The FIELD ARTILLERY Journal

IN THIS ISSUE:

Observation

JANUARY, 1942

Signposts of Experience

World War Memoirs

of

MAJOR GENERAL WILLIAM J. SNOW
USA-RETIRED

Chief of Field Artillery, 1918-1927

$2.75

(10% discount to members)

UNITED STATES FIELD ARTILLERY ASSOCIATION

WASHINGTON, D. C.

1941

About the Book

■ Upon our entrance into the World War in 1917 Field Artillery of the U. S. Army (all components contained 1130 officers and 21,875 enlisted men. On November 11, 1918, it had expanded to 22,393 officers and 439,??? enlisted men. This tremendous growth was accomplished successfully through the wisdom and skill of the First Chief of the Arm—Major General William C. Snow. When General Snow came to Washington in February, 1918, to take over the newly created office, he found conditions in a state of utter chaos. There was no one in the War Department to whom technical questions relating to Field Artillery could be referred. The General Staff had the function of making studies and recommendations, but someone was needed who would assume authority and ACT.

General Snow's first means of straightening out the trouble was to promulgate a comprehensive training program, radically different from the dismally ineffective system then in vogue. The new program quickly resulted in accelerating the flow of trained field artillery units to the A.E.F. Without it, the building of efficient regiment would have been impossible. Many of the ideas put into by the First Chief of Field Artillery, notably the Replacement Centers, are being used today; and the whole Nation owes General Snow a debt of gratitude for his part in directing this phase of our military expansion into proper methods. In fact, as the present Chief of Field Artillery said, shortly before the onset of the present emergency, "If I am ever faced with a problem similar to that of General Snow's in 1918, his memoirs will provide an excellent 'blue-print' for me to follow."

That portion of the book dealing with materiel also contains much which will surprise the reader. General Snow shows why guns and ammunition cannot be produced "from scratch" in a few months—not even by a great industrial nation like the U. S. He points out many pit-falls in the designing and testing of new weapons, lessons which we should heed carefully today. One item, no doubt unfamiliar to many, is the fact that the famous French "75" was by no means the best cannon of its kind, even in 1917. It was inferior in many respects to our own 3-inch gun, and the French themselves were on the point of designing a more modern field piece! We adopted foreign materiel in 1917 because of expediency; it is to be hoped that such a dilemma will not again confront us.

Although General Snow's work is a source book on one phase of our last great military effort, every word of it has an application to what we are doing today. Its timeliness can scarcely be overstated.

About the Author

■ William Josiah Snow was born on December 16, 1868, in Brooklyn, N. Y., the son of a lawyer. He entered West Point at the age of seventeen, and was graduated in the Class of 1890. He was commissioned in the artillery, and during the first years of his service was stationed near his home, at Forts Hamilton, Wadsworth and Slocum. In 1898 he was graduated from the former Artillery School at Fort Monroe, and for the next thirty years he was to be a pioneer in the development and improvement of the field artillery arm.

During part of the Spanish War Lieutenant Snow commanded old Fort St. Phillip at the mouth of the Mississippi. After a brief service in the Philippines, he returned to command a battery at Fort Riley—the youngest battery commander since the Civil War. In 1905 his command was converted into one of the two first horse artillery batteries the army had had since 1865. In 1906 he became secretary of the Mounted Service School, and held that position for a year and a half, until he was transferred to be adjutant of the 6th Field Artillery. In 1908 he became the first field artilleryman to graduate from the Army War College.

From 1910 to 1914 Major Snow was on duty in Washington in the Division of Militia Affairs, and in the former year he founded the Field Artillery Association, becoming in 1911 the first editor of *The Field Artillery Journal*. At the end of 1914 he was once more sent out to the Philippines, and in 1916 was transferred to Hawaii. At the outbreak of the World War he was recalled to the United States, and given the task of reorganizing the School of Fire at Fort Sill. In August, 1917, he was promoted to brigadier general and given command of the 156th Field Artillery Brigade at Camp Jackson.

On February 10, 1918, General Snow became the first Chief of Field Artillery of the United States Army, and he continued to hold this position, through a series of appointments, until his retirement nearly ten years later. He was promoted major general on June 26, 1918. For his war services he was awarded the Distinguished Service Medal, "For especially meritorious and conspicuous service in planning and executing those measures responsible for the efficiency of the Field Artillery during the war." He was likewise made a Companion of the Bath by Great Britain, and a Commander of the Legion of Honor by France. In 1919 he received an honorary LL.D. from Yale. General Snow retired from the military service on December 19, 1927.

MAJOR W. S. NYE, ***Editor***
LIEUT. HARVEY S. FORD,
Assistant Editor
LENNA PEDIGO, ***Business Manager***

NOW THAT WE ARE definitely in the war, the FIELD ARTILLERY JOURNAL feels that it is desirable to consider its position and determine future publication policies. It would be very tempting to try to compete with the press and publish the so-called "timely" material—the news from the war as it affects artillerymen. But a moment's reflection will convince any reasonable person that this is not our proper role. The JOURNAL goes to press nearly a month before its date of issue. By the time it reaches all readers, any so-called news would be quite cold. Furthermore it is obviously impossible (if it were desirable) to compete with the other legitimate news agencies in this field. Anything which they do not print, positively should not be printed.

WE WILL CONTINUE to furnish matter of professional interest and importance. All individuals and all units, until called to action, should endeavor to perfect themselves in the fundamentals of their trade, to polish their technique. Nothing will do more to augment morale and general usefulness. In this the JOURNAL will make every effort to be of maximum service.

WHEN THE TIME arrives that articles based on combat experiences are available, and can be published, the JOURNAL will print them. And we can promise that the JOURNAL will make available, as ever, exclusive information written from an artillery slant. We will continue to print personal combat experiences (from all war zones) which, for various reasons are not likely to appear elsewhere. Files of this magazine will, in the future, constitute a rich store a source data on this war.

WE HAD HOPED to publish as our lead article in this issue a recently-prepared study on Oahu, written for us on assignment by Major Ellsworth. For reasons which it would be superfluous to recount, we are killing this fine article, but not without deep regret.

The Field Artillery Journal

A Publication for the Field Artillery of the Army of the United States

JANUARY, 1942—Vol. 32, No. 1

PAGE

Published monthly by the United States Field Artillery Association. Publication office 3110 Elm Avenue, Baltimore, Md. Business and editorial office, United States Field Artillery Association, 1624 H Street, N. W., Washington, D. C. Address all communications for publication to the Washington office. Entered as second class matter August 20, 1929, at the post office at Baltimore, Md. Subscription price $3.00; Canada $4.00; foreign $3.50; single copies to subscribers, 25 cents; nonsubscribers, 35 cents. THE FIELD ARTILLERY JOURNAL pays for original articles accepted. It is published without expense to the government. Authors alone are responsible for statements made. ***Addresses, and changes of rank, will be changed as frequently as desired, upon notification; not otherwise. Changes should reach the editor three weeks before date of next issue. Immediate notice should be given of any delay in the receipt of the magazine. Unsolicited manuscripts should be accompanied by return postage.***

Organization of Observation

By Major W. H. Bartlett, FA.

The systematic coverage of the battlefield by artillery information-gathering agencies is the responsibility of the artillery commander. The primary task of these agencies is, of course, to locate artillery targets and to provide data which will permit the friendly artillery to enter into action expeditiously and bring accurate and timely fire on these targets. Today's war has augmented the duties of these artillery agencies to an even greater extent; observation must be maintained over the rear areas (as well as at the front) to give warning of air attack, mechanized attack, assaults by parachutists, saboteurs, or guerrillas.* In addition, it is tacitly recognized that the artillery information agencies must provide general battlefield surveillance—artillery OP's are relied upon to keep higher commanders continuously informed as to the situation at the front. And rightly so, for these OP's should be well located and oriented, more or less stable, and provided with the most efficient means of observation and communication. Artillery observation agencies must therefore be thoroughly indoctrinated with the importance of this secondary duty, and the personnel must be trained for it.

Obviously the artillery commander cannot visit every OP nor keep in close personal touch with all forward observers. He must delegate to his S-2 some of these duties. Chart 1 shows what agencies are available to S-2 in the performance of his task. That they are fairly numerous may be seen from the fact that even for the battalion, there are a minimum of seven agencies. Additional ones may be improvised if necessary, or other means (such as, for example, an aerial observer or flash-and-sound unit) may be made available by attachment on orders of higher authority.

Even in the fastest moving warfare, or where decentralization is the greatest, some planning in the use of these agencies—some type of coordination—must be exercised lest there be duplication of effort in certain areas, or total lack thereof in others. Example: Where only

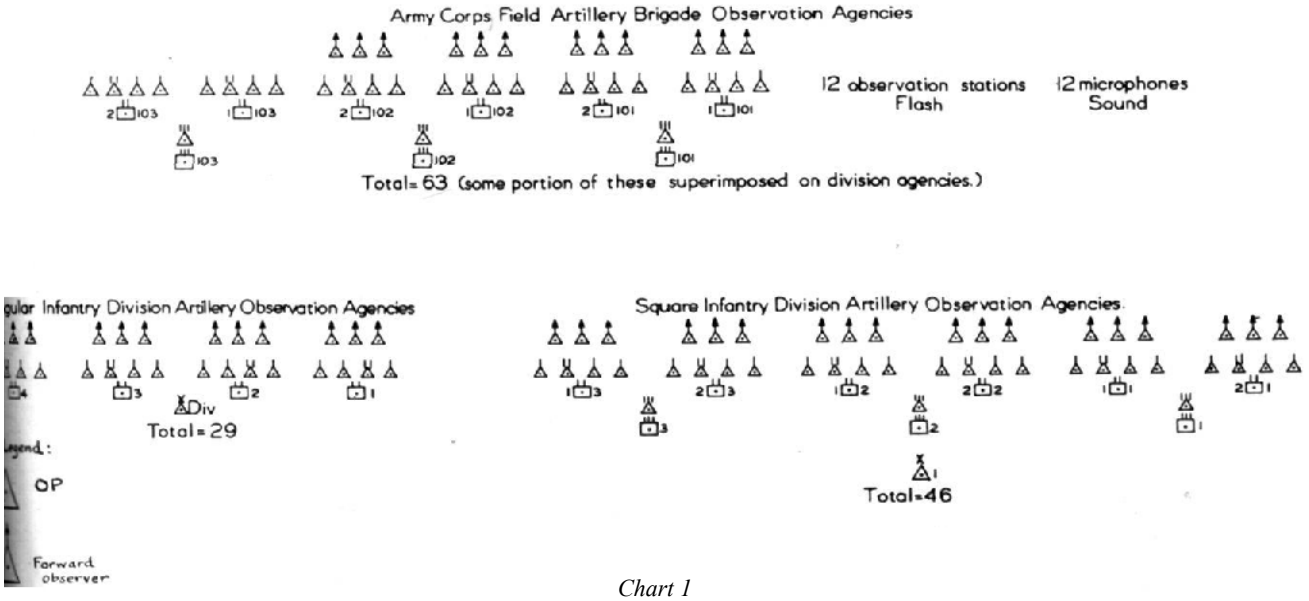


Chart 1

Note: Liaison officers who occasionally will observe not included

one hill is available for observation purposes in the zone of advance of a major unit, all agencies will tend to cluster on this high ground. This "puts too many eggs in one basket" and neglects to fully exploit other observation possibilities—such as buildings, trees, forward localities, etc., which may serve nearly as well.

Planning and coordination is further demanded by the requirement that, for proper economy of means, allotments of observation agencies to specific tasks should be based on capabilities and limitations as well as on availability. Example: It would be wrong to send an observation plane to adjust fire on a target which is visible from a terrestrial OP even though the plane were available and at the moment not otherwise engaged.

The discerning artilleryman will recognize that unrestricted and uncoordinated activity on the part of the observation agencies may well disclose the plan of the higher commander. This is especially true of the offensive, where the movements and groupings of reconnaissance parties prior to the attack advertise its imminence as well as the location of the main blow. On the defense, likewise, the organization of the ground may be revealed by injudicious use or location of observation agencies. History is full of examples of this sort of thing.

Organization of observation must commence when contact with the enemy is possible, and must be continued thereafter. It is not static, the S-2's work is not finished when he has formulated the initial plan. Visibility may change owing to a number of causes; alternate observation posts must be selected; the situation of our own troops and of the enemy will change; assignments of sectors and zones of observation must be readjusted; there are many reasons why coordination must be continuous. The zone or sector of observation assigned to an agency may, of necessity, have been delimited without sufficient reconnaissance. The observer may find his assignment to be impossible of execution. In such case he must report the circumstance and recommend a new assignment. When this occurs, other agencies may have to be coordinated so that all may observe effectively. Control of the artillery may pass from decentralized to centralized. Whenever a new limit of observation is secured by the advance of our forces, a new observation situation will present itself. The communication possibilities may change. All in all, it is obvious that coordination must be maintained *continuously* by specific and energetic action on the part of those responsible therefor.

By now the reader is, we hope, fully persuaded of the necessity for a thorough coordination of observation facilities. Is it possible to lay down rules or instructions as to how this coordination may be effected?

Consider the artillery battalion, which has seven observation agencies available organically. The coordination of effort of the mobile (forward) observers of the field artillery battalion is obtained by assigning definite areas of responsibility for observation to the batteries; these are called *zones of observation*. The boundary of a zone of observation is delimited on the ground and generally will run parallel to the boundaries of the supported unit (an avenue of advance, in contrast to a sector, which is a section of a cone). A boundary will, if possible, be along the limit of visibility in a particular area. The width of the zone of observation assigned to any observer will depend on terrain and visibility, and the employment of the supported troops. Batteries may subdivide zones assigned by battalions in order to cover

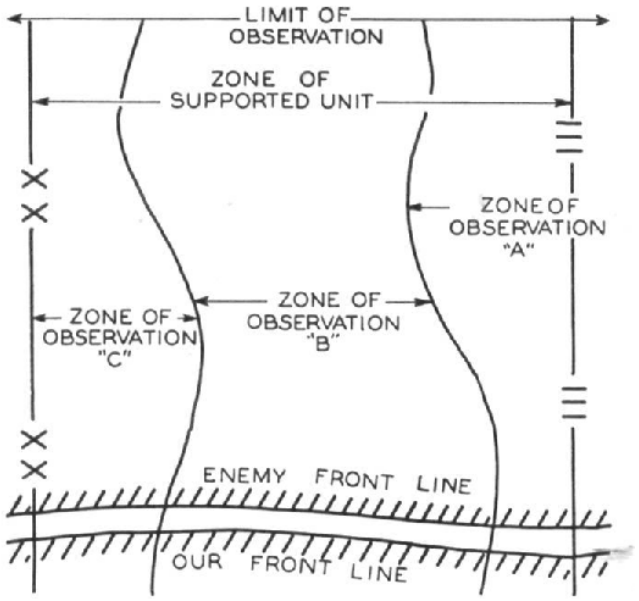


Chart 2

effectively the observation responsibility thus assigned. See chart 2.

Zones of observation should not overlap within any artillery battalion. In connection with the assignment of zones of observation, note particularly that the movement of the observer and his detail is not confined to the zone. The observer may maneuver out of the zone; the requirement is that he be able to *observe* in it. The procedure of assigning zones of observation for forward observers was adopted as suitable because complete centralized control of the observers is neither practicable nor desirable. The battery is permitted to retain control of its forward observation agencies subject only to the restriction that its zone-of-observation mission be accomplished.

Coordination of effort on the part of station (observation-post) observers within the battalion is obtained by assigning *sectors of observation* to observation posts. A sector is delimited on the ground. It defines for the observers the responsibility for observation. (See chart 3.) The size of the sector depends on the terrain and the mission. Any observation post may sub-divide the sector assigned in order to provide efficient observation by single observers. The battalion should limit the size of the sectors assigned in order to provide efficient and continuous coverage of the battalion area. It is necessary that these battalion assigned sectors overlap each other, for otherwise wide gaps would occur and parts of the battalion zone of responsibility would not receive proper attention. Individual sectors assigned to different observers at the same observation post need not overlap. In most situations small areas in one sector will be obscure from one observation post but will be visible from another. Essentially, however, the battalion observation post should be employed to reinforce the other three, and it will rarely be advisable to employ observation posts close together. Sectors are difficult to select from a map or vertical photo, and they should be assigned on the ground. Air oblique photos taken from low altitudes provide the only means readily available for assigning sectors without visiting each OP.

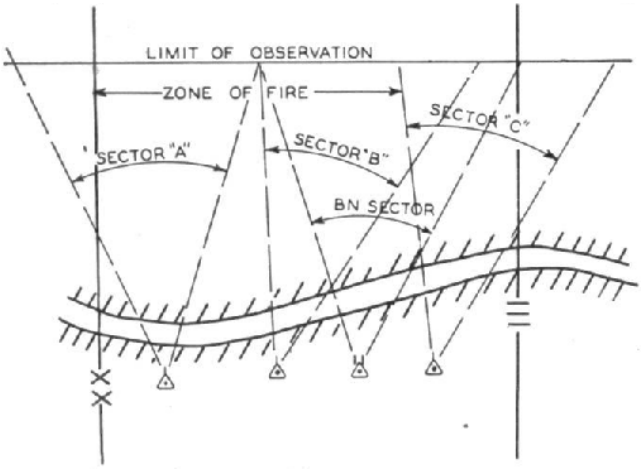


Chart 3

Note: The zone of fire must include the entire zone of action of the supported unit. Error in diagram to emphasize this point.

It is conceivable that in certain situations one or two observation agencies may well provide all the observation necessary. On flat, heavily wooded terrain, where visibility is extremely limited, it is possible that all seven authorized agencies as well as improvised observers might be profitably used well forward in zones of observation. In the attack when the enemy initially holds commanding observation it may be highly desirable to keep some units moving forward, ready to occupy the observation terrain as soon as it is captured.

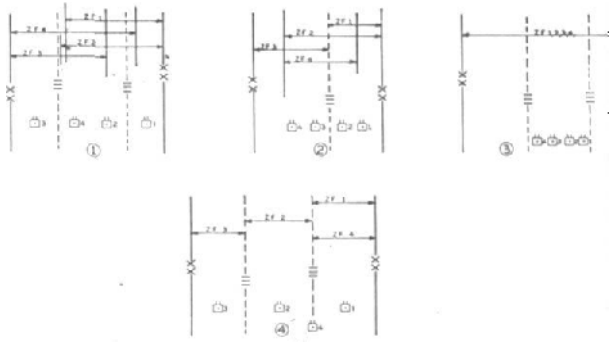


Chart 4

1, 2, and 3 situations are normal, since the zones of fire (ZF) permit the massing of the bulk of the fires of the division. 4 does not permit massing of the bulk of fires of the division. Conclusion: Normal employment will require zones of fire beyond the boundaries of the zone of action of the supported unit.

As indicated on Chart 4, many direct-support artillery battalions will have zones of fire that fail to coincide with the zones of action of their supported unit. Further, a battery of field artillery, and therefore a battalion, has the ability to cover a *sector* (from one position)

rather than a zone perpendicular to the front. Observation agencies of battalions assigned reinforcing or general support missions must utilize the areas subdivided by the direct-support artillery (Chart 4).

Thus far in the discussion the reader has been presented with the problem, its importance has been emphasized, and a few general means of coordinating observation have been set forth. Is it now possible to be more specific, get right down to earth and tell how to do it? The answer to this may be found by considering a specific problem:

You command a battalion of artillery in general support of the division shown on Chart 5 (your unit is not shown

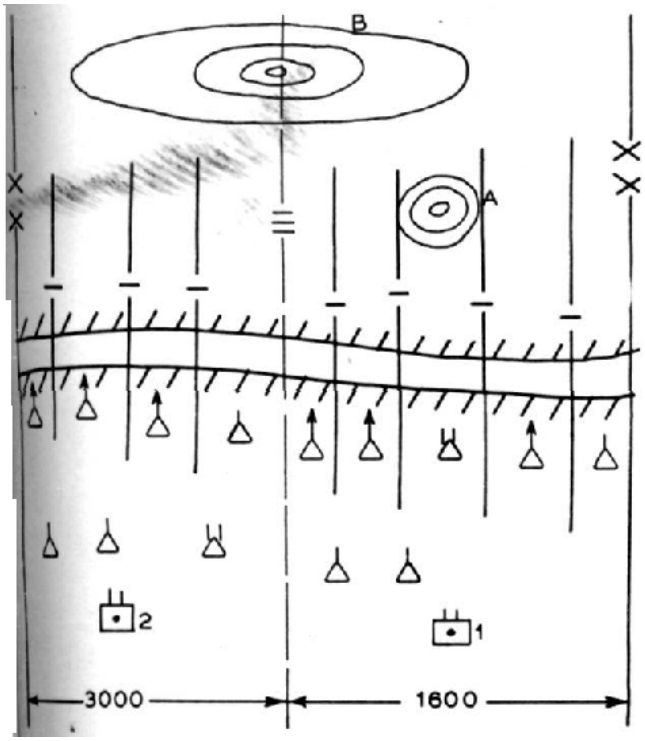


Chart 5

on the chart). The two direct-support battalions shown on the chart have observation responsibility in the zone of action of their respective supported units, and have organized their observation agencies as indicated. The division will attack. The terrain is lightly wooded, and almost flat except for hills A and B.

Questions:

a. How will you employ your observation agencies?

b. If the control of observation agencies is not planned, how many observers will, at one time, occupy hill B during the battle?

c. Should observation agencies on hill B be controlled by the officer thereat who has the loudest voice or the most rank (or by neither)?

d. Would you have your S-2 reconnoiter the entire 4600 yards of front for observation possibilities before you committed your observation agencies?

e. Do you consider that your forward observers (if any) should maintain the same detailed observation of the terrain in the immediate front of the supported troops as is required of the direct-support artillery?

f. If your observation agencies are to be used on only a portion of the divisional front, which portion would you choose, other things being equal?

g. If you were given an observation responsibility within the division zone of action, would you consider that this requirement limited your observation so that observation over important terrain outside the division zone would not be required by your agencies?

The extreme difficulty (if not impossibility) of providing satisfactory answers to the foregoing questions, even in a situation which is fairly specific, proves one thing: *Organization of observation is not amenable to standard operating procedures*. Every case must be solved on its merits. If we have gained nothing else from the study, even that negative information is extremely valuable.

A few additional general instructions may be laid down:

Initially the organization of observation must be as complete as time will permit; it must be improved continuously thereafter. The greatest care should be exercised by the commander who organizes observation, to insure that all concerned understand the vast difference between *limitation of observation* and *organization of observation*. For example, the zone (sector) of observation delimited to the battery by the battalion is not intended to *limit* observation but rather to *place a definite responsibility*.

The basic requirement for organizing observation within the direct-support artillery battalions should be observation within the zone of action of the supported unit.

