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From *J. E. Pilcher*

THE

# Transportation of the Disabled

WITH SPECIAL REFERENCE

TO

CONVEYANCE BY HUMAN BEARERS.

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BY JAMES E. PILCHER, PH.D.,

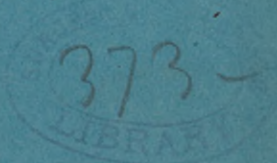
Assistant Surgeon, U. S. Army.

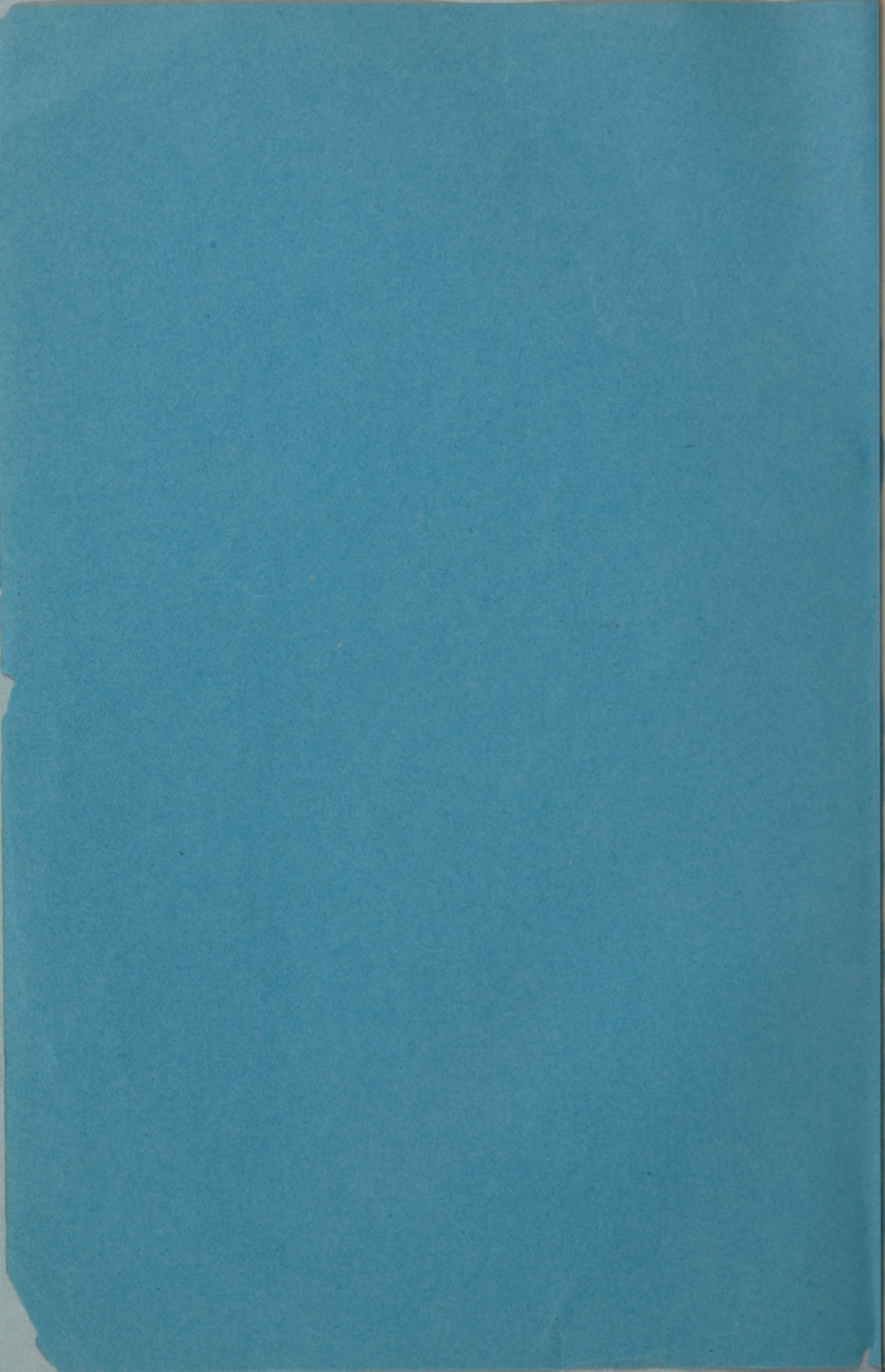


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NEW YORK:

