasters will be responsible for the regimental property and baggage, and the trains under their charge.

"Quartermasters will attend in person to the drawing of necessary supplies at depots, and will habitually accompany their trains on the march."

This paragraph provides for the proper conduct and discipline of trains.

"16. Commissary stores and forage will be transported in the supply trains and not in the regimental and squadron baggage wagons, except that which is required for immediate consumption. When the supply trains are not convenient of access and when troops act in detachments, the quartermaster's department will

assign wagons or pack mules for the purpose of carrying supplies for immediate use, but the baggage of officers or troops, or camp equipage, will not be carried in the wagons, or on animals so assigned."

This paragraph prescribes certain definite property to be carried in baggage trains, and prohibits certain other property from being carried in supply trains.

"17. The wagons allowed to a regiment or other organization will carry nothing but forward for their teams, cooking utensils for the men and officers, field rations immediately required, and authorized officers' baggage. It is contemplated that each baggage wagon except those of the ammunition trains, will carry the necessary forage for its own team for immediate use."

By "Rations for immediate use," is to be understood rations to be used until such time as it is contemplated to draw upon the division supply trains accompanying the command.

The following paragraphs are disciplinary in character:

"18. On the march, unless otherwise ordered by the Commanding General, the baggage train of each brigade will follow in the rear of the brigade except when an early engagement is anticipated, when all transportation, except the ammunition trains, will follow in the rear of the army or will be otherwise disposed as the Commanding General shall direct. Brigade trains will be under the direction of the brigade quartermaster, assisted by the quartermasters of the respective regiments composing

the brigade, all of whom will use every effort for the preservation of the strictest order and discipline."

"19. Freight trains will be driven at a walk. Any teamster found trotting or running his team will, besides such other punishment as may be awarded him, be fined one dollar for each offense.

"Unnecessary locking of wheels is prohibited."

"20. No soldier shall ride in loaded baggage wagons, nor in empty wagons except by special instructions to that effect to be given by proper authority."

"21. The division supply trains will, as a general rule, follow the baggage trains of the troops for whom the supplies are intended. Should a train be delayed by accident on the march it will be drawn to one side of the road while those in the rear will close up the interval. Whenever trains or wagons for any reason, halt from any cause, they will, as far as possible, be drawn to one side of the road so as to admit of free passage of troops, artillery, and other trains that may be ordered to the front."

"22. If trains meet on the road, those advancing towards the enemy will be given right of way, and those going to the rear will halt if there is not room to pass while in motion."

"23. In drawing supplies from the depot, the officer or other person in charge of the train to be loaded with supplies will park his train at a point to be indicated by a representative

of the Quartermaster's Department in the vicinity of the depot, then report to the depot officer for instructions as to the time and manner of bringing up his train to receive the supplies."

"24. Mess for teamsters. In cases where teamsters have no separate mess, but mess with their organizations, suitable provision will be made by commanding officers so that teamsters may not be delayed in procuring their meals."

"25. Wagons and their covers will be designated by the following markings on wagon bodies and wagon covers:

"Regimental baggage wagons will show the designation of the regiment, above or in front of proper brigade and division device.

"Brigade baggage and supply wagons will bear the proper brigade and division device.

"Division wagons will bear the division device, and the wagons making up the division supply trains will bear the device of the supply department to which they pertain, in addition to the division device. In addition the ammunition train will show in colored and horizontal bands six inches wide, in light blue, red or yellow, whether the ammunition carried is for infantry, artillery or cavalry.

"The wagons pertaining to the hospital service will bear the device of that service, in addition to the device of the division. The signal corps and engineer corps wagons will be

similarly marked.

"The devices for marking wagons will be as follows:

"For the division, a red "M" except the cavalry brigade wagons which will bear a yellow "M".

"The infantry brigades will be shown by black numerals, 1, 2, 3, 4.

"The artillery brigades by crossed guns and notation of the battery."

The object of the preceding paragraph is apparent. It is the intention to provide all wagons with distinctive markings which can be placed upon the sides of the wagons and covers, so that each wagon can be at a glance identified, and the character of its supplies known.

"26. In order that acting quartermasters may receive as full benefit as possible from the Autumn Maneuvers the troops, when in bivouac, will be supplied with wood and forage from the vicinity of the bivouac as far as possible.

