

FRAGILE BOOK

RETAIN IN ENVELOPE WHEN NOT IN USE

D  
530  
.U53  
1917  
no. 3  
c. 3

**CONFIDENTIAL**

No. 1376

G-5

NOT TO BE TAKEN INTO FRONT LINE TRENCHES.  
Issued Down to include Battalion Commanders.

**UNCLASSIFIED**

**Notes on Recent  
Operations**

**No. 3**

**GENERAL HEADQUARTERS  
AMERICAN EXPEDITIONARY FORCES**

A. G. PRINTING DEPT., G. H. Q. A. E. F., 1918.

**PROPERTY OF US ARMY**

Newman

**G. H. Q.**  
**AMERICAN EXPEDITIONARY FORCES,**

**FRANCE, Oct. 12, 1918.**

The following notes on the St. Mihiel operations and the first four days of the Meuse-Argonne operations are published for the information of the command.

**BY COMMAND OF GENERAL PERSHING:**

**JAMES W. McANDREW,**  
*Chief of Staff.*

**OFFICIAL:**  
**ROBERT C. DAVIS,**  
*Adjutant General.*

## NOTES ON RECENT OPERATIONS NO. 3

ST. MIHIEL (September 16-20)

1. All objectives in these operations were promptly gained and almost exactly as planned. However, notwithstanding the rapid advance and its nearly exact conformity to program, some difficulties were encountered and some deficiencies were noted from which lessons for assistance in future operations can be drawn. The following notes deal with some methods which gave good results and with others which did not prove so successful.

2. *Formations.* The formations in general were good. Scouts seemed to be used intelligently. Leading waves were thin. Small columns followed the leading waves and were generally of suitable depth. Adequate arrangements for cleaning up hostile trenches were the rule.

3. *Smoke Screens.* Gas companies with the first line divisions made effective use of their mortars in throwing smoke shells. Hostile positions which were to be turned were thus screened at ranges of 200 to 500 yards, and passage of wire and the bridging of streams were successfully done under cover of their smoke. This use of smoke should be continued and extended.

4. The gas companies also in some cases made use of thermite shells in overcoming machine gun nests. The moral effect of their liquid fire proved to be very great.

5. *Stokes Mortars.* The Stokes mortars, where the enemy machine guns had not been accurately located, and the one-pounders, where the hostile guns were located, again gave excellent results.

6. *Tanks.* Where the tanks took advantage of every opportunity to gain ground and did not hesitate to operate in advance of the infantry, their services in cutting wire, in overcoming machine guns, both in timber and in the open, were highly effective. Where their advance was cautious, and when they remained habitually behind the infantry, they accomplished nothing. If the tanks are to be anything but a nuisance they must always be used in future with boldness and aggressiveness.

7. *Wire.* Wire was generally cut by hand and without considerable delay. Teams, both of infantry and engineers, should be drilled in rapid work. In low wire, or in any wire not of the newest, axes working close to stakes quickly produce or prepare a gap. Rapid progress through wire is largely a matter of previous organization and drill.

8. *Direction Lines.* Direction lines should habitually be maintained by compass bearings. In those organizations in which there had been careful drill in the use of the compass no difficulty was encountered, either in wooded or open country, in the maintenance of proper lines of advance. In some other organizations, where landmarks only were assigned, misunderstandings arose and units were found attacking obliquely across the line of advance of other troops. Failure accurately to follow direction lines means that troops will be crowded into some areas and that other areas will be vacant. Further painstaking training is required for both officers and men in marching across country and through timber by compass direction.

9. A satisfactory solution of the traffic difficulties encountered includes provision for roads, determination of what traffic is to use them, priority thereon, and traffic control. In each staff three officers are primarily interested: G-1 (or G-4), the engineer, and the provost marshal.

10. The question of roads reduces itself almost to a mathematical problem, because we know on our side of the line where the good road ends, and it is possible to ascertain from prisoners and from aeroplane photographs where the good road begins in the enemy's territory. Detailed preparation must, therefore, be made by the staff to overcome these bad stretches immediately the advance has commenced. A conference should be held at each headquarters by G-1 (or G-4), the C. E. O. and the P. M. after each has made his plans, to see that nothing has been overlooked.

11. Unless flatly impossible, each division should secure two routes within its zone of advance—one for forward traffic and one for return. Even a trail for return traffic, most of which is light, is better than to attempt to use a poor road of the character to be expected through trench systems for two-way traffic. Empties or light ambulances en route to the rear will be able to negotiate many connected-up trails which would be impracticable for loaded vehicles. But it may not always be practicable to secure one-way lines, and even more than one division may have to use one road. In the latter case the corps must take over the conduct of stretches to be used in common by more than one division.