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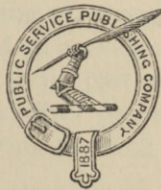
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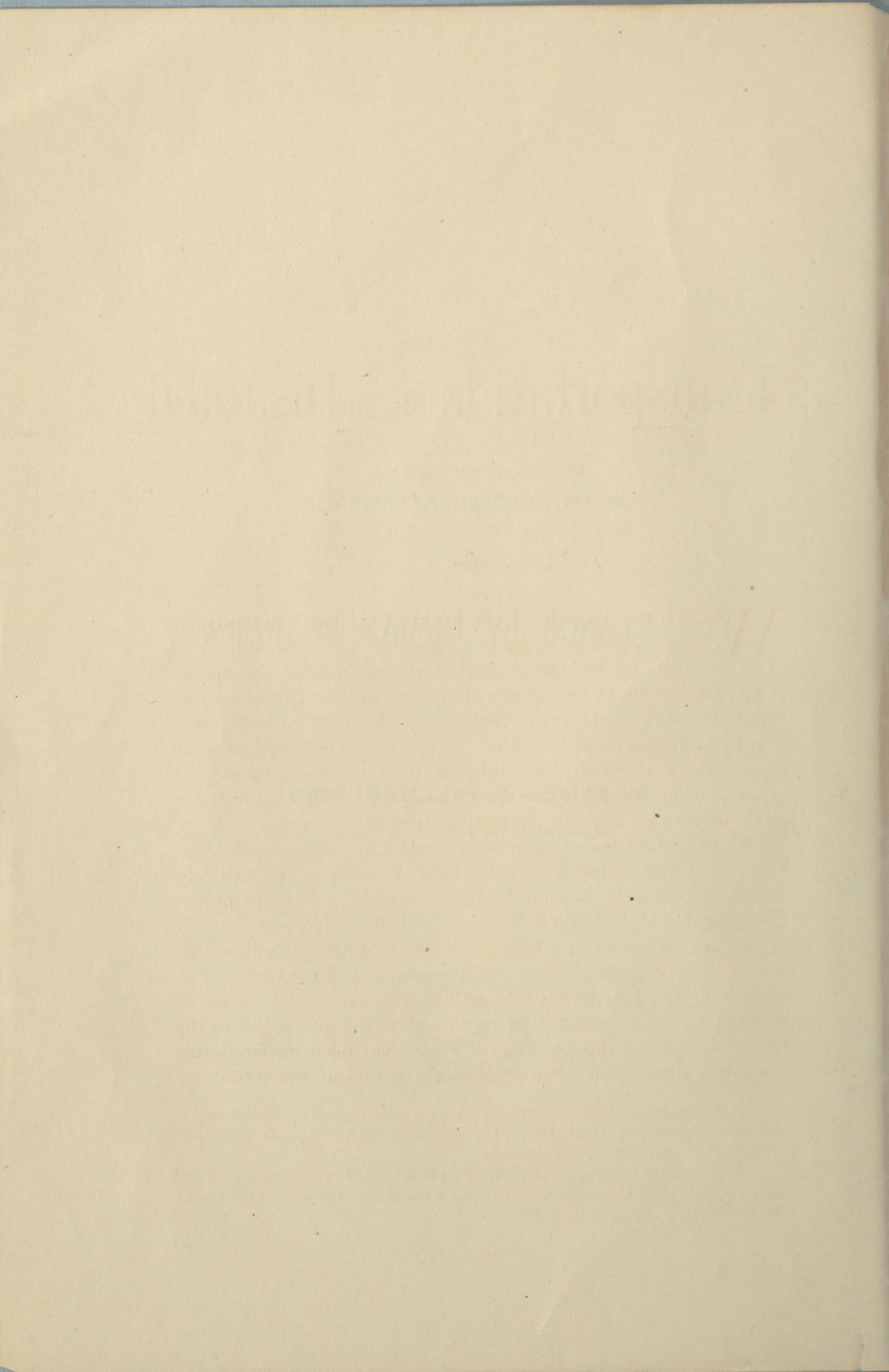
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THE TRANSPORTATION OF THE DISABLED, WITH  
SPECIAL REFERENCE TO CONVEYANCE BY  
HUMAN BEARERS.\*

BY JAMES E. PILCHER, M.D., PH.D.,  
ASSISTANT SURGEON, U. S. ARMY.

WITH the growth of the world in civilization, humanity has begun to supplant barbarity in the treatment of man by his fellow-man. Annihilation of the enemy is a characteristic of the savage massacre, while civilized warfare attempts only to weaken the enemy to such an extent as to cause him to yield the point in dispute. Instead of seeking the death of a disabled opponent, the ethics of the time tend toward the removal of his disability and the keeping him under such restraint as to prevent his engaging in further hostilities.

An important feature of the new order of things then is the removal of the wounded from the field of battle to the most desirable place for the treatment of their injuries. For the proper performance of this duty thoroughly drilled men and suitable appliances are essential. During the War of the Rebellion, the necessity for organized means of transporting the wounded culminated in the formation of an ambulance corps, which rendered yeoman service during the latter part of that conflict, but in the reorganization of the army, after peace had been declared, this corps was eliminated. During the long period of peace that has

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\* A lecture delivered before the Military Service Institution of the United States, at Governor's Island, March 21, 1888. The lecture was illustrated by the actual performance of the methods by trained bearers.

The illustrations of this paper are mainly reproductions of photographs, for which the writer wishes to acknowledge his indebtedness to the skill and courtesy of Lieut.-Col. Anton Hegar, Surgeon U. S. Army.

since elapsed in our country, European nations have been developing the subject of aid to the injured still further, and the experience derived from the more recent wars, in which they have been engaged, has thrown new light upon the requirements of field sanitary service. After many years of effort, the Medical Department of the United States Army has succeeded in obtaining the organization of a Hospital Corps upon a plan so broad and liberal as to justify the highest hopes as to the work to be accomplished by it. The number of men in the corps is as yet unlimited by legislation, and additional to the enlisted strength of the Army as prescribed by law, and when it has its full complement, according to existing orders, it will number from eight hundred to a thousand men, including Hospital Stewards and Acting Hospital Stewards. In addition to this number, four men in each battery, troop, and company in the Army are designated as Company Bearers, and are to be instructed in litter bearing and in first aid in medical and surgical emergencies. Although not prescribed in orders, it has been suggested that the members of regimental and other bands, whose duties are of a non-combatant nature, should be utilized in case of an action. When possible, then, these men should be drilled in carrying the wounded in addition to those already named. The Militia of the various States are falling into line, and notably the New York State National Guard, at the suggestion of Major Fowler, Surgeon of the Second Brigade, has already organized an ambulance corps, which is now under active instruction.

The material for rendering aid to the sick and wounded having been thus made available, the question as to the best means of utilizing it arises. The first point of importance in case of a disabled man is to bring him to the point where he can receive the attention of the surgeon; in case of an action, this would be the first dressing station near the line of battle. This must of necessity be done by hand, with regularly constructed or extemporized litters, or without assisting apparatus. In any case, a definite, uniform system of handling the injured should be employed. The required movements may be executed in silence according to a prescribed rhythm to which the bearers should have become habituated. After some considerable observation of the soldier, however, I am forced to the conviction that this plan is wholly impracticable, particularly for Company Bearers, because of the large amount of drill necessary to train them to

properly execute the movements without distinct commands, and, owing to the limited amount of time allowed for the training of these bearers, it would be impossible to drill them sufficiently to cause them to execute the movements rhythmically without verbal orders.