"Quartermasters and acting quartermasters should supply themselves with the necessary blank forms to enable them to render the proper accounts which will be paid by the Chief Quartermaster."

"27. The foregoing order is hypothetical and prescribes the provisions that would be made under ideal conditions to enable brigades, and lesser organizations of the Maneuver Division, to operate independently. So much of its provisions as may be

deemed impracticable will be held in abeyance."

It is not to be supposed that in a camp of maneuver all of the provisions of the foregoing order can be carried out, nor is it contemplated that they shall. It is desirable, however, to exhibit the order as complete as practicable, that such variations be made from it as may be necessary under special conditions and requirements.

It is interesting to note in passing that the provisions of this order allot something less than one-fourth the amount of transportation to each regiment than was allowed in the first general transportation order of the Revolutionary War.

XI.

RELATION BETWEEN IMPEDIMENTA AND TRANSPORT.

It is essential that the young officers of the army, and those not already familiar with campaigning, be educated to a full understanding of the difference between the comforts to be expected in a permanent garrison or cantonment, a more or less permanent camp, and a bivouac, in which the army is stripped and ready for immediate service on the firing line, and the still further stripping of the army for service actually on the firing line itself.

The troops should pass from one of these situations to another freely, and without the embarrassment of carrying

superfluous equipage and property of any character. In leaving the camp or garrison for active field service the baggage should be cut down to the lowest practicable amount, and all that is superfluous should be left behind, either under proper guard or turned into depot. It is believed that the allowance of tentage, baggage and transportation for camp and bivouac, indicated in the proposed order is a liberal one. All of this baggage, except that carried on the persons of the men, will again be left behind when the troops take actual engagement on the firing line, and will only be advanced to the troops after the fighting is over, and results have been produced.

It is to be noted in this connection that the earliest transportation orders issued to our armies during the Civil War provided from 10 to 13 wagons per regiment. In the last transportation order issued to the Army of the West, which solved problems of transportation that had never been known in the armies of civilized nations in the world before, the allowance for the baggage was one six-mule wagon to each regiment. A similar amount of transportation was allowed to the Army of the Potomac in its final advance to Appomattox. The total number of wagons, however, per thousand men, including the brigade, division, corps, and army supply trains, was almost as great as in the beginning of the war, namely: about from 34 to 37 wagons per thousand men in the Western Army, and 22 per thousand men in the Army of the Potomac.

General Ingalls, Chief Quartermaster of the Army of the Potomac, reported that on the 1st of July, 1862, after the seven days' battle before Richmond, his transportation was forty wagons per thousand men. After Antietam the number was 49 per thousand men.

General Batchelder, Chief Quartermaster of the Army of the Potomac, reported that in the Appomattox campaign there were 22 wagons per thousand men.

In the past, when difficulties have arisen with the transportation service, the fault has not been wholly with the department furnishing that service. The line itself has not always been reasonable in its demands.

As an illustration of the relative amount of baggage considered necessary for the use of the troops in a permanent camp, and that to be taken by them when moving forward from the permanent camp towards the point of active operations, as well as its effect upon the mobility of the troops the movement of the army from the camps of concentration in and about Port Tampa, Florida, via Port Tampe to Santiago, Cuba, will be a most pertinent one as it is fresh in the minds of all persons interested in military affairs.

It will be remembered that twenty-five escort wagons had been designated by orders from the War Department as an allowance of transportation for a regiment of infantry in the field.

Colonel Bellinger, the Depot Quartermaster at Tampa, in

speaking on this subject, says:

"During the movement of the troops from their camps in and about Tampa to Port Tampa, where they were to embark upon the transports, in order to save time by avoiding the necessity of carefully stowing the baggage in the cars for the short trip of nine miles, an average of from seven to eight box cars were allotted to each regiment for the transporting of the company and regimental baggage.

"So little was the problem of transportation appreciated by some of these troops that in one case a regiment whose strength was less than seven hundred men, used fourteen box cars to take its baggage from Tampa to Port Tampa, and in no case did any regiment confine itself to the baggage which its allowance of wagons could have hauled on the march.

"It will be readily seen that the taking of this large amount of baggage reacted in every conceivable way against the efficiency of the troops and against their personal comfort.

"1. By impeding their entraining.

"2. By preventing the running of the trains from Tampa to Port Tampa on the schedule arranged for the movement.