12. In the division, not only should the roads and general manner of use be determined beforehand, but the routes decided upon should be carefully studied and, as far as possible, reconnoitered by the Division Engineer. He should determine just how he will cross our own trenches and wire and the enemy's trenches and wire, what demolitions of bridges and roads he can expect the enemy to make, and what difficulty will probably be further brought about by the artillery bombardment. He should decide whether to bridge or to level the enemy trench systems, how to make suitable gaps in the wire for his road, how to go

over shelled areas, and how to replace bridges that will probably be down. Engineer dumps should be established in our front line trenches to meet the needs of all these different purposes. Bridges to be erected should, wherever practicable, be framed beforehand. Working parties for each item of construction or repair should be organized and drilled therefor and be ready to begin their particular task the moment the first line of infantry has overrun the ground. Once begun, the work must be driven with desperate speed, instead of in the shiftless manner frequently seen during the St. Mihiel operations. And every important piece of work should be directly under charge of an officer.

13. Traffic along such a route must be opened at the earliest practicable moment. But the work must be so organized and the traffic so regulated that the improvement of the road can go steadily forward.

14. The most important duty of the Engineer troops is to provide roads. They should be assigned such tasks and should not be used as infantry. In fact, it will usually be advisable, under existing conditions in France, to reinforce the divisional engineers by pioneer infantry, or labor regiments, and sometimes, where the anticipated labor for prompt reconstitution of traffic ways is very great, by infantry from divisions in reserve.

15. *Priority.* In using the roads, careful priority should be established. Ordinarily, artillery should first use the up road when the divisional artillery begins its movement forward. But even then there must be economy. Nothing is gained by rushing forward all of the artillery if there is no reasonable prospect of soon getting up enough ammunition to serve the guns. Arrangements should habitually permit kitchens to go forward the first day. Communications are of first importance. Transportation required in the maintenance of communication must, therefore, have right of way over all. This includes staff cars, motorcycles, mounted officers and orderlies, and signal carts. And these means must be permitted in the usual case to travel both ways over roads which are otherwise only one-way.

16. Motor transport, except staff cars, motorcycles, and light ambulances, should be kept off the poor roads to be expected when the enemy's trench systems and the devastated ground behind them are being overrun. Contents of heavy trucks should be dumped before the area of good roads has been passed and animal-drawn combat or other trains be used to forward these contents to the troops. On poor roads heavy trucks are invariably soon stalled. When stalled, until disposed of, they block everything behind them. Stalled trucks should be dragged from the road at once and no time wasted in futile attempts to get them on. Spare teams or caterpillar tractors should be provided in advance and be spaced along the road to assist all transportation across difficult stretches.

A rigorous march discipline is essential. Troops and trains must keep to the right of the road. The left side must be clear to permit the rapid passage of staff officers and messengers. Doubling must be prevented. Convoys must be broken. Commands must go into the fields for meals and permit traffic on the road to pass. Infantry must march across country, notwithstanding the fact that marching there may be rather heavy.

17. An intelligent military police must be posted along the road at all critical points, cross roads, bridges, mud holes, and they must patrol the road between such points to maintain discipline. They must have intelligence and training enough to understand who should be given the right of way. For example, they must not compel a staff officer delivering an urgent order to keep his car in a slow-moving artillery column. Their authority must be exercised firmly, but not arbitrarily; on the contrary, with judgment and tact. Officers of the military police should be stationed at all of the most important points. They, too, must patrol between. The whole road should be under charge of an officer of considerable rank. And, if of considerable length and importance, it may be advisable to put assistants in charge of sections.

18. If heavy traffic is to be carried both ways over a narrow road, alteration of movement must be provided across places too narrow for two-way passage, such as bridges and turns.

19. *Care of Animals.* During the long halts of artillery organizations while awaiting the clearing of blockades, the drivers and other mounted men frequently slouched in the saddle for hours instead of resting both themselves and their animals by dismounting. Doing so constituted a gross negligence on the part of the responsible officers.

20. *Orders.* Orders, with a few noteworthy exceptions, may properly be charged with too great length and with interference in the province of the subordinate. Most of them provided in detail entirely too far into the future. All of the defects brought about by a long course of instruction in stationary warfare were very much in evidence. Divisions issued orders called field orders which, at great length, gave instructions for preparatory training, were full of contingent clauses, detailed formations even down to include the battalion, and repeated in their appendices many standing instructions contained in manuals or general orders. Orders of such length are impossible of comprehension. They admit of an infinite variety of interpretations. The probabilities are that most of the subordinates concerned never read them through. Their purpose was to secure a methodical, prearranged attack down to the smallest detail. This result would much better have been attained by less voluminous orders, framed in accordance with the precepts of our Field Service Regulations, which leave suitable initiative in the hands of sub-

ordinate commanders all the way down. Then, to secure united action, the subordinate commander should be required to submit the draft of his order for approval before publication. Brigade and regimental commanders would not thus have been eliminated from the hierarchy of command as they in reality frequently were.