Then, having arrived at the conclusion that the movements must be executed in obedience to certain commands, I have formulated the following requisites for the proper carriage of the disabled :

1. A system of manipulation of the hand-litter should first be established, and the execution of extemporized methods should be adapted to it.

2. The maneuvers should be so arranged as to prevent confusion and preserve smoothness, and the commands should be so expressed as to bring this about.

3. In this connection the small number of men commonly available for drill should be considered, as well as convenience for expansion in case of an increase of forces.

4. The commands should be so expressed as to convey to the bearers in the clearest possible manner the idea of the maneuver to be executed. Experience in military tactics has shown that this is best accomplished by (*a*) a preparatory command, to give the men warning of the impending movement, followed by (*b*) a command of execution to cause the maneuver.

5. The same command should not be applied to different movements in bearer drill. The mention of this point may seem rather unnecessary, but the repetition of this error in nearly every plan for bearer drill, that I have seen, has impressed its importance upon me.

6. There should be an analogy with the authorized tactics for other arms of the service. (*a*). When the same movement occurs in bearer drill and in the drill of other arms of the service, the movement should be executed in the same manner and in obedience to the same commands. (*b*). The same command should not be applied to different movements in the authorized tactics and in bearer drill, because the use of commands, conflicting with those of other arms of the service, would be a constant source of confusion and demoralization to the company-bearers who are required to be familiar with both.

The unit of bearer drill with the litter should be four men, a number which experience has shown to be necessary for the

prompt and efficient conveyance of the insensible, to provide proper relief for the bearers, and to afford additional assistance in certain maneuvers. The unit of the bearer drill of the St. John's Ambulance Association is three men, and under the stress of necessity, this may be sufficient for some civilian purposes, but it will not answer for military emergencies. Any organization for the purpose of litter-bearing then, should consist of multiples of four.

#### THE FORMATION OF THE BEARER COMPANY.

These fours should be united into a company for purposes of organization. In forming the company, all bearers, regardless of corps, should be made by the senior Hospital Steward to *fall in* in single rank without arms, according to height, the tallest at the right, and facing to the right. Junior Hospital Stewards and Acting Hospital Stewards should act as file-closers and take their posts two yards in rear of the line, the senior at the right, the junior at the left, and others in order of seniority, from right to left.

The senior Hospital Steward should then command

1. *Left*, 2. FACE,

upon which the men face to the left. He then calls the roll, after which he commands

1. *Count*, 2. FOURS,

in order to divide the company into the proper bearer squads. After the squads are thus designated, he commands

1. *Twos left*, 2. MARCH, 3. HALT.

This movement being executed, he commands

1. *Right*, 2. FACE,

following it by

1. *Right*, 2. DRESS, 3. FRONT,

all these movements being executed as prescribed in the authorized Infantry Tactics.

By this means he has obtained a two-rank formation, with the odd numbers (1 and 3) of each set of fours in the front rank, and the even numbers (2 and 4) of each set of fours in the rear rank. The advantage of this arrangement will appear in marching the various squads to the litters, when it will be seen that, *without any confusion and in the simplest manner possible, the bearers nearest the same height will be paired.* The company then being



formed in this manner, the senior Hospital Steward passes down the front of the front rank to the center, advances six yards, salutes and reports to the medical officer in command, who stands twelve yards in front of the center of the line, and who then commands

*Take Your Post,*

upon which the senior Steward faces about and returns to a position in and at the extreme right of the front rank. The medical officer then assumes command.

At the conclusion of all drills and ceremonies, the medical officer having brought the company back into the position just described, addresses to the senior Hospital Steward the command:

*Dismiss the Company.*

The Steward then marches the company to the point where it is to be dismissed, when he takes his post six yards in front of the center and facing it, and dismisses it with the command

1. *Break ranks,* 2. MARCH.

THE MANAGEMENT OF THE HAND-LITTER.

The medical officer, having assumed command of the company formed as prescribed in the preceding section, sees that a number of litters corresponding to the number of complete sets of fours present are placed in a line parallel to the company, the litters perpendicular to the line and three yards apart. I believe that the Halstead litter now supplied by the Medical Department of the Army is the most generally useful, while it is simple in construction, thoroughly portable, and exceedingly manageable. It consists of two ash side-bars eight

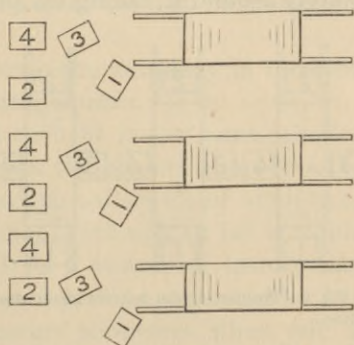


Fig. 1.—Position of bearers just after the command: *To your posts—march!*

feet in length by two inches in diameter, connected by a strip of canvas six feet long and two feet broad. The side-bars are connected by two flat bars of wrought-iron, hinged in the middle, to permit the litter to be folded, while just within the iron bars are situated the legs, also arranged so as to fold.

The medical officer assigns to the hospital stewards and act-

ing hospital stewards such duties in connection with the drill as he may consider advisable. If there is an incomplete squad, a steward may be assigned to fill a vacancy, or the squad may act as injured men in the drill, practice the extemporized methods of carrying the wounded described hereafter, or perform such other duties as may be considered advisable.

Each set of fours constitutes a bearer squad and forms a drill unit complete in itself, as I have already remarked. Nos. 1 and 2 are the bearers proper, and Nos. 3 and 4 are the relief party. No. 4 is the chief of squad and gives all the commands to it. If No. 4 is absent or disabled, the command devolves upon No. 3, and if the bearer squad is reduced to two, the rear bearer is the commander.

The company and litter then being arranged as indicated, the medical officer commands

1. *Right*, 2. *FACE*.

This command having been executed, he follows with

1. *To your posts*, 2. *MARCH*.