When possible, artillery other than direct-support artillery should coordinate the employment of their observation agencies with the artillery of direct support.

It may be helpful now to consider a number of examples in which the situation is given fully enough to permit specific solutions to the problems presented. These examples are not to be taken as "blue prints" but only as an indication of the elements which must be weighed and the decisions which must be made in similar or different situations.

EXAMPLE 1

Unit: You command a field artillery battalion in direct support (Chart 6).

Observation Mission: To be prepared for observed fires and military information within the zone of action of your supported unit.

Partial Situation: Your supported unit will attack with the main effort on the left. The terrain is open. Two small hills are suitable for observation and from them you are able to observe your zone of action as far as the

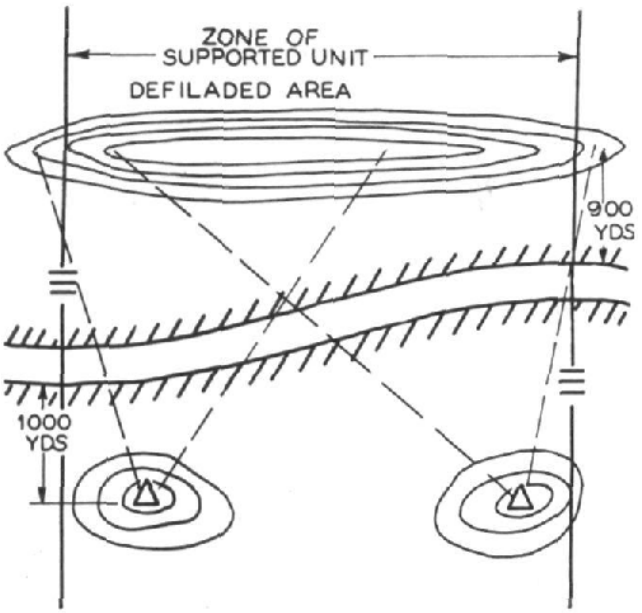


Chart 6

covering crest which is 900 yards into the hostile territory. No ground observation either in your zone or in the zone of action of the adjacent units is available that will provide observation beyond the crest mentioned.

Questions:

a. Will you send out forward observers prior to the attack?

b. Provided you employ only two agencies on the small hills, how will you employ or to whom would you assign the other two observation post agencies?

c. How will you employ your observation agencies?

d. Do you as battalion commander feel responsible for the area beyond the crest? If so, what would you do about it?

Answers:

a. Forward observers must be sent out prior to the attack. The forward observers must advance with the leading elements of the infantry in order to take immediate advantage of the observation when it is captured. Losses due to enemy action may be expected; hence additional improvised agencies must be organized and alerted.

b. The other two agencies would be assigned to the S-2. He may hold them in readiness for use when the crest is captured or he may use them to replace agencies lost through enemy action. The S-2 must plan on a new observation organization when the crest is taken, consequently this assignment would give him the means to accomplish his task.

c. Observation post agencies as in *b*. In addition, three forward observers would be employed. The zones of observation, other considerations being equal, would be smaller on the left, owing to the priority of the support for the main infantry effort.

d. Yes. The battalion commander should report to he division artillery officer the lack of ground observation with a request that air observation be assigned.

EXAMPLE 2

Unit: You command a field artillery battalion in direct support (Chart 7).

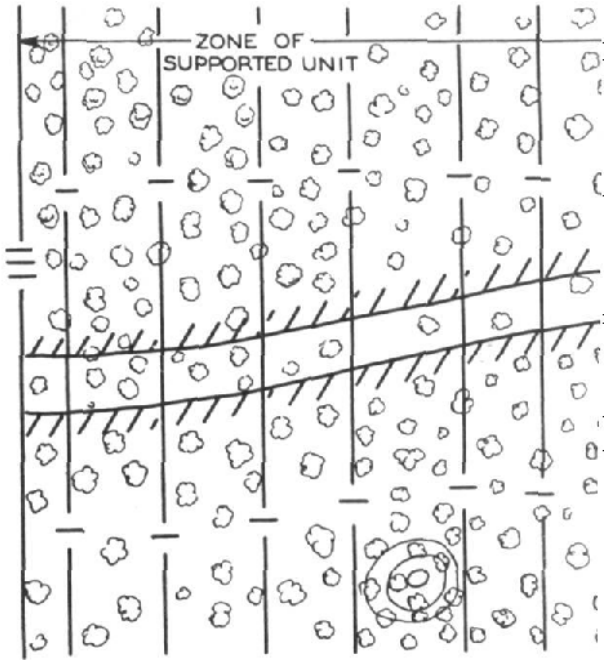


Chart 7

Observation Mission: To be prepared for observed fires and military information within the zone of action of your supported unit.

Partial Situation: Your supported unit will attack with the main effort on the left. The terrain is wooded and comparatively flat; it affords only one wooded knoll suitable for an observation post. Your battalion S-2 recommends that only one observation post be established and that six forward observation agencies be employed in six zones of observation.

Questions:

a. Would you approve the recommendation of your S-2?

b. Because of the wooded nature of the terrain it is impossible to delimit by the usual methods the zones on the ground. How would the zone of advance be indicated? What additional information should be given to the observation agencies? How much information of the enemy would you expect to receive from the OP on the hill?

Answers:

a. Th recommendation of the S-2 should be approved. When observation points are not available and when visibility is restricted, the organization of observation must include the increase in the number of forward

observers. Observation must be secured in many and varied types of terrain and the organization of observation will not be solved by any standing operating procedure. The flexibility of means of observation is therefore desirable, and forward observers and observation post details must be used interchangeably. On occasion it may be necessary to organize more agencies and employ them in forward positions.

b. In this situation a starting point and an azimuth of advance may be given. Observation agencies initially are provided with maps or photos and with all available information to enable them to fire a battery or mass the fires of the battalion. These data are brought up to date by information sent to them from time to time by the personnel at the fire-direction center. Forward observers and observation post personnel can work to better advantage when they are familiar with the latest S-3 data of their units. In this type of terrain it is possible that the observation post established will not be able to locate enemy dispositions as such, but they may be able to locate dust clouds, lights, and flashes that will give effective direction to the search for information by the other agencies. Also, the observation post may be able to warn rear and higher units of the approach of hostile combat aviation.

EXAMPLE 3

Unit: You command a field artillery battalion in direct support. (Chart 8.)

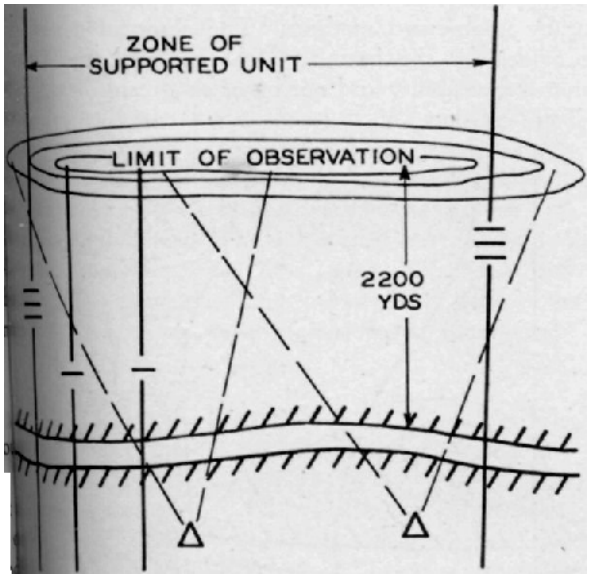


Chart 8

Observation Mission: To be prepared for observed fires and military information within the zone of action of your supported unit.

Partial Situation: Your supported unit will attack with the main effort on the left. The terrain is relatively flat and open and can be covered effectively with observation by using two observation posts. Forward observation is organized by assigning zones of observation, but the zones cannot be eliminated beyond the infantry first objective, which is the limit of observation. An observation airplane has been assigned to work with your battalion. Another field artillery battalion has the mission of general support of the division and of reinforcing the fires of your battalion. The commander of this battalion asks for your recommendations for the employment of his observation agencies within the zone of action of your supported unit.

Questions:

a. Would it be advisable for him to employ his agencies without consulting you?

b. Do you believe that the observation responsibility of the general-support battalions should have been covered in the divisional artillery field order?

c. Would you recommend that the commander of the general-support battalion employ observation agencies in your area?

d. Would you arrange for him to work directly with the airplane or would you ask him to have his operators listen in on the air missions?

e. Would oblique photos be of assistance in organizing observation beyond the first objective?

Answers:

a. On many occasions it may be necessary to employ the reinforcing artillery observation agencies without consulting the direct support commander; however, it is believed that whenever possible all artillery agencies should be coordinated by the assignment of observation responsibility.

b. Yes, when possible. The zone of fire of the artillery battalions will often include large sectors, in order to employ mass fires, and the mere assignment of fire missions will not necessarily indicate the responsibility of the commanders for observation.

c. Yes.

d. If his operators listen in on the air missions, prompt assignment can be made without loss of time in the event the reinforcing battalion is called upon to fire the air mission.

e. Yes. Oblique photos of the area beyond the first objective would permit the assignment of zones of observation beyond the crest. The battalion S-2 will have a difficult enough time organizing all the agencies along this crest and beyond it during the battle. Oblique photos from the ground observation posts would also provide a superior method of organizing observation especially in situations where time permits of their use.

EXAMPLE 4

Unit: You command a field artillery battalion in direct support (Chart 9).

Observation Mission: You are to be prepared for observed fires and military information. You are in direct

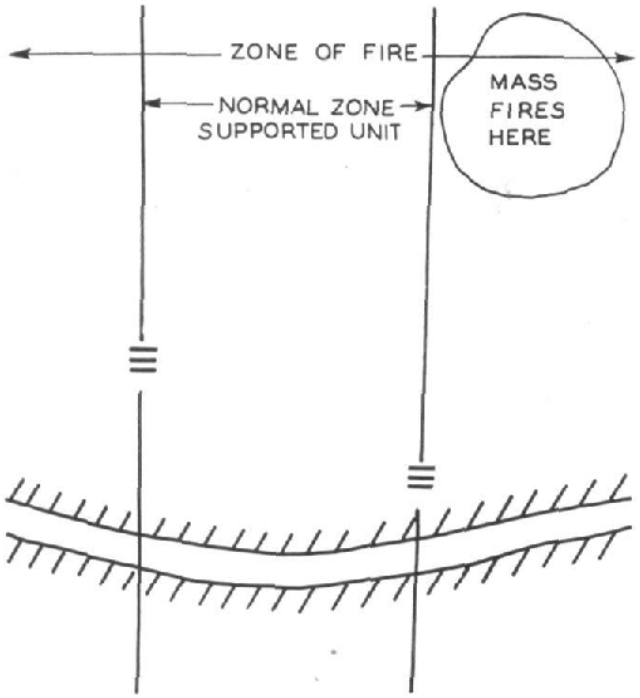


Chart 9

support of an infantry regiment but you have a much wider zone of fire than the front of this regiment.

Partial Situation: Your supported unit is on the defensive and will defend along the line indicated on the chart. This generally indicates that each infantry company will have to defend a larger sector than on the offensive. One battalion of field artillery with the division has been assigned in general support.

Questions:

a. Would you assign zones of observation to your observation agencies outside of the defensive sector of your supported unit?

b. Would you organize additional observation agencies to assist in covering such a wide zone of fire provided points of observation were available?

c. Is it possible for your observation agencies to adjust fires for other artillery battalions when they fire in the sector of your supported unit?

d. When you have the mission as indicated of massing fires in a given area, does this mission carry with it the responsibility for observation in the mass-of-fire area?

Answers:

a. Normally, no. The organization of observation within any battalion should be based on a prior plan of observation responsibility made by the division artillery officer. In an average case, other considerations being equal, the direct-support artillery battalion must, as a basic requirement, organize observation to cover completely the defensive sector of the supported unit. The observation situation should in all cases be reported to the division artillery officer, who is charged with the responsibility for observation within the division.

b. No. A report would be made to the division artillery officer and these advantageous points would be explained to other artillery units and then if not used they should be manned by improvised details. The primary observation mission of direct-support artillery battalions is the zone of action of the supported unit. Until this mission is thoroughly accomplished, observation outside this zone would not be sought. The organization of observation does not *limit* observation.

c. Yes.

d. No. However, the guns or howitzers must be placed in positions from which they can shoot into that area. The responsibility for observation does not operate to *limit* observation, except that only certain areas can be covered by the limited means available.

The boundaries shown indicate that at least three battalions of the organic artillery in direct support are employed abreast. Mass-of-fire area indicates that the bulk of the division artillery must be able to shoot into this area. In this diagram we should assume that the two adjacent artillery battalions and at least one of the general support battalions would be required. If all battalions required to shoot into this area would provide observation into it, a consequent congestion of observation agencies would result in normal terrain. This would probably produce a lack of coverage of the other zones. The massing of fires can be accomplished by observed or by unobserved methods. The observation would be provided by the battalions charged with the observation responsibility and not by or as a result of the mass-of-fire mission.

EXAMPLE 5

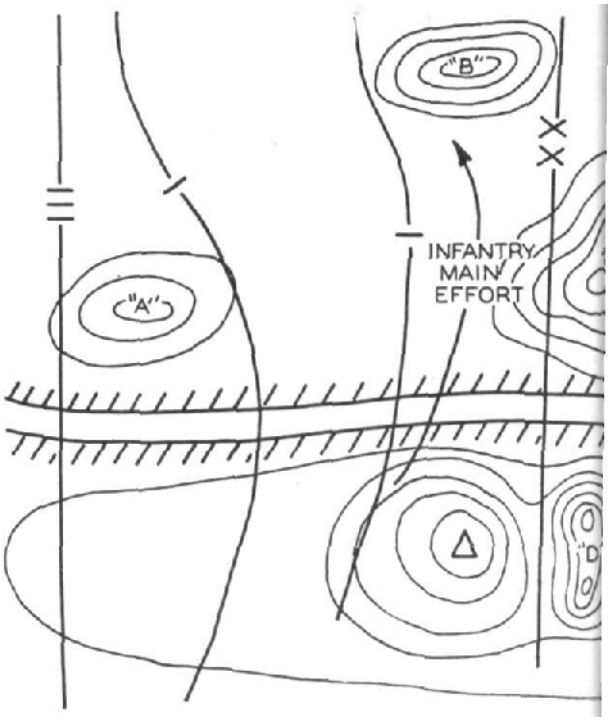


Chart 10

Unit: You command a field artillery battalion in direct support (Chart 10).

Observation Mission: To be prepared for observed fires and military information within the zone of action of your supported unit.

Partial Situation: You are able to cover your zone of action immediately in front of your supported unit from one observation post. From a study of the terrain you find that you could obtain superior observation from hill "D." It also becomes apparent that after hill "C" is captured it will afford superior observation in the zone of your supported unit's main effort. Both hills "D" and "C" are outside your division's zone of action. Your S-2 reports that unless there is careful planning, congestion of observation agencies will ensue during the action.

Questions

a. Would you expect to find your two right forward observers occupying hill "C" during the battle?

b. Would you establish an observation agency on hill "D" in order to provide dispersion of observation agencies?

c. Would it be advisable for your forward observers to know what areas are covered by your observation post on the one small hill?

d. Would you as battalion commander specify the observation agencies to be employed on hill "A" after it is captured?

Answers

a. Yes. The movements of the forward observer are not restricted to the zone of observation; the requirement is that he be able to *observe* in his zone.

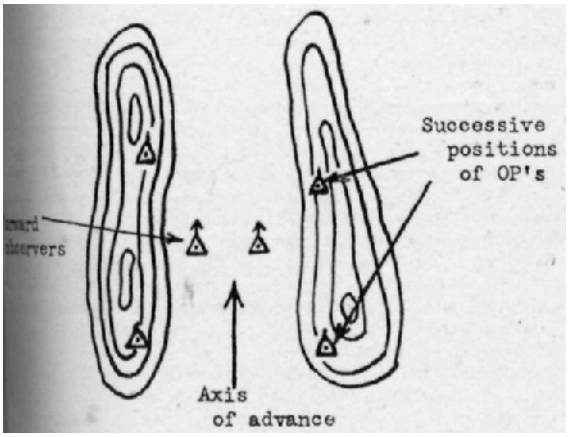
b. The use of the hill "D" should be coordinated by the division artillery officer, but, in the absence of instructions to the contrary, hill "D" should be used.

c. Yes. The coordination of effort on the part of the observers is bound to be more effective if each one knows what the other can see.

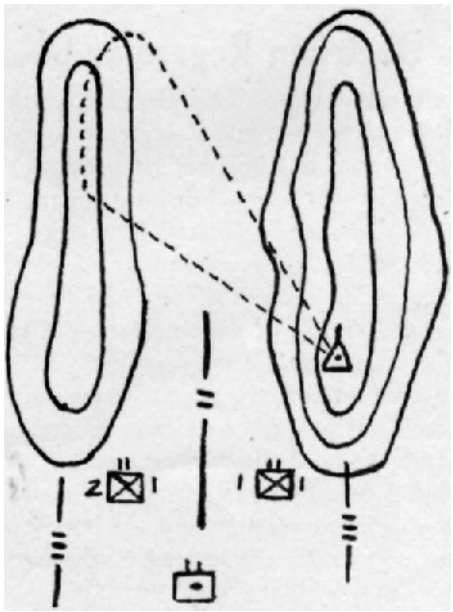
d. Yes. I would probably consider the recommendation of S-2. The authority to control the observation agencies may, and in most cases probably should, be delegated to the S-2.

Planning of Observation

We cannot help adding a few random thoughts stimulated by Major Bartlett's fine study, which may emphasize his plea for a careful organization of all observation facilities, even during a war of fast movement. Inherent in our peacetime training, which has been limited by the available terrain (of military reservations) where we "advance the attack" from Chatto Ridge to Mission Ridge to Andrews' Hill—or from Vaughn Hill Ridge to Mac Ridge to Polly Ray—is the conception that observation advances from ridge line to ridge line. Actually attacks are made along valleys, and *parallel* to ridge lines. The picture (conventionalized) is more like his:

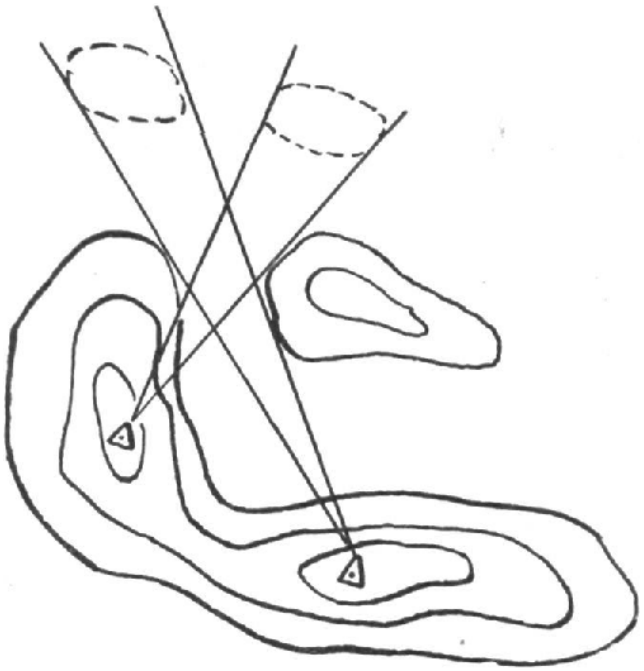


This use of terrain will influence our employment of observation agencies, and even where great decentralization is foreseen, will demand careful prior planning and coordination. An observation post, masked by the very ridge on which it is located, may not be able to see far into its own zone, but may have excellent view into that of an adjacent unit, as shown below. Unless this is provided for in prior planning, the supporting artillery may be greatly handicapped in its delivery of observed fire, even though excellent observation is available.



Another point which reminds us of the necessity for foresight in arranging the employment of observation

agencies is that OP's often are located in terrain like this:



In this instance areas visible from the two OP's will not overlap, and the sector of observation of each may be quite narrow. This will handicap location, by intersection, of targets and topographic points such as base points. It will require the augmented use of short base lines at each OP, which in turn will necessitate careful prior planning and provision for the special type of survey involved.

All in all, observation to be effective in a war of movement requires more than spur-of-the-moment decisions and off-the-hip shooting.

★ ★

German Doctrines Regarding Observation

The original draft of two German articles on observation, which follow, make reference to the German Artillery Regulations. In this connection, statements made in the German release "Reasons for the Success of the German Artillery" (FIELD ARTILLERY JOURNAL, December, 1941) bear repetition:

"The special importance of observed fires has shown itself clearly. . . . One of the outstanding lessons of this war is the fact that German artillery reconnaissance played its part extremely well . . . liaison between tanks and artillery was effected to a large extent by the employment of special artillery observers. . . . The secret of the success of the German artillery lies for the most part in the excellent training and the importance of observed fire, so strongly emphasized by the German regulations."

The following are pertinent paragraphs from the German artillery regulations dealing with reconnaissance and observation:

Terrain reconnaissance

a. Artillery terrain reconnaissance is carried on preferably in person by all artillery commanders from division to battery. In addition, there are artillery patrols and single individuals who reconnoiter. The former are used mostly for more distant reconnaissance while the latter perform the local route reconnaissance and search for positions in readiness, resting places, and close defense possibilities.

b. Artillery patrols are either mounted or motorized, and consist of one officer and two or three messengers according to the mission Every battalion should ordinarily be prepared to furnish a patter for use by the higher artillery commanders.

c. Their effectiveness is a matter of preparation; by moving out in advance they must acquire such knowledge of the presumed comber terrain, and perhaps of the enemy, as to assure that the subsequent decisive reconnaissances of commanders and artillery commanders for the disposition of the artillery will proceed along the right line In case of need they may even replace the latter entirely through their own reports. Fast riding, rapid dependable motorized mobility on and off the roads, trained sense of location at night and in fog, tactical sense, and artillery training are all required of the patrol leader.

d. At first, centralized employment of patrols by the artillery commander is necessary to avoid scattering of effort, overlapping of missions, and useless sapping of strength of organizations. In general two patrols for light artillery and one for medium should suffice for the division artillery commander. In addition, a patrol is require for each independent battalion and for each advance-guard battalion

e. Artillery patrols operate under the protection of the division reconnaissance battalion. They receive very specific missions that concern the employment of the artillery and are limited strictly to the minimum for the sake of prompt reports. The statement of the mission must contain, along with information of the caliber and mobility, the actual number of battalions or batteries for which the patrol must find observation posts. General areas and the terrain over which observation is desired must be indicated. In addition the general gun-position area and the areas over which effective fire is desired must be given.

f. Finally, the order must specify where, and perhaps when, reports are to be made. The mission always includes reconnaissance of covered routes suitable to the mobility and caliber in question. On reconnaissance for light and medium motorized artillery, the strength of bridges and sometimes their possibilities for detour by fords with firm bottoms becomes especially important.

g. Besides their missions, artillery patrols should report important observations of the enemy and share this information with the infantry. But they must not become diverted from their artillery mission by general reconnaissance of the enemy.

h. Upon entry into action, the artillery commander ordinarily returns the patrols to their organizations.

i. Artillery patrols can also be used for securing special information during combat, as, for example, routes of approach, covered areas, alternate observation posts and firing positions for the units present, and the ever-necessary reconnaissance for the employment of reinforcing artillery. Their strength and composition depend on their missions.