21. Supplementary orders and messages were quite frequently, or perhaps generally, dictated. Usually the dictation started before the staff officer had made any notes of the sub-heads under which he intended to arrange his instructions, or had any logical sequence in his mind even of the matters with which he intended to deal. It is seldom that an order need be dictated to a stenographer. When it is so dictated, an order unnecessarily long and poorly and indefinitely worded almost invariably results.

22. *Telephone.* The telephone was used entirely too much by staff officers for the transmission of orders. Orders delivered by such conversational means lack positiveness and lead to misunderstandings on both sides. They absorb the time of staff officers who should have more important duties than those of telephone operator, and they lead sometimes to a serious block of the lines. In general, there should be a greater use of concise, definite, carefully framed messages. The telephone should be used less, the buzzer more. Moreover, the buzzer has the technical advantage that it will work in a satisfactory manner when by reason of extended lines or poor connection the telephone is unintelligible. In a rapid advance, the danger of the enemy's listening in is usually very slight.

23. As has ordinarily been the case, there was in general too great a dependence upon the telephone as the only means of communication. If the telephone went out, there was frequently no other means ready to replace it and there was a general tendency to regard no other communication as possible. It must be remembered that telephones are only one of many means, and that each of the means provided has its specific use. Few horses were brought forward. Yet in most cases, carefully organized mounted messenger services working by relay over short routes were almost everywhere practicable, and would have furnished a speedy, efficient messenger service across country when the motorcycle was of little value because of muddy and congested roads.

24. *Artillery.* While the plans contemplated, after crossing the trench system, the rapid and successive movement of the artillery in accordance with the methods of open warfare, in actual execution this movement closely followed the methods of trench warfare. In particular there was a lack of promptness in starting the artillery and in attempting to move forward too much.

25. In surprise attacks of this kind a sufficient artillery concentration is made to dominate the hostile artillery and afford the infantry a powerful support in overcoming the enemy trench system. Both this operation and that of July 18 show that with careful arrangements for concealment before the attack, the artillery has practically complete freedom of initial disposition, and complete freedom of movement so far as the enemy is concerned after the attack begins. From these facts, it is clear that practically all the artillery should be placed well forward before the attack and promptly advanced thereafter. The accompanying guns, for example, could readily have been concealed the night before the attack just in the rear of the enemy barrage line. The road reconnaissance could have followed the first infantry waves and the trenches crossed immediately after the necessary repairs had been completed. As it was, the infantry outstripped the accompanying guns and rendered them ineffective as such.

26. A similar procedure could have been followed in the case of infantry batteries. They could have fired or not in the trench attack, depending upon circumstances. If they fired, the objectives should have been those first captured. Reconnaissance should be made and firing ceased as soon as it is possible to cross the trench system. Such batteries should move as complete fighting units with caissons and combat trains.

27. Thereafter the movement of artillery should be continuous and independent of the ammunition dumps of position warfare. Ammunition supply should be as provided for in regulations.

28. Whether it will be possible to move all of the tabular quota of artillery forward the first day of such operations depends upon the terrain. It should be possible in nearly all cases, however, to advance at least one regiment of light artillery with combat trains in continuous support of the infantry. Before moving forward more light artillery than this, one, or preferably two, battalions of division howitzers should be advanced.

29. The effectiveness of the artillery support given the infantry during the trench attack was not tested by a stiff resistance, but there is every reason to believe that it would have been equal to any emergency. There was no preliminary adjustment of fire, so that map firing was initially necessary. The accompanying fire took the form of a barrage in some cases, and, in others, of a progressive fire on carefully selected points. Unless the artillery is so powerful as to permit the barrage to be everywhere thoroughly effective, the latter method is preferable. The accompanying fire in crossing trenches was, of necessity, based on a time schedule. In view, however, of the slight resistance actually encountered, it proved to be too slow in its progression and

hampered the infantry advance. This suggests the advisability of prearranged signals, or other means by which the accompanying fire may be either hastened or ceased altogether, and reliance placed solely on the accompanying guns and infantry batteries.