At *march*, Nos. 1 and 3 move forward until Nos. 2 and 4 are able to fall in directly behind them, as shown in Fig. 1. They then march to the left side of the litter and pass, No. 1 completely around it, taking his post between the front handles; No.

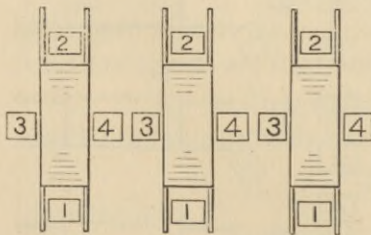


Fig. 2.—Position of the bearers about the litters.

3 following to the middle of the right side of the litter; No. 2 to the rear handles, while No. 4 stops at the middle of the left side of the litter and faces about.

Now it will be observed that in forming the company the men were sized from right to left, and that consequently Nos. 1 and 2 are more nearly the same size than Nos. 1 and 3 or 1 and 4. In the same way Nos. 3 and 4 are more nearly the same size than Nos. 1 and 4 or 2 and 4. We have then both our bearers proper and our relief party matched in size, and this without the least confusion or conflict. This was the end sought in devising this formation, which was selected from a large number which were subjected to experiment, because of its simplicity and ease of execution.

To bring the company back into the company formation, the

litter squads should be made to bring the litters into a line parallel with and facing the proposed line of the company and three yards from it. The senior Hospital Steward then takes a position at the extreme left of the proposed line and on the line of the rear rank. The medical officer then commands

1. *Into ranks*, 2. MARCH.

At *march*, the bearers pass about the litter, marching in the reverse of the direction taken in "*To your posts; march.*" No. 4 of the right-hand squad advances and takes his position in the line indicated by the Hospital Steward and facing to the left; No. 2 follows and takes his place immediately behind No. 4; No. 3 follows and takes his position at the right of No. 4, and No. 1 follows and takes his position at the right of No. 2. The other squads advance in the same way and simultaneously with the right-hand squad, but each forms on No. 2 of the preceding squad instead of on the Hospital Steward. The medical officer then commands: *Right face*, in obedience to which the men face to the right and the senior Hospital Steward passes in front of the line to his place at the right of the line.

#### THE MANIPULATION OF THE LITTER.

The company is now fully formed, and the officer may assign parts of it to any distinct duties, or cause them to be dismissed, as already prescribed.

By the order *To your posts, march*, the company is resolved into its component elements, the litter squads.

The handles of the litter should be held in the hands, carried by the side. If a litter is carried upon the bearers' shoulders, the height at which he is carried is a continual source of anxiety to the patient. If one of the bearers should stumble or fall it would be a positive source of danger. It is a matter of history that General Stonewall Jackson died from injuries aggravated by falling from a litter borne on the bearers' shoulders, when one of the bearers fell wounded.

The bearers should take a firm but not springy step, about twenty inches in length, with the knees rather bent and the hips moved as little as possible. Theoretically, the best step for them to take is the "mountain step," in which the bearers' feet fall upon the ground in succession—a gait similar to that of a "single-foot" horse. Practically, the soldier is so accustomed to keeping step that it would be impracticable to train company

bearers in this step. A disagreeable swinging motion is given to the litter if both bearers step off with the same foot, but this can be obviated by the "break-step," in which the rear bearer steps off with his right foot, while the other bearers step off as usual with the left foot. Practically, then, this is the best gait for use in litter bearing.

The litter should be held level. This is obtained on level ground by having the bearers as nearly as possible of the same height, as already mentioned. In passing over uneven ground, the bearers should act in concert, so as to still maintain the level, the bearer on the higher ground lowering his end and the bearer on the lower ground raising his end. If a declivity is so marked that it is impossible to keep the litter level, it should be carried so that the patient's head may be higher than his feet, unless he is suffering from a fracture of the lower extremity, when the reverse order should be adopted.

The litter should not be carried over a fence or wall, or across a ditch or marked depression, except when it is absolutely impossible for the bearers to pass around them. If this is impracticable, a portion of the fence or wall should be torn down; the ditch should be crossed by lowering the litter on the margin of the ditch while the first bearer descends into it; he then draws his end of the litter out over the ditch and holds it while the rear bearer descends and lifts his end down; in ascending on the other side, the process is reversed.

The litter should always be carried with the patient's feet forward, except in case of a fracture of the lower extremity, and in making a marked ascent. It can readily be seen that this will conduce greatly to the comfort of the patient.

The litter-squad having been marched to their posts, the squad is commanded by No. 4, who commands

1. *Lift*, 2. LITTER.

At *litter*, Nos. 3 and 4 stand fast, while Nos. 1 and 2 stoop, adjust the straps about the neck and shoulders, and grasp the handles of the litter, as in Fig. 3. (Two) They gently lift the litter by resuming an erect posture.

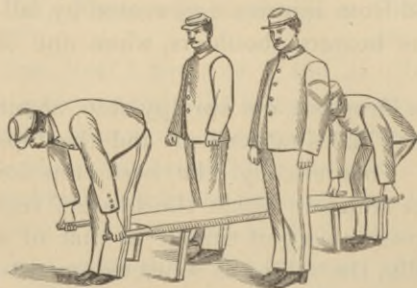


Fig. 3.—"Lift Litter."

To place the litter upon the ground, No. 4 commands

1. *Lower*, 2. LITTER.

At *lower*, Nos. 3 and 4 face inward toward the litter, and grasp its legs, as in Fig. 4.

At *litter*, all four gently stoop until the litter rests upon the ground, Nos. 3 and 4 guiding the legs, and (Two) resume an erect posture, all facing in the direction of the litter.

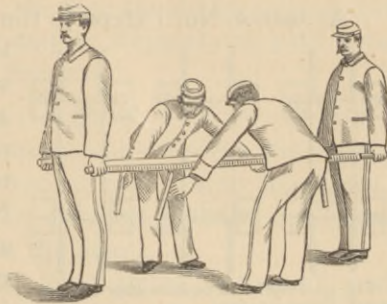


Fig. 4.—“Lower.”