Observation

a. Terrestrial observation is of basic importance for the location of targets and firing of the artillery because it functions day and night whereas air observation is available for short periods only.

b. Terrestrial observation is also charged with the duty of keeping unbroken watch on friendly and enemy troops. Important changes in the situation must be promptly reported back for the sake of the proper conduct of the battle. Therefore ground observation must start to operate immediately upon arrival at the observation post

c. Observers advanced well forward (mounted or motorized and equipped with pack radio sets) can make possible the effective use the limiting ranges of long-range artillery.

d. The mission is of decisive importance in the reconnaissance and selection of observation posts. In general the main observation post should be withdrawn from the mass of hostile fire directed against the infantry and from accidents in the local fighting.

e. A concentration of observation posts must be prevented by the regimental and battalion orders that assign the terrain areas. Outstanding terrain features which drawn the attention of the enemy are especially to be avoided.

f. With a scarcity of observation possibilities and narrow zones of action, the best observation posts should be assigned to the flash battery and those battalions which are to furnish direct support to the infantry. They need observation posts from which they can see the zone of their own infantry and, if possible, that of the adjacent infantry on both sides. Batteries which are charged primarily with counterbattery and long range harassing fire need observation post also. However, unless they are directed against specific units of the

enemy infantry, they can get along with observation posts that have a more distant and more general field of observation. In most cases they will have to change observation posts or set up additional posts in accordance with their changing missions. Under certain circumstances, it is possible to depend on the observation posts of the light artillery which can see the terrain in question.

g. Installation of observation posts must be kept hidden from the enemy. BC telescopes must be carefully concealed. The senior commander present is responsible that all units carry on their work under cover, including cover from air observation. Distribution of the units in the terrain; concealment of maps, papers, and everything that would reflect the sun; and careful provision for covered traffic to and from the observation posts are all necessary. Through careful instruction of all units, including telephone operators and messengers, as to the points in the terrain from which defilade is to be maintained, and by traffic regulation for later arrivals, a breaking of cover can be avoided. These protective measures take on an increased importance when a great number of observation posts are to be set up in a restricted and small area full of artillery.

h. Observation posts that are to be occupied for a long time should be provided with cover against fire. However, the principle that the best protection is enemy ignorance of your location applies here.

i. If, in the course of combat, an observation post becomes worthless through smoke, hostile fire, or local attack, then observation must be continued from some other position. Alternate observation posts must be reconnoitered beforehand for this contingency, and their occupation prepared in advance.

j. Constant and unbroken observation of the combat terrain by battalion headquarters and by batteries, and the continual search of the hostile terrain in their sectors for targets which are at once located on the map, begin with the assignment of missions, and must not be interrupted even while firing. Hence a coordinated assignment of missions that fits the terrain must be provided for the observation post, and over any extended period, a relief also.

k. Within the battalion, the battalion commander is responsible for the selection of observation posts. These must provide for observed fire and observed concentrations of fire in the whole area assigned for observation in accordance with the artillery mission.

l. The observation post of one battery, the "Call Battery," should be near the battalion observation post, in order to be able to get the fire of this one battery on a target as quickly as possible.

m. The mission of a battery must be capable of fulfillment from the main observation post of the battery. The latter should provide a good all-embracing view of the battery's own observation sector and if possible, a view into the adjacent sectors.

n. In general, the allotment of observation posts and areas should be such as to facilitate their occupation and use. That is the case when the observation posts are practically along the line of fire. However, the terrain must be reconnoitered for all the possibilities of observation. Usually a disposition of the observation posts to the side allows observation of other parts of the terrain. There must be no hesitation in a displacement of the observation to obtain a specific end. Continual extension of the field of observation by placing observers in tall church towers, trees, on roofs, peaks, and the observation ladder is an important duty of all artillery commanders.

o. If, from the main observation post of artillery assigned to the direct support of infantry, the infantry front line cannot be seen, or sufficient immediate support cannot be furnished, or difficulties in so doing can be foreseen during the combat, then an officer with either a telephone or a pack radio must be sent forward with or to the leading infantry elements as a forward observer. For an attack his effectiveness begins even in the infantry assembly positions.

p. To be effective as a forward observer, for the most difficult shooting, requires dependable artillery knowledge and experience, as well as knowledge of infantry combat methods, and a lot of initiative. The duties of the advanced observer are:

(1) To enlarge the scope of observation and determination of targets of the main observation post through direct contact with the forward elements of the infantry; to attach independently, as far as is consistent with the mission from his battery commander, or to furnish observation against those targets which are most effective against the friendly infantry; and, above all, to keep proposing such fires to his battery and to the infantry.

(2) To transmit to his battery impressions, reconnaissance results, reports, and wishes of the advanced infantry elements, and thus to extend the effectiveness of the artillery liaison system.

q. Consistent with performing his chief duty, he is not tied to the location of the infantry commander. He belongs rather where he can see and be of help with the firing. He must make his presence known to as many neighboring infantry units as possible, and above all, he must obtain at once and maintain continually a rapid, direct, and certain exchange of observation, reconnaissance, and target information with the nearby observers of the heavy infantry weapons. He must build up a firing chart on which are located the gun position, observation post, and base line of his battery, and if possible, the sector of fire, the observation sector of the main observation post, and any existing check concentrations. He must report the extent of his own field of view to his battery commander at the earliest opportunity. Agreement upon the use of coordinates must be made before he is sent forward.

r. Observation posts advanced far to the front or to the flank often yield surprisingly deep and good insight into hostile territory. However, shooting from them is not simple. They will, therefore, find their primary employment as auxiliary observation posts for use in strictly limited missions.

TRAINING OF THE FORWARD OBSERVER IN THE GERMAN ARMY

By LIEUT. COLONEL THOMAS NORTH, FA

By way of comparison with the instructions recently disseminated in Training Circular No. 58, there is an interesting article in the April 1941 issue of the *Artil leristische Rundschau* by Colonel Kruse on the training of the forward observer. It contains many a valuable and practical hint. "The forward observer is the representative of the artillery with those infantry elements which are most exposed to the effect of the enemy artillery and heavy weapons, and who therefore turn most readily and most urgently to the artillery for help," begins the author. "Energetic officers of decisive character, and in exceptional cases non-commissioned officers, properly trained in tactics, gunnery and the technique of signal communication, are required." The article deals in considerable detail with the various matters in which the forward observer should be trained.

The forward observer's detail in the German Army is generally similar to our own, and consists of the chief, the second-in-command (who acts as his relief), communications personnel (with a pack radio), and a runner. These form a battle team, and should not be changed.

The equipment is interesting:

Map-board, with map

Target overlay

Place-name code (extract only)

Protractor in case

Clinometer (in case firing positions are to be reconnoitered)

Firing table (if possible, an extract on a card)

Field-glasses	Pistol
Spade	Emergency rations
Wire-cutters	NO written orders.

Dever from Black

German divisional OP. Personnel shelters are splinter proof; view from OP commands a stretch of road. Two BC telescopes are in use. Beer bottle holds down a late copy of the "Deutsche Allgemeine Zeitung" (*newspaper*). *Telephone has a very long extension cord. Records are in brief case marked F-I.*

The reiteration of measures to insure secrecy throughout the article is impressive.

PREPARATIONS

The forward observer must make his preparations at the battery command OP. The necessity for rapid movement requires that the section be mounted, in spite of the obvious disadvantages.

After dismounting at the battery OP the section must dig in, apart, however, from the other troops. The radio must be tested by establishing communication with the firing battery, taken down, and protected from fire, sun, and dampness. Then the section can rest. A firing chart is prepared by plotting the OP, base piece, duty gun, base line. Data for the other batteries are usually unknown. Avoid plotting tactical data. Prepare an extract from the battery target overlay. Note the details of the terrain, particularly covered approaches, single buildings, towns, roads, bridges, fords, our own front line. Determine the compass down the axis of the battalion zone.

Complete the place-name code, which must always be in the possession of the radio-operator, by adding local code-names (for example: Wood on hill 350 = Bushwood).

All this must be prepared by the forward observer and his second-in-command, distributing the personnel of the battery OP as little as possible, and in such manner that upon order the section can move out promptly and smoothly to its post.

TAKING POST

The author emphasizes that a forward observer is ALWAYS posted, both in the attack and in the defense. Under heavy enemy fire, decision must be made as to whether the two available radio sets are to be used for communication between battery OP and firing battery, with wire from the former to the forward observer, or whether the radio shall be used between the forward observer and the battery OP, with wire to the battery; if the former is selected, plenty of personell will be kept busy laying wire and hunting breaks.

For cooperation with the infantry the forward observer's detail should get forward early, if possible while the fomer is still in its assembly positions. In the attack it is wise to indicate the zone of advance so that the forward observer will not be attracted by neighboring high ground and get out of touch with the battery OP. The battery commander’s order must prescribe whether the section is to be employed to supplement the observation of the battery OP, or whether it is to work with the infantry and possibly select the next battery OP. In the first case the forward observer must be instructed as to the general location for his OP, as well as the requirements as to observation. If working with the infantry he must know to which commander he must report and where he probably can be found, also if necessary, an appropriate location in case he is to select a new command OP. In any case the communications net must be specified.

PROCEDURE IN MOVING TO POSITION

Casualties often occur among the forward observer's detail because it lacks the necessary infantry training. It has been possible on many occasions to recognize these artillerymen

by the manner in which the detail moves across country. It is desirable therefore to learn cross-country movement from the Infantry. Training is especially necessary in advancing in line or in file, behavior under artillery and infantry fire, use of cover, use of entrenching tools for temporary or more permanent cover, crossing watercourses, and aids thereto.

As soon as the forward observer reaches the vicinity of the infantry with whom he is to work he should call out, "Artillery is here" in order to make his presence known for the benefit of the maximum number of interested infantrymen.

Colonel Kruse points out that the value of the radio operator depends not only upon his technical capabilities but also upon his physical vigor as well; he must haul his set around, yet be ready to function without evidence of fatigue in his voice. The author therefore recommends that the training program include a good deal of cross-country marching, by day and night, and with and without the radio equipment.

SELECTION OF THE OBSERVATION POST

Many infantrymen hold that the forward observer belongs in the front line. They do not stop to consider that good observation can rarely be found there, that the assembling and operation of the radio set is attended by the greatest difficulties and danger, that the observer must expose himself for long periods of time during observation which is hazardous under enemy infantry fire, and that the infantry commander can maintain communication with him only with the greatest difficulty under such circumstances. If, as often happens, the question is put as to whether the artilleryman's life is worth more than that of the doughboy, it may be retorted that in the case of an infantry casualty, only the firepower of one small-arms weapon is lost, whereas in case of a casualty to the forward observer, or to his communications, the fire-power of at least four cannon is lost to the fighting infantry.

The forward observer belongs where he can observe, where infantry calls for fire can reach him, where he can learn how the battle goes, and where the functioning of his communications is reasonably protected. The infantry has its own heavy weapons; it is therefore not necessary for the forward observer to be able to peer into every nook and cranny of the front line. If he has the mission of cooperating with the infantry, the forward observer's OP belongs at a company command post, for the reasons given. The same rule applies as in the case of the combat post of the infantry commander and his attached or supporting artillery commander—the artilleryman belongs where he can observe.

There can be no quarrel with the sentiments here expressed, they sound like the voice of experience.

Next come some hints as to the selection of the forward observer's OP. It should have these characteristics:

Observation over the assigned zone.

Covered route for runners (and as short as possible) to a company CP.

Covered approach for reliefs and supplies, etc., which means no OP on a forward slope. Effectiveness does not necessarily disregard cover; the enemy can see as well as hear!

Good camouflage of OP and approaches, because enemy eyes are near.

Additional hints are:

Avoid the vicinity of high trees since they increase the effectiveness of artillery projectiles which strike them.

Use cover made of, or in, earth as free as possible from stones, to avoid increasing the effect of bursts by stone fragments.

Keep away from the OP's and the positions of the infantry heavy weapons, especially heavy machine guns. Artillery OP's have priority over machine guns in choice of position.

The author adds that the necessity for prompt response to infantry calls for fire which reach the forward observer during the course of the action may allow him little time to hunt for the best OP. Any OP from which he can accomplish his mission is a good one. Improvement must wait for lulls in the fighting.

DUTIES AT THE FORWARD OBSERVER'S OP.

Start at once to observe the battlefield, to establish communication, and to prepare cover. Observation from the forward observer's OP should not be interrupted for an instant.

Locate additional possible targets and prepare the firing data for them. The forward observer should be allotted the series from 150 up for numbering targets so that no conversions will be necessary at the battery. In dealing with the infantry the use of numbers does not work out since it uses its own series (infantry targets); in this case it is better to agree upon a set of code-names, for example: White house, Lone poplar.

Should the BC telescope happen to be available it should be set up with arms horizontal because this gives the best stereoscopic effect, and the arms accommodate themselves better to the shape of the ground.

As soon as possible report your position and visibility possibilities to the battery. Plan for the necessary rest and reliefs within the detail; always strive to conserve physical energy. For rationing, the detail will often have to shift for itself, or may be attached to the infantry.

It is not always possible for the forward observer to accompany the company commander as he moves forward. He (the artilleryman) may be busy conducting fire, or he may see from the present OP that the visibility decreases as he goes forward. It is then the responsibility of the company commander to indicate to the forward observer his axis of advance and to keep in touch with him.

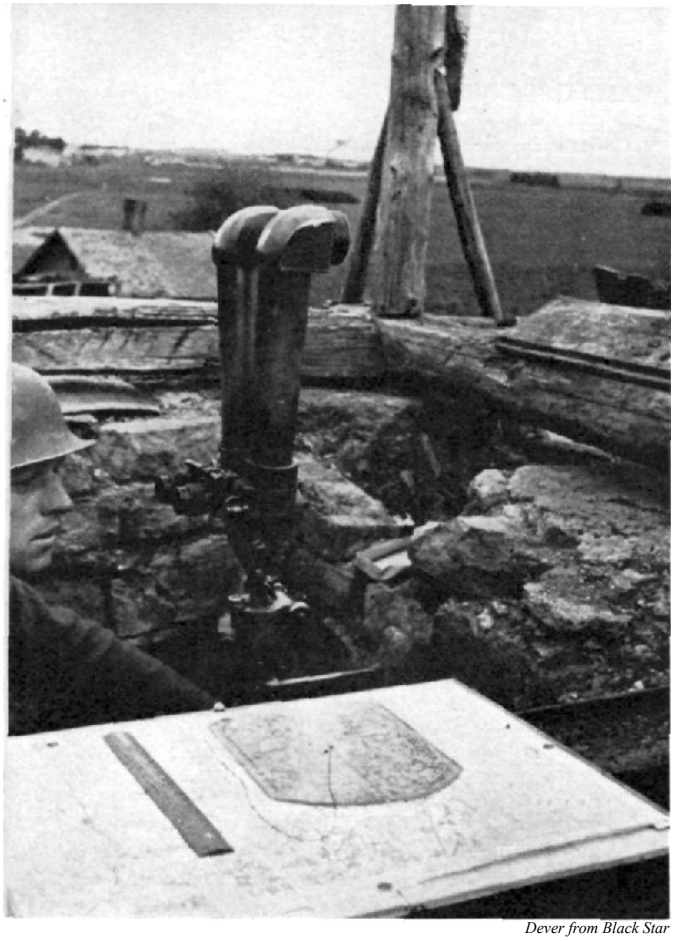
Special training should be given in:

Carbine and pistol firing.

Observing from under cover in thick terrain.

Treatment of wounds.

The stereoscopic value of the BC telescope is not generally appreciated in our service, nor is the advantage of mounting it on a low tripod so that the observer may work with the least exposure, lying down, for instance.



Dever from Black Star

MISSIONS OF THE FORWARD OBSERVER

The forward observer's mission consists of locating new targets, reporting them, and firing upon them. Targets are often far less distinct than on the firing range. Through continuous observation and minute inspection of the battlefield the forward observer must therefore strive to detect targets from the faintest indications, however good may be the camouflage, and from repeated observations arrive at correct conclusions as to the enemy intentions.

With a view to the detection of targets and taking them under fire the forward observer should be trained in the following:

Distinguishing between the shell wave and the gun wave,* the direction of fire, range and caliber of the enemy artillery, and its approximate location. The infantry tends to exaggerate the caliber and to estimate the range as shorter than it is. This must be countered by actual target information by the forward observer.

Estimation of possible positions for enemy heavy infantry weapons. Familiarity with their sounds, muzzle-flashes, and smoke.

Estimation of the strength of enemy infantry (company, platoon, section) in various situations.

---

* Very few artillerymen seem to be familiar with the fact that the shell wave is a sharp noise like an explosion, set up when the projectile travels faster than 1,100 feet per second. They confuse this sound with the muzzle wave and consequently are unable accurately to judge the direction from which an enemy weapon may be firing. It is very important that forward observers be instructed in these matters.—Editor.

Decisions as to whether discovered targets should be taken under fire by the heavy infantry weapons or by the artillery. It is necessary to accustom the infantry more than in the past to the principle that the attack of close-in targets is fundamentally their business. In deciding which type weapon to use on a target, the amount of cover and the actual ammunition situation (supply conditions) should be considered.

It should be remembered that the German infantry has more organic heavy weapons than does our own, including at least two 150-mm. howitzers and six 75-mm. howitzers per regiment; the decision discussed in the previous paragraph must therefore constitute a quite live problem.

The forward observer must report to his battery, and through it to the artillery commander as well as to the local infantry. His reports are of particular importance to the artillery since he is so close to the front line and the immediate battle impressions. Upon his reports as to the progress of his own and the enemy front lines, and the operations of the infantry on both sides, important command decisions may often depend. The forward observer must always bear this important responsibility in mind. He should make only reports of which he has absolute certainty; he should guard against being led into relaying so-called "panic reports." In the absence of other instructions he should report every half-hour during quiet periods. Even the report that nothing new has been observed is of importance.

The battery must be kept informed as to the exact location of its forward observer. Of especial value is training in the map location of the OP and the procedure in making reports on small-scale foreign maps which have no German grid system.

It should be impressed upon the infantry that in the company and the battalion headquarters some runners should be trained in reporting targets to the artillery. In going to the OP these runners must repeatedly make sure that they can still see the target which they are to report. If this is no longer possible when they arrive at the OP they should guide the observer to the point from where they last saw their target.

The forward observer should not let himself be induced to attack with the infantry. A most important job for him is to observe the infantry advance and to report on it. He should use his pistol only in self-defense.

If his battery changes position, prompt instructions should be given to the forward observer as to new communication channels and further missions.

If it happens that at a new forward OP radio or wire communication fails to reach the battery or its OP, commands should be relayed from the last position occupied. If communications are definitely interrupted the forward observer should not advance further but should obtain either fresh equipment by runner or orders to govern his future actions.

The infantry should be informed that in case of necessity it will be allowed to report to its commanders through the artillery communications system.

This all reads like good sound sense. Colonel Kruse next passes to:

ARTILLERY TACTICS

In the artillery training of the forward observer, special emphasis should be laid upon the following:

Composition of a marching column, with special attention to the artillery element.

Attachment and support.

Duties of the artillery liaison sections, of the forward observer, of the command OP, of a flash-ranging platoon posted for general tactical observation, of the outpost of a sound-ranging battery, in reference to the infantry fight.

Definition of such terms as harassing fire, fire for destruction, barrage, interdiction fire, etc.

The forward observer must master these matters since he must be prepared to give the infantry definite information when questioned.

INFANTRY TACTICS

As for infantry tactics, the following should be covered in training:

Development and deployment.

Composition of an infantry regiment.

Suitable missions, most effective and maximum ranges of the heavy weapons.

Formations of the infantry regiment in the attack and in the defense.

Colonel Kruse next passes to the subject with which we are more familiar—gunnery training. Much of his advice is worth repeating, even though it follows our own teachings:

GUNNERY TRAINING

The most important element in the instruction of the forward observer is gunnery. Consideration should be given to the special conditions under which he has to shoot, and the nature of the targets which he must take under fire. A thorough training in the theory and practice of gunnery is essential in order that he may be able to shoot with self-reliance and sureness. This training should include the following matters:

Firing commands, for transmission by radio and telephone.

Use of field-glasses, hand, fingers, etc., as aids in target designation and in firing.

Choice of charge—morale effect and physical effect.

Choice of fuze—use of time-fuze, smoke-shell or ricochet to aid in sensing the first round.

The map as the most important aid to the artilleryman. Use of the map takes time but often speeds up the effect.

Rapid map location of the OP with the required accuracy.

Necessary service practice, emphasizing: ricochet fire, procedure after lost or doubtful rounds, creeping from the far side of the target. As opposed to firing from the battery OP, careful preparation of range and deflection must be insisted upon because of the difficult conditions under which the forward observer must work.

Estimating whether a shoot is justified in case of a large angle T considering the greater ammunition consumption entailed.

Dispersion. The forward observer must the able to reassure the infantry in the case of an occasional unavoidable "short," or of shots which fall near our own troops as a result of movements of the battle which bring them close to the targets. He will often be the "goat" for the artillery.

The unfortunate accidents which occasionally happened, or were alleged to have happened, to our infantry in the last war would have been a great deal rarer had there been an artilleryman present near the infantry, with communication to his batteries.

The author ends this section with the observation that the forward observer in the meeting engagement has the job of taking the approaching enemy under fire as early as possible. Therefore it is desirable to prepare plenty of check concentrations along his zone of advance, with code-names; the direction of fire and range to each should be known to him.

TECHNIQUE OF SIGNAL COMMUNICATIONS

The forward observer can accomplish his heavy responsibilities only if his communications are in good order. Since he has only a very limited number of radio or telephone operators, it is essential that he and his second-in-command be sufficiently trained in communication technique so that they can operate in case of casualties or as reliefs. Especially must they know how to assemble and dismount the sets, operate them, be familiar with voice-code, and recognize and correct the more common troubles.

At the OP forward observer must designate the posts of the communications personnel, and constantly insist that the whole crew disperse as much as possible. Not more than two men should lie close together, even at the battery OP.