30. After the trench system had been crossed and the artillery had advanced, the difficulty of moving forward ammunition made it by all means necessary to cease the extravagant methods of map firing and utilize direct observation. The terrain afforded excellent observation posts and battery positions. But observed fire was used rarely, if at all. It must be inferred that artillery commanders do not appreciate the immense advantage of adjusted fire and the waste and loss of effectiveness in searching areas.

31. Aside from the difficulty of moving the artillery forward, the positions selected after the advance were in some cases too retired considering the offensive nature of the operations. For example, in one division, at the end of the second day, the light artillery was practically all in line about five kilometers in rear of the front line. The 155 howitzers were not yet in position. Instances have been reported of general instructions for the artillery not to advance closer than a certain prescribed distance from the front line. Such instructions induce timidity, are not sound in offensive operations, and will be revoked at once. Guns, if captured during counter attacks, well pay for themselves in losses saved our infantry and inflicted on the enemy.

32. The use of smoke to mask likely sites for machine guns proved very effective in spite of a strong lateral wind.

33. There was some tendency to use the division howitzers for distant harassing fire. Their mission lies first in the stronger obstacles immediately impeding the infantry advance, unless the operation has passed beyond the range of the corps and army artillery.

34. *Headquarters.* As a rule, headquarters of all commands were too far back. At the beginning of the second day, one division had its headquarters 25 kilometers behind its firing line. Any proper command of a division so dispersed in depth is impossible. When attacking, the first position of command should as a rule be well forward. An early move again will then not be necessary. Each move disrupts to a certain extent the established communications, and therefore should be infrequent. On the other hand, the division headquarters must not be left so far behind that information and orders have to be sent and received over miles of country. In moving forward the division or other commander risks communication to the rear. This latter risk is the lesser evil of the two. If it becomes a question of losing touch with his command or of losing touch with the rear, he should retain the ability to exercise his command.

35. *Marking Headquarters.* A general failure to indicate the headquarters of various commands was noticed. One staff officer carrying an important order from the division to the infantry brigades wandered for hours over the field of battle before he could locate either brigade headquarters, and yet he was never far distant from the commanders for whom he was searching. Commanders of smaller organizations, platoons, companies and battalions in no case seemed to realize that it was their business to know, wherever they were, who was on their right and left, in front and rear of them, and where the headquarters of higher units were to be found. They must keep themselves informed of these matters by suitable connecting patrols, and they must promptly and accurately inform or furnish guides for messengers, staff officers and higher commanders who are en route thereto.

36. *Discipline.* Platoon and company commanders did not sufficiently control their organizations. When halted, men were prone to get out of ranks and out of control. It is absolutely essential that company officers keep their men in hand, in ranks, under control. Straggling must be prevented. The end of a hard fight frequently finds a considerable mixture of units. It is the business of all officers to separate their men and reorganize their units at the first lull in the fighting.

37. Companies were noted habitually assembling as a body for meals, thereby greatly assisting the enemy's aerial observation. Such assemblies must be under cover, and preferably then in bouies no larger than platoons.

38. *Sanitary Units.* The ambulance companies were generally found established well to the front and performing their normal function. In some cases, owing to road blocking, motor ambulance companies designated for advance points could not get up. This difficulty could easily have been obviated by designating animal drawn ambulance companies for the advance post, and by moving the dressing station equipment up on the pack mules provided for this purpose; as pack mules can work entirely off the road they would not have encountered any great difficulty and would have arrived at the proper time with their equipment. The animal drawn ambulance companies could have moved up over muddy roads that were not blocked, because they were relatively impracticable for motor transportation, or could have moved along the side of the road, the center of which was blocked. In one division it was found that the animal drawn ambulances, which were needed and could operate over difficult roads well to the front, were used for evacuation from field hospitals at the rear. Field hospitals were established and used as triages, and for the slightly sick well to the rear. While the use of a field hospital is desirable in many cases for triage work, there should be no inflexible order requiring establishment of central triages at all times. Diffi-

culties of terrain, road and hostile fire may render it necessary and feasible in many cases to have primary sorting done at dressing stations well advanced, and field hospitals used for shelter of patients during delays in evacuation.

53. *Evacuation.* The evacuation behind the triages was satisfactory, and evacuation hospitals were well located and efficient. Evacuations from battalion aid stations and advanced dressing stations, however, were frequently greatly delayed as a result of the blocked roads.

## MEUSE-ARGONNE (September 26-30)

1. Considering the fact that this was the first time under fire for some divisions, these operations were highly creditable to all concerned. Certain deficiencies developed. For the correction of these, and to insure the maximum effectiveness which it is believed all participating organizations will be capable of in the next operations, the following comments are made. Some of them have no application to many divisions; some apply rather generally. Division commanders will note and correct those deficiencies which pertain to their own organization.

