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WASHINGTON, D. C.

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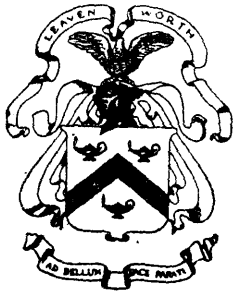
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WAR DEPARTMENT,

WASHINGTON, *August* 7, 1918.

This bulletin is the first number of "Military Notes on Training and Instruction." It is a compilation of information obtained from various sources, available in the War Plans Division, General Staff, U. S. A.

This information will be published, periodically, under the supervision of the Training and Instruction Branch, War Plans Division, General Staff, U. S. A., and will contain such notes and information as is thought will prove of general interest and benefit to the various arms of the military service.

If this bulletin contains information that has been previously distributed or does not meet a need and is not of interest its publication will be discontinued. Expressions of opinion as to its value are invited.

Attention is called to the fact that the contents of this bulletin are of a confidential nature.

(062.1 A. G. O.)

BY ORDER OF THE SECRETARY OF WAR:

PEYTON C. MARCH,
General, Chief of Staff.

OFFICIAL:

H. P. McCAIN
The Adjutant General.

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SIGNAL COMMUNICATION.

1. Trench warfare has unduly emphasized the use of telephonic communication, which cannot be extensively maintained in warfare of movement. It will very rarely be possible to provide any communication by wire in front of infantry brigade headquarters and it is impossible to count upon the telephone forward of divisional headquarters. Commanders of infantry brigades and units must accustom themselves to rely entirely upon other methods of communication. Greater attention must therefore be paid to the organization of such means of communication, especially visual and wireless.

2. In each divisional area efforts should, if possible, be concentrated on one main artery of communication from front to rear, which should consist of cable, wireless, visual signalling and despatch riders, as circumstances permit. Headquarters of divisions and of infantry and artillery brigades, should be placed in as close proximity as is practicable to this artery, on which signal officers should be established to serve several headquarters. It is for corps to select the location of these arteries and to assist in their formation, so that divisions may be enabled, if necessary, to move to points at which they will find both forward and rearward communication already provided.

3. It is essential that the moving of headquarters of a formation or unit should be notified as early as possible to higher, lower and adjacent formations or units. The difficulty of maintaining communication has sometimes been much increased by failure to indicate the position at which new headquarters were to be opened or to inform all concerned of alterations of plans in regard to movements arranged.

4. It would seem that there has sometimes been a lack of discretion in regard to the use of the signal cable wagon. Cases are reported in which all available cable was laid out while the situation was still obscure, so that the cable could not be recovered on withdrawal and in other cases it seems that no use was made of the cable wagons, which were sent back when they might usefully have been retained.

5. In a withdrawal it is inadvisable to trust entirely to permanent overhead routes; when cut they take a long time to repair and a cable line can be restored much more quickly.

GERMAN POWER BUZZERS.

(From French Third Army Bulletin, June 18, 1918).

Information obtained from a captured German specialist.

The power buzzer service is carried out by the same divisional detachment as the radio service (Divisions Funken Abteilung, abbr. Difua or Divfunka).

Within the divisions the power buzzer stations are distributed as follows:

One station for the brigade, one station for each regimental headquarters, one station for each battalion in line, that is to say, seven stations for the divisions.

The number of stations varies slightly at times, it happens, for example, that the distance between two stations requires an intermediate one, but this is always considered as exceptional.

In general, the power buzzer station (Erdfunkenstation) is in the same dugout with the command post to which it pertains.

No regulations fix the pitch of sending; it is left to the judgment of the operator who regulates it in order that the receiver may hear as well as possible.

A commutator permits of five different pitches, from low to high.

The German power buzzer system has been considerably extended and has been accompanied by a reduction in the use of the telephone.

Each station can communicate, not only with the station of the unit immediately above or below it, but also with all its neighbors.

In this connection the usefulness of multiple bases, with several orientations, permitting sending in all directions, has been recognized.

At present German machines are constructed for a maximum of five bases with lengths varying from 50 to 150 meters.

Each machine can be used either for sending or receiving.

The artillery sometimes uses the power buzzer system as far as the brigade which telephones to the batteries concerned.

The power buzzer is much used in stable sectors, but is not employed during an advance, when the telephone alone is employed.

It seems that the Germans have a very important power buzzer system. The degree of perfection reached by its organization shows that they intend to increase the importance of its role with regard to communications in the advanced zone.

Detachment of Messenger Dogs.
(Meldehundetruppe).

(From French Military Advisory Mission Bulletin).

This detachment is commanded by a lieutenant, who has charge of the pigeon service at the same time.

The total personnel is about 70.

This detachment at the present time has 26 messenger dogs. Two men are thus assigned to each dog—the man who sends a message and the man receiving it. Except in the case of absolute necessity these men always work with the same dog.

These dogs have charge of the liaisons between the command posts of company commanders, battalion command posts in line or as support (K. T. K. or B. T. K.) and regimental command posts. They maintain liaison for 3 and 4 kilometer distances.

Men and dogs remain about 10 days in the sector and have 20 days' rest—the latter usually spent in training.

Detachment of Carrier Pigeons.

(Brieftaubenabteilung).

This section is commanded by the same officer who commands the messenger dog detachment.

The personnel includes 1 feldwebel; 5 pigeon attendants (Taubenpfleger) to take care of the pigeons; 5 porters (sometimes more) (Taubentraeger) who carry baskets of pigeons to the various command posts, either in wagons or on their backs.

These pigeons maintain liaisons between battalion and division command posts. Each battalion command post has, almost regularly, at least 4 pigeons. Company command posts are rarely provided with pigeons.

A movable loft is kept near the divisional command post. This is a wagon with one story slightly raised, harnessed to two horses. It can shelter about 150 pigeons, which is the normal allotment per division.

The use of night flying pigeons seems to have been very satisfactory so far.

TANK NOTES.

Use of Tanks in Germany.

(From French Military Advisory Mission Bulletin).

The Germans are said to have stopped the tanks at Cambrai in the following way: The rifle and artillery fire compelled the infantry waves to remain in place; the advancing tanks were easily attacked with grenades (concentrated charges) and with small arms (S. R. M. bullets), once they were cut off, batteries also took part in their destruction.

As a result of this experience the Germans are said to have drawn the following conclusions on the subject of the organization and use of their tanks:

1. Necessity of having more rapid tanks (a good many sources indicate speeds averaging 8 kilometers on hilly ground).

2. The tanks advance in quincunxes, in zig-zags.

3. The tanks are protected in the front and on the flanks by the infantry sturmtrupps marching on each side at 150 to 200 meter intervals.

4. For training purposes there is a "Tankschule" in Germany and also vast manoeuvering grounds, one of which is in the neighborhood of Montmedy.

Description.

The tank is torpedo shaped. It weighs 10 tons and measures about 8 meters in length, 3 meters in width and about 2.5 meters in height. It resembles the British tanks, except in the matter of "bandages." The tank was completely protected by armored plating. The loop holes could be closed by means of shutters which, according to the prisoners, hermetically seal the openings against gas. The tank can turn rather easily.

ARMAMENT.

(*a*) A rapid fire 5 cm. gun, on a pivot, with a periscopic sight. The gun has an angle of elevation of 60 degrees. An illuminating shell, which lights up the terrain in front for three minutes, is said to be used for night action. The gun also fires gas shells.

(*b*) Four machine guns, one on each side, one in the front and one in the rear. The two last have an angle of elevation of 50 degrees.

(*c*) Flame projectors, to be used in place of the machine guns in case of an obstinate resistance. The flame was projected a distance of 60 meters. It was produced by a mixture of tar and an exceedingly inflammable matter called "carbolineum," expelled by oxygen under high pressure.

ENGINE.

The 8-cylinder 250 horsepower engine was mounted in an interior closed compartment. A light producing dynamo was driven by the engine. The tank is said to be capable of 15 km. (?) per hour on flat terrain.

PERSONNEL.

The personnel of a tank includes 2 drivers, 2 gunners, 4 machine gunners and 2 extra men, all under the orders of a junior engineer officer. The personnel all wear fire-proof clothing.

ORDER FOR TANK ATTACK.

(From "Summary of Information, A. E. F.," June 11, 1918).

BAVARIAN TANK DETACHMENT No. 13.

In the Field, May 31, 1918.

1. Situation of the enemy. See the maps which have been issued.

2. The seventh and first armies are pursuing the defeated enemy towards the Marne. The force which still holds Rheims must be outflanked by an attack from the west and east.

3. Tank detachment No. 13 will co-operate with the Four Hundred and Sixty-third Regiment (Two Hundred and Thirty-eighth infantry division).

4. The Artillery preparation will begin at 2:30 a. m., June 1. Fort de la Pompelle will be bombarded until 5 a. m.

5. The Detachment will support the Four Hundred and Sixty-third regiment in the capture of the enemy's position between the road Rheims-St. Hilaire and the Vesle.

6. The tanks will leave the departure position at 3:10 a. m. and will break through the enemy's trench at 4:40 a. m.

Order of battle for the tanks, right to left:

Lieuts. Korb—Fuchsbauer—Romkopf—Ludwig—Burkhart.

Beyond the first hostile trench the direction taken will be Fort de la Pompelle and the region to the south.

Lieut. Korb will first push forward as far as the hostile trench near the canal. Approximate point of breaking into the lines: Blue point Wl (co-ordinates 2,018). The first mission will be to reduce the point of support on the northern edge of Saint Leonard. The trench along the canal will then be cleared and also the trench situated near the road Sillery-Rheims, by advancing to the east almost to a line with Fort de la Pompelle. In the event that the garrison of point of support, west of Fort de la Pompelle, continues to resist up to this time it will be attacked from the south.

The tanks Romkopf, Fuchbauer, Ludwig and Burkhart will advance to the hostile trench, communicating with the point of support west of Fort de la Pompelle, will clear the trenches between that trench and the high-road, advancing towards the east and reducing the garrison of the above-mentioned point of support.

Approximate point of breaking into the hostile position: Immediately to the west of blue point Jl (co-ordinates 2,118).

In case there is a modification in the battle situation the commanders will act in the spirit of paragraphs 5 and 6 (line 3).

7. After the missions ordered in paragraph 6 have been carried out the trench system on the western side of Fort de la Pompelle will be attacked, if such action is still necessary.

8. The mission of the detachment will be considered as completed when the infantry will have reached the Vesle.

9. Assembly point: Woods north of the Central of the battery (1,722).

10. After 5 a. m. there will be a receiving station for visual signals on Nolda Hill (1,920). The visual signal equipment will be used.

11. To each tank will be assigned a detachment from assault battalion No. 1. Details will be given later.

12. The liaison center of the tank detachment will be in the Bois des Turcos (1,919). The exact location will be given later.

13. During the attack all the tanks will report:

(*a*) Immediately the first hostile trench is crossed.

(*b*) Immediately a point half-way to the objective has been reached.

(*c*) Immediately the objective is reached.

(*d*) Every event of any importance.

14. Each tank will have two carrier pigeons which will be used to report the fact that the objective has been reached.

15. First-aid station.—The first-aid dressing station of the Four Hundred and Sixty-third regiment. The location will be announced later.

16. The fuel wagon will be stationed at the southern entrance of Nogent at 5:30 a. m.

17. The field kitchen, with the hot mid-day meal, will be stationed after 9 a. m. at the assembly point of the detachment. Feldwebel Mueller will be in charge.

18. After 5 a. m. the ammunition wagon will be on the Prinzenweg, on a line with Nolda Hill. Its arrival will be reported to the liaison center of the tank detachment.

19. I shall take post at the liaison center of the Detachment.

(Signed) WILHELM,
Lieutenant and Detachment Commander.

(Addenda to the Order for the Attack)
In the Field, May 31, 1918.

1. To Paragraph 6 (line 3): In place of "the tanks Korb and Fuchsbauer" read "the tank Korb." At the end add: The tank Ludwig will advance from red point G1-L1 (2,019) to blue point I1 (2,118), reduce the machine gun nests in that center of resistance and return to the departure position. The unit will provide itself with water at that point. It will report when it is again in condition to attack.

2. To Paragraph 11: The accompanying troops will be at the intersection of the trench which leads to Nolda Hill and the Prinzenweg at 1 a. m. Lieut. Larsen will take the men at this point and will conduct them to the tanks in order to receive instructions from the commanders.

3. To Paragraph 12: The liaison center will be on Nolda Hill near the observation post of the Four Hundred and Sixty-third regiment.

4. To Paragrapn 15: The first-aid station of the Four Hundred and Sixty-third regiment will be near point 101 (at 19.20).

(Signed) WILHELM,
Lieutenant and Detachment Commander.

INSTRUCTIONS ISSUED BY GERMAN GENERAL STAFF.

(Translation of a German order).

Cooperation of Infantry with Tanks.

I. The task of the tanks is similar to that of the artillery accompanying the infantry, and comprises:

(*a*) The engagement of hostile supporting points, machine guns and centres of resistance.

(*b*) The support of the infantry during hostile counter attacks.

II. One of the deciding factors to ensure success is a prompt exploiting on the part of the infantry of the effect produced by the tanks.

The position of the infantry, whether preceding, in line with, or in the rear of the tanks, will depend on the tactical situation.

For attacks with short objectives, the infantry and tanks will advance in close touch with one another. In the case of distant objectives, the speed of the tank prevents it from keeping pace with the infantry. This temporary delay must not cause the infantry

to stop; it must continue to carry out its task with all possible rapidity, irrespective of the progress made by the tanks.

Should the infantry be held up in front of a strong point, the tanks will immediately pass through the line of the infantry and will work their way forward to attack and destroy the point of resistance.