"3. By impeding the detraining of the troops at Port Tampa.

"4. By impeding the embarkation of the troops on the transports.

"5. By rendering it absolutely impossible to unload this baggage at Santiago or to have moved it forward had it been

unloaded. Nor would any use have been made of a great deal of it, had it been practicable to get it up to the troops.

"A great deal of this baggage remained in the holds of the transports and was returned to the United States without ever leaving the vessels.

"Besides the superfluous and unnecessary amount of property taken by the troops to Cuba, large quantities of personal, as well as regimental property were left by the troops in their permanent camps at Tampa.

"Had a systematized policy maintained regarding the amount of property to be used in their permanent camps by the officers and men, and in making the movement had a systematized and very much reduced amount of baggage been decided upon for the troops to carry forward with them, much less of time and property, as well as just and unjust criticism of the military authorities, would have been avoided."

As a rule it will be no part of the duty of the quartermaster to prescribe what shall and what shall not be transported; that is the province of the Commanding General. The quartermaster will merely indicate what quantities can be transported by the means at hand.

When an engagement is imminent the most important element to be carried is the ammunition - after that, the hospital supplies, and after those, the rations. At this juncture both the hospital supplies and rations should be simplified as much as

possible - it is impossible to provide the same comforts for the sick and wounded at the front as can be found at the base hospital. These things should be simple, effective, and easy of transportation.

The same is true of the ration. The simpler and lighter at this juncture, the more certain it is to reach the men promptly. It is believed that the certainty of having hard tack, bacon and coffee in hand will more than make up for the knowledge that a more elaborate menu exists somewhere in the rear if it could only be brought up. It is well enough to bring refrigerated beef on the firing line, when it can be done, and it is certainly a great treat for the men; but it is believed that it would be a useless tax upon the transport service to attempt to do it habitually, and it is believed also that the Commanding General who would undertake it, or permit it as a practice, must find that many other needs of the army will suffer as a result. The general rule will be in active campaigns to relieve the transport of every unnecessary burden in order that it need not fail in its proper functions.

XII.

METHOD OF UTILIZING TRANSPORT WHEN LIVING ON THE COUNTRY.

TRANSPORTATION ORDER OF GENERAL SHERMAN. REPORT OF GENERAL EASTON.

In order to give a comprehensive view of the operations of

the transportation service of the Western Army in the Atlanta campaign, and the march to the sea, illustrating the manner of using transport when living on the country, I beg to be allowed to quote from General Sherman, and from General Langdon C. Easton, his Chief Quartermaster:

"Upon November 9th, before leaving the vicinity of Atlanta, General Sherman issued the following orders:

"Extract.

"1. For the purpose of military operations this army is divided into two wings. The right wing, Major General O. O. Howard commanding, composed of the 15th and 17th corps; the left wing, Major General H. W. Slocum commanding, composed of the 14th and 20th corps.

"2. The habitual order of march will be, wherever practicable, by four roads as nearly parallel as possible, and converging at points hereafter to be indicated in orders. The cavalry, Brigadier General Kilpatrick commanding, will receive special orders from the Commander in Chief.

"3. There will be no general train of supply, but each corps will have its ammunition train and provision train, distributed habitually as follows: Behind each regiment should follow one wagon and one ambulance; behind each brigade should follow a due proportion of ammunition wagons, provision wagons, and ambulances. In case of danger, each corps commander should change this order of march by having his advance and rear brigades

unencumbered by wheels. The separate columns will start habitually at 7.00 a. m.; and make about fifteen miles per day, unless otherwise fixed in orders.

"6. *** As for horses, mules, wagons, etc., belonging to the inhabitants, the cavalry and artillery may appropriate freely and without limit - discriminating, however, between the rick, who are usually hostile, and the poor and industrious, usually neutral and friendly. Foraging parties may also take mules and horses to replace the jaded animals of their trains, or to serve for pack mules for regiments or brigades. In all foraging, of whatever kind, the parties engaged will refrain from threatening or abusive language, and may, where the officer in command thinks proper, give written certificates of the facts, but no receipts; and they will endeavor to leave with each family a reasonable portion for their maintenance.