2. *Aggressiveness.* The divisions participating during the first few days of the Meuse-Argonne offensive, as a rule, did not display the markedly aggressive spirit which is required by the American mission in this war. Advances were generally too slow and too cautious. The fruits of victory were, therefore, not what they might have been. The infantry sometimes seemed more concerned with the avoidance of loss than with a desire to close with the enemy. Companies, battalions, and regiments occasionally remained inactive in the presence of relatively small hostile forces while waiting for orders, or for artillery support, or for machine guns, or missing grenades, etc., etc. Troops have been taught not to make frontal attacks against machine guns. It may be that such instructions have over-emphasized the conservation of men until timidity has been produced. To maneuver is desirable. But it must be remembered that maneuvering is only in order to place the enemy at a disadvantage, and that the final aim is to close with him in personal combat. The desire to do so must be fostered in our infantry in every possible way. Platoon, company and battalion commanders, when confronted by a situation, must not vacillate between conflicting solutions while searching for the ideal, but promptly determine upon a reasonable procedure and ACT. In case of doubt, adopt the bolder solution. It is seldom wrong to go forward. It is seldom wrong to attack. The best way to clear up a doubtful situation is to advance. In the attack it is much better to lose many men than to fail to gain ground. Inaction is the worst military crime.

3. *Headquarters.* As in the St. Mihiel operations, headquarters were frequently established entirely too far back—so far behind that command could not be properly exercised because of the long period of time required to receive information and return orders. The command of troops must be based upon fairly recent and fairly accurate information of what is happening at the front. All commanders from the divisions down should, whenever practicable, be on commanding ground from which they can overlook the actual field of battle. In the war

of movement they should seldom take station in dugouts underground. Their headquarters may be posted in such places, but the division commander himself should usually be at some suitable observation station. On the offensive, all commanders should be well forward, the division commander seldom more than 3,000 meters behind his firing lines. Before moving from one observation station, a message center should be established near the new station, and all concerned notified of its whereabouts.

4. Some commanders, however, went to the other extreme and were so far forward that they were not commanding their divisions, but only some small portion thereof, as a battalion or a company. If one is too far forward he is just as unable to secure proper reports from the whole command and to issue proper orders as if he were too far back. In every case there is a reasonable compromise between a location too far forward and one too far back.

5. *Rifle.* Not enough use was made of the rifle. Companies and battalions were prone to demand assistance from the artillery in overcoming one or two machine guns which could easily have been smothered by well-directed rifle fire and quickly overrun. A greater use of controlled rifle fire will be insisted upon in future training.

6. *Machine Guns.* The use of machine guns generally showed a decided improvement over previous operations, but much more remains to be done before they exert the continuous influence throughout the fight which can reasonably be expected of them.

7. Some divisions made no use of their guns in the initial stage of the attack. In an attack on a highly organized position, or in resuming the advance in open warfare after a halt of several hours or days, it is desirable to use all or a considerable part of the guns not assigned to front line battalions for putting down a standing barrage on enemy lines of communication and retirement, probable approaches for counter-attacks, or for neutralizing fire on woods or difficult terrain which is to be enveloped and attacked from the rear. One division made excellent use of its guns to neutralize a woods which it passed by, and later attacked from the rear. A great number of prisoners were thus captured with very small losses.

8. In such situations, the enemy's machine guns will seldom be visible, but our machine guns can often render their positions untenable by firing on the edge of the woods. This method requires abundant ammunition and consequently a greater use of carts and animals. Provision must be made for getting these carts forward at the earliest possible moment. In this respect the practice of divisions differed greatly. Some kept the carts well forward at all times, while others did not advance the carts until several hours after the opening of the fight.

9. When the guns can only be gotten forward by hand it will usually be advisable to put only eight guns into action. The guns of the center platoon should be kept in the vicinity of the carts and used for anti-aircraft work. A corporal and one private will be sufficient to man a gun for this purpose. This will leave two sergeants and twenty-four men to be used as ammunition carriers for the flank platoons. These sergeants should be made responsible for the progress of the carts and the replenishment of the ammunition of the guns in action.

10. *Tanks.* Tanks were sometimes not assigned definite tasks, and although badly needed against the machine gun nests, which constituted the enemy's chief means of defense, frequently took no part at all in the action and served only to assist in blocking the roads. They should be assigned definite tasks and should execute these tasks with energy and boldness. They should be placed under the infantry commander whose organization they are to support.