Positions which the artillery may not have been able to engage, for example, machine gun nests situated on reverse slopes or which have not been previously located (flanking emplacements which are suddenly encountered), must be put out of action by the prompt intervention of tanks. The infantry must follow immediately in rear of the latter; tanks themselves cannot maintain possession of a captured position.

For defence against counter attacks, the tanks will dash forward from the positions they occupy at the moment the counter attack is launched and will make for the parties of the enemy which may have succeeded in penetrating our lines. This is the best method of securing co-operation by the tanks in counter measures carried out by our infantry.

It is very important that infantry and tanks should maintain close touch and that their respective commanders should personally confer together during the battle.

The tank crew, if their tank is put out of action, will take part in the attack as an assault detachment, making use of their machine guns and carbines.

(Sd.) LUDENDORFF.

TRENCH AND SHELTER NOTES.

(From French Military Advisory Mission Bulletin).

In the course of the battle continuous trenches must not be thought of in the first line; they will then be replaced by nests of shell holes (Trichternester), held by isolated groups of men and machine guns, disposed in diamond formation. The shelters of these shell holes will be improved by means of outlines of mines or by connecting them with neighboring shell holes, by means of tunnels supported by frame work. The earth dug up will be thrown into the unoccupied shell holes, or if the shape of the ground permits, they will be spread upon the surface of the ground. With time, shelters will be obtained (stollen) which, seen from without, resemble ordinary shell holes, and therefore escape aerial observation. If the condition of dampness of the ground prevents the use of outlines of mines, very simple organizations will have to suffice for protection against the shrapnel fire.

On the grounds, immediately behind the first line of trench holes, supporting points for machine guns, assaulting troops and units of support which will have been brought forward, will be established. To this effect shelters left standing will be used, but failing shelters the emplacement will be made in open country.

In front of the first line of shell holes a network of wires will be placed in an irregular line, but forming as far as possible a continuous obstacle. Along this same idea it is well to decorate, with barbed wire, the shell holes situated in front of the first line, in order to prevent their occupation by the enemy.

Further back it is preferable to surround the nests of shell holes with defenses clearly localized, for a continuous line might render difficult, on our part, any offensive action.

Make an intensive use of obstacles placed in order to oblige the enemy to take a direction desired by us and to bring him under the fire of our machine guns.

All defense works must escape the notice of the enemy, works and lines, too much in evidence and continuous, may not fill this important condition.

A large portion of the supporting troops and reserves must be sheltered in open ground, inside of neighboring shell holes, in the woods, in the hollows, etc. and everywhere where aerial observation may be escaped.

Villages, as far as possible, must be avoided, for, as experience proves, they draw the enemy fire.

The supporting and reserve troops must work methodically at the construction of a continuous position, comprising several lines and escaping, as far as possible, from the enemy's view (counter slope position) (Hinterhangstellung).

This position will constitute a position of support for the defense troops, echelonned in depth, in front of it. It must be decorated with a mighty network of wire, with passages for the assaulting troops and must comprise several lines of trenches.

Deep shelters will only be constructed on second and third lines. The first line will only comprise small shelters for about one-sixth of the occupants expected as garrison of the position. This position will be, in general, the line of protection for the artillery and must be found at 1 or 2 kilometers from the first line of shell holes.

If enough labor is obtainable new positions based on the same principles will be constructed further back (to form falling back positions).

It is indispensable that there should be, in front of the first trench, a continuous and thick obstacle comprising three networks, of 10 meters depth each, separate from each other by an interval of 5 to 10 meters; these networks will follow an irregular course, they must not have much elevation from the ground, especial care will be taken in the flanking of the most advanced network. The wire must not be excessively taut, if so, the vibration of the projectiles will occasion much damage among the networks. Failing other means, solid barriers of wire (Drahtzäune), having one to one and a half meters in height and two to three meters distance from one another, may be used.

The most advanced network will be established first, the exterior border of this network must be about 60 meters from the first line.

Before the second trench and the following ones, as well as before the first trench of the rear positions, passages will be made in the wire network, these passages will first only be trimmed with stakes, the wires will merely be laid near by.

The observation of the furthest advanced of the three networks will be assured by the establishing of watchers' holes or little portions of trenches in the rear of the first line.

In the rear zone the networks will be divided in slices of 10 meters in depth, not connected together and irregularly placed, or numerous and solid wire barriers will be erected, utilizing for this purpose natural covers such as hedges, hollow roads, etc.

Elephant Shelters.

(From "Notes on Recent Fighting," by British General Staff).

Concreted elephant shelters, although subjected to a very heavy bombardment, proved invaluable as battalion headquarters and as shelters for assembling troops. They were placed inside ruined houses and were protected by 3 feet of reinforced concrete. In making these shelters, care should be taken that the elephant shelter actually rests on a bed of concrete. The walls, roof and floor should form a box of concrete around the steel of the elephant shelter.

GAS NOTES.

Gas Projectors.

(From French Second Army Bulletin, June 10, 1918).

Information obtained from prisoners regarding gas projectors now in use:

MATERIEL.

Tubes are 1.30 m. in length and from one to 2 cm. in thickness, weight 70 kgs. The tube is carried by two men, a handle screwed on the bottom to carry it. The projector is fired by an electric fuse. The base plate consists of a piece of sheet iron 75 cm. in diameter, which is cupped out so as to hold the tube while being fired.

PROJECTILES.

Smooth, 18 cm. gas shells.

Phosgene.

Blue cross (see summary of information No. 43).

Traces of yperite have been observed upon the ground covered by these gas projectors.

Yellow cross (?) new.

GAS MASKS.

A special plug is distributed to the men for use against their own gas (blue cross and yellow cross), as the ordinary masks do not offer sufficient protection.

EMPLACEMENTS.

Trenches are 40 to 50 meters long. Tube emplacements are constructed about every 60 cm. The section of the trench is in the form of a V. It is from 50 to 60 cm. deep.

The two projector attacks in which the prisoners participated took place on April 15 and 17. The earth work was done during the night preceding the attack. The bringing up of the ammunition and the installation of the materiel took place during the day, the ammunition being brought up between 5 a. m. and 8 a. m. Everything was carried out with the greatest silence. The suspicious noises reported in the sector on April 18 were due to the dismounting of the projectors.

The attacks of April 15 and 17 were preceded by no peculiar indications. The same is true of the two attacks on May 9.

USE OF GAS BY THE ENEMY PRIOR TO HIS ATTACK ON THE BRITISH ON THE AISNE, MAY 27, 1918.

(From "Notes on Recent Fighting," Prepared by British General Staff).

PARTICULARS OF THE BOMBARDMENT.

There was practically no gas shelling on our front up to the morning of the 27th of May. At 1 a. m. that day an intense bombardment with gas and H.E. shell was opened along the whole sector and apparently extended on both flanks. There is no reliable information as to how much gas was used on our front line system, but various targets—notably woods and villages in the back areas—and battery positions were very heavily shelled with gas. The enemy attacked about 4:30 a. m. and the whole of the area affected by the preliminary bombardment appears to have been free from gas by about 7 a. m.

NATURE OF GAS SHELLS USED BY THE ENEMY.

Everywhere the gas seems to have caused sneezing, but there is no evidence to show that the enemy employed any new gas. It is clear that a large number of blue cross shells were used, but as it is impossible to distinguish this shell from H.E., except for the gas effect, it is difficult to arrive at an estimate of the proportion of blue cross shells actually fired. The matter is further complicated by the enemy's employment of shells containing ethyl dichlorarsine (yellow cross, I), the gas effect of which is similar to that of blue cross. A considerable amount of ethyl dichlorarsine was used in the bombardment. Green cross shells were definitely recognized by the characteristic smell of phosgene. The evidence as to the employment of yellow cross shells (dichlorethyl sulphide) is inconclusive, especially as it is uncertain how far the effects of ethyl dichlorarsine (yellow cross, I) may resemble those produced by dichlorethyl sulphide.

EFFECTS OF THE GAS.

The gas formed a continuous invisible cloud of low concentration, with pockets, where it was more concentrated. It was noticeable as far back as corps headquarters, about 8 miles from the nearest point in the line.

The casualties caused by the gas appear, however, to have been few and mostly slight. They were caused by:

(*a*) Shells bursting close to men.

(*b*) Removal of respirators owing to the difficulty of seeing.

(*c*) Men being surprised when sleeping.

(*d*) Blue cross shells being mistaken for H.E.

(*e*) Respirators being damaged.

The protection given by the box respirator appears to have been complete so long as the respirator was in good condition. On the whole, the gas discipline was excellent and the system of alarms worked quickly and well. The sector was well provided with gas-proof dug-outs and staffs were able to work without wearing respirators.

CONCLUSION.

As the whole bombardment prior to the attack only lasted 4 hours and was directed against a highly-organized trench system, the main intention of the enemy was probably to cause a temporary paralysis of the defence. For this purpose, a combination of gas shell and H.E. appears to be more effective than either gas or H.E. would be alone.

The effects of the gas may be regarded as practical and moral. The practical effects arise from the physical discomfort which it causes and the difficulty of seeing when men have to wear their respirators for any length of time. Reports, however, show that the majority of our artillery continued firing in spite of the gas and that in some cases the rate of fire was not even reduced to any appreciable extent. The moral effects are uncertainty as to whether it is necessary to wear respirators and a tendency for men who have smelt the gas to believe that they have been poisoned.

For defence against this use of gas three things are essential:

(*a*) Discipline.

(*b*) Careful instruction of officers in the properties of the various kinds of gas used by the enemy.

(*c*) Thorough and consistent practice with the respirator by all ranks.

DISCIPLINE IN CASE OF GAS ATTACKS.

(From Bulletin of French Advisory Mission, July 1, 1918).

Document found on a prisoner belonging to the Seventy-fourth reserves (Two Hundred and Thirteenth division):

April 4th General Ilse, commanding the Fifteenth army corps, Brimont group, repeated the regulations relative to "gas discipline."

"I do not want to disregard the fact that my order of March 21, 1918, relating to anti-gas protection, brought about a great improvement in "gas discipline." But new cases of intoxication, which have resulted during the past few days, prove that gas discipline in some units, companies or batteries, is not up to the desired level.

"The investigation made on this subject proved that the reason for these accidents was flagrant violations of the principles of paragraph II of the gas regulations. Most of the men poisoned by gas have been severely punished in their own corps for their infraction of regulations.

"I am absolutely convinced that these losses result solely from improper observation of the regulations on gas discipline. I require this discipline not only because every senior officer is personally responsible, but particularly out of affection for my men. Consequently I emphasize again the fact that every unit should exert its utmost endeavor to see that this discipline is maintained.

"We, the commanders, know only too well the effects of gas. But we also know that the danger it offers can be minimized by a rational use of the excellent means of protection at our disposal.

"I hope that this reminder will enable us to attain the desired end.

"In the future the division will at once investigate the cause of each case of gas intoxication. If it is the result of any infraction of regulation the culprit will be severely punished.

"The results of each investigation will be sent to the staff of the group so that everyone may profit from the lesson thus learned."

AIR NOTES.

Giant Airplanes in the German Army.

(From French Military Advisory Mission Bulletin).

Since the beginning of 1916 the Germans have been constructing very powerful airplanes capable of carrying considerable amounts of explosives. The first models, constructed by the Gothaer Wagonfabrik and the firm of Siemens-Schuckert, were not satisfactory. The most recent model, the Lizenz model, seems to be in condition and has probably been adopted by the German aviation service.

These giant airplanes (Riesenflugzeuge or Rfluzeuge) are intended for long distance night bombing. According to apparently reliable reports the characteristics of the Lizenz plane are as follows:

Four 300 horsepower Maybach engines, 1,200 horsepower.

Span 43 meters.

Total length 28 meters.

Crew 9 men.

Weight unloaded 9,200 kilograms.

Weight with full load, during flight, 14,600 kilograms.

Weight of bombs that can be transported 2,250 kilograms.

Horizontal speed, under full load, 120 to 130 kilometers at low elevations, 130 kilometers at 3,000 meters.

Height limit, unloaded, 4,000 meters.

Height limit, loaded, 2,600 meters.

The crew consists of two officers and seven men. There are 2 pilots, one of whom is an officer, they all work together, as the bodily fatigue is too great for one man alone.

The airplane is arranged to carry two bombs, weighing 1,000 kilograms, or two 300-kilogram bombs, or four 100-kilogram bombs The difference between the weight of these bombs and the total transportable weight (2,250 kilograms) is utilized for the transportation of 50 kilogram bombs and incendiary bombs.

Armament 4 machine guns.

The radius of action of a Lizenz plane is said to be about 1,000 kilometers under full load.

At the present time there are:

Two depot squadrons of giant airplanes (Riesenersatzabteilungen or R. E. A.) at Berlin and at Cologne.

Two squadrons of giant airplanes (Riesenflugzeugabteilungen: Rfla), numbered 500 and 501. The personnel of one of these squadrons is about 20 officers, 700 to 800 enlisted men, 5 or 6 giant planes and about 20 ordinary biplanes.

During the night of June 1-2 a machine of this model of giant plane was captured in the district of Nanteuil-Haudouin, where 8 of the crew were taken prisoners.

Importance of Identification of German Protective Flights.

(From "Notes on Recent Fighting," by the British General Staff).

Protective flights (Schutz-Staffeln, abbreviated Schusta), now popularly called battle flights, seem to be used mainly for the purpose of operating against ground troops. Both pursuit (Jagd-Staffeln, abbreviated Jasta) and protective flights have been concentrated for all recent offensives. The location of these flights has therefore become an important indication of hostile intentions.

On account of the greater number of pursuit flights, concentrations of these are not easily ascertained. Protective flights are more easily identified because they exist in smaller numbers, 38 having been identified to date. These are equipped with Pfalz, Halberstadt, Hannover and L. V. C. machines and are ordinarily attached to corps.