"8. *** The organization at once of a good pioneer battalion for each army corps, composed, if possible, of negroes, should be attended to. This battalion should follow the advance guard, repair roads, and double them if possible so that the columns will not be delayed after reaching bad places. Also army commanders should practice the habit of giving the artillery and wagons the road, marching their troops on one side, and instruct their troops to assist wagons at steep hills, or bad crossings of streams.

In his interesting "Memoirs" the General tells us that--

"The greatest possible attention had been given to the artillery and wagon trains. The number of guns had been reduced to sixty-five, or about one gun to each thousand men, and these were generally in batteries of four guns each. Each gun, caisson, and forge was drawn by four teams of horses (eight horses). We had in all about two thousand five hundred wagons with teams of six mules each, and six hundred ambulances with two horses to each. The loads were made comparatively light, about 2,500 pounds net; each wagon carrying in addition the forage needed by its own team. Each soldier carried on his person forty rounds of ammunition, and in the wagons were enough cartridges to make up about two hundred rounds per man, and in like manner two hundred pounds of assorted ammunition were carried for each gun. The wagon trains were divided equally between the four corps, so that each had about eight hundred wagons, and these, usually, on the march occupied five miles or more of road. Each corps commander managed his own trains; and habitually the artillery and wagons had the road, while the men, with the exception of the advance and rear guards, pursued paths improvised by the side of the wagons, unless they were forced to use a bridge or causeway in common."

And again, in regard to the march from Savannah through the Carolinas to Goldsboro, we have the General's remarks as follows:

"Thus was concluded one of the longest and most important marches ever made by an organized army in a civilized country. The distance from Savannah to Goldsboro is four hundred and twenty-five miles, and the route embraced five large navigable rivers, viz: The Edisto, Broad, Catawba, Pedee, and Cape Fear, at either of which a comparatively small force, well handled, should have made the passage difficult, if not impossible. The country generally was in a state of nature, with innumerable swamps, with simply mud roads, nearly every mile of which had to be corduroyed. In our route we had captured Columbia, Cheraw, and Fayetteville, important cities and depots of supplies; had compelled the evacuation of Charleston City and Harbor; had utterly broken up all the railroads of South Carolina, and had consumed a vast amount of food and forage, essential to the enemy for the support of his own armies. We had in mid-winter accomplished the whole journey of four hundred and twenty-five miles in fifty days, averaging ten miles per day, allowing ten lay-days, and had reached Goldsboro with the army in superb order, and the train almost as fresh as when we had started from Atlanta."

In his report of the great march from Atlanta to Savannah, General Easton (Chief Quartermaster of the Army) states that "Upon leaving Atlanta, November 15th, 1864, the army consisted of four corps of infantry and one cavalry division, as follows, viz:

"14th corps; 15,680 men, 1,408 horses, 4,436 mules, 571 wagons, and 112 ambulances (38 wagons to 1000 men);

"15th corps; 18,000 men, 2,164 horses, 5,726 mules, 666 wagons, and 146 ambulances, (36 wagons to 1000 men);

"17th corps; 11,000 men, 2,156 horses, 3,107 mules, 385 wagons and 77 ambulances (35 wagons to 1000 men);

"Cavalry corps; 5,000 men, 7,000 horses, 1,800 mules, and 300 wagons - total, 63,680 men, 14,768 horses, 19,410 mules, 2,520 wagons, and 440 ambulances.

"The following was ordered as the allowance of transportation for baggage, etc., on the march:

"One wagon to each regiment; two wagons to each brigade headquarters; three wagons to each division headquarters; five wagons to each corps headquarters; one wagon to each battery (there was one battery to each division). The balance of transportation was directed to be distributed as follows, viz:

"Three wagons to each division for hospital purposes; one wagon to every one hundred men, including artillery, for ammunition, and the remainder, 1,476 wagons, was used in transporting forage, subsistence, etc.

"The army started from Atlanta with four days' grain.

"The subsistence transported for the whole army was as follows, viz:

"Hard bread, twenty (20) days' rations; salt meat, five (5) days' rations; sugar and coffee, thirty (30) days' rations; soap,

rice, candles, five (4) days' rations; salt, eighty (80) days' rations.

"The army started from Atlanta with 5,476 head of beef cattle in addition to the above. The army marched by corps, and on roads as near parallel to each other as could be found. Each corps had its own pontoon train, and each division its own pioneer force, and with these organizations streams were crossed, roads repaired and sometimes made, without retarding the movements of the troops. The management of the trains differed somewhat in each corps, but I think the best arrangement was where the train of the corps followed immediately after its troops, with a strong rear-guard in the following order:

"1st. Corps headquarters baggage wagons.