11. *Roads and Traffic.* Both were handled somewhat better than in the St. Mihiel operations, but a great many of the same faults there noted appeared again. In addition, the military police were seldom able to give intelligent directions about roads, villages and headquarters, yet such directions are essential if information and reports are to be rapidly transmitted. Headquarters were generally not marked. Flags, visible for considerable distances to the rear, should usually be displayed except when hostile aeroplanes are overhead. Roads and villages were not marked at all or else inconspicuously. Large signs should be prepared before the attack and erected after the support battalion has cleared. Signs should be provided at all roadforks and crossroads within and outside of villages, showing directions to the front, to the rear, and to adjacent villages. The names of villages should be conspicuously placed at all entrances thereto, preferably by painting black letters about eight inches high on a white background painted on a face of a building or stone wall.

12. *Artillery.* Little use was made of infantry batteries, yet an aggressive artillery well to the front was required to make practicable the rapid advance of the infantry.

13. The handling of the divisional artillery after the trench to trench phase of the attack was unsatisfactory, as in the St. Mihiel operations. The initial positions were also faulty.

14. The initial artillery positions must be as far forward as is possible consistent with concealment before the attack. There is no other restriction.

15. After the infantry has crossed the hostile trench system, the handling of the artillery should be directed toward insuring a smooth and uninterrupted flow of artillery forward, equipped and formed for open warfare.

16. It seems not to be realized that the method of attack used at present originated with the enemy. Its difficulties are fully realized by him. He well knows that when the attack has progressed to the limit of range of the artillery in its initial position, the advantage of the overwhelming concentration of artillery ceases to a large extent. His method of resistance is based on these facts. The solution obviously lies in moving the artillery forward so promptly and so rapidly that the initial artillery superiority is maintained at every moment thereafter.

17. It must also be remembered that close artillery support is essential to a rapid advance against serious resistance, unless the advance is only to be made at heavy cost. Conversely, the closer the artillery support, the more rapid will be the advance. It is only in this way that the division can gather momentum and develop real offensive power.

18. In general, the form actually taken by these operations after crossing the trench system was an effort to repeat by successive stages the same methods of artillery support as were used in the first place. The resistance to the infantry developed in varied and unexpected ways, of which the artillery received little information, and therefore gave the infantry little assistance. Barrages and similar stereotyped forms of fire fell ineffectively in the distance. As the limit of range of the initial artillery positions was reached, a point well known to the enemy, his relatively weak artillery opened with good effect on easy targets. In several instances, our infantry as well as roads with heavy traffic were severely shelled, without a shot from the mass of artillery in our rear.

19. The artillery movement is begun by the accompanying guns. Ordinarily, these guns have no mission in the trench phase other than to make every possible disposition for crossing the trench system promptly, with caissons and special equipment. They do not take part in the firing before H hour. They should be placed the night before the attack in concealed positions close behind the first waves of the battalions they are to support. If the situation permits, a crossing for them should be prepared before H hour over our trenches and through our wire. The guns should pass our lines and the enemy's very closely after our leading waves. Reasonable risk must be taken. If the ground is too difficult for the teams to move unaided or with the aid only of the gun personnel, infantry help in dragging the guns forward and in digging ramps across the hostile trenches and cutting the hostile wire must be provided. In bad ground this may be even as great as a company from the reserves for each accompanying gun. No men should be left back from the front line battalions for this purpose. It is absolutely essential that such guns go forward with the bat-

talions they are to support, no matter how difficult the terrain may be. Intelligent arrangement beforehand, adequate support, energy and courage will get them ahead. Their movements are not confined to roads, which may separate them from the infantry and subject them to previously adjusted hostile fire. With proper pre-organization and initial disposition, the accompanying guns should clear the trenches within one hour after the attack begins.

20. The accompanying guns are followed at the earliest possible moment by the infantry batteries. The remaining artillery follows as ordered, in quantities depending on the road facilities, taking into consideration the demands of other essential traffic, including the ammunition supply other than that with the batteries. Division trench mortar batteries function as infantry batteries.

21. In endeavoring to move artillery forward, care must be taken not to place them on the road earlier than it is possible for the forward movement to commence. This moment is ascertained by a proper reconnaissance.

22. In the movement of artillery forward, it is not a question as to whether the initial position still has sufficient range to reach the infantry line nor of the temporary diminution of the intensity of the fire; but one of close support of the infantry, a constant use of the roads from the beginning, and avoiding the absence of artillery support, which will inevitably result if the movement is delayed.

23. Artillery movements observed revealed glaring defects in the matter of reconnaissance. A battalion commander, closely followed by his battalion and his detail, was found making personal inquiries as to where the infantry was. Another halted his battalion on a congested portion of the road, thus closing it, leaving orders for the battalion to wait there until he sent for it. Another halted his battalion in column on a road shortly afterward heavily shelled, while he personally rode forward to inquire as to the road. Another incident occurred on the second day, where an infantry battery arrived in the vicinity of possible positions and waited for over two hours without leaving the roads.