In the questioning of pilots and observers and during the examination of prisoners, a special effort should be made to identify any movement or concentration of these protective flights.

German Precautions Against Air Observations.

(From Summary of Air Intelligence, R. A. F., June 19, 1918).

Two British N. C. O.'s, who escaped recently from the German lines, state that the Germans take care to camouflage everything,

mechanical transport is permanently camouflaged with material resembling our own netting. Other transport, when parked, even for a short period, is drawn up close to a hedge and covered with branches. Transport is never parked in an open field.

Great care is also taken to camouflage supply dumps.

RAID AND SCOUTING NOTES.

(From French Military Advisory Mission Bulletin).

A RAID.

The series of raids executed by our men in Lorraine continue to be successfully conducted. On February 9th a particularly successful action resulted in the capture of prisoners and considerable loss to the enemy.

The operation had been carefully arranged. Our artillery range was adjusted with great caution, two days in advance, after which we concentrated our fire on several points and the enemy began to show great anxiety. On the night of the 8-9th, particularly, the place where we were expected was illuminated by flares.

Our artillery began its fire for effect at 5:35 a. m. on the 9th. Under cover of this fire one company, commanded by Capt. Laffitte, left its trenches, threw two pontoons over the Seille, crossed this river and blew up the enemy's entanglements with melanite charges and penetrated through the rear into the town of Alincourt.

The garrison had been given the alarm and it was only after violent struggles with hand grenades that our men overcame certain isolated points of resistance.

In the course of this skirmish some 20 Germans were killed or wounded in their shelters, among others the officer commanding this part of the sector. Twenty-seven others were taken prisoner by this gallant company, whose own losses were very slight.

The commanding officer who led the attack, at the head of his men, was the last to cross the river on return, having first ascertained that the few wounded had all been brought back.

GERMANY—INDICATIONS OF RAIDS AND RELIEFS.

(From the experience of a French division, from French Military Advisory Mission Bulletin).

The Germans try to take prisoners by sending out at night large patrols of from 20 to 50 men, which form ambuscades. When this method does not succeed, as is usually the case, they resort to a raid with artillery support. Their recent practice has been to open suddenly and without warning a very violent bombardment, usually at nightfall or dawn, although when there is a moon it may come at any hour of the night. A strong and thick box barrage is put down on a part of the line. Meanwhile the storming troops, who have slipped up close to our wire, work into our lines in several

columns. Rapidity of execution is characteristic. They try to penetrate to a considerable distance so as to take our sentries from the rear.

Although there is nothing certain in the indications, the following points should be carefully considered, as they have often been noted immediately preceding a raid:

1. Unostentatious registering by the enemy's batteries on our batteries and defensive organization, on our wire, on breaches in our wire. Fire on other points at the same time to divert attention from his real objective.

2. Registering by trench mortars.

3. The infantry airplane flies over the point of attack, usually rather low.

4. Small patrols are also noticed, reconnoitering the wire, not only to see if it is destroyed, but also to make sure of their itinerary. It is occasionally possible to pick up some of these patrols.

5. When the raid is very important, the usual indications of a serious attack are also present, namely fire with gas shells and high explosive on the sensitive points in the sector.

6. Artillery fire of neutralization on our barrage batteries, especially if gas shells are used.

7. Registering on the supporting points.

8. Any fire of destruction by artillery or trench mortars, or fire with larger caliber than usual.

9. Fire on rear organizations. The more serious the effort, the greater the amount of fire on sensitive points in rear.

10. Continued fire on breaches in the wire.

11. Gas bombardment on any reserve positions or the bottoms of ravines.

12. Balloons in observation, especially if the general visibility is not good enough to warrant the ascension. They are usually up the day before the raid.

13. Artillery fire against observation posts or command posts.

14. Shiny points in the wire, either the German wire or our own, which are freshly cut ends, indicating recent cutting of breaches.

15. Any abnormal movement in the German lines.

Reliefs.

In the case of a relief, the indications are usually given by a change in the habits of occupation or regime of fire of the enemy.

1. In some divisions smoking is permitted well forward, in others it is not; some divisions allow fires where others prohibit them. The appearance or absence of smoke thus becomes an indication of relief.

2. Night firing is common in some organizations and unusual in others.

3. Some organizations do much more indirect fire with machine guns than others.

4. Some organizations use the rifle more than others.

5. The reconnaissances by officers of the organization taking over are sometimes noticed. They usually attract attention by the fact that they walk around in an unusual manner and in very small groups.

6. Activity of wireless ground telegraphy, telephone or visual signals is always suspicious.

7. Increased circulation on communications in rear.

8. Noticeable decrease in artillery activity, due to batteries being relieved.

9. Considerably increased amount of registering for several days, firing practically everywhere in the sector, ordinarily with time shell (new batteries registering on all objectives.)

Scout Detachments.

(From French Third Army Bulletin, June 25, 1918).

The following are extracts from an order issued by the Two Hundred and Twenty-second Division under date of May 26, 1918, on the subject of scout detachments (Spaehtruppen):

I. *Mission of Scout Detachments.*—The taking of prisoners, as often as possible, will be the principal mission of scout detachments. Observation is an important but secondary mission. This principle must be the basis of the formation and instruction of scout detachments. Success will most often be obtained in making sudden and surprise attacks on patrols and hostile outposts in front of the lines or within the enemy's positions. Scout detachments will not hesitate to remain several hours every night in ambush. This kind of activity requires men who are particularly resourceful and full of initiative, with a sense of the terrain and ready to attack the enemy at sight.

Undecided and hesitating men who are not capable of taking advantage of the right moment are of no use for scout detachments. The leader of a scout detachment is to be a model for his men. He will neglect no occasion for inspiring his men with a deliberate and offensive spirit and of training them to act on their own initiative. The preliminary condition for success in a scout detachment is the ability to recognize indications of the enemy's activity. This information is to be obtained in the two or three days following entry into the sector. It is also necessary that scout detachments post observers, as soon as they arrive in sector, to see and listen for the enemy's movements by day and by night.

This watching of the enemy is to be directed on the following points:

Movements of patrols, work on accessory defences, with reports on the importance and nature of these defences, gaps in the entanglements, guards, nature of the terrain, facilities for cover, noise

of digging, fresh earth, traffic within the enemy's lines, smoke, sounds of voices, barking, observation posts in the trees, command posts, movements of signallers, visual signal stations.

This information will be completed by aerial photographs and accurate data on the position of the troops.

II. *Carrying Out Raids.*—A complete picture of the life of the enemy is quickly obtained by the method indicated above and it is on this basis that the leader of the scout detachment will lay his plans.

Carrying out the raid is then relatively simple.

It is necessary in all cases that reconnoitering detachments, attacking from the front, be of sufficient strength (about 20 men), for many patrols are sent out from the main detachment for flank and often even rear protection. These patrols will be equipped with light machine guns.

When the patrolling is to the front it is particularly necessary to get into position before the enemy does, that is to say, as early as possible in the evening, at points between the lines where the enemy is known to pass. Strong hostile patrols will be attacked with sudden impetus and captured after a short but violent fight with rifle fire, machine guns and hand grenades; it is preferable to attack single men without firing.

Accurate observation of the enemy's accessory defences may also make it possible to attack him in the rear while he is working.

III. Captured prisoners will be brought back by the party and the killed will be stripped of the insignia of their uniform (collars, shoulder straps, buttons) and of their papers.

On the other hand, the scout detachment is bound to leave no prisoner with the enemy, nor any wounded or dead; if a man is in danger every one of his comrades must know that he is to be helped to escape. If in spite of everything their efforts are unsuccessful, the honor of the soldier demands that he should refuse to make any statement to the enemy, whatever it may be, he will not betray his comrades.

It is absolutely necessary that our wounded and killed be brought back.

IV. It is of extreme importance that the battalions in the first line, before the departure of a reconnoitering patrol or before a raid, should be in touch with the artillery liaison officer (A. V. O.), in order that the detachment may not be hindered in carrying out its important mission by friendly artillery fire.

V. The detachment must be armed and equipped according to the purpose to be accomplished. Rifle fire is especially important. Wire cutters are always indispensable. All regimental insignia and distinctive markings, letters, sketches, in short, everything which might furnish information to the enemy, will be left behind. The

men who take part in the operation may carry only an identity disc bearing their name and date and place of birth.

NOTES ON SECRECY IN OPERATIONS.

(Translation of a German document, from French first army bulletin, June 18, 1918).

IDENTITY CARD.

Jaeger Seiller, Cyclist Company No. 155, holder of this card, belongs to the division police; he is to call attention to all infractions of the regulations regarding secrecy and security.

I. *By day* (*a*) North of the line Marle-Montcornet march formations must not be in greater strength than one company or one battery at a time.

1. (*b*) South of this line, as far as the line Marchais-Soissons-La Selve, no traffic is allowed in clear weather, if the weather is dull, the formation of one company and one battery must not be exceeded, distance must be at least 300 meters.

2. South of the line Marchaise-Soissons-La Selve, as far as the zone visible to terrestrial observation, do not march in dull weather by day, except by squads and single vehicles (or guns); distance 300 meters.

3. Single vehicles, which are obliged to travel on service by clear weather up to the zone visible to terrestrial observation (line Chaussee-Montberault-Hill 198, north of Orgeval cross-roads, 500 meters southwest of the southern exit of Festieux, triangle of roads, one kilometer north of Aubigny, bent 800 meters west of the church of St. Erme, eastern exit Goudelancourt-Amifontaine), must be bearers of an order in the name of the passenger, signed and stamped by the unit commander and stating the purpose, distance, date and time of journey.

Distance between vehicles 300 meters.

Sentries will examine the orders.

4. South of the zone, seen as far as the hill of La Bove, only hospital vehicles and automobiles for the transport of wounded will be allowed to pass in clear weather. They will pass singly and at a distance of 300 meters from one another. They will be provided with orders.

(*c*) On the terrain, seen by hostile terrestrial observation, the circulation of individuals alone is authorized; no vehicles are allowed.

(*d*) On the approach of hostile aviators the infantry and, if possible, vehicles not moving will immediately leave the road and take shelter. All movement is to stop. Infantry is to lie down.

(*e*) Parks may only be established when concealed from aerial observation or in farms close to buildings.

II. *At night.*—Columns in excess of one company or one battery not allowed, distance at least 300 meters. All movement will cease,

even at night, on the approach of hostile airplanes. No bivouac fires, lanterns or electric lamps are allowed. *Darken the windows.*

III. *In general.*—Neither singing, music, noise, creaking or loose wheels and brakes are allowed. South of the line Festieux-Mauregny-Montaigu wheels are to be wrapped, shoulder straps are to be rolled up. Cover epaulettes.

IV. If the presence of a spy is suspected the police personnel must request the identity card of the officers and men. It is required that such cards be issued by the commander of the troops in the division sector.

Arrest all without papers.

All officers, non-commissioned officers and men must conform to the regulations of the police.

Whoever refuses to observe them will be reported to the division of La Bove or to the fourth reserve corps, Chateau de Marchais.

(Signed) VON HUELSEN.

MACHINE GUN NOTES.

(From "Notes on Recent Fighting," by British General Staff.)

1. The following translation of a German document (Ia/48,580) indicates good dispositions and handling of our machine gun units during the fighting in March. It emphasizes again the value of the disposition of machine guns *in depth*—both in attack and defence. In the attack, security against counter attack is thereby given to the flanks; in defence, provision is thereby made for resistance to the enemy's attempts to widen any gap into which he may penetrate.

2. Fire effect is the essential. Therefore, an extensive field of fire (1,000 yards or more) is required for machine guns, direct fire must be a primary consideration and the employment of guns singly should be avoided. Generally, forward guns should be employed in pairs and guns in rear should be in pairs or groups of four, so as to facilitate control of a considerable volume of fire.

3. In defence, the disposition of machine guns in depth must be based on definite plans for restricting the area into which an attacker might penetrate. The enemy generally attempts to effect penetration at the weaker portions of the line and to take our more strongly prepared positions in flank and reverse. This should be anticipated and should not necessitate bringing our machine guns into action in unforeseen directions, as has sometimes occurred.

4. Single guns with hostile infantry may be dealt with in previously prepared defences by single 18-pounders in advanced positions and on all occasions by the fire of rifles and Lewis guns used boldly in front of the main position.

5. Co-operation between the infantry and Lewis guns and machine guns is essential, particularly in open warfare, and must be practised during training. Instances have been reported during the recent fighting when orders to withdraw were given to the infantry which

were not communicated to the machine gunners. This omission resulted either in the guns being withdrawn without orders, or in their being left in their old position until it was impossible to withdraw them owing to lack of any covering fire. The Lewis guns, as they are more mobile, should cover the withdrawal of the machine guns.

As soon as the infantry has withdrawn and reorganized on its new position a proportion of the machine guns, which have covered the withdrawal, should be released to take up fresh dispositions in depth.

6. It is of the greatest assistance to the infantry commander in obtaining a quick grasp of the position if the machine gun officer can prepare a sketch map, however rough, showing the situation of his guns.

7. A definite system of communication must be laid down and employed at all times between the machine gun company and its transport. This system must apply not only to the conditions of trench warfare but also to the new conditions which will arise in the event of open warfare.

The fighting limbers should be part of the company and controlled as such. They should be grouped together under the battalion transport officer.

8. The training of machine gun sections, with their transport, must be practised on all possible occasions. The proper use of limbers and pack animals appears to have been somewhat lost sight of during recent operations.

9. During a battle the machine gun battalion commander should establish his advanced headquarters near the advanced divisional headquarters, where he will be in touch with the divisional staff and have access to all the divisional means of communication.

10. The machine gun defensive organization must make full use of the existing communications within the divisional area. Machine gun commanders, therefore, must keep in close touch with the headquarters of the infantry and artillery units in their vicinity. In this way they will be able, if necessary, to make use of the infantry and artillery signalling system.