"2d. Division headquarters baggage wagons.

"3d. Brigade headquarters baggage wagons.

"4th. Regimental headquarters baggage wagons.

"5th. Empty wagons to be loaded with forage and other supplies taken from the country, with the proper details for loading them.

"6th. Ammunition train.

"7th. Ambulance train.

"8th. General supply train.

"As the empty wagons reached farm houses and other points where supplies could be obtained, a sufficient number were turned out of the road to take all at the designated point, and

so on through the day, until the empty wagons were loaded, making it a rule to take the first supplies come to, and to leave none on the road until all the wagons were loaded. The empty wagons could be loaded by the time the rear of the general supply train came up to them, and they would fall into their proper place in the rear of the division trains, if in time, or in the rear of the general supply train, without retarding the march. This arrangement worked well, and is probably as good as any that could be made for procuring supplies. As a general thing the wagons were required to go but a short distance from the line of march to obtain supplies, there being sufficient nearby."

It is obvious to the most casual observer that the real necessities in furnishing an effective transport service and providing for the greatest possible mobility, are that there must be a relative adjustment between the equipage and stores and supplies to be provided, and the amount of transport to be furnished.

It must be apparent that the character of the campaign, the ends to be attained, and the nature of the country to be traversed will impose limitations as to the baggage, equipage and supplies to be carried, and will thus afford a basis upon which the commanding general can figure the amount of transport required to accompany the army.

If the troops are to travel lightly equipped through a rich country where supplies are readily obtainable, the

effectiveness of the transport will be greatly increased; in many campaigns it will be found, however, that a great proportion of the transport animals will be engaged in the carriage of their own food. When it is remembered that a four horse wagon can transport through a country destitute of forage, only food for its own team for from twenty to thirty days, the limitations of animal transport can, at a glance, be appreciated.

It is therefore of the first importance that all considerations be carefully weighed in the outset, and that stringent regulations limit the amount of baggage, equipage, and supplies to be taken by the troops.

In the beginning of the Civil War the wagon trains so hampered the army that it was difficult for it to move. Quantities of baggage and impedimenta, and numerous camp followers encumbered the trains. A general order upon the subject was found necessary. Experience soon disclosed the true requirements for active service; baggage was dispensed with; unnecessary impedimenta left behind, heavy tentage soon fell into disuse, and in the later campaigns the shelter tent served for officers and men alike.

In the beginning of the war with Spain the allotment was 27 wagons to each regiment of infantry. In the beginning of the Civil War the allotment was 13 wagons to each regiment of infantry. In the final campaigns both of the Western Army and the Army of the Potomac, the allotment for baggage was one wagon to

regiment, although the total number of wagons assigned to serve 1000 men was not greatly reduced below the number required in the early campaigns.

Napoleon's maximum allotment of wheel transport was limited to 12 wagons for each 1000 men. With this number of wagons he calculated on carrying supplies sufficient to last for thirty days, counting, however, that each soldier carried eight days' rations on his back. When it is considered that the Great Master of the Art of War relied solely upon his wheel transport and the supplies of the country, and was without rail communications or as a rule a general supply train, the limitations placed upon the requirements of his troops can readily be understood.

No nation in the world maintains in times of peace anything like the full complement of transport required for the conduct of a war of magnitude, or even to provide for the complete mobilization of the forces from time to time assembled. Most Continental powers provide by law for procuring the necessary amount by requisition.

It is the policy of our government to maintain a small standing army and to rely upon volunteer troops for the bulk of the forces to be used in time of war.

This gives occasion for an exceptionally elastic system of supply and transport capable of accommodating itself to a sudden increase in the army. The transport, whether by water, rail, or

land, will be vastly expanded by purchase, charter, hire or service agreement, to meet the new conditions. And in that event it will be necessary that the existing present organization and methods be so extended as to control and operate the added transport service with as little embarrassment as possible.

At present the actual handling of all classes of military as well as all auxiliary transport, is in the hands of civilians under greater or less control of the military authorities; from the army wagon train in which the government owns all means and materiel and merely hires the man to drive the team, to the railroad or steamship company, where the control of the Government is limited to designating the manner in which its business shall be handled and the route it shall travel.