The radio set should be protected from projectiles and dampness, if necessary by digging. The telephone may be at some distance from the observer. The pole antenna is preferable to the wire antenna on account of its independence of directional effect and because it is not necessary to leave cover to set it up.

If there is only wire communication it should be doubled as soon as time and personnel permit. This one effort will avoid many a search for breaks.

Leadership is not something that can be successfully invoked by the beating of a tom-tom by a highly decorated medicine man. It can be acquired only by the strict adherence to well established underlying principles. A price so dear that only a few will pay. A practice that has been reserved for the chosen few.—COLONEL WILLIAM N. DAY.

Those who have opposed the Germans in recent campaigns have commented on the superior quality of German cooperation between ground and air forces. Mention has frequently been made as to how the appearance of a Henschel Hs 126 reconnaissance plane meant that accurate long-range artillery fire would soon come down. The following study lets us in on the "secret" as to how this is done. It turns out that there is nothing mysterious in the German methods. Adequate means, good liaison, adherence to proven methods—these give the answer.

German 105-mm. gun, the long-range weapon which so often interfered with French deployment during a meeting engagement or harassed them during a pursuit. Frequently used for counterbattery. Range about 20,000 yards.

Employment of the ARTILLERY AIR OBSERVER in the German Army

[From a recent (March, 1941) illustrative problem published in Germany for training purposes similar to those of our Extension Courses.]

THE SITUATION

The 25th Infantry Division has been attacking south and by 2 PM, May 5, the assault battalions have reached the high ground north of Eliasbrunn (see map). The 3d Bn 100th Inf is digging slit trenches on Hill 645 and the summit just west thereof, to cover the assembly of following units for a continuation of the attack. The 1st Bn 100th Inf (not shown) is in similar positions to the east of the 3d Bn. The divisional artillery is supporting the attack. Shown on the map are the general position areas of a medium artillery battalion which is a part of the corps artillery supporting the attack in this zone of action. The forward observers of the artillery (including the corps artillery) are with the most advanced infantry elements. While the infantry is reforming for the attack, the artillery details are performing the necessary reconnaissance, survey, and study of the enemy terrain, and getting ready to support the action.

There is a full and close exchange of information and survey and firing data between the infantry (especially heavy weapons commanders) and artillery observers and liaison officers.

While these measures are being carried out, the enemy lays down heavy artillery fire on Hill 645 north of Eliasbrunn and the summit west of the latter place. Within a short time the fire is shifted to the edge of the forest north and northeast of Hill 645 and inflicts losses on both the 9th and the 10th Companies as well as on the adjacent 1st Bn.

The artillery observers placed with the forward battalions of the 100th Inf can merely ascertain that the heavy artillery fire of the enemy is apparently coming from the region south of Heinersdorf and is coming from about two batteries. No further details can be obtained concerning the position of these batteries, because the terrain makes observation impossible.

There is no observation battalion (flash and sound) available for target reconnaissance and, hence, the division must find some other means.

Calling for an Artillery Air Observer

As a result of the reports sent in by the 3d and 1st Bns concerning the fire of the hostile artillery and of the impossibility of getting further details concerning the battery positions through ground observation, the 100th Inf about 2:30 PM asks the 25th Inf Div for an artillery aviator for the location and neutralization of the enemy artillery south of Heinersdorf.

The conversation between division and corps revealed that target reconnaissance from the air and the neutralization of the enemy batteries could be done most effectively by the corps (reconnaissance squadron of the corps, and the corps artillery) in accordance with instructions of the corps artillery commander.

So then at 2:45 PM the artillery commander receives through the corps the order to destroy the enemy batteries south of Heinersdorf, using parts of the artillery under his orders and an artillery air observer of the (Air Force) reconnaissance detachment (army) subordinate to the corps.

Everything else pertaining to the employment of the artillery aviator must be agreed upon by the artillery commander dealing directly with the aviation liaison officer from the corps.

The artillery commander intends to use the artillery air observer only for target location and for ranging purposes, and carry out fire for effect without the employment of an artillery aviator, because the reconnaissance squadron is to be needed for other purposes. The artillery commander will use a medium battalion against the enemy batteries south of Heinersdorf; the ranging fire of the battalion is to be done by only one battery.

Henschel Hs 126, short-range reconnaissance plane used for photographic missions and to observe for artillery.

The Aviation Liaison Officer

The corps artillery commander gives the following instructions to the aviation liaison officer with the corps:

"Enemy has been firing since 2:00 PM with about 2 or 3 batteries of medium artillery from the area south of Heinersdorf, into the assembly area of the 100th Inf north of Eliasbrunn. The hostile battery positions have not yet been definitely located.

"Our own front runs over north slope of Hill 609 (northeast of Ruppersdorf) — Hill 645 (600 m north of Eliasbrunn)—south slope of Katzen Mt.

"Upon orders of the corps the reconnaissance squadron, by means of an artillery air observer, is to reconnoiter the enemy batteries to the south of Heinersdorf and at the same time the 1st Battery of the 300th FA (10.5 cm guns) is to begin registration fire on the target identified. The fire of our medium battalions for effect then follows without further employment of the artillery aviators.

"The observation post of the 1st Bn 300th FA is on the north slope of Hill 524 north of Remptendorf. The firing position of the 1st Battery is on the edge of the forest just north of the hill; the battery will be ready for fire beginning at 3:00 PM. The firing battalion

works with map 1:100,000, large scale sheet No. 112.

"Place for dropping of messages or the place for display of visual signals: 500 meters southeast of Bahren Church (Bahren is 17 km north of Eliasbrunn) with the CP of the corps; 400 meters north of Pt. 524—north from Remptendorf—with the CP of the 1st Bn 300th FA. The visual signals are called for by means of a green flare.

"Methods used in sending messages: If we use the decimal grid (target designation square*) we take as our starting point the Wurzbach Church. Laying and contact points for the target designation square: A = Zoppoten Church, B = Ruppersdorf Church.

"I have marked off the area for aerial reconnaissance here on the map (road that leads in a north-south direction through Wurzbach, from Klettigshammer up to the road fork 2 km southeast of Neundorf—Lobenstein—Unterlemnitz.

"Frequencies, call signals, code names, etc., for signal communications are arranged here for you.

"Please report the time when the airplane starts."

The compilation for the signal communications traffic which is at the disposal of the aviation liaison officer contains the following data:

a. Radio traffic:

Unit	*Frequency*	*Call signal*	*Code name*
Corps command	200	nzi	Schule
Artillery signal communications post	300	la3	Bergwerk
1st Bn 300th FA	400	aij	Schlange

b. Service signals:

eup	Eliasbrunn	vye	Wurzbach
ode	Oberlemnitz	ufa	Unterlemnitz
hdf	Heinersdorf	ibu	Helmsgruen

Remarks:

Weather: clear, lower limit of clouds 3,500 m, overcast 4/10-6/10, visibility—20-30 km.

Signal communications:

From the battle headquarters of the corps (Bahren, 17 km north of Eliasbrunn) to the advanced airdrome of the army reconnaissance squadron (north of Neunhofen—27 km north-northeast of Eliasbrunn—) there is telephone and radio connection. In addition, the aviation liaison officer has at his disposal a liason airplane (Fieseler "Storch") and 1 motorcycle messenger.

FIRST REQUIREMENT

What are the actions and orders of the artillery liaison officer?

A SOLUTION TO FIRST REQUIREMENT

The aviation liaison officer compiles the following order for the army reconnaissance squadron:

1. *Enemy situation:*

Since 2 PM the enemy has been firing with about 2 or 3 batteries of medium artillery from the region south of Heinersdorf against the concentration area of the 100th Inf north of Eliasbrunn. Firing positions of the hostile batteries not known heretofore.

2. *Our own front line:*

North slope of Hill 609 (northeast of Ruppersdorf)—Hill 645 (600 m north of Eliasbrunn) south slope of Katzen mountain.

3. *Mission:*

The army reconnaissance squadron, upon the orders of the corps and by means of an artillery aviator, reconnoiters the enemy batteries south of Heinersdorf and adjusts the fire of the 1st Bn 300th FA (10.5-cm cannon) upon the targets that have been located. Firing position of the battery, on the forest edge north of Point 524 just north of Remptendorf.

Reconnaissance:

Road which leads in the north-south direction through Wurzbach from Klettigshammer up to road fork 2 km southeast of Neundorf—Lobenstein—Unterlemnitz.

Fire for effect is not to be observed.

4. *Signal connections:*

a. Radio traffic:

Unit	*Frequency*	*Call signal*	*Code name*
Corps command post	200	nzi	Schule
Artillery signal communications post	300	la3	Bergwerk
1st Bn 300th FA	400	aij	Schlange

b. Service signals:

eup	Eliasbrunn	vye	Wurzbach
ode	Oberlemnitz	ufa	Unterlemnitz
hdf	Heinersdorf	ibu	Helmgruen

c. Message dropping and visual signals:

Unit	*Message dropping post or place where visual signals are made*
Corps	
1st Bn 300th FA	500 m southeast of Bahren
	400 m north of Point 524 north of Remptendorf

Visual signals called for by means of green light flare.

5. *Maps:*

Map 1:100,000, large scale sheet No. 112.

6. *Message procedures:*

"Target designation squares."

Laying point and junction point: A = Zoppoten Church; B = Rupersdorf Church. For the decimal grid start from Wurzbach Church. By liaison airplane to army reconnaissance squadron.

(Signed) X
Aviation Liaison Officer.

The aviation liaison officer sends this written order by the liaison airplane (Fieseler Storch) to the leader of the reconnaissance squadron at the advanced airdrome.

Immediately after sending out the order the aviation liaison officer tries to reach the squadron by telephone in order to give it the following warning order.

"The reconnaissance squadron assigns corps artillery commander an artillery air observer for battery reconnaissance and for registration. He has an order to adjust

---

* Editor's note: The Germans use an arbitrary grid etched on a celluloid square, for designating targets. Such designations can be sent in clear over radio, because the orientation points of the platen (points A and B) can be changed as often as desired.

the 1st Bn FA against enemy batteries south of Heinersdorf. Fire for effect is not to be observed. The battery that is to be adjusted has four 10.5-cm cannon. Battery will be ready for fire at 3 PM. The order for the mission has just been sent you by my liaison airplane."

SITUATION (CONTINUED) — THE RECONNAISSANCE SQUADRON (ARMY)

The reconnaissance squadron is at its airdrome just north of Neunhofen (27 km north of Eliasbrunn). The airdrome is connected by telephone and radio with the CP of the corps and has for its use all devices necessary for carrying out the flying operations.

European

German 15-cm. gun, often used for counterbattery or for long-range fire of various types.

Planes ready for flying and for radio operation are kept camouflaged (concealed) and ready for instant employment. A shelter is provided on the edge of the airdrome so that the airplane crews may have an opportunity to rest.

The squadron leader is accommodated in a small blockhouse in the neighborhood of the quarters of the crews; he has two messengers with him. In addition, he has telephone connection with his own base airport. An operations chart which is kept up to date shows him at all times the planes that are ready for starting and for operation of radio.

Through the aviation liaison officer the squadron leader has just received the preliminary order for target reconnaissance and for ranging. This preliminary order gives him information concerning the nature of the mission and of the target and he knows that in a few minutes he may count on the arrival of the liaison airplane through which he will receive the final order for the mission.

SECOND REQUIREMENT

a. What measures does the squadron leader take after he receives the preliminary (warning) order?

b. What measures does he take after he receives the final order for employment?

A SOLUTION TO SECOND REQUIREMENT

a. From his operations chart the squadron captain sees what airplanes are available for the purpose in view. He gives the order to make H.S. 126 2 J. and H.K. (planes) ready at once for artillery flight. "Start readiness" to be at 3:25 PM. By means of a messenger he has the crew of the airplane come up, and he gives it some instructions pertaining to the contents of the preliminary order.

Technical officers and signal corps officers are likewise given their instructions.

b. After the landing of the liaison airplane, the squadron leader has the written order for employment read in the presence of the airplane crew and the technical officer and the signal corps officer and explained briefly on the basis of the map.

Then he has the flight leader to repeat the contents of the order in cue words. He adds: "It is supposed that

the enemy batteries are on the east edge of the woods east of Wurzbach (points on the map). Since during their employment the sun stands in the southwest, they must count on serious glare effects and poor visibility due to the vapor and the sun. So then you must make short forward advances perpendicular to our own front lines.

"In flying back and forth pass over Ziegenrück [evidently a path through friendly AAA defense]. Flying altitude 3,000 meters (10,000 feet).

"If there are no other questions, start at once, because the battery that is to be adjusted has already been prepared for fire a good while."

Situation (Continued) and Third Requirement

The airplane crew has received its employment order through the squadron leader.

What measures does the crew take before the start?

A Solution to the Third Requirement

The crew marks on the map (scale 1 : 100,000) the position contained in the order and sets the "target designation square" with its zero point on point A (Zoppoten Church). Observer and pilot discuss their route of flight in a brief manner. The observer explains as follows:

"We fly from here toward Ziegenrück at an altitude of 3,000 m. From there over Leibenmuehle to Eliasbrunn; then towards Wurzbach and back towards Heinersdorf and on to Oberlemnitz. From there make thrusts toward Helmsgruen and back to Unterlemnitz. Take the bearings because I have to concentrate on the reconnaissance. If you are attacked by enemy pursuit planes, then dive at once behind our lines."

The crew starts out, taking along a hand camera.

Situation (Continued)—Attack by Enemy Pursuit Planes

Airplane (HS 126) starts at 3:20 PM. The start was reported to the aviation liaison officer and by the latter to the corps artillery commander.

In the flight over the reconnaissance area the observer recognized clearly two enemy batteries and at 3:55 PM he reports by radio to an artillery radio station as follows:* Target 1, 69170-92510. Target 2, 69620-91650.

Immediately after giving this report the observer sees to the right and rear, behind his machine, two enemy pursuit planes which are getting ready to attack his plane.

Fourth Requirement

Give the decision of the observer and the measures of the crew.

A Solution to Fourth Requirement

The observer calls the attention of the pilot to the enemy pursuit planes, puts a clip on the machine gun, makes it ready for fire and observes the behavior of the enemy pursuit planes so as to fire upon them as soon as they get within the range of machine-gun fire.

Contrary to the original understanding, the pilot does not dive but flies into the clouds and directs his course to the advanced airdrome (approximately 10º) and seeks to escape by blind flying.

Even though the battery has already been informed concerning the results of the reconnaissance and is able to attack the target by map fire, the observer, after about 5 minutes, decides to leave the cloud cover in order to fly along the lower limit of the clouds toward the target and execute the second part of his mission. By exploiting low hanging strips of clouds the crew tries to escape from view temporarily.

When the enemy pursuit planes again attack, the pilot makes a low-flying dive behind his own lines and flies to the advance airdrome; a subsequent flight over the reconnaissance area is no longer urgently necessary and seems to be without any purpose, because it may be supposed that the enemy pursuit planes will repeat their blocking operations.

Situation (Continued)—Actions of the 1st Battery (10.5-cm. Cannon) of the 300th Art. Rgt.

Within the framework of the 1st Bn, the 10.5-cm. battery has gone into position on the edge of the forest north of Hill 524—just to the north of Remptendorf.

The observation post of the battery is close to the observation post of the battalion. In accordance with orders, the battery is ready to fire at 3 PM.

The battery commander has just been informed that his battery is to be adjusted by aerial observation upon enemy medium artillery south of Heinersdorf.

Fifth Requirement

What preparatory measures does the battery commander take?

A Solution to Fifth Requirement

The battery commander orders the communications NCO to use the small radio sections; he determines the location of the ground radio post and the site for the visual signal station, the signal connection between ground radio post and firing position, and the time the radio is to be ready for reception. He assigns timekeepers and aerial scouts [AAA warners?].

He issues the following order:

"Make the plotting table ready for the aerial adjustment; the calculation section is to go to the firing position at once. Lieutenant X (observation officer of the battery) takes over control of the observation post; I go to the firing position."

At the firing position he issues the following order:

"Prepare at once thirty rounds of AZ ammunition for each gun!"

The battery is to make itself ready for fire and wait for the report or a call for fire by the artillery aviators.

---

* The designations refer to the target-designation gadget.—Editor.

Strategical March of the Light Artillery Battalion

By Lieut. Colonel John J. Burns, FA.

Editorial note: Experiences of the combatants in Europe indicate that the methods which have been taught to U. S. artillerymen are efficacious in producing smooth marching. Those units, French or British, who had poor march discipline or neglected some of the measures and precautions which a well-trained organization considers routine, frequently got into serious trouble. On the other hand, good-marching units arrived in their new areas on time, and generally without serious loss, in spite of traffic congestion, refugees, darkness, bad roads, and hostile bombers. The time spent in studying and practicing proper marching technique will pay a unit big dividends when it goes to war. The following article emphasizes certain points proved again on recent marches along the Pacific Coast. The system of signal discs recommended by the author was used successfully by his battalion during lengthy marches and maneuvers. A similar system is also standard practice in the German Army.

NE may say that the wartime strategical march of the light artillery battalion has as its object the arrival of the battalion at a certain place by a definite time in the best possible fighting condition.

Interference with the successful accomplishment of such a march takes various forms. It may consist of terrain conditions, weather, movements of our own troops or civilians (including refugees), or enemy action.

There are several ways of reducing or avoiding interference, including a logical organization of the column and distribution of fire power throughout it, reducing the amount of time spent marching on the road, controlling the column, enforcement of march discipline.

Consider first the organization of the column. Suppose that it marches in the order A—Hq.—B—S & A—C Batteries; that in each firing battery the order is; Pioneer truck (pace setter); Prime mover with gun; Truck w/o trailer; Prime mover with gun; Trucks with trailers; Truck w/o trailer; Prime mover with gun; Truck w/o trailer; Prime mover with gun; Mechanic truck.

Suppose that the battalion motor repair section, immediately preceded by the ambulance, brings up the rear of the battalion column, and that provision has been made for the automatic rifles to be distributed in pairs to the lead, center, and rear vehicles of each battery.

What advantages have been obtained? The fire power of the battalion has been distributed so as to offer means for the close defense of all elements of it and for the reduction of road blocks. The pioneer trucks have been placed so that repairs of damages to the road occurring during the march can be undertaken most expeditiously. Then too, placing the pioneer truck in the lead provides a heavy vehicle as pace setter. The surplus motor power has been distributed to make it most readily available to the gun trucks should difficult terrain have to be negotiated.

In the case of a mechanized attack from the front, the pioneer truck could instantly be driven across the road to block it and to afford the 1st Section time to go into action. The mechanics' truck and the 4th Section could act similarly in case of an attack from the rear. In case of a flank attack, trucks following the gun trucks could drive longside the exposed side of the gun trucks to afford time and protection for the guns to be put into action.

To provide protection against an air attack, the column can be elongated to the extent of having 100-yards distance between vehicles. This makes a rather expensive target for airplanes to attack. It also permits the use of the 75-mm gun, M-2, and the 105-mm. howitzer firing time shell to destroy and to force to great heights any attacking planes.

Against cavalry, infantry, or parachutist attack the best course would seem to be the use of rifles, pistols and grenades while the column runs the gauntlet.

Since a column is highly vulnerable on the road, despite all the measures taken above, it is extremely important to reduce to the absolute minimum the time spent exposed on the road. The condition and nature of the route, visibility, traffic conditions, etc., are time factors. However, assuming a daylight march over good roads in average terrain, it is the 2½-ton prime mover of the firing battery which determines the speed at which the column can travel.

During a two-thousand-mile daylight march from Fort Lewis, Washington, to Southern California and return, the maximum speed for periods not to exceed thirty minutes for the present 2½-ton truck pulling a 75-mm. gun was determined to be about 40 miles per hour. For short spurts required, for example, in passing another vehicle this may be increased to 45 miles per hour under excellent driving conditions. However, except in emergency, no vehicle in column should be permitted to exceed 40 miles per hour.

If no vehicle is to exceed 40 miles per hour, then from experience it is known that the average speed of the guide or pace-setting vehicle should be about 25% under the maximum speed allowed vehicles following, or for the light battalion, 30 miles per hour. Also, in order for the pace-setting vehicle to average a certain speed, it

must have a top speed 10% higher than its average speed. Consequently in this case the top speed would be about 33 miles per hour. Now if we consider an eight-hour march with a ten-minute halt after the first hour and after every two hours thereafter, we shall have 7 hours and 20 minutes' running time. At 30 miles per hour we would cover 220 miles during the eight hours with halts. Actually we cover about 27.5 miles each hour.

To summarize, it is practical to use the following as a guide:

a. Maximum speed, control vehicles: 50 miles per hour or the state limit, whichever is lower.

b. Maximum speed, any vehicle in column: 40 miles per hour.

c. Maximum speed, guide or pace-setting vehicle: 33 miles per hour.

d. Average speed, pace-setting vehicle: 30 miles per hour.

e. Distances covered, ten-minute halts included:

8 hours ..... 220 miles
9 hours ..... 250 miles
1 hour ..... 27.5 miles

In the case of fairly good mountainous roads, the speed of the prime mover drops to about 7 miles per hour on the grades. On dark nights, the speed drops to about five miles per hour.

When secrecy of movement from air observation is desired and speed is essential, such movement can be accomplished at twilight or dawn with slight chance of being discovered. The driver does not require headlights, and observers in planes in the bright sky cannot see his movements in the dusk below. The planes will fly high because they present an excellent target to guns below which are invisible to them.

In northern latitudes this will often permit a march to be made in an hour and a half that would otherwise require all night to be completed, and then only with difficulty and hazard.

The distance of 100 yards between vehicles was mentioned in connection with the elongation of the column for protection against air attack. The question arises, is 100 yards the proper distance, and if so, should it be rigidly adhered to?

We know that the greater the distance between vehicles, the poorer becomes the target that the column presents to the enemy air force. On the other hand, the longer the column, the greater the road space required and the longer the column is exposed to air attack on the road. Then too, the question of the distance that should be maintained between vehicles going 40 miles per hour has to be considered. The distance of 100 yards seems to be about the minimum distance in which a driver at that speed can react to traffic incidents and properly handle a truck with a towed load. At slower speeds, while it is safe to close up to shorter distances, a better target is presented to hostile aviation.

The distance decided upon should be constant and not vary with circumstances. This is so because the training of drivers to drive at a fixed distance is one of the most difficult training objectives to attain. It takes a great deal of practice to get drivers to visualize approximately a distance like 100 yards from the vehicle ahead. Of course a certain amount of variation, more or less is inevitable, and to be expected; 100 yards permits this. However, if it is left to the discretion of the drivers to determine in accordance with circumstances the distances which they will maintain, the distances will vary in numbers about equal to the number of drivers. Experience shows that even when the drivers are striving to maintain 100 yards, the variations just about fall within allowable limits.