Indirect Fire with Model 1908 Machine Gun.

(Order issued by German G. H. Q., May 20, 1918 (Ic. 86, 703, op.), from French third army bulletin, June 17, 1918).

It has been shown on various occasions that there still exists some uncertainty as to the purpose and method of indirect fire with the Model 1908 machine gun.[1]

Before opening fire a thorough examination of the ground must be made, taking into consideration the flat trajectory of the model 1908 machine gun.

[1]The 1908 Machine Gun is a heavy water cooled gun (Maxim) on a sled mount.

Select a firing position and an observation post.

Use the aiming apparatus with absolute precision.

Establish sure liaison.

1. Between the observer and the firing position.

2. With the infantry over which the fire is directed.

In order that the indirect fire may be effective, observation must be made during the ranging fire as well as during the fire for effect.

Indirect fire, when executed without using the regulation aiming apparatus or with a makeshift to replace it and which is confined to firing with high deviation over the undulations of ground, amounts to nothing but a confused spray of bullets. *It is a useless waste of ammunition* which is wholly unjustified and which must be forbidden in the same manner as indirect fire with the model 1908-1915 machine gun.[1]

The peculiar characteristics of indirect fire require some time for its preparation and execution. This time depends upon the skill of the commanding officer and the ability of the men. Indirect fire belongs rather to the sphere of defensive operations, as the latter permit realizing all of the preliminary conditions required for the serious application of this method of firing. It may likewise be employed to advantage in the preparation and even in the first phase of an attack.

During the progress of an attack, on the other hand, it is nearly always necessary to make use of direct fire. Furthermore, during occasional lulls in the fighting, if hostile fire forces the model 1908 machine gun under cover, or if the slackening of the combat permits the model 1908 machine guns to resume distribution in depth, it will be of advantage to employ indirect fire.

One company in each detachment of picked machine gunners will always be equipped with the new aiming apparatus: Graduated circle, goniometer, sighting triangle.

(Signed) LUDENDORFF.

ANALYSIS OF THE GERMAN INSTRUCTIONS ON THE USE OF THE MACHINE GUN FOR THE OFFENSIVE.

(From Bulletin of French Advisory Mission, July 1, 1918.)

Anhalt fuer Verwendung des M.G. im Angriff, Februar, 1918.

The doctrine of the German Command on the use of the machine gun for the offensive is as follows:

The value of the machine gun as a *defensive* arm is well known; but hitherto its employment as an *offensive* arm has been only

[1]The 1908-1915 is a light gun with bipod mount and rifle butt stock. It is handled by one man.

vaguely foreseen. It is now a question of determining the principles for such employment.

Participation of machine guns (light and heavy) in an infantry attack should be rationally organized according to a plan elaborated in every detail.

Take care to distinguish between tactical use of the light machine gun and that of the heavy.

I. *Light Machine Gun.*—As a rule 2 guns per platoon, the reorganized company consisting of 3 platoons.

Each gun is manned by a section (1 section chief, 1 squad of 4 gunners and 1 replacement squad, employed for the supply of ammunition and to protect the gun).

The two sections thus organized constitute the very skeleton of the infantry attack.

Two methods of employment:

(*a*) *Offensive Nests* (Angriffsneste).—First wave, consisting of groups of light machine guns, which play the role of *advanced offensive points* and which are intended to hold the enemy entrenched and prevent the intervention of any enemy machine guns still intact.

(*b*) *Direct participation in the attack.*—Other sections of light machine guns advance with the waves and constitute their *chief means of fire.* Their mission is as follows:

To fire during the advance, at short ranges.

To aid in mopping up the trenches.

To be installed in captured positions.

To protect the units being organized there.

To fire on the retreating enemy.

The chief concern of the command will thus be:

1. To keep intact the maximum power of the light machine guns.

2. To see that their supply of ammunition is kept up to its full quota.

II. *Heavy Machine Guns.*—They form an intermediate step between light machine guns on the one hand and trench mortars and field pieces on the other.

Their essential mission is not to combat enemy machine guns (this is left to grenade throwers and Minenwerfer), *but to insure a maximum firing power to the infantry engaged at a decisive point.*

They should help the light machine guns to carry an attack forward (sweeping fire on the first objectives of the infantry to keep the enemy entrenched and fire on the enemy rear), support the light machine guns in their struggle against airplanes and tanks, resist counter attacks and ward off attempts at flank enveloping movements. To fill these various missions, the heavy machine guns are *echelonned in depth.* This echelonment is always maintained during the advance, so that the heavy machine guns, in steady contact with the infantry, are always ready to intervene at decisive points, or

they are ready to direct a barrage fire (direct or indirect, with concentration or without), on the enemy rear, as the heavy machine guns are able in a certain measure to replace the artillery when the latter extends or eases fire, or they are ready to fire during the intervals in the infantry line, or for flank fire, or, if necessary, for direct insertion of machine gun platoons in the line, for the time being deprived of all its essential means of attack.

"Thus," says the instruction, "the attack advances until it reaches its final objective."

Echelonment in depth, as provided for in the preliminary arrangements, enables the heavy machine guns to renew their attacks automatically, in constant collaboration with the infantry and with an irresistible power.

According as the tactical situation alters there are new missions to be fulfilled succeeding each other in close succession. Once the troops are engaged, these problems should be resolved on their own initiative and within the sector assigned to them. The final end to be attained by the machine guns, however, is always the same: To carry the offensive power of their fire to the front without losing sight of the objective to be reached and to open the way for the infantry, which latter, without looking to the rear, continues its push with an irresistable dash.

The present instruction seems to have been closely applied during the offensive now going on.

CAVALRY NOTES.

(From "Notes on Recent Fighting," by the British General Staff.)

Attention is called to the following points with regard to the employment of mounted troops:

1. Whether in attack or defence cavalry and cyclists, if they are to be used to the best advantage, must work in the closest cooperation with the other arms and the fullest use must be made of their mobility.

2. In mobile warfare one mounted man who knows how to use his rifle is, owing to his mobility, of more value than three equally well-trained men on foot. One bullet from the flank has more effect than three bullets from the front. Recent operations have emphasized the fact that a sudden burst of fire from a comparatively few rifles, coming from a flank, can disorganize a hostile attack far more effectually than a much larger body of fire coming from the front. Cavalry, owing to its power of combining fire action with mobility, can, if properly used, always delay the advance of the enemy's infantry. Cavalry, therefore, even when employed as infantry in the line, should never be far from its horses.

3. Dismounted cavalry cannot be used to the best advantage if brigades and regiments are broken up and sent in small detachments to reinforce infantry units. Every effort, therefore, should be made when cavalry is put into the line to keep brigades and divisions

intact with their machine guns, R.H.A. and R.E. It will then be possible for the cavalry commander to maintain a mobile reserve to be employed wherever the tactical situation may require. The value of such a reserve was brought out on several occasions during the recent operations. In the fighting between the Somme and Marcelcave, from the 27th of March to the 3rd of April, a mounted force varying from one regiment to one brigade was retained as a mobile reserve by the cavalry divisional commander. The situation on our right was always uncertain and sometimes critical. This mounted force supported the infantry as far south as Aubercourt and Hangard and the reconnoitering detachments which it provided did valuable work south and southeast of Villers-Bretonneux.

4. The cavalry, R.H.A. batteries and M.G. squadrons found it surprisingly easy to break off an engagement. This was largely due to the maintenance of the mobility of these units and to the training in open warfare which they had received. A cavalry division was holding the line north of the Somme from Sailly Laurette to the west of Morlancourt on the 26th and 27th of March. Although hotly engaged with the enemy in front of Sailly Laurette on the evening of the 27th the division was able, upon receiving orders to do so, to break off the engagement at 4:35 p. m. and at 10:30 p. m. was assisting in the defense of the line from Warfusée Abancourt to the Somme at Bouzencourt.

5. Throughout the recent operations invaluable work was done by small officers' patrols. Experience has proved that reconnaissance by mounted patrols is probably the best means of obtaining the necessary information with regard to the enemy's movements and the position of our own troops. It is impossible to attach too much importance to the training of officers and men in this work.

6. The following points with regard to the work of mounted troops in action were noticed during the recent operations:

(*a*) There was a tendency, when coming into action, to dismount too soon. When galloping up to a position units should remain mounted up to the last possible moment.

(*b*) A senior officer should always be left in charge of the led horses and he should have a few spare mounted men to act as messengers. The position of the led horses has frequently to be changed owing to shell fire and, unless the closest liaison is maintained with the fighting troops, there is a danger of losing touch.

(*c*) The Hotchkiss gun proved a most useful weapon. Its fire was invaluable in covering the withdrawal in rearguard actions. All reports show that pack horses must always accompany troops when dismounted. The Hotchkiss gun and ammunition must be brought up on pack as near to the firing line as possible. Casualties among the Hotchkiss gunners were heavy. It is necessary, therefore, that a large reserve of these gunners should be trained.

ARTILLERY NOTES.

(From "Notes on Recent Fighting," by the British General Staff.)

As soon as the nature of the fighting changes from trench warfare to open conditions, whether in advance or withdrawal, command must be decentralized to a considerable extent.

Every endeavor must be made to ensure that headquarters are moved as seldom as possible.

In a withdrawal, infantry and artillery headquarters should move back along an existing line of telephone whenever this is practicable.

Selection and Occupation of Positions.

The semi-covered position is the most suitable for 18-pounder and 60-pounder, in this type of fighting, for the following reasons:

(*a*) Observation can probably be obtained from close to the battery and fire controlled by voice or megaphone.

(*b*) Dead ground is reduced and, if necessary, guns can be run forward and fired over open sights.

The more a battery can cover its immediate front and flanks the better.

The approaches and exits from battery positions must be carefully reconnoitered. Roads shown on maps cannot be accepted as passable by artillery or even in existence.

The immediate selection of an alternative position is essential.

During movement the withdrawal of artillery must be by batteries within a brigade and positions must be selected in depth accordingly. It is unsound to dispose the artillery covering a division so that one brigade is entirely in the forward zone, another further back and so on, as such methods may lead to the destruction or capture of a complete unit. If each brigade is disposed in depth it is self-supporting and one battery can cover the movement of another.

Observation.

Fire must be controlled from as near the position as is compatible with the nature of the country. When movement is frequent the laying and maintenance of long telephone wires is not practicable, even if wire is available.

The value of megaphones is emphasized.

Communication.

Telephone communication is not easy to establish or maintain. Runners and mounted orderlies must be used to the utmost to supplement visual signalling, which is often slow owing to the frequent need of transmitting stations.

A wireless sending set with divisional artillery headquarters would be of very great value in issuing orders to artillery brigade

commanders, but even when these are available it will generally be found that for short distances a mounted orderly is the quickest means of communication from D.A. to brigades and brigades to batteries.

Single Guns.

Single guns (18-pounders) have been used with success to cover an exposed flank of a line and in a street. They should not be placed too far forward, but about 1,000 yards from the front line and on the flank of strong points.

Notes on Rolling Barrage.

(From French Military Advisory Mission Bulletin).

The following note is a translation in ex-tenso of a secret note of the eighteenth German army, dated March 8, 1918, which fell into our hands on March 30th during the German attack on Plemont. It is the most complete document we possess on the organization of rolling barrage (Feuerwalze) prior to an offensive action.

It is to be noted that medium and heavy mortars and trench mortars are not utilized for this purpose:

(1) *Object of rolling barrage.*—The object of rolling barrage fire is to force the enemy to seek shelter and to enable our infantry to surprise them in this position.

Rolling barrage should therefore paralyze but cannot annihilate the enemy. It is of no benefit to the infantry unless the latter takes advantage of the situation and follows the barrage closely without fearing a few isolated explosions.

If a single enemy machine gun resumes firing it will cause more losses than the explosion of a few of our own shells.

(2) *Batteries employed for this purpose.*—All batteries to which no special duty has been assigned during the attack such as counter battery, the destruction of strong points and the rear lines, interdiction fire, supervision, accompaniment of infantry, etc., may be used for rolling barrage.

When assigning special duties it should be constantly borne in mind that the rolling barrage should be as dense as possible.

Rolling barrage proper is only executed by field artillery, batteries of light and heavy howitzers and light trench mortars.

The curved fire of mortars and heavy guns should be used, especially on account of the great regressive effect produced by the explosions on objectives which cannot be reached by rolling barrage. This fire jumps from line to line and from one strong point to another in front of the rolling barrage. The medium and heavy trench mortars do not fire.

(3) *Opening of rolling barrage on the points of attack.*—At the hour X plus 300' (the houx X is that of the opening of general fire).

The rolling barrage advances according to schedule time.

The duration of the trajectory of the projectiles must be taken into account (Flugzeiten). Regulate the watches!

(4) *Advance of rolling barrage.*—By stages:
First stage of the light batteries (field guns and light howitzers) and heavy batteries (heavy howitzers) 300 meters.

Subsequent stages of the light artillery are 200 meters and of the heavy artillery, on account of their less rapid fire, 400 meters.

(5) *Intervals between stages.*—After the first stage the light artillery pounds on one spot for three minutes and the heavy artillery for only two. After the following stages the light artillery concentrates its fire on one point for four minutes and the heavy artillery for eight.

The stages of the heavy batteries precede those of the light artillery by one minute in order to prevent the advancing infantry from being hurt by the bursting shells.

(6) *Concentration of rolling barrage on one point.*—The fire should last longer on certain lines and, if necessary, on the terrain situated between them (for instance on the lines furthest from the first position, on intermediary positions, the edge of villages, hills between the intermediary position and the second position) in order to force the garrison to conceal themselves sufficiently before the arrival of our infantry, or in order to allow the latter to follow the barrage closely (dicht an die Feuerwalze aufschliessen) or to rest.