In marching, it should be remembered that the rear bearer steps off with the right foot, the others with the left foot. If it be desired to march directly forward, No. 4 commands, 1. *Forward*, 2. MARCH; if it is desired to turn at a right angle, the direction is changed by the command, 1. *Litter Left* (or *Right*), 2. MARCH; or if it is desired to turn obliquely, the direction is changed by the command, 1. *Litter Half Left* (or *Right*), 2. MARCH.

When the destination is reached, or when it is desired to rest or change bearers, No. 4 commands, 1. *Litter*, 2. HALT.

To change bearers, the litter being lowered, No. 4 commands  
1. *Change*, 2. MARCH, 3. HALT.

At *change*, No. 4 faces to the rear.

At *march*, the squad marches about the litter in the direction taken when they marched to their posts. When No. 1 reaches the place vacated by No. 4, No. 4 that vacated by No. 2, No. 2 that vacated by No. 3, and No. 3 that vacated by No. 1, the command *Halt* is given. Nos. 3 and 4 then become the bearers, and Nos. 1 and 2 the relief party. When it is desired to resume the original position, the march is continued in the same direction, the command *Halt*, not being given until the desired position is gained.

#### THE MANAGEMENT OF THE LITTER AT THE AMBULANCE.

To load a litter upon an ambulance, the same general line of action may be pursued, care being taken to differentiate the commands from those of ordinary litter exercises. A litter having been brought with its front handles at the rear of the ambulance, its long axis in the long axis of the ambulance, No. 4 commands

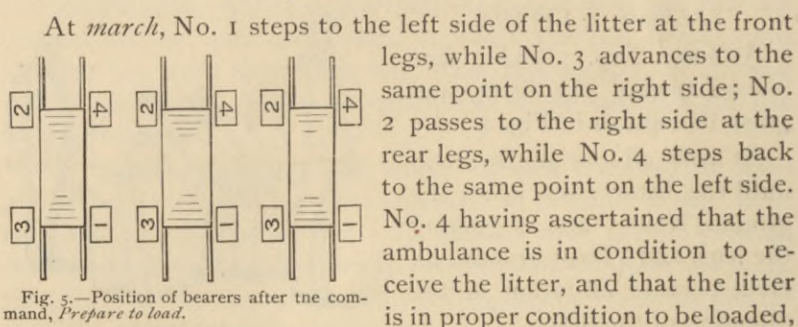
1. *Prepare to Load*, 2. MARCH.

Fig. 5.—Position of bearers after the command, *Prepare to load*.

commands

1. *Raise*, 2. LITTER.

At *raise*, the squad face toward the litter; at *litter*, they stoop, and with the palms upward, grasp the side poles of the litter, and (Two) gently raise it to the level of the rollers of the ambulance, upon which it is to be placed. No 4 then commands

1. *Load*, 2. LITTER.

At *litter*, each bearer folds up the leg adjacent to him, and the litter is gently passed forward on to the rear roller, when (Two) Nos. 1 and 3 step back to the right and left one yard, while Nos. 2 and 4 push the litter gently in, its full length, and (Three) step back facing distance, while Nos. 1 and 3 return to their places, and face toward the ambulance.

The squad may now be marched to a new litter, or into ranks. In the former case, Nos. 1 and 3 face to the left, and Nos. 2 and 4 to the right, and march about a central point, falling in in the order 1, 3, 2, 4. In the latter case the movement is reversed.

To unload a litter from an ambulance, a squad should be marched to the rear of the ambulance and formed as described in the preceding paragraph, Nos. 1 and 3 in the front rank, and Nos. 4 and 2 in the rear rank. No. 4 then commands

1. *Unload*, 2. LITTER.

At *litter*, Nos. 1 and 3 face inward, and step back one yard to the right and left respectively; (Two) Nos. 2 and 4 step forward, and grasping the rear handles, draw the litter gently out, seizing the litter-poles at the rear legs, with the palms upward. (Three) Nos. 1 and 3 advance and grasp the litter poles at the front legs, with the palms upward, and (Four) the litter is drawn clear of the ambulance. If the ambulance contains four litters,

the first should be carried nine yards to the rear before being set down ; if it contains two litters, the first should be carried three yards to the rear ; if but one, it may be stopped one yard in rear of the ambulance. No. 4 then commands

1. *Depress*, 2. LITTER.

At *litter*, the bearers gently stoop and lower the litter to the ground, each bearer seeing that the leg adjacent to his hands is in proper position, (Two) arise to an erect posture and (Three) assume their proper places about the litter.

In case it becomes necessary for a squad to assume entire charge of an ambulance, when the litter has been brought to the ambulance No. 3 takes his position as ambulance driver. No. 4 sees that the ambulance and litter are prepared, and gives the commands as before. In this case No. 2 passes forward on the right side to the front legs, while No. 4 assumes sole charge of the rear end, standing between the handles. The litter is then loaded by the same commands as with four bearers, Nos. 1 and 2 remaining at the sides of the litter after the front handles have been deposited upon the rollers and helping to push it into the ambulance. The ambulance is unloaded by three bearers, with the same commands as for four, the bearers being assigned to the same posts as when loading.

It not infrequently occurs that the services of litter-bearers are demanded when they are under arms or mounted. Maneuvers, by which both horses and arms may be satisfactorily disposed of or utilized so as not to interfere with the proper performance of the bearers' duties, have been devised, but it would seem best that the present paper be confined strictly to the means of handling the disabled, and not encumbered with accessory details.

THE TRANSFER OF A PATIENT TO OR FROM A LITTER.

Perfect familiarity with the manipulation of an empty litter having been obtained, bearers should be taught how to transfer a patient to and from the litter. After a considerable number of experiments, the following methods have been selected as the most satisfactory :

The patient lying at full length, on his back if the character of his injuries will permit, the empty litter should be brought with its front handles at his head and its long axis in the direction of the patient. No. 4 then commands

1. *To the patient*, 2. MARCH.