Besides, it is essential in figuring march time tables to have a known fixed distance between vehicles. Any great variation from that distance will throw the table out and may cause interference with the march of other units. Consequently, a fixed distance of about 100 yards should be adopted and ordinarily drivers should be required to maintain it.

It is important that driving fatigue be kept at a minimum. Added to the fatigue caused by driving a vehicle under favorable conditions is that due to driving in column. This is due in part to maintaining a fixed distance and to changing speeds caused by the column "whip." In addition to the advantages cited above, the maintenance of a fixed distance between vehicles eliminates a great deal of the whip, provided certain exceptions are observed. It is believed that requiring drivers to maintain 100 yards actually brings about a reduction of driver fatigue.

The exceptions are: Upon approaching a hill, for example, the pace-setting vehicle should exceed its top speed and run for the hill at 40 miles per hour. Following vehicles should conform. In approaching a bottleneck or short bad section of road, the leading vehicle should slow down to an appropriate speed and signal the following vehicle to close up. Upon passing the obstruction, the leading vehicle should signal to extend and speed up. These signals are all passed back. Observing these exceptions, adherence to 100 yards actually reduces fatigue by promoting a smooth-running column traveling at a uniform speed.

By making the battery (with its few vehicles) the march unit and running with a time interval between them, two minutes for example, we can help eliminate much of the column whip with its resulting fatigue to drivers. However, the adoption of time intervals between batteries and fixed distances between vehicles give rise to the question of column control and discipline. This question involves advance reconnaissance, preliminary planning, and the use of bivouac details, route markers, pace setters, and control cars.

Upon receipt of the march mission with its assignment of route, times, critical points, etc., the route should

be reconnoitered. If this is not possible, then a map reconnaissance should be made. Based on the reconnaissance or map study (gas station map), a time table similar to that shown in Figure 1 should be drawn up. A time-distance graph showing a diagonal miles-per-hour line facilitates the preparation of such a time table. When drawn up by an experienced staff officer, and even when based only upon a careful map study, this table can be followed by trained batteries so closely that the pace setting vehicle will arrive at critical points within 60 seconds of the prescribed times.

In order that upon arrival at the destination for any stage of the march the column will flow easily and smoothly into its bivouac or assembly area without slowing the column down, a bivouac detail should be sent ahead when practicable. It usually consists of the battalion adjutant and sergeant major, and a noncommissioned officer and private from each battery. The noncommissioned officer meets the battery commander, explains the layout of the battery area and directs him to it.[1]

A route marking detail also should be sent ahead. Owing to the constant intermingling of vehicles of other units in the column, the use of such a detail even for short marches is today essential and should be habitual. Route markers should be carefully selected and trained. Ordinarily they are taken from all batteries except when combat is imminent, when they should be taken from the Supply and Ammunition Battery.

Each battery should send a truck load of markers, and one battery in addition should furnish an extra empty truck. The markers should wear or carry large distinctive identification insignia such as cross belts or a panel bearing the battalion number in large figures. This is necessary so that drivers can distinguish their own markers among the three or four that may be posted by various units at critical points. Each marker should be equipped with a whistle and a flashlight. Batteries can be assigned a block of fifteen numbers to be stenciled in small figures on the route marker's identification panel. Route markers should be posted in numerical order, highest first, to permit their being checked when being picked up.

They are posted at directional points, bottlenecks, crossroads, important intersections, railroad crossings, dangerous points, and at times when it is desired to transmit information by them to following drivers. It is the responsibility of the route marking officer that markers are posted at all such points.

However, two route markers at least should be carried in the lead vehicle of each battery. They should be used to mark points neglected by the regular route marking detail. Whenever a driver makes a turn or is about to pass out of sight of the following driver, he is responsible that the following driver conforms to his movement. On such a turn, the following driver signals that he is aware of the change to the new direction.

The duties of route markers consist in indicating the direction of the march, being traffic policemen, enforcing march discipline, and transmitting messages to drivers or other personnel as they come up. They should have authority to issue orders to effect column control. They must be safely posted so as to be visible at a considerable distance by approaching vehicles. At night, they should call out the name of their battalion and the new direction, for example, "10TH FA BN. GO RIGHT."

In order that the movement of batteries (march units) will conform to the march time table and be conducted with maximum smoothness, an officer or experienced and reliable noncommissioned officer should ride in the cab of the pioneer (pace setting) truck. In addition to disposing of incidents arising at the head of the column this officer is the pace setter for the march unit. He should be responsible that he arrives at control and critical points on time, that except when authorized he does not exceed the top speed for the pace setter (33 miles per hour). He must visualize the effect of various road conditions on his column and adjust his speed so as to avoid causing undue column extension, or forcing the rear of the column to travel for long periods at maximum rates of speed. At all times, he governs his speed to not over 20% under the safe maximum speed for the following vehicles. For example, if the road is mountainous, winding, and descending, and safe for the gun trucks up to 25 miles per hour, then for one mile beyond the slow stretch of road considered, the pace setter should travel at 20 miles per hour. The pace setter, using the time table furnished by the battalion, a time-distance graph, and speedometer, can know at all times his time and distance from the next control point. It is most probable that he will have to drive continuously at 33 miles per hour on good stretches of road to maintain a 30-mile average.

In order that the battery commander and the pace setter can exercise better control, the use of a signal disc by the assistant driver of each vehicle has been found advantageous. A disc 8″ in diameter painted red with a white center on one side and yellow with a black cross on the other has been profitably used. The disc is fastened to a four-foot handle.

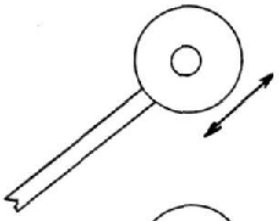
In using the disc for signalling purposes two basic ideas stand out. First, the red and white side to the rear indicates *100 yards*, the yellow side with black cross to the rear means *close up* at a halt, or *close to safe driving distance* while moving. Second, the position of the disc indicates change of speed. For example, when manipulated in the upper right quadrant it indicates *increase speed*, in the lower right quadrant, *reduce speed*.

[1]British experience in Flanders indicates that more detailed arrange?? sometimes are necessary. Frequently in combat, units do not ?? in bivouac "all in one piece." The first arrivals are met at the ?? to the bivouac area by the guide, and properly steered to their place. Later arrivals find no one to meet them. The use of ?? or more than one guide, might help.—Editor.

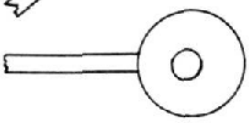
When held at the horizontal to the right it indicates *halt*. In order to attract attention the disc should be pushed up and down at a 45º angle in the upper quadrant with a motion similar to the double-time signal to indicate an increase in speed, and moved through a small vertical arc with a wrist motion in the lower right quadrant to indicate a decrease in speed. By changing the color and the position the following signals may be transmitted to the rear:

a. Vehicles traveling at 100 yards.

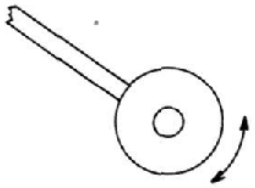
Red, right upper quadrant—"increase speed, maintain 100 yards."



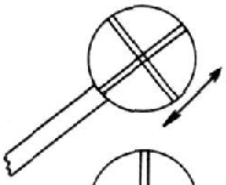
Red, right horizontal—"halt at 100 yards."



Red, right lower quadrant—"decrease speed, maintain 100 yards."

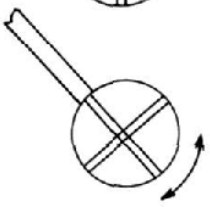


Yellow, right upper quadrant—"speed and close up to safe driving distance."



Yellow, right horizontal—"close up and halt."

Yellow, right lower quadrant—"close up and slow down."



b. Vehicles traveling closed up:

Red, right upper quadrant—"get 100 yards by maintaining present speed and then speed up."

Red, right lower quadrant—"get 100 yards by slowing down, then assume guide speed."

The use of the disc swung through a small vertical overhead arc by commanders to signal attention is convenient. Its use through a large 180º vertical arc on the right of the vehicle to signify hostile attack, red: mechanized; yellow: air, is a visual manner to pass the information quickly down the column. All whistles and horns should be sounded three times as the sound signal of such attacks.

When a vehicle falls out, sticking the disc with the yellow to the rear on the left side of the rear of the vehicle is a good way of indicating to other vehicles that they are to pass by or to disregard its movements.

Each assistant driver manipulates the disc from the right side of the vehicle, repeating all signals, and initiating them when necessary.

The use of the disc is an aid to column control and assists the drivers to keep their proper distance and to march smoothly.

As an illustration of how the disc may be used, and in order to bring out other interesting points concerned with column control, consider the case of passing through a large city with the column closed up to safe driving distance.

There are two ways of accomplishing the closing of the column which is traveling with 100-yards distance between vehicles and two minutes between batteries. One is to halt the head of the column at the outskirts of the city well off the road and wait until the column closes up. This results in a loss of time, confusion and danger of accident while closing and when the column pulls out again on the road. The other way is to slow the head of the column down and have the following vehicles close up by maintaining the higher rate of speed. This method requires less time because vehicles will not close up too tight with the consequent necessity of again extending. In practice, it proved less dangerous and more expedient.

When the battalion is moving with 100-yards distance between vehicles and two-minutes interval between batteries, the total length of the column is $(5\times1.2)/4=10$ miles. Closed up to 15 yards the length of the column is 1½ miles. Suppose that five miles short of the city, the lead guide vehicle drops to 10 miles per hour after the assistant driver signals from the right side of the cab with the yellow black cross disc to the rear and in the lower right quadrant. The assistant drivers following will repeat the signal. Drivers will maintain their speed (30 miles per hour) until they close up to 15 yards, a safe driving distance for 10 miles per hour. The head of the column at 10 miles per hour will require 30 minutes to cover the five miles to the city. The tail of the column 8.5/5=13.5 miles will require 27 minutes to reach a point 1½ miles short of the city. Three minutes is the safety factor allowed to take care of any undue extension that may have existed in the column.

The problem of column extension arises after having passed through the city. Because of the interference with other traffic caused by a closed column, it is desirable to extend it as soon as practicable. We must avoid causing any part of the column to slow down or halt (especially in the city being passed through) in executing the extension. Consequently, as soon as practicable the lead or guide vehicle gives the signal: "Speed up—100 yards distance," by displaying the red-and-white disc to the rear and giving the double time motion in the upper right quadrant. The leading pace-setting vehicle speeds up to 40 miles per hour. The following vehicles

repeat the signal and accelerate to a speed of 40 miles per hour so as to follow the preceding vehicle at 100 yards. The pace-setting vehicles of the following batteries pick up a speed of 40 miles two minutes after the preceding vehicle has pulled away. The leading pacesetting vehicle maintains 40 miles per hour. The pacesetting vehicles of following batteries drop down to 30 miles per hour to arrive at the next control point on time.

The use of the disc at an important stoplight crossing is interesting. The lead vehicle stops, giving the "slow—close up" signal. The following vehicles repeat the signal. By the time the second vehicle is about to close up, the lead vehicle crosses and gives the signal, "speed up—100 yards." As soon as the second vehicle executes the crossing, it repeats the second signal. The use of this method eliminates much of the accordion motion in a column. It applies to all temporary stops, bad spots or short stretches in the road and to small bottlenecks. Not more than two vehicles, however, should close up at any one time, in conformity with the principle that bunching may be fatal if attacked.

It has been shown that in extending a column the leading or pace-setting vehicle exceeds its top speed of 33 miles per hour. This does not violate the principle by which 33 miles was accepted and established as the top speed, because the rear vehicles will never have to exceed 40 miles to execute the extension. There is another case when the pace setter should exceed 33 miles per hour. Upon approaching a hill he should signal "speed up—100 yards" and run for the hill. The momentum thus gained will often eliminate the gun trucks having to go to eight miles per hour to negotiate the hill. If, in spite of that, the gun trucks are slowed by the grade, the pace setter conforms and maintains a slow speed for a distance equal to the length of the battery upon clearing the crest. This is necessary to avoid over-extension of the column, and having trucks traveling at dangerous speeds even though under the maximum of 40 miles generally set.

The smoothness and regularity of a column depend a great deal on the manner in which it is dispatched. The dispatching of the march units from bivouac, rendezvous, park or camp should be the responsibility of the battalion motor officer. It is he who should obtain the synchronized time and give it to all personnel who need it. He determines the rate of march to the initial point (IP) and the time required to reach it.

The battery motor officer or sergeant should dispatch the vehicles of the battery. They should be dispatched with a rolling start at a distance somewhat less than a hundred yards so that when they are moving past the IP they are at the 100-yards distance. This requires some experience and judgment. One should never lose sight of the principle that dispersion of vehicles secures great protection from air attacks. Vehicles should not be permitted to arrive closed up at the IP.

Prior to the move, the dispatchers report to the battalion dispatcher for instructions. They remain under his control as regards dispatching until they have completed the dispatching of their batteries. As a vehicle is dispatched, the distance, if different from the normal 100 yards, is announced.

In order that drivers may accurately visualize 100 yards, it may be desirable, until they are well trained, to post a couple of markers 100 yards apart a short distance beyond the IP.

Drivers should be trained to travel on the right of the paved part of the road, but not on the shoulders, at 100-yards distance, and to pass back all signals and orders at all times. Whenever they halt, they should be trained to pull off the roads well to the right, and, if practicable, to get under cover. They should be instructed that they slowly lose and make up distance to regain 100 yards, that they do not exceed 40 miles per hour no matter how far behind they fall. Drivers should be trained to assume complete responsibility for the operation and safety of their vehicles and the personnel and load carried. Assistant drivers, officers and noncommissioned officers riding in the front seats should assist the driver by the alert use of the signal disc and by interpreting signals received from ahead. Drivers should be taught that SAFETY OF OPERATION is the rule which takes precedence over all others.[2]

Drivers should be instructed to obey all traffic laws, traffic signals and signs, all policemen, military policemen, and route markers. No vehicle should pass another on the road; except that command cars, communication and maintenance vehicles, and ambulances engaged in appropriate and essential missions may do so when necessary.

Drivers should be trained to continue on the main highway or the route they are following unless directed by a route marker to leave. They are trained not to make a change in direction without assuring themselves that the driver behind has observed it. Drivers should wave their hands to the driver ahead to indicate they understand the change. Naturally this is done only when the route has not been marked at that point. Each pacesetting vehicle should carry a couple of route markers for such an emergency and drop them off at unmarked places as necessary.

Before the start of a march each driver should know: *a*. Destination; route; times of scheduled halts; cities to be passed through closed-up; *b*. Variations from normal in the following: speed of guide vehicle; maximum speed; number of his place in battery column.

If drivers get lost, they are trained to proceed to the destination by the most practicable route. All drivers

[2]European experience has also taught the necessity of having an NCO or acting NCO in charge of each vehicle. One of his duties is to keep the driver awake, no small task during war conditions when units are often kept moving more or less constantly, with no periods available for sleep.—Editor.

should be able to read a strategic, tactical, and gas station road map.

If the driver has to pull out for mechanical or other difficulty, he has the assistant driver give the *disregard* signal with the disc. This consists of holding it horizontally and twisting the handle to change alternately from red to yellow. He quickly dismounts, waves other vehicles by and puts his yellow disc to the rear on the left rear side of his vehicle. The battery repair truck stops and if one mechanic can care for the job, he drops off with his tools. The repair truck falls in at the rear of the next battery. If required, it stops and repairs are made within its limitations. If necessary, the battalion motor repair section at the rear of the battalion is stopped. As a rule only so much of the repair equipment as is necessary stops to repair a vehicle. Here also the principle against bunching must be observed. If a combat vehicle such as a gun truck or fire-direction truck falls out, the gun or the load of the FDC truck is transferred to the next truck available. The guns MUST KEEP ROLLING ALONG. As soon as the vehicle is repaired, it falls in and remains at the rear of the battery or march unit then passing. The driver should never attempt to regain his original place in the column.

The problem of halts deserves discussion. Halts should be scheduled in order to keep march units and serials from over-running one another. If practicable, halting places are selected in uncongested areas and should be marked. If marking of the halt is impractical, then the pace-setting vehicles of batteries and of the battalion should halt within one minute of the prescribed time. Vehicles should halt at 100 yards. Flagmen should be habitually posted well to the front and rear of a halted column to slow passing traffic. Except for necessary inspections, all men stay on the right of the vehicles.

About three minutes are required for a well-trained column to be ready to move from a halt after the signal attention has been given. Motors should be started one minute before the column moves out. Each driver, starting from the rear, puts out the left arm to indicate that the vehicle in rear and his own vehicle are ready.

The battery commander will find the signal disc a convenience in giving signals to his mile-long column. The battery commander does not ride as part of the column but goes where necessary to control and supervise it. A SCR-194 set in his car and another in the cab of the pace-setting vehicle assist him in giving instructions to the pace setter, who rarely is able to see what is happening at the rear of the battery. When riding in the column, control vehicles should conform to column rules.

A discussion of the best probable action of a column if subjected to air or mechanized attack should be interesting. With a battalion column of almost ten miles' length, it is improbable that an air or mechanized attack will engage more than one march unit (a battery) at a time.

With the little fire power available to the headquarters and the supply and ammunition batteries, their best course in the case of a mechanized attack is flight. In the case of the firing batteries, it would seem better to halt, go into action, utilizing ditches and other cover near the road. Men not needed to serve the cannon should disperse and take cover, firing their small arms; as practicable. Batteries in front or rear should escape by taking flight over alternate routes.

The action taken in case of an air attack differs in that flight offers little hope because of the far greater speed and maneuverability of the planes. All vehicles should be stopped in place, their motors shut off and brakes set. This is to avoid accidents to the personnel due to runaway vehicles, the drivers of which have been machine-gunned or otherwise incapacitated. Guns are uncoupled, prepared for action using time shell. Individuals not serving the guns disperse and use their small arms from any shelter available. When traveling at 100-yards distance, the use of the high angle fire cannon like the 75-mm. M-2 gun is entirely feasible. If the warning received is brief, the guns may not be able to go into action before the attack arrives. They will be ready, however, for the succeeding attacks. The enemy air force will soon learn to show its respect for an artillery column by flying at high elevations.[3]

Up to the present we have considered a daylight strategical march. Let us now consider the night march with its different problems.

The idea of traveling night and day to effect a concentration of a large part of our army should be anticipated as normal. In an army as large as ours the demands on the railroads will be such that motorized artillery can expect to concentrate by using its own means of transport, even for moves from one coast to the other. To move 3,000 miles in six days will entail a certain amount of night driving. We shall require many rely relief drivers and a maintenance service that can bring the vehicles through. Strategically located spare parts depots are essential. The distribution of parts by air-plane should be contemplated and planned for.

Whenever surprise requirements permit, we should travel with lights. An elongated column traveling with lights may suffer from air bombing and machine gunning but not seriously. For if drivers are trained to extinguish their lights upon attack or the approach of the attack, the advantage immediately turns in favor of the ground troops in the dark who can shoot air-planes from "the hip." Consequently we should under stand that we drive without lights primarily to secure surprise rather than for protection.[4]

---

[3]Air attacks on columns in Europe have generally been fairly protracted affairs. The attackers return repeatedly with bombs and machine guns, if not discouraged by heavy fire from the ground.—Editor.

[4]In the Balkans the Germans often drove *with* lights at night. Of course, they had control of the air, but they never knew when the British might raid their columns. They figured that they would get more casualties from accidents (mountain roads) if they drove without lights.—Editor.

If we travel without lights to obtain surprise, we find that, depending on the degree of darkness, we can travel from 3 to 20 miles per hour with from 3 to 75 yards' distance between vehicles. Under night conditions we should drive as fast and with as great a distance between vehicles as possible. Through woods on a very dark night, the speed will be about three or four miles an hour with vehicles traveling only a yard or two apart and frequently bumping into each other. This is a very fatiguing way of marching.

It is essential that the route be completely marked. The markers carry dimmed flashlights and call out the change in direction as indicated above. They should know a good part of the route and be posted during daylight.

The formation of the battalion column, especially in the woods in the dark, is a difficult problem. The formation should if possible be completed at twilight, but without coming out on roads. Liaison between batteries following one another is maintained so that the column on form by marching and without waiting. The battalion motor officer, the battery motor officers or sergeants, and the agents are used to maintain liaison.

There should not be much danger from a motorized attack and danger of discovery from the air is quite improbable. If discovered from the air, the column is quite vulnerable in the glare of flames. Dispersion, use of small arms, and bringing the 75's into play if possible appear to be the means which offer the best defense.

Throughout this whole discussion of strategic marches, only the battalion has been spoken of. But underlying it has been a consideration of the fact that the battalion will have the route available to it for only a very definite and limited time. If the battalion has the road to itself (a very unusual condition in an army of two million) then the principle of elongation should be applied to the extreme, that is, letting vehicles travel almost individually. Not only does this provide the best protection against attacks, but it can secure surprise even with daylight marches.

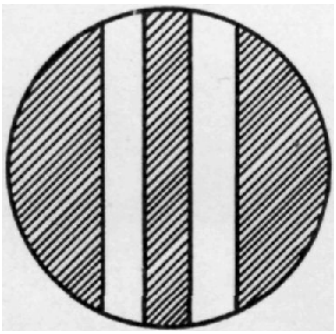
In conclusion, it can be said that everything described in this article except for fire action against hostile forces has been tried, tested and found entirely feasible.

A Distance Guide for Motor Vehicles

By LIEUT. COL. W. C. DUNCKEL, FA

The 48th FA Battalion has been particularly fortunate in the receipt of a number of experienced truck drivers among the Texas-Oklahoma selectees received June 18th, 1941. The Commanding Officer, however can credit most of his graying hair to a concentration of effort in obtaining some regularity in march distances between vehicles in convoy.

It is agreed that perfect distances cannot be obtained and maintained on highways of heavy traffic where civilian traffic is doubing cutting the convoy lanes continually Our problem, however, was to teach each driver how a distance of one hundred yards between vehicles could be gauged. With most of our drivers a distance of a hundred yards was usually exceeded from 50 to 200 yards on the driver's estimate of the prescribed distance.



Disc used for distance gauge

The background of scarlet is placed on a metal disc 8" in diameter. The vertical orange lines 13/16 of an inch in width and 15/16 of an inch apart bisect the scarlet disc.

In this day of "gadgets" we exhausted the field to obtain some means wherein a driver would be provided with an accurate optical gauge and his distance not be left to his personal opinion. A device that worked for some drivers was found worthless to the majority. Just before the recent movement of this Division for a week's stay in San Francisco, we found the solution. On the rear of each vehicle we attached an eitht-inch scarlet disc with two vertical orange lines. A vehicle bearing this disc was placed exactly 100 yards ahead of another vehicle. With a procession of drivers rotating in visual checks of the orange lines, we increased the width of these lines until a maximum number, approximately 90% of the drivers declared that the two orange lines had merged into one line. Thus, on road tests in convoy, if a driver saw the two lines as being merged into one line he knew that he was at one hundred yards' distance or greater. The procedure then was to close on the preceding vehicle until the merged lines became two separate lines again. The resulting preservation of distances on our trip to San Francisco and return was remarkable although the entire route involved highways packed with the most predatory of all motorists—the California driver.