(7) *Where and how long to concentrate on one point.*—This information is given by the army corps commanders by means of sketches (these sketches always bear the number 5, this number is given in the orders and range tables. That of the army only goes to the army corps commanders).

The army corps commanders consult with each other with a view to organizing the barrage on the limits of the area of attack so that the infantry may not risk being caught by the enemy on the flank.

(8) *Advance of rolling barrage after each period of concentration.*—The heavy batteries advance one minute before the light batteries.

The duration of the period of concentration should not be regulated but only the time of the advance.

(9) *Acceleration of the cadence by means of signals.*—A luminous signal has been instituted (extend: Vorverlegen!) in case it is desired to accelerate the cadence.

This signal should only be given upon an order from the battalion commander and a sufficient length of time beforehand.

The object is purely and simply to facilitate a momentary acceleration of the infantry advance.

The barrage will resume its regular cadence unless the signal is constantly repeated.

On the day of attack the signal is (a) green fuses (with or without sheaf) or else (b) short, vertical successive jets of flame emitted by the light flame projectors.

Upon receiving this signal the light and heavy batteries extend their fire 200 meters.

Before giving this signal it should always be remembered that the general order of the rolling barrage will be interrupted and that it may lead to an echelonning of fire which will compromise the safety of the infantry, as the latter advances more rapidly (flanking and machine gun fire).

(10) *Other modifications of rolling barrage.*—Independently of the adjustment of barrage by schedules and by signals the artillery commanders and assistant observers advancing with the infantry may, on their own responsibility, make certain modifications according to the exigencies of the situation if they recognize the necessity thereof from their own observations and those of the agents (airplanes, balloons, etc.), at their disposal.

The constant supervision of rolling barrage by terrestrial and aerial observation is of the very greatest importance.

It may happen that:

(1) The rolling barrage has passed certain strong points or machine gun positions without neutralizing them and that the infantry cannot follow. If the trench mortars and accompaniment batteries are not sufficient in this case the assistant observers and artillery liaison officers should again direct the fire of certain batteries or battalions co-operating in the barrage on these objectives, advising the artillery commanders of the fact.

If the duration of this fire has not been exactly determined the artillery continues firing until the signal "extend" is received either by telephone or by visual signals. It then rejoins the barrage at the point reached by the latter.

(2) Our infantry has already passed the above objectives and that they still offer resistance. The accompaniment batteries and the trench mortars alone will be employed in this case.

The fire of batteries executing the rolling barrage should never be shortened over the heads of the infantry.

(11) *Duration of rolling barrage.*—The duration depends on the range of the batteries participating in the rolling barrage. Our battery positions are near enough to allow the barrage to be extended everywhere beyond the second position. When the barrage has crossed the positions of the enemy batteries it is joined by the fire of the batteries which until then were employed for counter-battery fire. When the second position has been passed the batteries, engaged in the destruction thereof, also participate in the barrage.

On the other hand the batteries cease firing as soon as their maximum range is attained and only a few batteries continue firing.

(12) *Subsequent artillery support.*—The fire of high-power heavy batteries, firing from their original positions, may continue for some time after the maximum range of the rolling barrage has been attained.

It is then time to regulate the artillery preparation and protection. This must be done by individual initiative and by the initiative of the commanding officer, who must issue orders to the artillery which has been brought forward. The latter must be placed in position without delay, and its liaison with the attacking infantry cannot be too close.

By order of the General Commanding the army,

MAJOR GENERAL VON SAUBERWEG,
Chief of Staff.

CLOSE DEFENSE OF BATTERY POSITIONS.

(Translated from German document—From French Military Advisory Mission Bulletin).

It appears from an order issued by the artillery commander of the One Hundred and Third division that battery positions are to be considered as veritable centers of resistance in case the lines are broken by the enemy and as such they must be defended obstinately with carbine and grenade.

"A battery will be abandoned only on higher authority. The guns must not be destroyed until the last moment, immediately prior to the evacuation of the position. The simplest way of making the guns explode is to fill the mouth with stones before firing the last shot. Prepare for this emergency by having all the material at hand that may be necessary."

"Battery positions should not be abandoned even if the enemy has succeeded in piercing the infantry lines. Even though all means of liaison are wiped out a battery position still remains a strong center of resistance for our infantry who may secure a footing around it. The artillery personnel occupying the position will defend it with carbines and grenades. These points of resistance in the enemy's back will hamper his advance and facilitate the intervention of our reserves."

AMMUNITION USED BY THE ENEMY IN RECENT OFFENSIVES.

(From French Third Army Bulletin, June 19, 1918.)

It is well known that the artillery preparation carried out by the Germans in their recent offensives included a large proportion of gas shell, especially blue cross shell (sneezing gas).

A document originating in the Seventh German army, dated May 8, was recently captured. It gave a report of the preparation of the

German offensives of last May and enabled us to obtain the exact proportions of each kind of ammunition.

The supply was mainly H. E., blue cross (sneezing) and green cross (palite, variants and chlorpicrin) shell, in the following proportions:

1. Counter-battery fire (AKa) and long-range fire (Feka). Calibers: 77 mm., 105 mm., 150 mm. howitzers, 10 cm. guns.

Explosive shell 20%
Blue cross shell 70%
Green cross shell 10%

The 15 cm. guns, constituting part of the long-rang group (Feka), were provided with explosive shell only.

To give an idea of the rate of fire, during the preparation of the attack, it may be remarked that for the attack subsequent to June 9 a 77 mm. battery (AKa) fired an average of one shot per gun per minute (statement of a captured officer).

2. Fire against infantry (IKa—a and c—creeping barrage). Calibers: 77 mm., 105 mm., and 150 mm. howitzers.

Explosive shell 60%
Blue cross shell 30%
Green cross shell 10%

The 210 mm. howitzers, constituting part of the IKa—a and c—groups, were provided with explosive shells only.

3. Fire against infantry (I Ka—b—box barrage). Calibers: 77 mm., 105 mm., and 10 cm. guns.

Explosive shell 30%
Blue cross shell 60%
Green cross shell 10%

OTHER AMMUNITION EMPLOYED.

For the 77 mm. guns, Model 1916, and the 105 mm. howitzers, Model 1916, part of the explosive shells were replaced by "C" shells (new stream line shell).

The 10 cm. guns had, in addition to their regular allotment, a certain number of incendiary shells (500 to 1,500 to each corps) and capped shells (1,000 to 3,000 to each corps).

The 105 mm. howitzers were provided with a supply of illuminating shells (600 to 1,800 to each corps).

The 150 mm. howitzers were provided with a supply of smoke shells (500 to 2,000 to each corps).

REMARKS.

The document specifies that, in place of green cross shell, some yellow cross No. 1 may be used, but that the greatest care must be

taken to prevent confusing the latter with the yellow cross, which must not be fired under any circumstances. The distinction made by the Germans between the yellow cross shell (yperite, a non-volatile product and persistent in effect) and the yellow cross No. 1 is to be noted. According to information from the British army, it appears that yellow cross No. 1 shells are charged, not with yperite, but with ethyldichloroarsine. They should therefore have an effect comparable to that of blue cross shells (phenyldichloroarsine), but more violent.

The Creeping Barrage

(Issued by the British General Staff, May 6, 1918).

See Summary of Information No. 14 for translation of the German document referred to in the following notes:

1. The principles laid down by the enemy approximate to our own, but there is less insistence upon making the barrage as deep as possible in order to deal with defence in depth.

2. The enemy's plan of calling the beginning of the preliminary bombardment zero hour makes it necessary for his infantry to start by the watch instead of making the assault simultaneous with the opening of the barrage. The latter, which is the practice employed by us, is the simpler system and, therefore, has much to recommend it. On the other hand, recent operations show that the enemy usually attacks in artillery formation, taking tactical advantage of the ground, rather than in extended lines, so that possibly an exact synchronization between the infantry attack and the beginning of the barrage is less essential.

3. With regard to paragraph four the barrage described is not a true creeping barrage, the smallest "lift" being 200 yards. It is obvious, therefore, despite the remarks in paragraphs one and six, that the enemy attaches less importance than ourselves to the close following of the barrage by the attacking infantry.

It would appear from the German "notes" that the whole of the enemy's so called "creeping barrage" is concentrated as close in front of the attacking infantry as the safety limits of the different shells permit. With us, on the other hand, the various guns and howitzers usually fire in separate barrages (all creeping), although the fire of 18-pounder and 4.5-inch howitzer is occasionally mixed and the zone of the barrage extends to a depth of 1,000 yards or more. Our system, therefore, undoubtedly gives more protection against distant machine guns.

It is pointed out, however, that as the arrangement of a barrage must be dependent on the number of guns available and the nature of the country, the enemy's tendency to close up his creeping barrage and to employ in it every type of weapon, including the 15 cm. howitzer, is probably dictated by the fact that he has not so many guns with which to support the infantry as we usually have. In some of our operations last year corps had a gun (all types included) to every five or six yards of frontage. In an attack on a 50 mile front, such as

that of March 21, if artillery were provided on this scale it would necessitate the concentration of some 15,000 guns, which is out of the question.

4. The timing of the bounds, to which allusion is made in paragraph five, has no reference, apparently, to the estimated rate of the infantry advance.

5. The order as to quickening the barrage by means of signals (paragraph nine) is vague. The definition of a "considerable distance" is left to the battalion commander. The "echelonning" of a barrage is decidedly dangerous, especially if the covering guns are firing obliquely, or if hostile machine guns are sited for enfilade fire, as would often be the case. It is not altogether clear under what circumstances a battalion commander would be able to decide whether it was of any advantage to hurry on. In the general obscurity caused by smoke and dust it must be very hard to know what is going on either in front or to the flanks.

There is a widespread notion that the Germans are able to control their artillery by means of light signals and doubtless they attempt to do so. It is pointed out, however, that the occasions when this method of communication with the artillery can be carried out successfully must be rare, particularly if the fire of the attacking batteries is heavy. In practice, it must be extremely difficult to ensure that the battery or batteries which are really concerned see and respond to the signal and that other batteries which are firing ignore it.

6. The other methods of regulating the creeping barrage (paragraph ten) are excellent in theory. The difficulty in practice is to ensure any communication at all between liaison officers and artillery commanders behind.

The instructions contained in the same paragraph that any portion of the creeping barrage, which has been brought back, is afterwards to catch up the remainder of the barrage can only be carried out if the remainder halts sufficiently long to enable that part of the attacking infantry, which has been held up, to regain its place in the line at the normal rate of progress.

7. Attention is drawn to the last sentence of paragraph 11. The moral is that artillery officers should go forward, not as liaison officers with battalion commanders, but with the object of establishing communication between themselves and their batteries, in order to assist the infantry with observed fire, the value of which is incalculably greater than that of any mechanical barrage (see artillery notes No. 4, Section VI., paragraph 10 (iii.).)

When an attack has progressed to a considerable depth it may be expected that most of the enemy's original gun positions will have been over-run and his fire considerably reduced. Consequently, communication will be more easily maintained. Conditions approximating to those of open warfare will exist and the duty of the artillery is then to apply observed fire to known centers of resistance and to preserve the closest touch with the attacking units of infantry. The onus of

keeping touch must, however, be shared by the latter (field artillery training, sections 147 (3), 153 (5), and 156 (1), (2), (5).

INFANTRY NOTES.

Instructions for Combat.

(Translation of an order of the Fourteenth German division, June 18, in sector south of the Aisne—From French Third Army Bulletin, July 3, 1918).

(a) **General Remarks.**—1. Hold the first line of resistance against every hostile attack.

2. Our activity must constantly keep the enemy on the alert, inflict losses on him by every means possible and render his supply service as difficult as is within our power. The enemy must be worn out and his fighting strength exhausted as quickly as possible. On the other hand it is necessary, without sacrificing the security of our defense, to save our own troops as much as possible, protect them against losses, maintain their offensive power, and if possible, increase it. The troops must be imbued with the idea of their absolute superiority over the enemy. Everything should be done to supply and shelter the troops.

3. The new French gas renders a still stricter gas discipline necessary. Non-commissioned officers must keep constantly on the watch. Our troops must know that our mask affords full protection if adjusted in time.

4. All possible information regarding the enemy and particularly regarding the units in front of us, on his defensive organizations, on the artillery and trench mortar emplacements, must be obtained.

(b) **Infantry.**—The advanced line must be held with as small a garrison as possible. Troops will be distributed to a very great depth. The troops must be instructed in their duties at the various posts in the advanced zone.

Automatic rifles, trench mortars and rifle grenades must be very largely used in order to force the enemy, who is in a position very much inferior to ours, to keep below the surface of the ground.

Patrols will be very active. Particular care will be exercised in choosing the patrolling party, so as to avoid losses in prisoners. Every opportunity for taking prisoners will be seized.

Preparation for the German Attack on the Aisne Front.

(From French Military Advisory Mission Bulletin.)

The enemy's preparations were carefully and effectively concealed. The reserves which were to participate in the offensive were held far in the rear of the front and were brought up to the scene of action at the last moment by forced marches.

Night Marches.

Prisoner's statements and aerial observation indicate that the Germans are continuing to make extensive use of night marches to

execute their movements of approach. By day they generally avoid the roads on which the air forces report a large amount of orderly movement and make use of the by-roads or march across the fields in small units.

The forty-fifth reserve division, for example, which attacked on June 3 in the region of Chaudun, made nine night marches of from 13 to 20 kilometers before entering the line.

Definite information that an attack was to be made was not at hand until May 26, following the capture of prisoners during the night of May 25-26.

The preparations for attack employed by the enemy have not changed since the beginning of the attack. He makes special use of the method of infiltration, employing to the fullest extent ravines, sunken roads, woods and cultivated fields. It is in the folds of the ground over which the approach takes place that our artillery will find its principal objectives.