At *march*, Nos. 1 and 3 pass on the right of the patient, No. 1 to his knees and No. 3 to his elbow, while No. 2 passes on the left to his waist, all facing toward the patient. No. 4 steps to the left to permit No. 2 to pass between himself and the litter, then he takes charge of the injured part, or supports the head. No. 4 then commands

1. *Lift*, 2. PATIENT.

At *patient*, all kneel, (Two) No. 1 passes his hands with the palms uppermost, the left under the patient's calves and the right under his ankles, the fingers hooking up on the opposite side of the patient; No. 2 passes his hands with the palms uppermost, the right under the back between the loins and the shoulder-blades, and the left under the thighs at their junction with the body, the hands, if possible, hooking up on the farther side of the patient; No. 3 passes his hands similarly, the left under the shoulders and the right under the loins, the hands hooking up, if possible, on the opposite side. (Three) All arise, first upon one foot and knee, then upon both feet.

Or, at *patient*, all kneel upon one knee, (Two) No. 1 passes his hands as above, while Nos. 2 and 3 each pass one hand under the patient's thighs at their junction with the body, and the other under the back close up, under the armpits, the left palm down and the right palm up. Each bearer then grasps his companion's corresponding wrist and (Three) all arise. The grip is shown in Fig. 6, showing a two-handed seat, and this grip in the present instance is to be taken with both hands.



Fig. 6.—Two-handed seat, to show the grip of the hands.

The first of these methods is the best adapted for a perfectly helpless patient, is the more comfortable for the patient, and the more easily performed in transferring a patient from litter to bed, or from bed to litter; while the second is the more easily performed in transferring a patient from ground to litter, and is rendered still more easy if the patient can help himself by placing his hands upon the bearer's shoulders.

The patient then being lifted, No. 4 commands

1. *To the litter*, 2. MARCH, 3. HALT.

At *march*, the bearers move gently with side steps until the



patient is held over the litter, when, at *halt*, they stop. No. 4 then commands

1. *Lower*, 2. PATIENT.

At *patient*, the bearers gently stoop until the patient rests upon the litter, (Two) withdraw their arms, resume an erect posture and (Three) take their proper posts. No. 4 sees that the patient and the injured parts are disposed in the most convenient and comfortable position possible, and that the head rests easily upon a pillow formed by a coat, knapsack, blanket, or other similar article.

In removing a patient from one litter to another, or from a litter to a bed, the litter should be placed with the patient's head at the foot of the new litter or the bed and the preceding procedure followed.

EXTEMPORIZED METHODS OF MOVING THE WOUNDED.

But every old campaigner will remember that it was rather the rule than the exception when the supply trains were left behind, and he will readily recognize the fact that, as occurred in Lord Wolseley's Soudan expedition, the paraphernalia of the ambulance corps may be wanting. Again, small scouting parties of from two to ten men will not be burdened with litters. In cases such as these a knowledge of extemporized means of transporting the sick and wounded may be of the greatest advantage. Indeed, I am in very serious doubt as to whether it may not be of even greater importance than litter exercises themselves. In view of these facts, I have been astonished at the slight amount of attention that has been devoted to these methods. Thousands of pages have been written upon various styles of litters and ambulances, immense sums have been laid out in the construction of complicated hospital-ships and hospital-cars for large numbers of the sick, but the conveyance of the single man in case of the absence or insufficiency of this elaborate paraphernalia seems to have been almost entirely neglected.

In the execution of these methods, as in litter bearing, the utmost gentleness and care should be observed. For practice, they should be divided into clearly marked steps, each of which should be distinctly performed, also, as in litter bearing.

I have divided these methods into three classes:

- A. Methods by a single bearer;
- B. Methods by two bearers;
- C. Methods by three or more bearers.

## A. METHODS BY A SINGLE BEARER.

I consider these methods to be in reality the most important of all, both to the soldier and the civilian. The instances where a familiarity with these methods may be the means of saving life in case of fire and other accidents in towns and cities, will readily occur to the reader, while one who has seen frontier service cannot fail to remember numerous occasions where they might have been of vital service.

These methods naturally fall into three groups: I. Where the patient is carried in the bearer's arms; II. Where the patient is carried on the bearer's back; III. Where the patient is carried on the bearer's shoulder. In all these cases the most important question is how to lift the patient into a position in which he may readily be carried—a matter of no little difficulty when the patient is insensible or unable to assist, and particularly if he be a heavy adult. A year or two ago I made a large number of experiments with a view to devising a means of facilitating this procedure, and have continued these experiments during the past year, until I have finally settled upon the procedures described in connection with the following methods:

I. *Where the patient is carried in the bearer's arms.*—These methods are adapted to carriage for short distances and for those cases where it is thought necessary, for any reason, to have the patient under the eye of the bearer. There are three of these:

1. The patient lying on the ground, (1) turn him face downward, (2) stand astride of him and, with your hands in his arm-pits, raise him to a kneeling posture, (3) shift your hands about his body and clasp them in front, and (4) lift him upon his feet; (5) then, still holding him erect, shift yourself so that his right side will be against you and your hands under his left arm-pit; (6) then, retaining your left hand and arm in place, pass your right arm behind his thighs and (7) lift him into your arms. By this plan, a man can be lifted into the arms who could not otherwise be raised twelve inches from the floor. To lay the patient down from this position, (1) keeping the left hand and arm in place lower the patient's inferior extremities by lowering the right arm (2) the heels resting on the ground or cot, the left hand should be



Fig. 7.—Sixth motion in lifting patient into arms.

clasped *in situ* by the right, and (3) the patient gently lowered on to his back.

2. The patient may be *carried* with somewhat greater ease by taking a sheet, shelter tent or similar article, and tying the two opposite corners together, then (1) passing the broad center of the sheet under the patients loins and buttocks, and (2) the knot over the bearer's head with his right arm through the loop; then (3) slipping the left hand under the patient's shoulders and the right under his thighs, the bearer rises to an erect posture. To lower the patient, the bearer simply bends forward until he rest upon the ground or cot.