24. These instances are gross violations of the fundamentals of reconnaissance. In principle, a reconnaissance should be sufficiently advanced to enable the command to follow as rapidly as possible and move uninterruptedly into position. Proper training in this matter will enable even inexperienced officers to perform these functions satisfactorily. The special details for this purpose, if properly employed, are sufficient to permit adequate reconnaissance and good liaison with the infantry at all times.

25. These operations afforded constant opportunity for the successful use of accompanying guns, infantry batteries and supporting artillery with direct observation. Excellent positions abounded, with nearby observation posts. The hostile artillery was weak, which would have enabled our artillery to devote itself almost wholly to accurately adjusted fire on troublesome machine gun nests. Only accurate fire is effective in these cases. As it was, the infantry attacked these practically unaided, with unnecessarily slow progress.

26. Even after the tardy movement of the artillery across the congested areas, the positions taken were in most cases too far back. The possibility of counter-attacks makes it advisable to echelon the artillery in depth, and this is more or less automatically accomplished in advancing successively. But the echeloning should begin with the accompanying guns close up to the front line and should extend a lesser distance to the rear than is now the practice. Artillery well advanced is in itself a powerful means of defeating counter-attacks. It is difficult to justify, from any point of view, the situation where the 155 howitzers of a division were in advance of practically all of the 75 guns, as actually occurred.

27. *Animals.* Many instances of neglect and abuse of animals in the matter of watering, feeding and rest were noted. They were due for the most part to lack of attention by officers, poor discipline, and too much consideration for tired men at the expense of more tired but dumb animals. This matter is important from the standpoint of discipline and the ordinary dictates of humane treatment of animals, but vitally so in view of the present critical shortage of animals. Military necessity is being used to cloak abuse. The personal supervision of higher commanders is evidently not sufficiently exercised. Stern disciplinary measures are required.

28. *Captured Material.* Provision should be made in advance for the use of captured artillery. It frequently happens that captured guns could be put into action long before our own artillery can be gotten forward. Three 150 mm. howitzers with ammunition were available within 600 meters of a woods that held up an infantry battalion for two hours. They were not used due to the fact that no preparation had been made in advance. Twenty-four hours later when an attempt was made to use these guns it was discovered that the sights and observing instruments had been carried off by souvenir hunters. Some of these instruments were later located in the possession of officers. In each division there should be a few artillerymen trained in the use of enemy guns. A small detachment should accompany front line infantry battalions for the purpose of serving these pieces. Such detachments should be provided with range tables, and whenever practicable with sights for 77 mm. and 150 mm. guns. Infantry capturing serv-

iceable artillery should place a guard over it to prevent the removal of instruments by trophy hunters until it can be turned over to our own artillery.

29. *Cleaning Up.* Several divisions were decidedly deficient in cleaning up the ground they overran, usually not in the enemy's first line positions, but in later ones. General instructions in the usual case had been given, but in many cases no specific orders had been issued to a company to clean up a particular piece of timber or a particular village. As a consequence, one division was seen with its first line battalions deployed against one hostile position, while behind them the enemy occupied a strong line of machine gun nests which were being attacked by our second line battalions. Needless to say, the advance of that division was greatly delayed.

30. *Signal Corps.* Wire lines were frequently laid along roads. This, as usual, resulted in numerous interruptions by traffic. Roads are a favorite target for the enemy artillery. To avoid interruption by traffic and shell fire, all wire lines should be kept well away from roads. The extra initial labor involved is more than compensated for by freedom from interruption and facility in maintaining lines.

31. Little or no use was made of service buzzers or buzzer phones, although there were many cases where these instruments might have been used to a decided advantage. The value of the buzzer phone used as a telegraph instrument superimposed on a telephone circuit does not seem to be fully realized. This arrangement not only increases capacity for handling business over the line, but in addition, makes available a much more powerful instrument than the telephone. When lines become so poor that telephone transmission is quite impossible the buzzer phone used as a telegraph instrument will still be able to function.

32. The most powerful instrument available for the transmission of signals over wire lines is the service buzzer, but these signals transmitted over a poorly insulated line or a grounded circuit may be picked up easily by the enemy, provided he has listening stations in operation in the vicinity. Nevertheless, where the enemy is being pushed back, and where no other form of wire communication is possible, the service buzzer should be installed and used, as the advantage obtained through speed in transmission of important messages will almost invariably outweigh any other consideration.