Disposition for Attack.

The divisions which are to make the attack are distributed in depth. The disposition is usually the following:

Two regiments in the first line, one regiment in support.

In the regiment: Two battalions in the first line, one battalion in support.

In the battalion: Two companies in the first line, two companies in support.

The attacks before the final rush are prepared by fire from heavy machine guns in advanced positions in order to engage the attention of the defenders of our trenches and permit the advance of the infantry and light machine guns.

The leading elements, formed into two assault waves, are deployed at wide intervals and advance without regard for the centers of resistance, the reduction of which is the mission of the elements in support. The light machine guns, generally five to a company (plus one in reserve), advance as a part of the first wave and are covered by the automatic riflemen. A considerable number of these machine guns are used and it is on them that the infantry depends for its progress.

The formation is always dependent upon the conformation of the ground, infiltration being the basis of the advance. The companies in support follow in small columns, grouped into platoons, half-platoons and squads. The heavy machine guns and sometimes the trench mortars, follow 300 meters behind the support companies.

As soon as the attacking formations are taken under fire, everyone lies down and resumes the advance at the first lull. There are, therefore, no thick inflexible assault waves, but small, scattered groups, which offer poor targets and which try to push ahead as far as possible.

The infantry employs accompanying batteries. It is supported almost exclusively by field artillery, as only a few batteries of heavy artillery have been able to follow up to the present time.

It is the imperative mission of each unit to push straight ahead as far as possible without regard for what is happening on its flanks or in its rear.

Tanks were used at the start by small detachments at some points along the front of attack, but their use does not seem to have produced conclusive results and, since the Germans have been advancing, their appearance is no longer reported upon the new front.

The following translation is that of a document, probably issued by the thirteenth reserve or forty-fourth reserve division, found on a prisoner captured on June 3, 1918:

NOTES ON THE CONDUCT OF THE INFANTRY ATTACK, BASED ON THE EXPERIENCE OF RECENT FIGHTING.

23-4-18.

1. Over-run the first enemy positions quickly. During the course of the attack, do not give the enemy any time to reorganize. Subordinate commanders to act quickly and forestall the enemy. The infantry to push boldly forward under cover of their own auxiliary weapons. Do not wait for orders.

2. The attack should be launched *immediately on top* of the preliminary bombardment, in order not to give the enemy time to get his machine guns into action. Keep close up to the barrage.

3. It must be taken into consideration that, even during the heaviest artillery preparation, a few hostile machine gun nests will remain in action, these will have to be dealt with by infantry, *making use of the rifle*, machine guns (light and heavy), light *Minenwerfer* and hand grenades. The accompanying artillery cannot be expected to follow up quickly in this crater area.

4. Concrete dug-outs cannot be destroyed by the artillery, they will offer holding-on points for the enemy's machine guns. Keep the entrances under rifle and machine guns fire and attack them from the flanks. If several of these concrete dug-outs lie close together, attack them simultaneously. Do not crowd together when attacking these strong points. Captured concrete dug-outs to be marked by a small flag, or similar means. Do not pass by concrete dug-outs without clearing them out, unless they have been marked as captured.

5. *Do not attack in dense formation.*—Numbers will not decide but the use of the auxiliary weapons at the right moment will. Put in reserves at the points where the enemy is giving way, *not* at the point where he is holding out. Break through and roll up from the flanks.

6. *The following formations should be adopted; Very thin, first wave,* to ascertain where the enemy is still holding out. Behind this

light machine gun groups, reinforced by riflemen, these groups advance in rushes. Heavy machine guns and light *Minenwerfer* cover these rushes and follow on in longer rushes. Do not all rush at the same time; there must be *mutual fire support*. When the enemy has been located, smother him with rifle and machine gun fire so that he cannot make deliberate use of his weapons.

7. Tanks are best attacked from the rear.

8. Low-flying aeroplanes to be driven off by machine gun fire. Do not bunch together; reserves, especially, must avoid close formation and bunching together.

9. Positions should be taken up quickly on reaching the objective (organized in depth against counter attacks).

10. The strictest discipline must be maintained. Pillaging must be prevented. Men who rob the dead are to be shot.

Notes on the Employment of Lewis Guns During Recent Operations in Palestine

The successful results obtained from the employment of Lewis guns have been a very marked feature of the late operations. Both in attack and defence these guns have proved of great assistance to our infantry, they appear as a rule to have been skilfully and boldly handled and it is in no small degree owing to their employment that the successes achieved have been obtained without far heavier casualties among our troops. In these notes it is proposed to deal with their employment under three headings (1) General, (2) Results of experience as regards the specific points on which information was requested, and (3) A short account of a particular action in which a well-handled Lewis gun detachment achieved important results.

1. *GENERAL*—(*a*) *Tactical Employment.*—The gun was used almost throughout as a platoon weapon. A few instances are mentioned of two or three guns being grouped together for a special purpose and there is no doubt that opportunities for guns to be usefully employed in this manner will occasionally occur. As a rule, however, its role is that of a platoon weapon and as such it has proved of great value to platoon commanders.

Good results have been obtained, on many occasions, by pushing guns forward to positions from which the enemy's trenches and machine guns could be enfiladed and also to bring enfilade fire to bear against enemy counter attacks, it has also been used effectively when employed in front of the line to cover a further advance by the infantry. When used in either of these ways it was found that the best work was done by detachments whose commanders were given as free a hand as possible in carrying out the duties assigned to them.

In defence several instances are given, especially in the fighting among the hills, of the line being held by Lewis guns, the infantry being kept under cover on the reverse slopes and in this form of fighting it was also found that the employment of Lewis guns allowed the number of infantry necessary for picketing the hills to be greatly reduced.

The value of a Lewis gun with the point of an advanced guard is drawn attention to in one report.

(*b*) *Counter-Artillery Work.*—On several occasions Lewis guns have engaged artillery with decisive results. An account of one such action is given elsewhere, other examples reported are:

(1) Battery caught limbering up, mules shot down and battery captured.

(2) Mules of a section of field guns shot down at 1,100 yards, thus ensuring the capture of the guns.

(3) Mountain guns prevented from firing by shooting successive observing parties.

The difficuty in spotting a well-handled Lewis gun and the speed with which it can be moved to another position, if discovered, make these guns a very formidable enemy to artillery once they have been able to advance within effective ranges.

(*c*) *Counter machine-gun work.*—At close ranges the work of these guns has been most effective and, though a well-handled machine gun should always be able to defeat a Lewis gun at ranges over 800 yards, once the position of the latter is known, yet, on account of the speed with which it can be brought into action and moved to alternative positions when discovered, it has on many occasions been successful in silencing enemy machine guns at ranges beyond this distance. The combined fire of two or more Lewis guns was often successful in engaging enemy machine guns at ranges up to 1,500 yards. It was found that fire directed against the locality from which machine gun fire was coming, even when the guns themselves could not be spotted, was very often effective.

(*d*) *Counter-sniper work.*—The Lewis gun was found invaluable for this work and enemy snipers, once spotted, were almost always silenced as soon as a Lewis gun was brought into action against them.

(*e*) *Moral Effect.* The moral effect on our own men of the fire of Lewis guns is said to be considerable. Conversely the fire of a number of these guns at close ranges, even when material results are not great, is said to have a demoralizing effect on the enemy.

(*f*) *Field Glasses.*—It is insisted upon in several reports that all N. C. O.'s in command of Lewis gun sections should be supplied with field glasses.

(*g*) *Training.*—The importance of having a large reserve of trained Lewis gunners in every company is much insisted upon. In one brigade every man in the battalion is taught how to (1) Charge magazine, (2) Load and fire the gun, (3) Unload, and (4) Rectify the two commonest stoppages. *This must be made universal in all infantry battalions.*

2. (*a*) *Methods of Ammunition Supply.*—A considerable variety of views are expressed as to the best methods by which a sufficient supply of ammunition can be assured. These result very much from the

difference of opinion which exists as regards two points—(*a*) the amount of ammunition per gun which it is necessary to take forward with the Lewis gun section and (*b*) the number of magazines which a man can carry. As regards (*a*) the amount varies in different units between 31 magazines and four magazines, in the latter case ammunition was apparently brought up in boxes and the magazines filled on the spot when emptied, but this arrangement does not seem a very practicable one, nor is the necessity for it obvious. As regards (*b*) the number of magazines which one man is said to be able to carry varies between three and seven, four being the number given in the majority of cases. In neither of these points does it seem possible to lay down a definite rule, since the state of the weather, the nature of the country and the opposition which is expected will all exercise a qualifying influence.

The general method adopted seems to have been to bring the ammunition forward on mules as far as they could go and then to form a chain of carriers up to the gun, either in depth or laterally, as may be required. Differences of opinion again exist as to whether mules should follow their companies as closely as possible, or whether a distributing centre for the whole battalion should be established close to battalion headquarters. Here, again, no definite ruling is possible, but it is noted that in the majority of cases officers are in favor of mules being kept with their companies.

In some battalions magazines were regarded as public property between companies and the result is said to have been satisfactory. This, again, is a matter for the discretion of the commanding officers. The collection of empty magazines is said by many to be a difficulty, but that it can be overcome by careful arrangement is shown by the fact that in one case a battalion, after a big advance and considerable expenditure of ammunition, is said to have had only four magazines missing at the end of the day.

Several reports state that one magazine, to be used on emergency and not to be touched except in case of absolute necessity, was carried in the haversack of the No. 1 and that this was found invaluable on several occasions.

(*b*) *Expenditure of Ammunition.*—This was not so high as generally expected, on only one occasion, in the fighting around Nebi Samuel, was the expenditure almost equal to the full allowance of 8,000 rounds per gun. As a rule, 1,000 to 1,500 rounds a day appears to have been about the average. Expenditure was heaviest in defence and in the final stages of the attack. In the latter, good fire control was necessary in order to ensure that sufficient ammunition was available for consolidation.

(*c*) *Facility of Transport.*—All accounts agree that this presents no difficulties so long as it can be arranged that all guns are carried on mules, it being found that limbered wagons can not be brought up close enough for the guns carried in them to be available.

Arrangements are being made for this to be done in the future. The slings, handles and canvas carriers, some of which were supplied

by ordnance and others made regimentally, all seem to have been found satisfactory. It is expected that all Lewis guns will shortly be equipped with a sling, as is already the case in France. In a few reports the web pouches are preferred to the canvas buckets. The objection to the web pouches appears to be that they are difficult to get on and off over a man's equipment, make him slow in getting up and down and admit dust and mud. These pouches, however, were only issued a short time before operations commenced and it is thought that with further experience some or all of these objections will disappear.

(*d*) *Vulnerability.*—Here there is a direct cleavage of opinion, approximately half the reports saying that casualties are no greater than with the remainder of the platoon, whilst the other half state that losses among Lewis gunners were invariably heavy. The following are among the causes to which the casualties sustained by some units are attributed in the latter reports.

(1) The fact that Lewis guns were often used to hold a position while the remainder of the company were kept under cover.

(2) That guns were pushed well forward to cover the advance of the remainder of the infantry.

(3) Guns were spotted at night by their flash and thereafter attacked by the enemy with bombs, special men being apparently told off for the purpose.

(4) That Lewis gun teams are slower than riflemen and therefore likely to be spotted.

(5) Teams were inclined to bunch around the gun.

(6) Slowness in getting up and down.

(7) Want of reconnaissance of gun positions.

(8) Numbers 1 and 2 working close together.

(9) The small amount of rifle fire used by the infantry now-a-days shows up the gun and so attracts attention to it.

As regards (1) and (2) the fact that their use in this manner probably saved far heavier casualties to the remainder of the infantry entirely justifies these methods of employment. No. (3) can only be avoided by constant changes of position. Nos. (4), (5), (6), (7) and (8) are merely matters of training. No. (9) unless the target which presents itself warrants it, Lewis guns should not draw attention to themselves by firing when all else is quiet. *When possible every effort should be made to mask Lewis gun fire by rifle fire.*

(*e*) *Co-operation with machine gun sections.*—This was good on the whole, both in attack and defence. In the attack, formal arrangements for co-operation will often be impossible, but so long as machine gunners and Lewis gunners understand the characteristics of their own and other weapons and are quick to seize opportunities for mutual support, co-operation as an actual fact will exist and that this was so on many occasions is borne out by the majority of reports. In defence, formal co-operation appears to have been the rule, and in this the battalion Lewis gun officer appears in many cases to have been of the greatest assistance. The following remarks by the G. O. C. 157th

brigade, are quoted verbatim, as it is thought that the method of consolidation described therein may be taken as a model in all operations of this nature.

(1) "Lewis guns followed close behind the attacking lines, their special role being to watch exposed flanks and be ready to close any gaps which might open up in the line. As soon as the position had been captured they were pushed up and generally ahead of the line, to cover the consolidation until the arrival of the machine guns.

(2) "As soon as the position was more or less secure, the machine guns allotted for the consolidation of the position were sent forward, a few into the front line and the remainder to positions in the rear of the front line under cover of the Lewis guns already in the line and positions for them were immediately fixed with a view of forming belts of fire across the front. Now came the time when it was necessary for Lewis gun officers and machine gun officers to confer on the role to be allotted to the Lewis guns. Positions for the latter were selected to enable them to cover portions of ground not covered by the machine gun belt and portions which, though important tactically, yet hardly justified the telling off of a machine gun for the purpose of covering same. It was generally found advisable to have a Lewis gun placed close to a machine gun in order that it could take on close range targets and fill gaps if by any chance the machine gun had a stoppage."

This was found especially necessary on the steep slopes of the hills encountered, consisting as they did of numerous steps, where enemy snipers and bombers could creep up quite close to the machine guns. Lewis guns, owing to their great mobility, could be quickly moved from flank to flank so as to sweep with enfilade fire the steps beneath the machine guns.