There appears to be no eye-strain or fatigue caused by this method. The red and orange discs have been placed on the rear of the bodies of all vehicles at the height where the average driver's eye will be focused, naturally, on the vehicle ahead. The movement of the orange lines from separate lines to a merged line indicates to the driver, without a conscious effort of concentration, the slowing and speeding of the vehicle ahead.

This unit is now experimenting with other modifications of the design on the principal markings of the Distance Disc in order to provide an optical gauge of 50 yards in addition to the proven 100-yard gauge, and in the use of Glo-Co paint for night driving.

It is believed this device will be of benefit to all motor drawn units of the Army, admitting that other combinations of colors, to adhere to the branch or arm color theme, may require a test build-up such as we used in determining the width and spacing of our orange lines.

AQUA-BLITZING •

By LIEUTENANT JOHN B. SWEGER, FA

With nothing more than a piece of salvage canvas, the "Scrapping 13th" (13th Tng Bn FARTC) has paddled weapon carriers and ton and a half trucks all over Robeson Lake on the Fort Bragg reservation.

Given a good piece of canvas, the men of the 13th say that floating a prime mover will be as simple as floating a wooden boat in a bathtub. The 13th doesn't claim to have originated the idea, but the officers believe they have taken truck-floating out of the novelty stage and made it a highly practical expedient.

A picture of a floating "blitz buggy" started the whole project. "If they can float one of those things, we can float anything. Go to it!" Lt. Colonel Thomas McGregor told Captain C. F. Olsen, commander of Battery B. The experiment was turned over to 2nd Lt. George Byrd who went to work on it with the whole-hearted support of the officers and men.

An "I.C." Model-A Ford tractor was first to be tried. It was sunk twice before the men acquired the technique of getting the canvas folded properly. But after several trials, the right procedure was found. If the tarp was folded around the vehicle in a manner commonly used to wrap a package, water seeped in the folds, so next the four corners were brought toward the diagonals and tied. This worked fine and there was no seepage in the folds.

A weapon carrier was tried next on the same piece of 18×24 paulin. This time the scheme worked without a hitch. On the second trial the vehicle was afloat three minutes after arriving at the water's edge.

In nine minutes the floating weapon carrier was paddled 80 yards. The vehicle was kept in the water for over an hour. At one time there were eleven men aboard, giving it an additional 1,600 pounds weight. When it came time to disembark, only three minutes were required to get the vehicle moving under its own power.

The water line was found to be six inches under the fenders with the vehicle sitting level. There were about ten gallons of water in the tarp after an hour's time. This was attributed to leakage around the many patches on the salvaged canvas.

The method of floating a truck is pictured on the opposite page. Following the pictures from left to right.

1—Lay the paulin on the water, with two feet of canvas extending on to the bank. Station a man every three feet along the edge of the tarp.

2—Drive the vehicle slowly on to the canvas.

3—Tie the canvas to the sides of the vehicle.

4—With the vehicle on the tarp, the crew is shifted to the back, and the truck shoved away from the shore until it is floating.

5—The men then climb aboard and paddle the "craft" across to the opposite bank.

6—Coming ashore is easy if the bank is firm. Otherwise, winches or similar pioneering devices must be used.

A 1½-ton cargo truck was next in line and it floated like a cork. This time it took seven minutes to get the vehicle afloat. Six men were placed aboard. With long-handled shovels as paddles, they propelled the vehicle around the lake in 45 minutes. Surprisingly enough, this heavier truck drew about the same amount of water as the weapon carrier, although it was a little more unstable.

The 13th Battalion officers say that a pay load would make little difference in the flotation of the vehicle. The only difference between floating the weapon carrier and the 1½-ton cargo truck was that a bigger piece of canvas was needed. This time an 18×32 tarp was used.

To compute the theoretical depth to which a vehicle suspended in canvas will sink, the first step is to de-mine the cubic water displacement by dividing the gross weight of the vehicle by 62.4 (one cubic foot of water weighs 62.4 lbs.). Then, by dividing the cubic displacement by the product of the overall length and width, the depth of displacement is obtained.

Because of the tendency of the canvas to conform to the irregularities of the vehicle's undercarriage, it was difficult to compute the water displacement. It was found by experiment that the bulges underneath the vehicle made it necessary to double the computed water depth, giving a constant of two.

After finding the amount of water to be displaced, the next step was to find a suitable shoreline to conduct the trials. Experimentation showed that it was necessary to find a dropoff deep enough so that the center of the tarp was in enough water to float the vehicle. A dropoff free of stumps and roots was necessary to keep the canvas from being ripped. It was found that digging out was needed when a suitable natural decline couldn't be located.

The next step was to lay the tarp on the water with one or two feet of canvas extending on the bank and men stationed every three feet along the edge of the paulin.

An important lesson was learned in the next phase, namely driving the vehicle onto the tarp. It was found necessary to drive on in two-wheel drive. When the front axle drive was used, there was danger of tearing the tarp by too much tension when a wheel slipped. Moreover, it was better to drive on forward than to back on, because the wheels would not slip and there would be more pushing space for the men to boost the vehicle into the water.

On heavy vehicles it proved necessary to stretch a piece of canvas from bumper to bumper underneath the truck. This was done to keep the U-bolts, spring shackles, and other sharp projections from tearing the tarp. This contraption was dubbed the "diaper" by the men.

After the front wheels were afloat and the back wheels had lost traction, the tarp was folded up with the corners being tied diagonally. The tarp used by the 13th had tie ropes about every three feet. These were tied to convenient points on the vehicle body.

Both driving on backward and forward were tried, and generally, it was found that driving on forward gave better results. In an exceedingly sharp dropoff, however, it proved better to back on so that the engine weight would counteract the dropoff and keep the front bumper from plowing down. In order to keep the wheels from spinning, it was necessary to drive slowly.

With the vehicle on the tarp, the crew is then shifted to the back and the truck shoved outward until it floats. A tow rope with a buoy was attached to the front of each vehicle as a safety precaution. Thus, had a vehicle sunk, it would have been easier to snake it out.

Taking a vehicle out of the water was simply a reverse of the launching procedure. The truck was backed up to the shore and the crew disembarked.

A prolonge was used to pull light vehicles far enough up on the shore to give traction to the wheels, but it was sometimes necessary to winch a heavy vehicle out. Both the weapon carrier and the 1½-ton cargo truck were brought out on their own power several times, but there was danger of ripping the canvas by using such a method.

In crossing a rapidly flowing stream, the old ferry boat method could be used. A cable can be stretched across the stream. Snatch blocks can be threaded to the cable with the ropes tied to the front and rear of the vehicle. By tightening on the front rope and slacking off on the rear, the impetus of the direction of flow of the stream will push the truck across.

Experiments are now being conducted by the "Scrapping 13th" in transporting guns and personnel across water.

By the simple process of lashing together four poles to form a rectangle, the same old piece of canvas was made into a boat. The tarp was placed on the water and the frame set on top. Four men were stationed at the corners and the crew embarked. It was found necessary for the men, except the four at the corners, to lie flat because of the unstable bottom, but the experiment proved successful although minor details have not been fully worked out.

As for getting the guns across, the 13th isn't worring too much. Several former "horse-drawn" artillery officers in the battalion figure that the guns can be winched across if by no other way. They remember when they used to swim the horses and men and drag the guns across by using teams hitched to a double-tree.

But the 13th is not depending on this method. They are now trying something similar to the boat experiment. The plan is to lash poles underneath the axle, parallel to the trail, with cross pieces, one of which is lashed to the trail. The 13th officers believe that this will give enough support to keep the canvas spread out, so as to get more surface to take care of the gun weight displacing water. They're not making any claims about the success of this method. But they do say they'll float them somehow.

PROPOSED PLAN

The proposed plan is to have enough tarpaulins in a battery for emergencies. In cases where it is necessary to float the whole battery, it can be done. Often it would be just as convenient to set up a battery position on the near side of the stream, but forward reconnaissance and emplacement might make it necessary to take to the water.

If necessary to go forward on a reconnaissance, a command car could be across in a few minutes.

"Of course, you could swim across and walk, but you'd be wasting a lot of valuable time if you had to walk three or four miles," the Colonel says.

With tarps and trained personnel it is an easy job to get vehicles across, the 13th says. Supervisors of the project claim they can, with trained crews, get a battery afloat in ten minutes.

A ton-and-a-half truck is floated as readily as a half-ton.

War in The French Alps

By LIEUT. CHARLES TAQUEY, French Artillery

A phase of the 1940 campaign concerning which nothing has been published in this country

Totalitarianism has been indicted on so many counts that it must have at least one advantage: efficiency and earnestness. But the rout of the Italian forces in Greece and even more in Libya means that some qualification has to be made to that judgment. Is it that Fascism did not rebuild the souls of the offspring of the heroes of Caporetto? Is it that this totalitarian country, despite all its boasting, was at least as much unprepared for war as a "decadent democracy" like France? Such a defeat calls for a comparison with the struggle between the vaunted Fascists and the disparaged Democrats at the end of the war between France and the Axis.

I was myself in this war and spent all my brief military career on the Italian border. I should be glad to give here an eye-witness account of what happened to Mussolini's army during the fifteen-day campaign which Benito launched on the French. I do not intend to prove anything by the Italians' deeds which I shall report. If sometimes the macaronis do not appear to the best advantage, we must remember that it was not a question for them of defeating France. France was being defeated by Germany, and France was defeating herself on another front. It was only a question of taking a share in a victory by default.

During the first month of the war, before the Italians jumped in, we spent all our time at a distance from the border. The border itself was quite inaccessible during the winter. In the heights were only scout skiers, whom I joined sometimes. On the other side of the border were Italian scout skiers and Italian officers. From time to time, the Italians and ourselves joined in friendly chats. These conversations were highly encouraged by both General Staffs, very eager to get some of the military secrets of the other side. But as for military secrets, there were only a few. The Italians showed themselves proud of their alliance with Germany, but not unreasonably eager to fight. During the campaign of Norway, they seemed happy to be able to cheer the victor at a distance. On our side, the official motto was, "Ne pas exiter le secteur"—Do not make any monkey business, nor create any incidents. Our men did not make any monkey business, nor create any incidents. Our men did not wear their arms except on patrol duty and they were under very strict orders not to use them. At this stage, French politicians and brass hats were deeply convinced that Italy would play the same trick she did in 1915 and join the Allies. Despite

all the information we collected about the Italians at these friendly meetings and through other channels, the buddies of our deuxieme bureau remained persuaded of the innocuousness of the Italian machine. They were right, but not for the reasons they thought.

In May, when things began to be very bad on the Northern Front, the "Army des Alpes" carried on its quiet life along the Italian border. I spent there a wonderful time; how peaceful and untroubled, playing cards with my comrades of the crack chasseur corps, waiting for the Italians to come or not to come. Life was very nice in this post of command in the mountains, among the high green pastures where our only serious occupation was to pluck mushrooms after the rains.

As I have said, the Italians were not unreasonably eager to join in the dance, but Mussolini wanted to share in those historic events if not at too high a cost. On the 10th of June, when the part seemed lost for us, he made his declaration of war: "Italy can no longer wait. Italy must follow her destiny." One more occasion had been lost by us. Everybody agrees indeed at present that if the Allies, instead of standing still in 1939, had sent an ultimatum to Italy, the course of the war would have been changed. Even in June, it would have been possible to do something of the kind. And, as a matter of fact, the successes of the French Army on the Italian front were so great that one must regret that our defensive position did not permit us to press our advantage. Yet these successes are little known. Why? Some people explain that the French Government, eager to conclude an armistice with Germany, did not wish to give the French people the impression that part of the French Army had won a real victory. Some people allege that this same French Government, full of good will for the Italians, had done everything possible to alleviate the Italian difficulties and not to make a fuss about it. But the truth is that no foreign correspondents were on the Italian front. The events everywhere else were so breathtaking that nobody paid any attention to the campaign of the Alps.

Eight days elapsed after the Italians declared war and before they appeared anywhere along the border, although Mussolini had said that his armies would "march at twelve o'clock tonight." On the contrary, even at the time of his declaration of war, he was not ready and he wanted to improve his strategic positions. He moved 20 divisions near the border at least; probably in order that the last troops arriving could push the more advanced elements toward us and eradicate any idea of flight. We did not have, during the whole campaign, more than four divisions and three so-called "secteurs fortifies," altogether 120,000 men, on the border. When later on, the Germans in Wiesbaden asked us about the number of divisions we had altogether, we answered that France had, let's say, 100 divisions, they were puzzled. "How do you explain that?" they asked. "We know you had 96 divisions against us, and the Italians affirm that they have been fighting against 25 divisions."

This dreadful impression that our defensive organization made on the Italians came from the fact that they were ill-prepared for an attack, and that we had all the time to prepare a little too well for the defense. Too well, because by doing that we stripped ourselves of the possibility of an attack which, if it would not have permitted the French to surge out of a defeat, would at least have given to the French Government in Milano a shelter for the winter more comfortable than Vichy.

We had taken all our precautions. All the country between the border and our own lines of resistance had been evacuated: every living soul and all the cattle and foodstuffs. The infantry was strongly established in well constructed trenches, pillboxes and dugouts. So we were in perfect shape when, after eight days of watchful waiting, our Intelligence Service intercepted the first warlike order from the Italian High Command. Warlike, if you will. It read, "Proceed resolutely with all resources at your command, if you do not find any resistance." And how did they proceed! The poor fellows! They crossed the border everywhere from Geneva to Menton, trying to infiltrate themselves into the deep valleys. They thought, of course, that the French Army was completely destroyed and that the people of Savoie would greet them with open arms. But this was not the case. The French Army was in perfect shape, having spent a nice, sportive winter in the mountains and receiving all necessary ammunitions and supplies.

Therefore, the Italians proceeded about ten miles into the No-Man's land, as our guns did not have a range of more than five miles. But when they encountered the fire of said guns, their advance came to an end and their great problem was getting food and shelter. They did not dare to go back and they could not advance any more. Our artillery had a fine time spotting them and giving them lessons from time to time. I still remember a small house which we destroyed by a direct hit, and I can still see two fellows coming out of it and running like hell. "Vous les artilleurs vous nous avez eu jusqu'au trognons."—"Your artillery certainly took us to the cleaners," said one of the Italian prisoners some days later. It is, unfortunately, impossible for me to describe all the campaign and I must limit myself to a few stories of incidents which happened in my own sector. I may say only that against 20,000 Italians killed, wounded and captured, the French lost only about 400 people.

One day at one of the small advanced posts we had near the small village of Abries in one of the pillboxes, the aspirants in command of the post and a gendarme, who had been in the country for many years and knew the Italians very well, were observing the country. "Look there," said the gendarme, "What do you see coming down the slope?" "Looks like a band of 10, 30 or 50 Italians," said the aspirant, "and they seem to be hiding in the barn at the bottom of the slope." "Well, said the gendarme, "it's only a half a mile from here; let's go and

capture them." "But we are only six here," said the aspirant, "and we can not leave the pillbox empty." "It's not necessary to take all six," said the gendarme; "we could take only two soldiers with us and leave the others here; we will be enough for this big operation." The aspirant had his fingers crossed, but disliking to show any hesitation, he took two soldiers and the four of them set off for the barn. Arriving there and leaving the soldiers outside, the gendarme and the aspirant walked up to the door, pushed it open and had the pleasure of seeing fifty macaronis, including a captain, shivering and trying to keep warm by lying close to each other. The aspirant shouted, "Surrender! There are five sections of machine guns behind you." The Italians rose promptly—all fifty—the captain at the head. Easy capture, wasn't it? The kicker is that a few minutes later they saw another Italian soldier coming to their lines, holding his pants. He was admitted and had to explain. This was his explanation: "Being the orderly of the captain you have captured, and being outside when you made the capture, I followed you here, because I believe it my duty to follow my captain everywhere."

During that time, the propaganda fight went merrily on. We had, for our comfort, the glamorous speeches of Paul Reynaud, who was telling us with an amount of care and reserve certain unpalatable things about the so-called "poche," or pocket; the first effects of the German drive into our ranks and all the succeeding events. On the other hand, we had the speaker of Radio Rome, a lady whose sarcastic voice gave us a strong, if repressed, desire to kick her in the pants. She was making such extreme accounts of the German advance and such exaggerated reports about the Italian successes that we thought (unfortunately we were mistaken) that she was overdoing the German advance as well as the Italian successes. For instance, she reported at great length a certain battle of Chenaillet. It was supposed to have been a great Italian victory. A stronghold called Fort du Chenaillet had been destroyed by gunfire after hours of strenuous fighting. This fort had been the most powerful of all the French defenses. Its artillery had a range which had enabled it to menace Torenno and Milano, etc. As a matter of fact, I was only a short distance from this Chenaillet and we had never had any fort there on the wooded slope, but one single machine gun on which the Italians spent about ten tons of munitions to destroy.

With all this going on, the big war against Italy came to an end. The Germans won it on another front. For a time, we were supposed to make in the Alps a last desperate stand. A small village called Montbordon had been assigned to us as our last stronghold and we even began to dig trenches and to prepare for a big fight against the Italians on one side and against the Germans on the other side. But all that went on the rocks when the armistice was signed at Compeigne. Peace reached us who had been almost unaware that a war was being fought. And to give us even more than an illusion that life was going on as usual the Quartermaster Corps sent to my company as a first peace message the following: "State without delay how many trousers you need."

The Italians had been stopped at five or six miles before our lines and were still wondering what to do: go forward or turn back. Our guns were still pounding the enemy lines, my colleagues of the artillery being eager to use as many shells as possible before leaving. The commanding officer of the battalion with which I was a liaison officer told me on the 24th of June, a few hours before the Armistice, "Please, will you tell your friends that we would be very thankful if they could stop firing before ten o'clock? We want some sleep." I had no success when I telephoned the artillery headquarters that the infantry wanted to sleep. As a matter of fact, they continued to fire even after the Armistice, but if my companions complained, the Italians had no chance to do the same.

A few hours after the Armistice, a company of Italians came again to the village of Abries, of which I have spoken before. They were about a hundred, preceded by a white flag. A French officer shouted to them from his dugout, "What the hell are you coming here to do?" "But, sir, we have come to occupy your position. The armistice has been signed and you have lost the war." "Did we?" said the French officer. "That's too bad. I have no official news, and my orders are to defend my position. You will stack your arms and surrender yourself on this spot. If you budge, the machine guns which cover you will cut you down." The Italian looked perplexed. "Well," he said politely, "if that is your attitude, I have no objections." He ordered the stacking, and bivouacked his troops for the night.

Well, this is about all of the war in the French Alps. What else shall I say? Except that the stupidity of all these things brings a comic relief into our preoccupations of today. War is not so serious as it looks sometimes, and this is probably the strongest argument against war. If war is a manifestation of an evil genius, superior to humanity, from which we can not escape, then war is an awful thing which must be accepted; if, on the contrary, war is a silly little business without anything superhuman in it, there is no reason why we should not avoid it even with our limited human wisdom. The best way of preventing war being, of course, by all means to be ready to fight, and to advertise this readiness.

Man is not born timid. From childhood he adopts the character and ways of those who direct him.

"It is not by the ornaments at the ship's prow that the passengers are assured safety." It is the leadership on the bridge that counts.—COLONEL WILLIAM N. DAY.

COMMENTS ON THE WAR

WHY 1941 WAS NOT 1812

■ When the Germans invaded Russia last summer they created, among other things, a golden opportunity for American journalists to draw analogies with the famous campaign of 1812. Our feature writers and columnists were not slow to take advantage of it, and ever since then we have been flooded with imaginary conversations between Hitler and Napoleon, cartoons showing these two gentlemen looking sadly upon huddled groups of frozen corpses, endless references to "General Winter," and so on. These comparisons have all been very interesting, but unfortunately history does not beat them out. In fact, there is very little similarity between the two campaigns, and whatever may be the outcome of the current war in Russia, it will not be decided because one side or the other ignored or profited by "the lessons of 1812."

To begin at the beginning, Napoleon undertook the war against Russia largely for economic motives: the Emperor Alexander would not adhere to the continental blockade of England. But Napoleon was not eager for the war. A warm friendship had existed between Napoleon and Alexander since their meeting on the Nieman in 1807. Moreover, having established an autocracy in France, Napoleon was then attempting to gain acceptance of his position from his brother monarchs in Europe. The contrast with the present is plain. True, economic motives no doubt were partly responsible for the German invasion of Russia; but political antagonism was equally so. The ruling party in Germany had come into power on a platform calling for the extermination of communism, and an intensive propaganda had been

Dever from Black Star

A German armored unit has assembled in this draw, and is now advancing to the plateau in open order for the attack. The accompanying infantry will dismount as the vehicles approach the Soviet position, and will follow the vehicles in little groups, taking shelter behind the tanks. Note that two or three of the vehicles are towing 37-mm. antitank guns. German tanks advance in mass, as shown here, and with about 30-50 yards interval. They rarely attack singly or even in small groups. They frequently (if terrain permits) maintain almost parade-ground perfection of alignment. This is not for show purposes, but to facilitate control.

This new department of The Field Artillery Journal will be devoted to a discussion of pertinent phases of the present war. The emphasis will be upon the broad aspect of the war, rather than upon specific technical problems, and an attempt will be made to bring into better focus certain items which seem to be of general interest. More detailed discussions, dealing with technique, will (as heretofore) be made the subject of separate articles.

conducted for eight years with the single purpose of inculcating in the German people a lasting hatred of Russia.

At the beginning of 1812 Russia was engaged in war on her two flanks, with Sweden and with Turkey. With the aid of British diplomacy, these were quickly settled, and Russian troops were released to concentrate against Napoleon. There were many besides Frenchmen in Napoleon's army. He had two principal independent allies—Prussia and Austria. They were very unwilling allies, however, and had been forced to contribute troops as the result of their defeats in the campaigns of 1806 and 1809. The closest relationship existed between the Emperors of Austria and Russia and the King of Prussia, and, as events were to show, at the first opportunity Prussia and Austria deserted Napoleon. Aside from these contingents, the French army contained a great number of Poles, Germans, Italians and other nationalities which had been enlisted to take the strain off the waning supply of French manpower. Napoleon had a veteran army, but it was an army justifiably growing weary after twenty uninterrupted years of war.