3. A sort of harness has been devised by Hospital Steward Harbers, to be substituted for the sheet in the preceding method (2).

II. *Where the patient is carried on the bearer's back.*—A patient can be carried upon the bearer's back with much less exertion than in his arms. These methods are consequently better adapted to carriage for any considerable distance. There are four principal varieties of these methods:

1. The patient "pick-a-back."—(a) This is the oldest of these methods and is available, without assistance, only when the patient is able to assist by clasping his arms about the bearer's neck. It is best performed in the following manner:

(1) Let the patient, seated upon the ground facing you, clasp his arms about your neck (2) with your hands under his arm-pits raise him to a kneeling posture, (3) then shifting the arms about his body raise him to his feet; (4) then letting him support himself by his arms about your neck and assisting him with your hands, face carefully about; (5) then grasp the patient's thighs on either side, and draw them astride of your loins. The patient is lowered by reversing the movements of lifting him.

(b) An insensible patient can best be carried by the methods to be described presently, but if for any reason it is desired to use this method, after the patient is gotten upon the back with the help of other assistants, he may be kept in place by passing a broad strap—a belt for example—about his back under his arms and up over the bearer's forehead or about his chest.



Fig. 8.—Fourth motion in lifting patient astride of back.

(c) A sort of saddle has been devised by Fischer which relieves the bearer from supporting the patient's thighs, and enables him to devote his attention to keeping the patient in place with a strap passed about his back.

2. Analogous to Fischer's method is the plan of carrying the patient seated in a chair strapped upon the bearer's back.

3. Another method is much advocated by foreign authors, and may be of advantage in countries where the people are accustomed to carrying heavy burdens upon the head. But it is wholly unadapted to the American physique, and I only mention it as a curiosity and to condemn it. It is as follows: (1) Seat the patient with the knees and hips bent, the head resting on the knees; (2) then pass a long band—a belt for example—about the patient under his knees and arms; (3) then crouching down behind him back to back, pass the strap over your forehead and (4) arise. The strap should be short enough to bring the weight upon the shoulders and the upper part of the back.

4. The following method is a modification of one recommended by Capt. Shaw of the London Fire Department. It is comfortable to the patient and easy for the bearer, and is of particular value when the patient is not insensible, but at the same time is unable to render any assistance to the bearer. (1) Turn the patient face downward; (2) seize him under each arm-pit and raise him to his knees; (3) shift the arms about his waist, clasp the hands, and lift the patient to his feet; (4) then retaining the right hand in position grasp the patient's left hand with your left hand and draw his left arm back about your neck, bringing the hand



Fig. 9.—Patient across bearer's back.

down in front of your chest; (5) then, stooping slightly, pass your right arm around in front of the patient's right thigh and grasp it, whereupon he will fall across your back; (6) resume the erect posture and balance the body on your back.

### III. *The patient over the bearer's shoulder.*—

This method is of advantage because of the ease with which the patient can be carried, and because it leaves one hand free for other purposes. Another important feature is that it enables the bearer to thoroughly control the patient, a point of great advantage in case of a delirious or refractory patient. (1) Turn the patient upon his face; (2) standing at the head of the patient, seize him under his arm-pits and lift him

to his knees, facing you; (3) shift your arms about his waist and raise him to an erect posture, (4) at the same time placing your right shoulder at his stomach so that his body falls over upon your back; (5) pass your right hand forward between his thighs; (6) With your left hand grasp the patient's right hand and draw it under your left armpit, until you can grasp his left wrist with your right hand; (7) resume the erect posture.

In case of a female, where the skirts would make it inconvenient to pass the arm between the thighs, if the patient is not too large, the right hand can be passed around both thighs.



Fig. 10.—Patient over bearer's shoulder.

To lower the patient (1) the bearer drops on his knees, (2) bends greatly forward until the patient rests upon his buttocks, and (3) withdraws his hands and resumes an erect posture.

These methods for a single bearer are sufficient to meet any emergency which may arise and afford a sufficient variety to give to a bearer the rest to be derived from a change of position.

#### B. METHODS BY TWO BEARERS.

While, in many instances, it is really easier for one bearer to carry a patient by the methods which I have given, than for two to unite in carrying him, yet it is usually rather more comfortable for the patient to be carried by two, and for any considerable distance it is easier for the bearers. The methods by two bearers may be considered in three groups: I. Where the patient is carried without assisting apparatus. II. Where the patient is carried upon apparatus extemporaneously constructed for the purpose. III. Where the patient is carried upon articles diverted to that use.

I. *Where the patient is carried without assisting apparatus.*—In the execution of these methods, the action should be divided as in transferring a patient to or from a litter, and be performed in obedience to the same commands, substituting *Forward March* for *To the litter March*.

1. Four-handed seat.—This is the “lady’s chair” or “sedan

chair" of the children, and makes a very comfortable seat for a patient who is able to help himself to some extent. To form it, each bearer grasps his own left wrist or forearm with his right hand, and with his left hand grasps his fellow's right wrist or forearm. The patient, sitting upon the seat thus formed, helps to support himself by throwing his arms over the shoulders of the bearers.



Fig. 11.—Four-handed seat.

2. Three-handed seat with back.—This is recommended by Longmore as being the most desirable of these methods, but while it is undoubtedly useful, my own observation has taught me that it is inferior to the third method. To form the three-handed seat, the right hand bearer grasps his own left forearm with his right hand, and the left forearm of his fellow with his left hand; the left hand bearer grasps with his left hand the right forearm, and with his right hand, the left shoulder of his fellow.



Fig. 12.—Three-handed seat

3. Two-handed seat with back.—This method I consider the most comfortable for the patient and the least fatiguing for the bearers and in every way the most desirable of the methods by two bearers. The right hand bearer grasps, with his right hand, the left wrist, and with his left hand, the right shoulder of his fellow; the left hand bearer grasps, with his left hand the right wrist and with his right hand the left shoulder of his fellow.



Fig. 13.—Two-handed seat.