(3) In the early stages of the consolidation of a position to cover the taking up of their positions by the machine guns, it was found advantageous to have Lewis guns pushed well forward on the flanks. These guns were enabled to fire across the position and on more than one occasion they absolutely broke up enemy counter attacks before these could reach our "line."

(*f*) *Effect of fire at various ranges.*—The general results worked out approximately as follows:

Up to 700 very effective.

700 to 1,200 effective against suitable targets.

1,200 to 1,700 erratic, but occasionally used with good effect against targets justifying its use.

In ranges over 700 good results are generally unobtainable unless the No. 1 is very highly trained.

3. *Instance of effective action against artillery by Lewis guns during the battle of Sheria (see rough sketch.)*—A company of infantry, having passed through the rear of the enemy position, located an enemy howitzer battery to its right. This battery was inflicting heavy

casualties on a battalion on their left and would also be in a position to inflict losses on the company itself during its further advance. It was impossible to afford the time necessary to arrange for co-operation with our artillery.

The Lewis gun section, with an escort of 12 men, the whole under a sergeant, was ordered to try and work to a position from which it could enfilade the battery.

The sergeant moved his detachment into the Wadi under cover of rifle and Lewis gun fire by the company.

He then brought his Lewis gun into action at (2), and under cover of its fire advanced with his section extended directly towards the battery position at a range of 500 yards. The Lewis gun, by means of rushes made alternately with the escort, was brought up to within 100 yards of the battery.

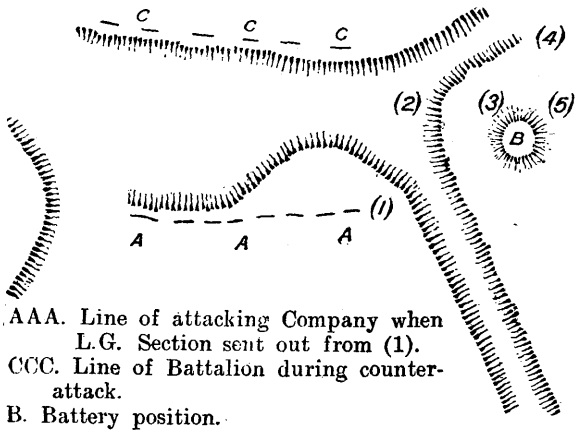
From this range the fire of the gun was brought to bear on the personnel of the battery. The sergeant then called upon the battery to surrender, which they did, the personnel comprising two officers and 25 men.

The Lewis gun was then moved to (4) to cover the evacuation of the prisoners. The enemy immediately afterwards attacked along the whole front of the battalion (C. C. C.), was caught in enfilade by the fire of the Lewis gun at (4) and suffered heavy casualties. On the attack being pressed the gun and section were withdrawn without casualties to (5), where they remained in action until the counter attack was finally dispersed.

POINTS TO BE NOTED.

(1) Free hand to detachment commander.

(2) Skilful use of ground in getting into a position from which their advance was presumably unexpected.



AAA. Line of attacking Company when L.G. Section sent out from (1).
CCC. Line of Battalion during counter-attack.
B. Battery position.

(3) Mutual support between escort and gun detachment.

(4) Conspicuous boldness and skill displayed by sergeant-in-charge and all concerned.

(5) The fact that no casualties were suffered by the detachment.

(6) Action against counter attack from advanced enfilading position on a flank.

POSITIONS SUCCESSIVELY TAKEN UP BY LIGHT GUN SECTION.

(1) On right of attacking company. From here section moved on receiving orders.

(2) Position while covering advance of extended escort from Wadi bed.

(3) Final position within 100 yards of enemy battery.

(4) Position while (*a*) covering evacuation of prisoners, (*b*) breaking up first counter attack.

(5) Position after withdrawal to line occupied by the battalion during final smashing of our counter attack.

INFANTRY FORMATIONS.
(From French Military Advisory Missions).

It has been made evident by recent operations that sooner or later, after crossing the first lines, according to the effectiveness of the demolition, the attacking troops encounter isolated points of resistance of varying importance which have withstood the artillery preparation or have been organized at the time of the enemy's reaction.

The result has been that the head units have suffered heavy losses of officers, men and materiel and have been forced to engage in a series of local actions.

Experience has shown that in local actions the best results were obtained by mixed detachments (combat groups) including practically the same proportion of automatic rifles, used to occupy the terrain and cover the manoeuver, V. B.'s to reduce the point of resistance and grenadiers to manoeuver.

Specialists should be grouped with a view to the use which experience has shown to be most suitable and so that they will manoeuver together automatically. Their instruction for combat will thus be made easier and more attention will be paid by the officers to the small simple manoeuvers to be carried out.

However, there are other facts to be considered, especially gun and trench ammunition.

We are carrying on an industrial war of materiel and transportation. The latter must be effected economically by rail up to the first line. All the supplies mentioned above may be carried on a 0.40 centimeter gauge in a communication trench or in the open, according to the terrain. The 0.40 centimeter gauge may be fed by a 0.60 centimeter gauge.

MOPPING UP.

The importance which may be rapidly assumed by an isolated point of resistance, which has not been reduced, shows that mopping

up may incur a regular contest. The groups of moppers up should therefore be stronger than mere squads of grenadiers. It would appear that, according to the instruction on small units, only organized platoons should be used or even preferably one-half platoons, to whom a mopping up zone has been assigned.

The head battalion should be relieved of all necessity of mopping up, in order not to break the impulse of the attack and in order that the commander may retain his entire effective strength, which is now rather diminished.

The mopping up units should be supplied by the second and third line battalions. They may constitute an additional wave for the head battalion. Their place and mission are determined according to the situation which will be occupied at the end of the first stage by the battalion, to which they belong, who will then rejoin them.

Some Conclusions Drawn from the Last German Offensive on the Western Front.

(From French Military Advisory Mission Bulletin).

Night attacks were very frequent and to a great extent with large bodies of troops, for instance, the German night counter attacks at Viller-Bretonneux, April 24th, which was made with four divisions, also the German introductory attack on Mount Kemmel executed at 2 a. m., in pitch dark, with nine divisions.

Bayonet fighting likewise often took place, often in "a death dealing atmosphere of gas," i. e., with masks adjusted. It is of the greatest importance that the troops are well drilled in the use of the bayonet. It is certain that if the troops have once given way, owing to the fact that the opponent is superior in the use of the bayonet, such fact will react most disastrously upon the morale of the troops and rob them of courage again to face and await a bayonet attack.

The infantry motors were extensively employed. They have been made completely mobile and follow, like the machine guns, the infantry advance. Mobility is the principal requirement of these weapons.

Principles of Attack and Defence.

(Translation of a German order without date or signature, taken from a captured officer of the twenty-first regiment, one hundred and fifth division—From French Tenth Army Bulletin, June 21, 1918).

I call attention to the following points:

"The garrison of a strong point must organize its defence in depth Within the strong point one or several constituent elements, located in rear and organized for resistance to the last, will be provided with a picked garrison for the purpose of causing the necessary check to the attack to facilitate defence and counter attack.

"The flanks of a strong point must be protected by wire entanglements. Accessory defences of the strong point itself must not be established solely along the outer parts of the position. It is preferable, on the contrary, to place them inside in order that they may not be systematically destroyed by the enemy.

"It is essential to organize machine gun nests in such a way that a flank attack against the strong point can be enfiladed.

"When attacking a hostile strong point, or counter attacking one which has been lost, the effort will in general be directed against the flanks rather than the front. As soon as the flanks have been forced the strong point beyond will be cleared by strong parties and the side facing the enemy will be immediately occupied. Local conditions will naturally modify the direction of the attack.

"When mopping up the fire of destruction by our artillery will be regulated by signal panels.

"It is necessary that the reserves follow closely in order to escape the enemy's box fire. They will in this manner be in a position to repulse the counter attack which is certain to occur.

"As following up our attacks on a large scale may lead the army into country covered with hedges, orchards and woods, it is indispensable that our troops, in view of an advance and fighting on such a terrain, be drilled and instructed in a practical manner, or, lacking such practice, be instructed at least theoretically.

"In advancing and fighting over close terrain, particularly in woods, it is most important to maintain close liaison in every direction. The use of long lines of skirmishers, in open country and bringing up reserves in deployed formations will be abandoned. The leading elements will advance preferably in line of sections or at least in line of squads in order to avoid scattering (non-commissioned officers and trusted men will bring up the rear). Section or squad leaders will thus keep their men in hand and be able to deploy them immediately as skirmishers as soon as they obtain contact with the enemy.

"Company commanders and the leaders of sections and squads have thus the actual direction of the fighting in their hands. Success depends on determination, prudence and skill. Quick and sudden attack with rifle, hand-grenade or bayonet succeeds particularly well in close terrain.

"No enemy can resist our charge.

"Light trench mortars, bomb throwers and accompanying artillery are of unquestioned utility. The battalion commander will use them to the fullest extent and move them forward at any cost. Reserves will follow closely and the accompanying artillery will keep in constant contact with the infantry.

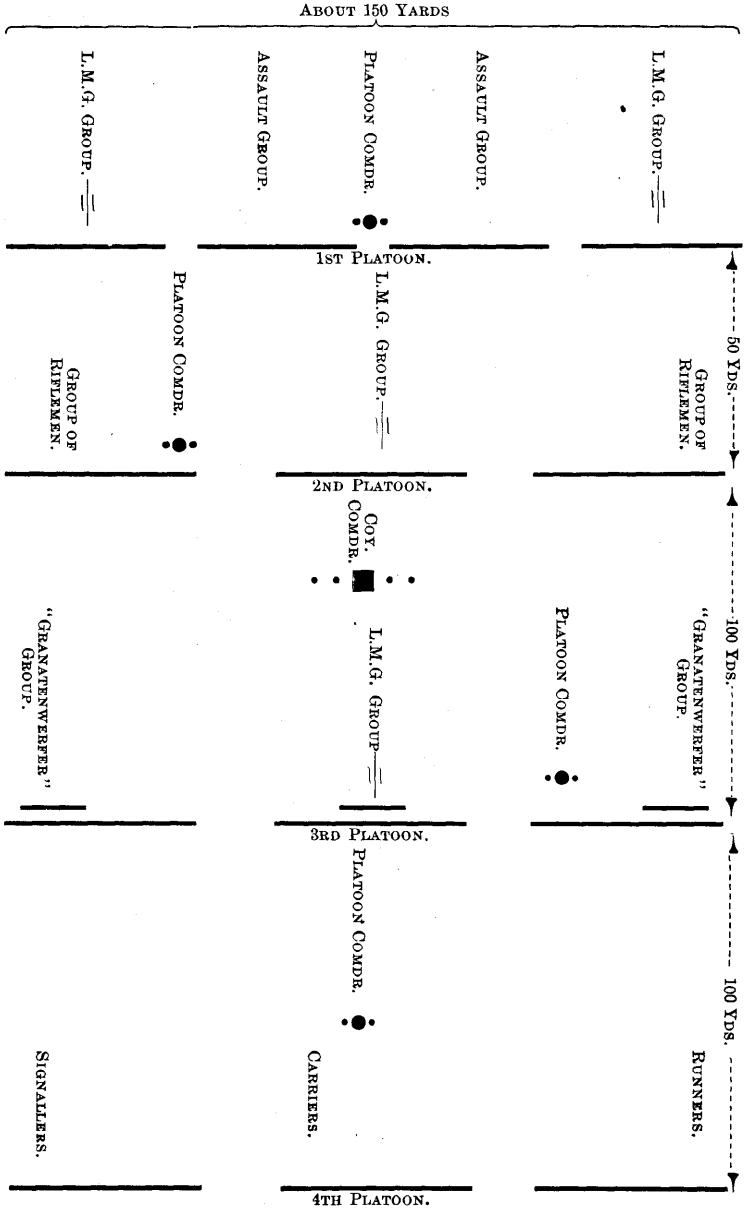
"Headquarters, including divisional headquarters, will be advanced. Communication, not only from front to rear, but also from rear to front and lateral communication, will be carefully maintained.

"The ammunition supply for the infantry in the first line and of its trench mortars, bomb throwers and accompanying artillery, will be particularly cared for.

"The application of these principles when advancing will ensure success."

Note by the French Tenth Army states that this document probably emanates from the general commanding the German Seventh Army.

GENERAL DISPOSITIONS ADOPTED BY A GERMAN INFANTRY COMPANY IN ATTACK
(From "Notes on Recent Fighting" by British general staff. Information supplied by a German Prisoner.)



NOTE:—Task of fourth platoon, in addition to maintaining communications, is to supply forward infantry with ammunition and engineer materiel.

Some Lessons from German Attack on the Aisne, May 27th, 1918.

(From "Notes on Recent Fighting," by British General Staff).

There was nothing new in the enemy's tactics but the success which he again obtained emphasizes, more strongly than ever, the following points:

(*a*) The outpost system must be lightly held. It is useless to expose to the preliminary bombardment a single man more than is absolutely necessary.

(*b*) It is none the less essential to organize some form of forward or outpost system, otherwise the enemy will simply destroy the main defensive battle line by his preliminary bombardment and will then overwhelm such elements as remain by the strength of his infantry attack.

(*c*) Reserves should not be sent up piecemeal as reinforcements to the troops holding the line, but must be used as distinct units with definite tasks.

(*d*) It is essential that a mobile reserve of guns should be retained.

Notes on Weapons and Materiels.

(From "Notes on Recent Fighting," by British General Staff).

The following point was brought out during the recent operations on the front of a corps in the first army:

Rapid rifle fire was the decisive factor in these operations. The men had confidence in their rifles and knew how to use them. The personnel of trench mortar and field batteries used their rifles freely. One field battery, when the enemy had got around its flank, beat off the attack at a range of under 200 yards and a forward section of artillery successfully engaged the enemy with rifle fire at short range while he was working around the rear of our infantry.