The Germans, too, began the present campaign with allies. Of the four principal ones, Finland and Rumania had been forced to give up territory to Russia only the year before. Hungary was bitterly anti-Russian because of the Bela Kun communist regime of 1919, and the government was still headed by Admiral Horthy, the man who had driven the communists from Hungary after the Great War. In Italy, as in Germany, the dominant party had for years had as its principal policy the destruction of communism. In addition to these, there were several bodies of Spanish, French and other foreign volunteers. Whatever feelings these nations may have had for Germany, they certainly bore no love for Russia. In any case, the invading army of 1941 was overwhelmingly German, and the foreign auxiliaries formed but a small fraction of its total. The German army, too, was a veteran army, but it was an army whose losses up to then had in no sense been serious or crippling.

The contrast in the matter of the all-important lines of supply is glaring. Napoleon's lines of communication stretched back all the way across Europe, through numerous depots and magazines in Germany, to Paris—a truly enormous distance in the horse and wagon age.

German armored division during the advance toward Moscow. Note the intervals between vehicles, and the fact that double columns are used wherever possible.

Not only are the German lines of communication much shorter in the present war, but the truck and railroad have made the job far easier.

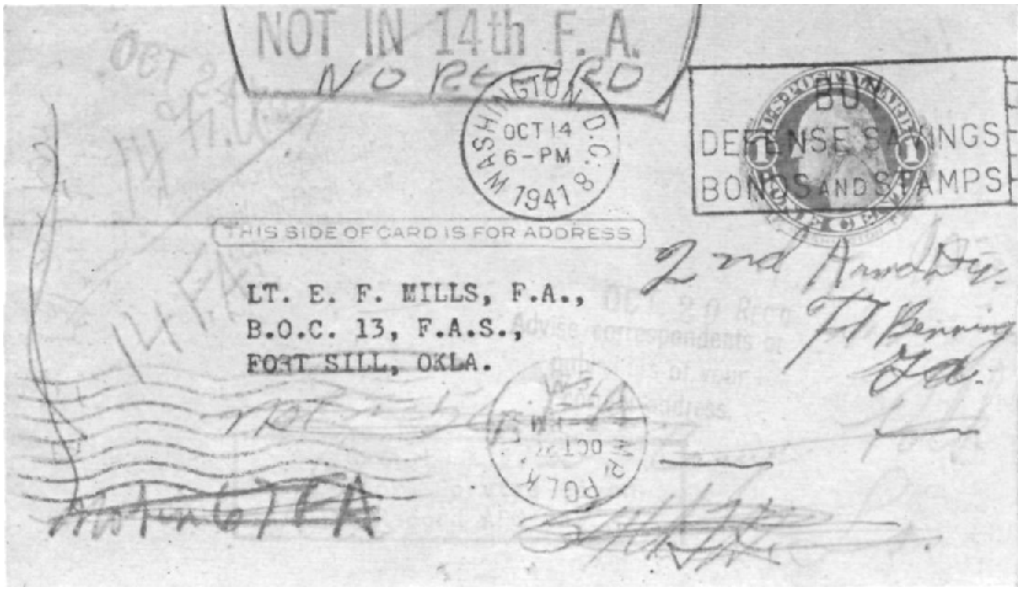
Napoleon's army numbered 450,000 men with 150,000 in reserve. His object was to catch the Russians and force them to a decisive battle. Failing in this, he apparently planned to winter in Smolensk and the western Russian cities, and try again the following spring. The northern winter was no novelty to Napoleon. He had spent the winter of 1806-07 in East Prussia and Poland, and had won a battle there early in February, 1807. On June 24, 1812, Napoleon began his invasion by crossing the Niemen at Kovno. Although there was a Prussian unit at Konigsberg on the Baltic, and an Austrian corps at Lemberg at the edge of the Carpathians, Napoleon's advance was in no sense a forward movement on a broad front, because these flanking detachments made no contribution to the campaign. The entire effective strength of the French army was concentrated on a relatively short front along the Niemen, between Kovno and Grodno. In essence, Napoleon's advance constituted a narrow thrust directed at Moscow.

The Germans have not revealed their plans, but the operations have presented wide contrast. It will be remembered that the Russians had, in 1812, been able to break off fighting in Finland and on the Danube in order to concentrate against the thrust on Moscow. When the Germans began their invasion at dawn on June 22, 1941, they attacked all along the line on a huge front, from the Baltic to the Black Sea, and they have since extended operations north and south to the Arctic and the Caucasus. They have simultaneously conducted several large-scale operations all along this vast front, and at no time has their attack degenerated into a simple drive on Moscow.

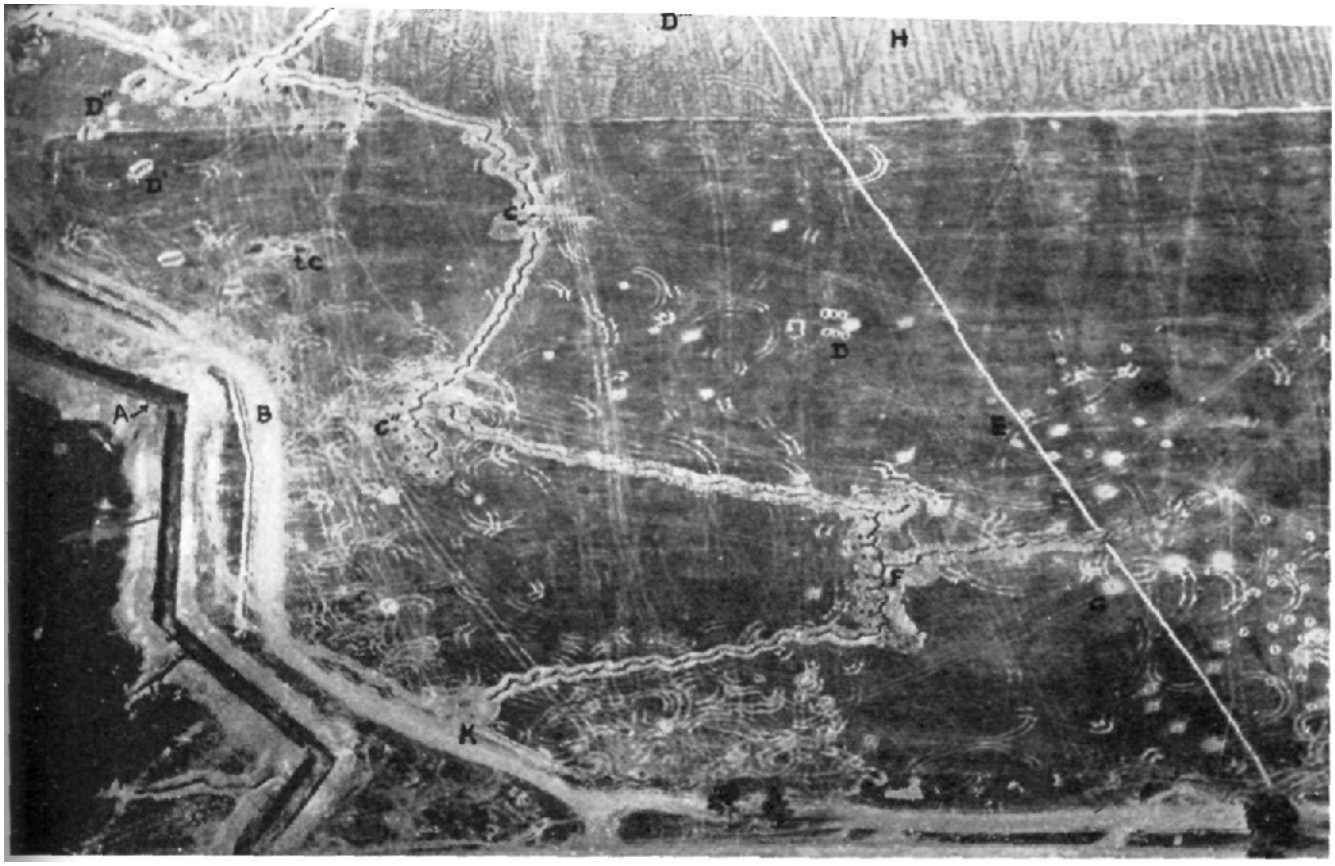
Since at the outset the Russians could muster only about 230,000 men in 1812, Napoleon enjoyed a very decided initial numerical superiority. On June 28 Napoleon reached Vilna, and, after some delays, occupied Smolensk on August 18. He still had not brought the Russians to a decisive fight, and therefore decided to push on. On September 7, he defeated the Russian army at Borodino, and the way to Moscow was now open. On September 14, 1812, he occupied the Russian capital. Napoleon was now nearly two thousand miler from Paris. This great distance coupled with the constant raiding of the Russian cavalry made it almost impossible to supply the army, and on October 18, Napoleon began his retreat. On November 3, the first snow fell, and on the 9th the army reached Smolensk. Three days later, Smolensk was evacuated and the now-famous retreat began in earnest. By December 15 the few remaining ragged remnants had recrossed the Niemen.

Even at the beginning, the Germans enjoyed no such numerical superiority as had been Napoleon's. Although the Germans took Smolensk on July 16, their advance has been methodical. Instead of once more adopting a policy of retreat—as was confidently predicted by many journalists—the Russians have resisted stoutly at every point. This resistance, together with the necessity for regrouping their forces and bringing up new supplies and equipment, have resulted in frequent setbacks to the German advance. It will be remembered that Napoleon's last offensive action was fought on September 7, and that his retreat began on October 18. If the German intend to make a general retreat they at least have shown no signs of doing so up to now. At the present writing they have announced that they intend to dig in for the winter. It is impossible to determine whether this is another stratagem; the future will determine that.

—H. S. F.



This is merely to show that life for our circulation department is not all beer and skittles. Please send in your changes of address, and PLEASE sign them. Under present and future conditions there may be increased difficulty in getting the Journal promptly to some addresses. Notify us if you fail to receive any issue.



AIRPHOTO OF BATTLEFIELD IN RUSSIA

Here is a Soviet position which appears to have been taken in reverse or from the flank by a German armored attack. A careful study of this photo with a strong reading glass discloses some interesting items possibly not clear to the unaided eye and which may be partially lost in this halftone reproduction. At *A* is a tank trap consisting of a deep ditch with vertically cut sides. There does not appear to be any revetting; neither are any other obstacles visible, though they may be present. *B* seems to be a dirt road, possibly made by the vehicles employed in bringing up workmen to construct the tank ditch. At any rate it seems to have been traversed and crossed readily by many tanks. Near *B* and elsewhere tanks have approached to the edge of the tank trap, probably to determine whether it contained any Russian infantry. Note the total ineffectiveness of the ditch; the tanks attacked from the flank, and did not cross it at any point shown in the photo. At *C*, *C′*, and *C″* are antitank gun positions. Severe fighting must have occurred at *C″* where the tanks have circled the strongpoint in a fierce melee. *D*, *D′* and *D″* are points where tanks have halted possibly disabled) and their crews have dismounted and dug slit trenches. The number of individual shelters beside these halted tanks indicates that the crew of the tank consisted of five or six men. At *D* the tank itself seems to have been dug in, at least partially. It appears that there is a ridge along the general line *D′″—E-G*, that the tanks halted along or in rear of this line and took up defensive positions. The number of tank tracks indicates that the attack was in force or that the tanks moved about considerably in order to win and hold the area. *F* is a defended locality with pits for automatic weapons and possibly antitank guns. *K* apparently was an armored cupola concealing a gun, which required much fighting to reduce. The ground must have been soft, possibly muddy; notice how the tank tracks are much stronger where they have made turns, or where they have started and stopped intermittently, notably at *E*. The trenches *C′-C″-F-K* do not appear to have been any obstacle for the tanks. Doubtless they were narrow and shallow. The trench leading to the left from *F* indicates again that there is a ridge in this area, and that where the trench ends at the right is defiladed from the forward areas. *H* seems to be a cultivated field. The diagonal white line, being much narrower than the tank tracks, probably is a buried cable. It is too straight to be a path.

Can our readers determine the direction from which the tanks approached? We would guess that it was from the top of the picture. What items of information are available from this photo which we have overlooked? For instance, are the small craters those of bombs, artillery, or infantry mortars? What is the black blob on the road about an inch to the right of K? Possibly a tree?

ANTITANK DELUSIONS?

By Brigadier General G. H. Franke, U. S. Army

FOREWORD

This was written previous to the recent Second Army and GHQ maneuvers in Louisiana. It was hoped that something in these maneuvers would reveal less need for the measures proposed or the development and exploitation of such means, but such was not the case.

Our newly formed provisional antitank units, largely weaponless at present, do offer promise for greater success if and when the necessary suitable weapons can be provided. In the meantime, the maneuvers only further emphasized the need of *individual means* of defense against tank attack. Even where almost unlimited antitank guns were present, many instances prevailed where only the individual was in a position to attack the tank. This will often be true along defiles, from upon embankments, from brush, from buildings, and within tank night assembly areas; to say nothing of from slit trenches. Men were prohibited from throwing anything at tanks during these maneuvers, so nothing could be demonstrated as to the efficacy of such means or the proper methods of employment.

Is there a solution for antitank defense so relatively simple that we have failed to grasp it?

We concede that a tank attack can be defeated:

a. With a sufficient number of equally good or better tanks—*if* the front of attack can be adequately anticipated for the concentrated effort of our tank superiority.

b. With a sufficient number of antitank guns capable of readily penetrating the enemy tank armor or otherwise stopping him as distantly as 600 or 800 yards—*if* the front of attack can be adequately foreseen to permit the concentration of such *suitable* antitank guns.

c. Behind *adequate* antitank obstacles and traps, natural or artificial—*if* the tank thrust must come against such obstacles and *if* the removal or destruction of these obstacles can be prevented.

d. Behind effective and adequately placed land mines—*if*, when once placed, the removal or destruction of these mines can be prevented. In this defense it must be remembered that land mines are effective upon only the first wave of tanks when being attacked by a persistent enemy well provided with tanks.

e. With air superiority sufficient to seek out and destroy the enemy tanks before his penetration or shortly thereafter—*if* the enemy tanks can be found by day or night and in any weather.

f. By any combination of the above—*but*, still with all the attendant *ifs*.

The above methods call for one or more of: complicated and expensive equipment with attendant production delay, extensive training when time may not be available, and prodigious manual labor on the front.

The foregoing methods of antitank defense are being studied and exploited separately and conjointly but without evidence of very confident expression that they will suffice unless the "ifs" can be eliminated. Conversely, exponents of armored units remain positive that they can overcome any such defenses that now exist or that are likely to be created.

In all likelihood, there is only one satisfactory answer to a massed tank attack, and that is a massed tank counterattack. It would probably be unwise for anyone to advance another theory. However, for any nation that is inferior in such equipment, it is foolhardy to depend entirely upon complicated construction and time to overcome its handicap when other expedients may suffice and will certainly alleviate the enemy's blows.

The purpose of this paper is *not* to discredit in any way the fullest development of the means already named but rather to encourage more detailed exploration along another line which is being little discussed, little appraised and little tried today. This method and means involves, relatively, simplicity as to training, avoidance of manufacturing bottlenecks, keeping economic costs low, and minimizing the labor involved.

When man first became master over the beasts of the jungle he did not seek larger and physically more powerful animals under his control to protect him. His protection was found in his own cunning and in his own courage and through missiles devised and propelled by his own hands. Skillfully, he hid himself in one way or another to stalk his enemy and thereby retain for himself the element of surprise, even on the defense.

Historical examples of the individual man attacking and destroying tanks are not numerous. However, the following comments are based upon fairly reliable reports, are well substantiated, and would seem to deserve reasonable credence.

Neither tanks nor antitank means were strongly represented in the recent Spanish War. Except for a few of modern design, tanks were mostly of obsolescent types. Nevertheless, when used, they *created considerable consternation and proved of value principally in their demoralizing effect—as has been the case in all subsequent campaigns*. Next to the antitank gun, the most effective defensive expedient used in Spain was reported to have been bottles filled with gasoline

and covered with a gas-soaked cloth. These, after the cloth was lighted, were thrown upon the tank with resultant spread of flame after breaking, which brought forth the occupants. Sometimes grenades were thrown along with bottles of gasoline. Another expedient consisted of tying five or six grenades to a central grenade having a handle. After pulling the pin from the central grenade the entire bundle was detonated when thrown at the track of a tank. Colonel Rudolf von Xylander, a reputed German military expert, is reported to have stated that "Infantry won some success against tanks with hand grenades" in Spain. It has been asserted that the Insurgents in this war granted a month furlough and 1,000 pesetas ($150 to $200) to an individual responsible for immobilizing a hostile tank by such hand missiles.

Although the Russo-Finnish war may have afforded unsatisfactory conditions of terrain and weather for any true test of either tanks or antitank methods, we do know that both were applied to an appreciable extent. It appears that in this campaign tanks were generally restricted to roads or to paths of packed snow. Here again combustible bottles were used. Some were of commercial manufacture. Some contained sulphide, alcohol, and gasoline; others a mixture of kerosene and a smoke producer. Matches, with a burning time of 50 seconds, were attached to the bottles but insulated therefrom by insulation tape. Bursting upon the tank, the entire contents caught fire. The object seems to have been to hit the radiator and top of the tank for assured penetration of the contents of the bottle to the interior. Destruction of tanks was reported when both the top and front were so hit. Our April, 1941, issue of THE FIELD ARTILLERY JOURNAL contains excellent illustrations of the effect and a description by Captain John C. Hooker, FA, of the so-called "Molotov Cocktail." It indicates an isolated instance of some antitank training in one of our units with this type of hand missile which was employed by the Finns against the Russians. The author's conception is that of a quart bottle filled with a mixture of two parts of gasoline to one part of oil; this proportion assuring slower ignition and the transmission of the flame into slits and crevices of the tanks to better ignite munitions, gas tanks and gas lines, and for better salutary effect upon the crew. For ignition, this missile had gassoaked waste taped to the bottom of the bottle. This method of ignition does not appear as satisfactory as the 50 - second match (wick) type referred to above, which permits more leisurely ignition in protected position, and approach to the tank thereafter for effectively delivering the missile. Antitank grenades of the potato masher type, containing about 1.5 kilograms of TNT in a tin, were also used with some success when detonated under the tanks. Six 1-kilogram blocks of TNT, with a hand grenade as a detonator, were reported successfully used when placed upon the tops of tanks. In other instances Finnish soldiers were reported to have worked in pairs; men hidden in ditches along tank routes pulled explosives across the road and under the tanks at a moment when dead space made the Finns invisible to the tank occupants. The Finns have provided rather positive evidence that Russian tanks caused no fear if the defenders possessed the morale and only reasonable means to overcome them as indicated above.

General Franco's soldiers filling bottles with gasoline to be used by Moors in capturing tanks; Spain, 1938, at Fruniz.

CHINESE COCKTAIL

Here is the history, in brief, of the so-called "Molotov" cocktail: In 1937, during the fighting around Shanghai, numerous Japanese tanks were captured or disabled by means of improvised gasoline bombs used by the Chinese. They were simply glass bottles of gasoline, without wicks, thrown against the tank. The heat of the engine and flames from the exhaust ignited the liquid. The following year both sides in the Spanish Civil War employed this weapon. In 1939 it was used by the Finns in the Russo-Finnish War, from whence the press dubbed it "Molotov cocktail." Apparently the idea came from "Molotov breadbasket," a name given by the Finns to a special type of multiple aerial bomb dropped by the Russians. So actually the Molotov cocktail is, like so many "firsts," an invention of the Chinese, and should be called *Chinese cocktail*.

Although there is little reliable evidence of even a commendable effort having been made to use hand missiles against tanks during the German advance into the Low Countries and France in 1940, we do have some evidence that small but powerful antitank mines were carried by the individual German soldiers and placed in front of positions at night. General Requin, commander of the French Fourth Army, has been quoted to the effect that the French lost many tanks in their counterattacks from mines so placed.

Under the threat of invasion since the summer of 1940, it is understood that the British have instructed their home guard units in guerrilla methods, to include hand missiles of types similar to those described above. They consider such means as particularly useful in villages and along defiles where tanks can be attacked from above, as from upper parts of houses, embankments and trees.

In more recent campaigns there is little evidence of application of hand missiles heretofore described; although press reports do indicate, in a general way, some isolated successes by such means and to include a degree of destruction from hand grenades thrown into the muzzles of tank cannon. There is evidence too of advantage being taken by night to pit the individual against the tank which has penetrated to rear areas.

In evaluating the possibilities of such individual means of antitank defense, lessons may be learned from the German methods of attack against fortified areas. Here we find infantry and engineers advancing on foot under cover of fire and smoke, with flame throwers, thermite and other grenades, Bangalore torpedoes, smoke candles, explosive blocks (6.6 lbs., with grenade-type detonating caps), charge-placing poles, and much other man-borne equipment, against even strongly reinforced concrete and steel bunkers, to render the knockout blows. Should men be less cunning and courageous and less adequately provided with hand missiles and equipment in defense?

What are the directives and doctrine within our Army along this line?

Our new "Field Service Regulations — Operations," Sec. V, Par. 687, reads in part: "Improvised combustibles and explosives thrown by individuals against the most vulnerable portions of enemy armored vehicles are valuable means of supplementing close-in anti-mechanized defense."

Par. 9, training Circular No. 3, W.D., Sept. 23, 1940, states in part:

"*a*. Troops must be taught to utilize localities which combine the advantages both of obstacles and cover for protection against mechanized vehicles. Every soldier, especially those armed with an antitank weapon, must be taught the possibility and use of his particular weapon against mechanized vehicles. The use of mines, gasoline bottles, and grenades, either issue or improvised, will be encouraged.

* * * * *

e. All troops must be impressed with the danger of withdrawal in the presence of hostile mechanized assault. *Otherwise, they will be caught in the open and destroyed*."

This provides a splendid beginning, but where have we gone from there and why in practice should we still be placing such dependence upon only *improvised* combustibles? It seems far-fetched to expect infantry or any other type units to provide their own munitions plants using materials which they find about the battlefield. It is difficult to picture combat units suddenly gathering together bottles, gasoline, explosives and fuzes to improvise any really useful quantity of hand missiles that will effectively stop tank attacks. Intensive training in the use of the hand rifle is well established. A highly improved weapon is in quantity production. Does improvement in antitank hand missiles, their issue like any ammunition, or intensive training in their use deserve any less attention in this day of armored unit supremacy?

The writer presumes in no way to offer advice as to details covering the best hand missiles or the best technical and tactical training in their use. He does offer for more serious consideration than is in evidence today:

1. The adoption, manufacture, and *issue* of a suitable hand missile capable of at least stalling the medium tank.
2. The adoption, manufacture, and *issue* of other devices such as man-portable flame throwers and smoke ejectors, to be used in suitable proportion in conjunction with hand missiles.
3. The determination of the best technical and tactical procedure in the use of such means and *very definite requirements as to detailed training therein*.
4. Such training, equipment and ammunition to extend to all grades and to all arms and services and to even fire departments, Legionaires, Home Guards, and other loyal groups which might be incorporated into the armed forces for guerrilla warfare against armored troops, should the need arise.
5. The indoctrination of all in the spirit of the *individual offensive* against armored vehicles in tactical and strategical defensive situations.