33. The general tendency seems to be to place entirely too much dependence on the telephone, and, when the telephone fails, to resort immediately to messengers, without attempting to use any other instrument over the lines already installed. This is bad practice and should be corrected.

34. Visual stations and radio stations established and ready for business often remain idle while messengers wander around in the dark, over congested roads and trails, vainly trying to locate someone for whom they have a message. Mounted messengers and motorcycle messengers should be held in readiness for use when other means of communication fail, but they should not be used as long as other means are available.

35. *Sanitary Troops.* In general the services of attached sanitary troops were satisfactory, except as affected by deficiency in numbers and difficulty and delay in bringing up the battalion combat equipment, due to the broken terrain and roads and improper transportation. Mistaken zeal was shown in some cases by making long distance evacuation of single patients by litter when the majority of patients would have fared better if the battalion litter bearers had been used for the collection of the many patients in groups, to be cared for by the ambulance company personnel on its arrival, and later evacuated by wheel transport. Dressings were generally well applied, but complaint was heard of damage done by unnecessary use of the tourniquet. Medical Department soldiers were not greatly used as litter bearers in the advanced positions. Combatant troops or infantry litter bearers were doing much carrying, which fact, with other less legitimate depletion, took many rifles from the firing line. In one case, eight riflemen were noticed accompanying one wounded man to the rear. The provisions of the regulations prohibiting combat troops taking wounded to the rear should be rigidly enforced. Supplies were generally adequate in the advance positions owing to the small ratio of casualties on the first day.

36. *Ambulance and Dressing Stations or Triages.* In these open operations the establishment of a general dressing station for the entire divisional zone was the rule. Here patients were collected, dressed, sorted and evacuated as road conditions permitted. As these establishments were necessarily large they required much shelter and cover. As there was usually only one to the division, stations were considerable distances from battalion and regimental collecting points or aid stations. They were frequently established on congested roads (always targets for artillery fire) and consequently were unnecessarily exposed to fire and caused long carriage of patients to them. In open operations, difficult terrain and bad or congested roads will be the rule, and consequently evacuation from the dressing station by ambulance will be difficult and slow. The measures to be taken to secure best care of the wounded are to move up at least two or three dressing stations by pack mule, or by bearer detachment carriage, and distribute them over the divisional zone in such a manner as to secure cover on lines of covered evacuation from the front, away from shell-threatened villages and cross roads and near the collecting points of wounded of

the brigades or regiments they are to cover. Here the casualties can be collected, dressed and cared for until the roads are repaired and ammunition train congestion has ceased. Such action will secure early clearing of the field and collection, and the best possible care of cases until evacuation can be accomplished. Here primary sorting can be done, and, if necessary, a secondary triage can be done at an establishment located farther to the rear on a route of sanitary evacuation. While such procedure does not bring the patient to the evacuation hospital sooner, it does permit early clearing of the field, collection, dressing and anti-tetanic prophylaxis, feeding, warning, shelter and care and relief of the attached sanitary troops for further duty with their organizations, and maintains the patient in better condition for his evacuation trip.

37. The dressing stations, particularly those under canvas, worked efficiently in general after patients had been received. Those established in dugouts, cellars or buildings were cramped for room, and in many cases had not cleared out obstacles and debris sufficiently to permit economy of effort.

38. *Ambulance Detachments.* Work excellent, in so far as spirit, interest, care and driving were concerned. Evacuation was much delayed in forward areas by destroyed roads and jams.

39. *Field Hospitals.* Owing to the existence of fixed hospitals in rear areas, evacuation was made from the triage direct to hospitals designated for special types of cases, and the field hospitals were used in some case to equip and man the triage, for slight cases, or held in reserve.

40. *Corps and Army Sanitary Troops and Establishments.* Generally held in reserve for future use, a correct procedure, or were designated for special types of cases.

41. *Evacuation.* Except as limited by road conditions, evacuation satisfactory. Cases arriving at evacuation and surgical hospitals were held, cared for and cleared in a satisfactory manner in accordance with a well ordered scheme. Some of the fixed establishments were at considerable distances owing to the necessity of using buildings built by the French for the sanitary service of intrenched positions. Several of these units had not completed establishment until late owing to the fact, as stated, that sufficient transportation was not furnished for rapid movement of equipment and because of the prohibition of erection of tentage at night before H hour.

42. *Military Police.* Military police were not noted at the sanitary establishments to the rear. It is necessary to have at least a small squad of military police at triages and evacuation and surgical hospitals in order to hold slightly wounded, malingers and skulkers, able to return to their command, who are evacuated or wandering to these establishments.