(From French Military Advisory Mission Bulletin).

I. *Automatic rifles.*—Automatic rifles are of great value for holding the terrain and for operations against isolated points of resistance.

Their great drawback is jamming, which is caused either by the rifleman (consequently it should only be used by experienced men and never by colonials) or by rain and mud.

Considering the great effectiveness of automatic rifles it is advisable to avoid this inconvenience by keeping 6 or 8 per company in good condition and with a plentiful supply of ammunition.

To this end only the absolutely necessary number should be in use in each platoon. This number varies according to circumstances.

The remaining automatic rifles should be forwarded, packed, as a first reserve.

A large supply of D.A.M. cartridges should be provided (this is facilitated by reducing the number of automatic rifles firing at one time). They should be forwarded close behind the automatic rifles.

Note.—The D.A.M. cartridge is the French rifle cartridge with head reinforced for use in automatic weapons.

Each party of automatic riflemen should be provided with a small supply of coal oil for the first cleaning of dirty guns. They may then be replaced and put in good order immediately, unless the damage done is too great.

II. *Machine Guns.*—Machine guns are always very reliable.

It has often been noted that the German machine guns could not have been silenced by our troops if they had been accompanied by a small infantry support, including grenadiers.

They should also be taken into account for defensive purposes.

III. *Grenades.*—The citron grenade has given very satisfactory results.

The V.B. is the most successful, for barrage, as a cover for the wire cutters or to support operations. It is advisable for V.B. grenades to be packed in cases of 25 instead of 50.

As regards other grenades:

The German grenades are very popular. The regiments have requested that they be provided with a certain number of these grenades for the instruction of personnel so that during operations they may be used as a first reserve supply.

The A.B. grenades give excellent results but the two following points should always be noted in regard to their use:

In communication trenches the advance is hindered by their smoke.

When used in shelters the latter are made useless for a long time.

IV. *Automatic pistols.*—Automatic pistols should not be distributed in large numbers as they are of little use in action and easily get lost. It is preferable to replace them with carbines with bayonets.

NOTE.—It is not believed the experience in the A. E. F. justifies this conclusion.

V. *Fuses.*—The following should be discarded:

The large stick rocket which, in reality, is never carried beyond the jumping off trench. The 25 mm. pistol which has too short a range and reveals the position of the person firing it.

The following only are to be retained: The rocket rifle and especially the V.B. fuse, which is very visible and easy to carry and fire.

Signals with 1, 3, and 6 lights are very satisfactory. It would be advisable to manufacture them in different colors in order to permit combinations of signals and prevent their interpretation by the enemy.

New Type of Grenades for Grenade Throwers.

(From Bulletin of French Advisory Mission, July 1, 1918).

According to a British Intelligence Bulletin, the Germans have invented an improved model of grenade, with handle (Wurfgranate), for grenade throwers (Granatenwerfer).

The new grenade differs from the old (1915 model) in the following characteristics:

1. The systematic fragmentation stria are on the inside, not on the outside, which is grooved.

2. A special device *makes this grenade burst above the ground.* A steel tube closed at the end encases the cast iron body of the grenade. This tube is held in place by the fuse. Between the bottom of this tube and the end of the cast iron body is a chamber containing a charge of black powder. When the grenade strikes the ground the fuse begins to act and simultaneously ignites the black powder charge and the detonator in the grenade. The black powder takes fire first. Under its influence the steel tube acts as a mortar. The grenade is projected above the ground and bursts in the air, owing to the action (delayed) of the detonator.

3. The propulsion charge is enclosed in a white cast iron box (and not in a blank cartridge, as in the 1915 model), in such a way as to leave more room for the bursting charge.

NOTES ON OFFICER'S TRAINING.

Officer's Training Course.

(Translation of a document found on this army front upon the body of a lieutenant of the two hundred and seventy-second reserve regiment, eighty-second reserve division, who had taken the course of instruction for officers of the eighteenth army.)

Course of Instruction of the Eighteenth Army.

May 19, 1918.

Schedule of Course.

First Day (Tuesday).—Individual combat fire (fleeting targets, instruction of the isolated rifleman).

Instruction of grenade throwers (throwing grenades at a given target).

Use of the automatic pistol (army pistol) with butt, against combat objectives.

Combat fire with the sixteen mm. bomb-thrower, light trench mortar, light machine gun, heavy machine gun, rifle grenade, upon centers of resistance and points of support.

The use of heavy machine guns. Tactics. Box fire. How to occupy a position. Ammunition supply.

Second Day (Wednesday).—Co-operation of the light machine guns with the infantry squad in the attack and the neutralization of

centers of resistance (one light machine gun, one infantry squad). Ammunition supply for light machine guns.

The attack of centers of resistance by a platoon with the assistance of light and heavy machine guns, light trench mortars, 16 mm. bomb throwers.

The subdividing of a platoon in the assault. Use of a curtain of skirmishers.

Duties of the platoon commander.

Third Day (Thursday).—The company attacking with all its auxiliary weapons, including the accompanying artillery.

Subdivision of the company during the attack. Interior communications of the company.

Duties of the company commander.

Fourth Day (Friday).—The company attacking with all its auxiliary weapons. The attack of villages, points of support and centers of resistance.

Fifth Day (Saturday).—The battalion attacking with all its auxiliary weapons, including medium trench mortars.

NOTES ON CAMPAIGNS.

(From French Military Advisory Mission Bulletin).

The Battle of Riga.

Observations and information obtained through study of German orders.

Owing to the capture of a number of documents (orders, sketches, maps, etc.), especially those issued by the second division of the guards, it has been possible to make a detailed reconstruction of the operations during which the Germans got possession of Riga September 3, 1917, under the command of General von Hutier.

This operation, which was executed by eight infantry divisions and two and one-half divisions of cavalry, was to include a break in a re-entrant on the Russian lines along a 4.5 kilometer front only and then lateral exploitation of the break by a wheel to the left. Even if the dazzling success which crowned this operation was due largely to the moral decomposition of the Russian army, the details of the preparation as well as the powerful and carefully planned use of all means of attack should be taken into consideration, particularly as certain of these characteristics will undoubtedly reappear during offensives that the German army may execute in the future.

The main points of the period of preparation and the period of execution are summarized below:

Assembly and Transportation of the Rupture Troops to the Scene of Action.

The attack was fixed for September 1. The earliest concentration of troops for this operation seems to have taken place during August, about 120 kilometers to the rear of the front line. The configuration of the region selected for this was very like that where

the operation was to take place. The troops were trained in the execution of every detail of the projected attack for ten days. Silently they took their places in the jumping-off trenches, day and night, embarkations and disembarkations were made silently and in the best of order and a position along the river attacked. Advance was made beyond the first position in wooded terrain where access was difficult and the conquered terrain was held.

The movement of large units towards the zone of attack began August 22. Day marches were made up to within about 40 kilometers of the front. From this point, about 40 kilometers from the front, marches were also made by day. From a point about 40 kilometers from the Russian front all movements were made by night or in early morning mists. Roads commanded by enemy balloons were carefully worked out and passage on them forbidden to the columns of troops.

It would be well to consider the possibility of similar movements in case of an offensive along the French front. But such an operation would be of a more important character, more rapid and far more extensive if account were taken of our complex system of routes and the combined use of marches on foot, railroads and motor convoys.

DETAILED PRECAUTIONS TO INSURE SECRECY OF OPERATIONS.

Such an undertaking as the passage of a river, 300 to 400 meters wide, has absolutely no chance of succeeding unless the enemy has a weak hold on the opposite bank and is taken by a surprise attack. Thus it is indispensable for the operations to be kept secret. The Germans took every precaution toward this end.

1. *Transportation orders* indicate the arrangements made to detract the attention of the enemy espionage system from the concentration of troops for the operation: Very light traffic and all signs removed that might disclose the identity of the units engaged (shoulder straps wound up, inscriptions on trucks hidden, etc.). As a matter of fact, although the troops were concentrated within 120 kilometers of the front, not the slightest suspicion thereof was entertained by the Russian general staff.

2. *The troops* themselves were left in ignorance as long as possible of the operation they were going to execute, as well as the zone where this operation was going to take place.

3. *The initial orders* (orders for movements, use of the artillery and trench mortars, etc.), were written only by *officers* and communicated to *officers* exclusively.

4. *Reconnaissances* made by officers in the sector where the passage was going to be executed were made in small groups, at different days and times, so that the enemy would be unable to notice any abnormal circulation in the first position.

5. *Movements of units*, in a zone 40 kilometers to the rear of the first line, were made only at night. All circulation was forbid-

den by day. Bivouacs and parks were to be concealed from direct view of the enemy, as well as from the view of enemy aviation. Bivouac fires of any size were forbidden.

6. *All artillery emplacements* had to be constructed by night and camouflaged with the greatest care during the day. Emplacements of trench mortars were not to be disclosed by any earthworks.

7. *Artillery adjustments* were to be made with the greatest discretion possible (batteries were to be adjusted successively and with a very small number of shells). The regular batteries of the divisions in the sector (first reserve division and one hundred and third division) were allowed to fire only 30 shells per day. It was absolutely essential that the enemy should not be fired on with a larger number of shells than in ordinary times and also essential that the enemy should not notice the increase in the number of emplacements.

8. *Balloons* sent as reinforcements were allowed to ascend only in succession so that the enemy would be unable to determine the increase in numbers.

9. *Any use* of the telephone was forbidden within 800 meters of the first line. The use of notebooks and ciphers was compulsory. Great precautions were recommended for all telephone conversations lest any indiscretion should be involuntarily committed which might compromise the entire success of the operation.

10. *Strict supervision of postal communications*, as well as of relations between soldiers and civilians.

Organization of the Artillery and the Trench Mortars.

The real break in the front, which was to be executed by 3 divisions, placed side by side, was prepared for by massed heavy artillery as follows:

One hundred and fifty seven batteries (91 field artillery batteries, 20 of heavy guns, 36 of heavy howitzers and 10 batteries of mortars).

Twenty-one trench mortar companies (plus the infantry trench mortars of 9 divisions).

The heavy artillery allotment of the 3 sub-sectors of attack complied with the regulations but the number of trench mortars was increased (520 to 570 heavy, medium and light guns for a 5 kilometer front).[1]

The reinforcement artillery appears to have been brought up into position from 5 to 8 days before the attack. The trench mortars, reassembled in 3 camps corresponding to 3 sub-sectors, were brought into line the day before or two days before the operation. It has been seen above what detailed and careful directions were given in order to conceal the new positions and adjustments. A certain number of batteries even made their adjustments on the very morning of the attack.

[1]Other German orders recommend 1 trench mortar for every 10 meters of front for an offensive.

The artillery was divided into two masses:

1. Divisional artillery (preparation and infantry support).

2. Counter-battery artillery (36 batteries under a special commander). This arrangement, seen here for the first time in the German army, seems to be the indication of a new departure, of which the last regulations (dating from 1917) seem to consider the possibility, although preceding regulations considered that artillery combat was one of the roles of divisional artillery.

All the trench mortars were grouped under the orders of one commander.

On the day of attack operations were adjusted as follows:

The hour that the infantry was to cross the Duna was represented by H and all the batteries were adjusted at daybreak.

From H-5:10 o'clock to H-3:10 o'clock violent fire of gas shells against the Russian batteries, camps and certain important points. This was only neutralization fire, not demolition fire.

At H-3:10, destruction of positions by the divisional artillery and the mass of counter batteries on approaches, vulnerable points, balloons, wires, neutralization fire, kept up with gas shells, incendiary shells fired on villages.

At H o'clock the infantry crossed the Duna, while certain batteries of heavy howitzers executed fire with smoke shells. Advance under a progression of barrages, executed on previously determined objectives, at the request of the infantry.

The trench mortars began firing at H-2:40, with the organizations of the first and second line trenches as objectives. The fire was executed in three phases with ranging salvos at the end of the first and second phases and at the beginning of the third. From H-16 minutes, to H, rapid fire.

Part of the artillery and at least part of the trench mortars (light, medium and heavy) accompanied the infantry across the river as soon as possible. This was accomplished first by rafts and then on bridges thrown across by the engineers.

Conclusions.

The operation was completely successful, with only a few insignificant losses.

The methods used by General von Hutier would be of no use in an offensive along the west front. They would have to undergo extensive changes to meet the requirements of the size of such a manoeuver, the organization of our positions and the excellent training and moral unity of the adversary that our enemy would find before him. But the principles on which these methods are based, conforming in every way to the experiences of the war and German doctrines, might be put to practical use in warfare even with us. These basic principles are as follows:

Attempt at surprise by keeping secret the point of attack[1] until the last minute, by means of rapid and secret transportation and by the use of new expedients (at Riga extensive use of gas and blistering shells against which the Russians were able to offer almost no protection).

Powerful means of action, brutal and brief use thereof, artillery preparation was violent and short, as before the battles of Galicia, Verdun and Tolmino.

Employment of a large mass of artillery, directly the battle began, for counter-battery fire exclusively.

Opening in the enemy front by means of an attack on a limited objective (divisions assigned to break through the front at Riga had one regularly determined objective and, in case of easy advance, another objective). Immediate exploitation by divisions in the second and third lines, reinforcing the divisions assigned to break through, or for passage through the assaulting troops.

NOTE.—The operations of the eighteenth German army (von Hutier's army) on the western front between March 21st and April 5th, 1918, were in many phases in line with the Riga campaign and the main features, "concentration on field of battle" was carried out successfully.

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[1]The point selected for the Riga attack was particularly strong. The Germans had to take a first position consisting of three lines of trenches along the Duna, 300 meters wide, and a second position 3 kilometers to the rear of the first. In addition, several Riegelstellungen barred the way to Riga.

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