4. Bearers at knees and shoulders.—The front bearer, taking his position between the patient's thighs, grasps them on either side and, on lifting, elevates them to just above his hips; the rear bearer raises the patient's head until its back rests upon his breast, then passes his arms under the patient's arm-pits from behind, and interlocks the fingers of his two hands in front. This method is comfortable for the patient, but not as easy for the bearers as some of the others. It is well adapted to the carriage of exceedingly weak patients.

II. *Where the patient is carried upon apparatus extemporaneously constructed for the purpose.*—The procedures under this head may be grouped into three classes. In the first two the patient is seated, in the third he is supine. In the first two the patient should be gently lifted by one bearer while the apparatus is placed beneath him; then he should be lifted and carried as in transferring a patient to or from a litter. In the third class, the patient should be transferred to the extemporized litter, and this litter should be manipulated in the same way as the regulation hand-litter.



Fig. 14.—Patient carried by bearers at knees and shoulders.

1. A seat may be constructed by forming a ring of leather, rope, canvas, cloth, etc. The bearers grasp opposite sides of this ring while the patient sits upon it. For ordinary purposes this is inferior to the two-handed seat already described; when bearers are engaged in bearing the sick for a considerable length of time, the hands become cramped and fatigued, and in this case, the ring is of service. The German *trag-sitz* or bearing seat is an elaboration of this method.

2. A convenient litter may be constructed from two rifles with their gun-slings. To form this, the slings should be let out to their greatest length. That of one rifle should be unhooked from the ring near the muzzle; the sling of the other rifle should then be passed over this one; the unhooked sling should then be made fast again and passed over the other rifle. In the absence of gun-slings, the pieces may be connected by belts, straps, knapsacks, and other similar articles. The patient is to be seated upon the litter thus formed, leaning upon the rear bearer.

3. A hand litter may be constructed by taking two poles of suitable length and connecting them by coats, the sleeves of which are turned inside out and which are buttoned about the poles which are thrust through the sleeves. Three blouses used in this way form an excellent litter.



Fig. 15.—Litter constructed of two poles thrust through the sleeves of three blouses.

The middle blouse is left open to show the disposition of the sleeves. The buttons are to be carried underneath. They may also be connected by picket ropes, straps, belts,

etc., and when these are covered by a blanket or something of the kind, the result is a very comfortable litter.

III. *Where the patient is carried upon articles diverted to that use.*—In the execution of these procedures the maneuvers and commands prescribed for the hand-litter should be employed. This class may be divided into two groups, according to the attitude of the patient.

1. The patient may be carried between two bearers, seated upon a board, a rifle or carbine, or a chair.

2. The patient may be carried on a litter extemporized from a broad board, a door, a shutter, a cot, or other similar articles. The use of blankets, tent flies and the like to be carried by their four corners, is inconvenient for the bearer's and uncomfortable for the patient. It is difficult to conceive of a case where, in the absence of rigid poles or frames, such as are enumerated in this paper, it may be necessary to resort to the awkward blanket.

#### C. METHODS BY THREE OR MORE BEARERS.

It is not infrequently the case that the paraphernalia of litter bearing is deficient while there is an abundance of men for bearing. It is, moreover, not infrequently the case that patients are so injured, that in the absence of regularly constructed litters, the services of three or more bearers are necessary in order to carry them comfortably to any distance. If the distance over which the patient has to be borne is considerable, it is frequently desirable, in order to prevent fatigue, in the absence of a satisfactory litter, to divide the weight of the patient among several bearers.

I. *By three bearers.*—In case of a wound of the lower extremities, where the patient is carried by two bearers according to the methods already described, a third bearer may be employed to support the injured limb.

II. *By four bearers.*—1. The methods of carrying a patient in transferring him to or from a litter fall under this head—Nos. 1, 2 and 3, being the bearers proper, while No. 4 supports the head or the injured part—and they may be utilized for bearing a patient in the absence of a litter.

2. A litter may be constructed by forming the poles on either side by two rifles lashed together at the muzzle and connecting these poles by a blanket, tent fly, coats, or similar articles. The bearers being numbered as in hand-litter exercises, Nos. 3 and 4



grasp the poles in carrying at the point where the rifles are lashed, and thus support the weak point.

III. *By five bearers.*—A patient may be carried by five persons, one on either side supporting the head and shoulders, one on either side supporting the pelvis, and one supporting the legs. A greater number of bearers than five can not act conveniently.

#### CONCLUSION.

By proceeding with the discussion of the transportation of the wounded upon wheeled or other vehicles, the subject might be extended almost indefinitely, but I have purposely limited myself to that part of the subject concerned with carriage by human bearers, in the belief that less was known of this than of any other part, and that consequently such a study would be of particular value at the present time. It has been my aim to introduce nothing merely theoretical but to present what, after a careful winnowing of a large number of experiments, has been shown by practical experience to be the best. I trust that further investigation may still more perfect this fundamental portion of the management of the disabled, and that with a more prevalent knowledge of this subject the future may be brought into still greater contrast with the past.

The history of war has hitherto been a story of hundreds of lives lost by lead and steel, and of thousands of deaths due to sheer neglect. The broader humanity of our age is leading us to a higher conception of our duties to the fallen, whether comrade or adversary. The general of the future will not disregard the care of the injured in forming his plans for a coming battle, nor will it continue to be said that living men cannot be spared from dealing death, even to engage in saving life. Properly trained men will be found in every command whose duty it shall be to stay imminent death upon the field and, by means such as have been described, tenderly bear the wounded to points where surgical skill shall gather up the half-broken threads of life. The death-rate of future campaigns will be diminished, peace will be gained at a lower price, and the horrors of war will be vastly lessened—and in the attainment of this result the most important factor will be the proper *transportation of the disabled*.

THE HISTORY OF THE UNITED STATES

It is the duty of every citizen to be informed of the rights and duties of his office, and to exercise them with wisdom and moderation. The history of the United States is a record of the struggles of our people for liberty and justice under the laws of God and man.

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