In time of war it is not likely that these methods will, to any great degree be departed from, but the necessity for effective organization must be apparent to all.

As an illustration of the magnitude of the number of animals required for the operations of a vast army, it is interesting to note that during the first year of the Civil War there were purchased for all purposes 109,789 horses and 83,620 mules, exclusive of those bought in the field under emergency, or acquired by capture, which would probably swell the total to an aggregate of a quarter of a million animals or more.

During the second year 197,457 horses and 11,068 mules were purchased in like manner.

After every battle or considerable march, large numbers of animals were turned in to depots disabled. These had to be replaced from depots; many of those turned in died, and those recuperated, together with others purchased formed the supply for further issues in the same manner.

To provide for such an expansion and produce the best results, it is necessary that the peace organization be along such lines of proven efficiency as will assure a nucleus upon which dependence may be placed; a unit available in any class of work; an organization capable of moving coherently as a whole, with uniformity in detached units, and of operating under every circumstance with all possible precision.

Upon the ability of its officers to bring about such conditions will depend the welfare and success of an army, and methodical organization and systematic forethought alone can be relied upon to produce results so much to be desired.

XIII.

CONCLUSION.

It has been the object in these papers to show the necessity of that uniformity of method in the treatment of questions of military transport whether by sea or land, which will conduce to efficiency and make good the prestige of our arms.

There has been no effort to indicate how new legislation might be made to improve conditions, but these have been taken

as they are found.

Far be it from us as a people to depart from the traditions of our fathers and seek in the fleeting bubble of a military ascendancy the substantial glory which is the lasting product of the arts of peace. Our national interests have ever led us in the ways of commercial enterprise, educational enlightenment, religious freedom, personal liberty, and the abundant development of our magnificent domain.

When, turning from these high ideals we enter upon a career of conquest; when our aim shall have become a sordid commercialism; our creed, that might makes right; and when for Deity we bow the knee to a God of Gold; then indeed shall we find our mission as a nation at an end; then shall those that seek our shores, guided by the erstwhile friendly beams that light the gateway of the West, no longer find beneath the uplifted torch of Liberty a haven from oppression, but, unfortunate souls, shall find themselves enticed by traitorous rays to freedom's shipwreck on a treacherous coast.

God forbid that such should be the apotheosis of these United States.

When first our ancestors set foot upon these shores, a trackless wilderness challenged the ax of the pioneer, savage tribes threatened his existence, and conditions of danger lurked about him through the day and made his nights a ceaseless vigil. The problems that were solved by those sturdy men, and

which have been met and mastered by their children since, have made of us a nation marvelous in our accomplishments; unique in the annals of history, powerful for the progress of civilization. Let us guard well our priceless heritage.

Our armies have ever sprung to the defense of our homes, to the maintenance of liberty, to the vindication of principles deep seated in the heart of every soldier in the ranks. May it never be otherwise.

And our Navy! How glorious its record! Where should we look for greater inspiration than to that story of matchless achievement from the days of the Good Ship "Constitution," to the battle of Manila Bay, or the annihilation of that gallant foe at Santiago!

Proud have been the deeds of our soldiers! None can surpass them in courage, honor and fortitude. Their valor, whether from the North, South, East or West, rests on principles, not pay, and has seen its ample attest in the Revolution, in the War of 1812, in the Campaign against Mexico, in the thunder of that unhappy fratricidal strife when the rivers of our land flowed crimson to the sea, and again when shoulder to shoulder our common country met a common foe!

If upon our army we depend for our internal defense, and for land campaigning oversea when the call of country takes us forth, to our Navy we must look as the outward bulwark of our defenses, the guarantor of our national integrity abroad.

Upon it we must rely for the protection of our rights and the safeguarding of our responsibilities, in the scattered dependencies where we are discharging duties Providentially imposed; for now we must face the future in the knowledge that our period of splendid isolation is a story of the past.

May our Army and our Navy ever be none less victorious than of yore; our officers and men none less intrepid than the great Commodore who shouted to his hard pressed fighters "Don't give up the ship;" none less majestic than in that victorious message "We have met the enemy and they are ours," and none less chivalrous than he would say "Don't cheer boys, don't you see the poor devils are dying!"