Against an army of individuals so equipped and so trained the tank takes on the aspect of a dog versus ticks in a tick-infested area. The dog will destroy a few but others will penetrate his ears and other parts and so infest his body that death is his only escape if left to his own efforts.

Someone has paraphrased a maxim of General "Dick" Ewell to read, "The road to glory cannot be followed with much baggage. We can get along without everything but fuel and ammunition." Many a soldier in recent campaigns has craved something in lieu of equipment and of even other arms with which to effectively attack the tank. To some extent he is being taught the folly of running from tanks but has been given very little with which to "sock" them.

Does this not comprise a challenge, and can our industrial ingenuity and military training meet it in time?

Convoy ships at their moorings at Aden (*Life photo*).

BRIGHT LIGHTS

By Lieut. Colonel Riley F. Ennis, GSC

With shillings in their pockets and with itching feet, Capetown looked like paradise to three thousand sea-weary British soldiers and airmen. They grew impatient at the dallying of the port officials as our "trooper" drifted slowly toward the harbor. Table Mountain loomed high in the background, and with two small peaks formed a horseshoe like the valley in which Capetown lay. The gentle approaches to the precipitous mountain were covered with white-stucco, red-tiled-roof houses nestling among the trees. In the foreground were white "sky-scrapers" holding forth their promise of cinema houses and pubs.

The ship drew near; a heavy wind was blowing across the narrow entrance to the new basin of the harbor. The Captain walked nervously back and forth on his bridge, as three great ocean-going tugs gingerly moved our Cunarder toward the basin. As she reached the entrance a gust blew her toward the breakwater and a tug rushed to the rescue.

The railbirds were as relieved as the Captain when our ship slipped safely into her berth; but they soon forgot everything in their eagerness to fish over the high sides for copies of the Capetown papers which were being hawked by dozens of men and boys at the dock. After almost two months at sea with only fragmentary radio reports, they gorged themselves on the most uncensored news they had read for a year and a half.

That night the streets of Capetown were crowded with soldiers and sailors. They walked down the middle of the streets, crowded into cinemas, milk bars, pubs and eating places. They seemed to enjoy most the brightly lighted streets and store windows. It was an extremely orderly crowd, in which I saw only one drunken soldier.

During the night most of the airmen disembarked. They were loaded on waiting trains and rushed to Rhodesia where a large pilots' training center was being established—a part of a project to move these establishments from the United Kingdom to more peaceful parts of the Commonwealth having favorable flying conditions.

Colonel Pearson and I left the ship to go by rail to Durban. The first night the train climbed from the narrow coastal plain to the Great Karroo, a dry Arizona-like plateau which covers over 100,000 square miles and supports one of the great wool industries of the world. In every direction the landscape was covered with Karroo bush and bounded by steep, rocky, barren-looking mountains.

Our train stopped at all towns. Frequently, each consisted of only a pretentious station, a sheep pen, a store and a few mud huts. The station masters, dressed like admirals, signalled the trains in and out of the stations with much flag waving and ceremony. The railroads are State owned and for years there has been talk of the great need for a Capetown-to-Cairo railroad; but when one sees their narrow gauge single tracks, short sidings, small trains and slow schedules, its value is questioned. Although at the present time one with great freight-carrying

---

The recent dispatch of American missions to the Middle East, as announced in the press, and the still more recent increase in tempo of operations in that theater, make this series of significant value.

capacity like that of our transcontinental railroads would immeasurably strengthen the defensive position of the Middle East.

During the second night the Great Karroo gave way to the grassy plains of the Orange Free State. The next morning in Bloemfontein, the cradle of the Boer War, the leisurely train tarried to give the Durban passengers a few hours to look around. On the street there were many South African soldiers. Their narrow-brimmed sunhelmets, bush shirts, well cut shorts and fine set up appearance make them the best looking soldiers of the British Commonwealth. An officer proudly pointed out that every soldier we saw wore the red tab on his shoulder strap, indicating his willingness to fight anywhere in Africa.

South African is proud of her war effort. As a curtain raiser, there was a violent political upheaval. However, the patient and able leadership of General Smuts has brought the greatest degree of unity in their history to some two and a half million whites, about 40 per cent of whom are of British and 50 per cent of Boer descent. The fusion of these two elements has, and will continue to be, a most difficult problem.

The war has done much to industrialize South Africa. The South Africans now make all their own arms and equipment, including artillery. Their armored cars, built on a Marmon-Herrington chassis, are being supplied to many units in the Middle East. The Brigadier responsible for its design feels that its South-African armor plate, for its thickness, is the best in the world. The difficulties in organizing a munitions industry in this mining and agricultural nation deserves careful study.

From Bloemfontein the railroad continues eastward across gently rolling, grassy, treeless plains broken only by "mealie" fields. Suddenly it turns northward and skirts around the northern edge of Basutoland which is a crown colony and outside the Union. It is a high mountainous area thickly populated with over 600,000 negroes; and the white population is carefully limited by law to a few officials. Only one Christian religious sect has been allowed in Basutoland, to avoid the customary struggle for converts between the missionaries.

As we entered Natal, the blanket-covered Basutos at the railroad stations gave way to the scantily clad Zulus, many of whom live in a comparative savage state in mud and grass huts on modern, well fenced farms where they work for a few shillings a month. Their regular diet is a "mealie" gruel. Their economy is simple, for their aim in life is to get a wife, to have a girl child to sell for five head of cattle, to buy another wife, and have more girl children.

As the railroad approaches the coast it winds tortuously down through the green hills of Natal toward Durban. Mr. Sims, an old timer in South Africa, explained that the contract for building the road had been given to a Scotchman on a mileage basis. Mr. Sims served as a staff officer with General Smuts in the Boer War and is today one of his many admirers. As a man of means and broad experience, he expressed the opinion of a large and rapidly growing group of the more substantial leaders in South Africa, when he said, "After the Boer War we got more than we asked for—a nation and the protection of the British Commonwealth; but in the last 20 years we have not contributed our share to the common defense."

Natal is the great British stronghold in South Africa and its principal city, Durban, vies with Capetown for being the greatest seaport of the Union. With no blackouts, brilliantly lighted streets, hundreds of American automobiles, and no ration cards, Durban was the promised land to the soldiers of our convoy. The citizens took the problem of their entertainment seriously. They picked them up off the streets and took them to the beaches, country clubs and on sight-seeing trips. Dances, teas and every conceivable form of amusement were provided during their five days' stay. As our "trooper" slipped away from the California-like city, nestling on the green hills and in the valleys of the coast line, the soldiers were singing, "When the Lights of Durban Shine Again," one of their own compositions.

Outside by stateroom, a soldier remarked, "Durban spoiled the army like Hore-Belisha. They gave us real American hospitality." But I felt that we could not have done so well.

Three days out, a cruiser, which had come around from Great Britain with the convoy, left us to hurry to the Mediterranean. The sailors lined the rails and with the band playing, she paraded by our "trooper," the flagship. The soldiers, led by Colonel Halifax, enchanged "Hip Hip Hoorays" with the sailors. The band played "Auld Lang Syne" and the cruiser partly stuck her modern dual-purpose guns in the air and sailed away.

Thereafter, on Sundays the cruisers paraded up and down the line of columns of merchantmen. On the first Sunday, like a Pied Piper, a little Belgian liner broke out of the column and followed the cruiser. When the commodore indignantly signaled for an explanation, the simple reply was, "We wanted to hear the music."

Its Captain was a "two-barrelled" Belgian. After Dunkirk the ship had run out of a neutral port amid gun fire. At Freetown the airmen aboard her were replaced by a Senegalese Brigade and French Foreign Legion organizations. The skipper welcomed them with open arms and put them to work on his dirty ship. They scrubbed her from fore to aft and from scupper to keel. At 5:30 AM they started the day with an hour of singing—thereafter they sang as they scrubbed. The dirty black hull might have been streaked with red lead on the outside, but on the inside it became as bright as the proverbial nigger's heel. The chief engineer ruled his engine room with a ham-like right fist. When a drunken sailor twisted his nose at Durban, he quietly

put him to sleep for the rest of the night with a fatherly tap on the chin.

Those were lazy days as we moved up the east coast of Africa. The weather was generally calm and the visibility crystal clear. Frequently a few lazy porpoises flopped listlessly out of the calm sea. Planes from the cruiser landed easily on the water and were picked up with little trouble. When a freighter approached, a cruiser like an inquisitive sniffing puppy would challenge her, and after a huddle, she would continue on her slow course.

One night a fully lighted Portuguese liner passed through our convoy—a strange sight among the dark, shadowy hulks that slid silently through the water. That night off the starboard bow, red flashes of light appeared far off on the horizon. They looked like gun fire. After carefully watching them for a long time, the Commodore realized that they were only flashes of lighting in a tropical storm.

Our course carefully avoided the shore line to prevent reports of the position of the convoy from reaching the enemy. Somehow, in spite of the great air of mystery which prevailed about our movements, I eventually found out all the important secrets but one—I never did and still do not know whether our course took us east or west of Madagascar.

The farther north we went, the hotter the weather became. And in the afternoons the boat deck resembled a nudist colony; it was covered with officers in shorts or less, in various stages of sunburn or tan, getting ready for their service in the Middle East. Several were so badly burned that they were put in the sick bay and orders were published threatening disciplinary action against those who became incapacitated for duty because of sunburn.

The social life on the "trooper" took on a little more color; for two good-looking English "sisters" (nurses) joined us at Durban, bound for Aden. When the group that was disembarking at Aden gave their farewell party, the Group Captain (Colonel), commanding troops, announced his engagement to the blonde sister.

The new section of Aden clings precariously on a bit of flat ground between the sea and the barren, brown mountains. At the end of the harbor is the opening of a flat valley covered with piles of salt which shine like so many millions of crystals in the sunlight. The only green in sight are a few stunted trees in the park in front of the Crescent Hotel. The citizens of Aden may have water to drink and baths or grass and gardens—and they prefer the former. It has been only a few years since water was supplied by camel water carts. Part of the water supply for Aden still comes from tanks built at the direction of the Queen of Sheba and uncovered by an Englishman in 1899.

Our Consul General came aboard to take me ashore for a visit. A small, dark haired young man in white shorts without the eternal sun helmet, he gave me a most genuine welcome, for I was the first American to visit Aden since his arrival nine months before. Mr. Timberlake is one of the leading residents of Aden—he plays tennis, golf, polo, sings in a choir and identifies himself with all civic movements. The British officers had a good word to say for him and commented on the high type of men in our Foreign Service.

In his cool, spacious and comfortable office and residence combined on the top of an old Moorish type building, he told me the story of the Italian air raids. During the latter part of 1940 they made some fifty raids of all types over Aden. In the early raids the Italians lost so many planes in landing at night that they began to time their flights to get back to their fields across the way in Africa just after dawn; thereafter, they appeared over Aden with clock-like regularity.

Invariably the Italian pilots reported, "Leaving Aden burning and in ruins." However, the British and Italian press reports did not agree; so the Italian colonel, who was operations officer, flew over with a raid to secure first-hand information. This time the pilots had to fly over the city into the antiaircraft fire and the colonel's plane was brought down. He was captured and became a privileged character who wandered around pretty much at will. He was entertained by the R.A.F. officers, Mr. Timberlake, and many Aden citizens, and had ample opportunity to see the damage done by his air raids—a few holes in an air field which were quickly filled.

The other ranks (enlisted men) could not be taken ashore in Aden; so Colonel Halifax, who commanded an artillery regiment, would not permit his officers to go. Instead they gave a cocktail party. A feature writer of the *London Daily Mail*, just out from Abyssinia, was there and told the story of the South Africans who were flying a military mail route with an old crate. They were getting "bloody tired" of the routine, so built a homemade bomb out of a packing case, scrap iron and explosives. As they passed over a little Italian fort in the bush, which had been challenging them, the co-pilot attempted to push the bomb out of the plane. The fuze was burning, but he could not budge it. The situation was desperate. Finally, with help and a valiant effort, they dumped it. When it detonated, the bomb kicked the plane high into the air, but it killed or wounded practically every Italian in the fort.

The Italians did not believe, for administrative reasons, that the campaign from Kenya into Abyssinia was possible. At the start of the campaign the three British divisions from Africa were on a front of over 600 miles and from two to three hundred miles from the railheads on the Mombassa-Nairobi railroad. The supply roads were miserable tracks axle deep in dust. An excellent day's run for trucks was 100 miles. Roughly, 35,000 men and 26,000 trucks, including those of the division trains, were required to supply the 38,000 men of the divisions.

The campaign had to be completed between the "Little

A British convoy of merchant shipping goes on its way under the protecting wings of aircraft of the fleet air arm of the Royal Navy. Associated Press photo.

Rains" and the "Big Rains" or it would become immobilized. Most of the trucks had to be driven and maintained by negroes. One main supply road eventually became almost 2,000 miles long.

Some of the major supply lessons uncovered in this mobile operation were:

The reserve of vehicle drivers was wholly inadequate.

The 3-ton commercial Ford truck was an unsuitable conveyance. The number of broken front springs was a nightmare.

The two-wheel trailer was completely useless.

It was found necessary for the vehicles to carry a minimum of 400 gallons of gasoline.

The flimsy four-gallon gasoline tins had so many "leakers" that they were impractical. Most unit commanders wanted eight-gallon (Imperial) steel drums which could be fitted into a side box on a truck.

Vehicle replacement points were needed in forward areas.

There was a constant and continuous lack of vehicle parts.

It was necessary to teach vehicle drivers simple maintenance and repair.

The divisional supply services organized for a 60-mile carry proved inadequate, for the distances were never less than 170 miles.

Fresh bread was the most desired item of the ration.

The five pounds per man per day ration proved too liberal and resulted in waste.

The South Africans came out of the campaign firmly retaining their belief in the importance of the appeal of a distinctive and striking military uniform; and that as men lose pride in their appearance, discipline as a whole suffers.

During the night we spent in Aden, black-out discipline aboard ship was relaxed. Port holes and doors could be opened if the light did not shine on the water. The night was hot and stifling; and the loading gear squeaked and rattled.

The convoy broke up in the Gulf of Aden and the ships proceeded singly up the Red Sea. The old timers had promised us hot weather with a trailing wind; actually it was a bit chilly with a strong head wind.

One day before lunch I was talking with a little cabin boy, who took care of the "Marconi men." He had just received his first promotion—from bell hop to room steward—and was feeling like a man. Perhaps 14 years of age, he was frail with scholarly white features and had a fine choirboy voice. He sang in the talent show and always got a big hand. After leaving school he made a trip to the west coast of South America. On the way back to Great Britain, submarines attacked their slow convoy. The first night three ships were hit and on the second, nine. With great pride the youngster described how their escort sank the submarine—which first raised to the surface before it plunged to the bottom.

His great ambition, like so many Britishers, was to come to the United States for a visit or to make his home here after the war is over. The glowing picture which this grave eyed boy gave of New York, framed from stories he had been told by sailors, would have given any of our citizens a feeling of great pride.

Going up the Red Sea, one or both of the coast lines was always visible. Dry, brown and without a bit of green, they are one of the most uninteresting areas in the world. The path used by the Children of Israel cross the Red Sea was safely covered with water; and Mount Sinai loomed up as barren and dry as the rest of the landscape.

On the morning of April 20, our ship dropped anchor at Suez after almost eleven weeks at sea. Suez is at the wrong end of the Canal. Its port facilities were built for pilgrims and peanuts; but are so poorly located

and inadequate that the pilgrims were landed in small boats. Many of the corpulent old gentlemen were discouraged from making the trip a second time.

Off our starboard lay the deadly boring sand dunes and plains of Sinai, whose only claim to renown is that Moses should have selected this forsaken area for the Children of Israel to wander in. It is certain that few of them wander there today.

Several miles off our bow a ship was emerging from the Canal, a narrow strip of water which disappeared between the sand ridges of the desert. The canal's 101-mile course was largely determined by the existence of a chain of salt lakes; the chief obstruction was "the embankment" rising only fifty-two and one-half feet above sea level.

Ships tower high above the long stretches of sand and pass quietly through a land which nature has rendered silent throughout the ages. Sometimes a few Arabs or a string of camels can be seen, but more often on the east nothing but vast expanses of sand. Along the west bank the monotony is broken by a few trees on the Sweetwater Canal and the tents of units guarding the Suez.

The guards of the Egyptian Army, whose country is not at war, duplicate those of the Empire. Dressed in shorts and short-sleeved khaki shirts like the British soldiers, the distinctive part of their uniform is the high cloth cap with visor and neck cloth which covers the tarbush.

At Kantara the railroad, which Allenby built during the World War, reaches the Canal. It follows the sea short route to Gaza, which has been taken by most of the invaders of Egypt and the returning armies during the past 4,000 years. Here in June "Jug" Cornog, U.S.A., and party en route to Cairo had to sleep on the station platform because of passport difficulties with the "Gyppie" officials.

At the north end of the Canal is Port Said, long distinguished as "the most wicked city in the East." However, a series of hard and unsympathetic police officials have done much to clean up the town except for the hawkers of horsehair fly chasers and smutty post cards, the latter being principally photographs of art treasures.

During the peacetimes little effort had been made to prepare for the defense of the Canal. Communication facilities have been built to meet only normal commercial requirements. Twice Great Britain has been forced to defend the Canal. Recent events have proven the necessity of maintaining strong defenses at all vital sea bases and water routes; and have indicated the urgency for the strengthening and dispersing of these defenses.

WAR EXPERIENCES OF A DETAIL MAN

BY CORPORAL CRANE

The second position we occupied in the spring of 1918, like the first, was one that the French had used for three years. The enemy was much better informed about it than we were.

The gun emplacements of Battery E were so exposed that the major almost used them, thinking that the enemy would never believe that anyone could be so dumb. He changed his mind at the last minute, however, and split the battery, placing one platoon several hundred meters to the northeast and the other platoon several hundred meters to the southwest of these very obvious gun emplacements, and leaving the old positions on the line between the two platoons.

His hope was that the sound ranging system used by the Germans would be confused when the two platoons fired in unison and that their findings under these conditions would triangulate on the old positions.

Corporal Williams from Battery E was my relief on the forward OP. When he came up to take over after the first forty-eight hours we discussed the possibility of our little plan working out. Each day a spotter plane had been over but the enemy made no attempt to shell our position. The night after Williams relieved me, a well-organized enemy raiding party came over and kidnapped Williams from his post, killing Private Mountain, who was his wire man.

The following afternoon the plane returned and the Germans opened on the *old* positions with eight-inch "ash cans" and continued for two hours to pound them to bits. The nearest thing to a casualty was the Lieutenant Doctor, who still held to the major's first hypothesis. Fast foot work saved him, but the aid station was a wreck.

There were two schools of thought in the battalion; one held that the Old Man had outsmarted the Germans and the other that Williams had done a smart bit of reluctant lying after his capture. To his credit, the major was the leader of this latter school. After careful computation he announced that, as far as he knew, Williams was the only $300,000 liar in the American Army.

EDITOR'S NOTE: *In preceding issues Colonel Lanza has discussed the diplomatic and strategic background of the war between Italy and Greece. In this article he continues with a description of the winter war in Albania, and the international events which eventually threw Germany and Yugoslavia into the struggle.*

WAR IN THE BALKANS

By Colonel Conrad H. Lanza, FA.

The Greeks, attributing their prior success largely to the poor fighting qualities of their enemy, planned to continue the offensive along the whole front. The new Italian C-in-C decided to hold the Greeks while withdrawing slowly to a defensive position to be held until spring, and preparing for a decisive battle to be waged later.

On 17 November, the Greeks attacked Corizza—the largest and only industrial town in Albania. The attack moved along the mountain ridges around both flanks, in an effort to pinch off the town. The Italians were subjected to constant shelling from batteries which had been dragged up the heights, but offered unexpectedly strong resistance. The Greeks identified both divisions of the newly arrived XI Corps in line. The Italian Air Force was very active and superior to anything the Greeks had in the air.

The first Greek assaults, made in daytime, broke down under terrific artillery fire and bombing. The Italians promptly advanced to counterattack, and took quite a few prisoners. It was necessary to adopt a policy of short, limited advances, which could be completely protected and prepared for by the artillery. This arm on both sides played the predominant role in what was a very bitter battle. After four days of incessant fighting, the Greek artillery was all around Corizza, and made the place absolutely untenable. The Italians withdrew, but their artillery prevented the withdrawal from becoming a rout. Large depots which had been installed at Corizza before the war started were lost. The Greeks took some 1,500 prisoners from stragglers and small detachments cut off. It was a considerable victory and well fought for.

While this battle was going on, the Italians withdrew slowly near the Adriatic coast, without much fighting. Near Konitsa, the Italians retreated about 10 kilometers.

On 1 December, the Italians were still retreating to the new line they proposed to hold, pending reorganization and replacement of materiel for something more suitable for mountain warware. In the rugged Pindus mountains the ground was covered with snow, in places four feet deep. The Greeks followed the Italians, and attacked constantly. Reports from Yugoslavian sources indicate that the fighting was extremely bitter. All gains made through attacks or counterattacks were costly. No advance was possible until the artillery had prepared the way. Keeping the guns well forward, and maintaining their ammunition supply in that difficult country, were major problems which slowed operations.

On 4 December the Greeks attacked Porto Edda. After a terrific artillery preparation they took the town by assault, capturing 1,100 prisoners, but were unable to hold their gains. The Italian artillery, containing many 149-mm. howitzers, placed heavy concentrations of fire on Porto Edda, and the Italians succeeded in reoccupying their former positions. On the opposite flank in Macedonia, on this same day in a local operation, the Greeks took 600 other prisoners and 6 guns. In both cases success was attributed to the efficiency of the artillery. On the 7th the Greeks again attacked Porto Edda. This time, by encircling the town from the east, the were able to seize and hold it. Three thousand prisoner were taken, and about 100 heavy infantry weapons. The Italian artillery, which seems to have been well to the rear, again attempted to drive the Greeks out. The possession of high ground around Porto Edda made it unnecessary for the Greeks to maintain other than small forces in Porto Edda, which remained within their line.

On the 8th the Greeks by moving around the flank passed Argirocastro on both sides, and the Italians with drew to new positions several miles to the north, claiming that they had done so without loss. Greek reports claim "large numbers of prisoners," and capture of materiel of importance without listing these. Two hundred prisoners were claimed "east of Argirocastro."

Very heavy fighting occurred on the 10th along the whole front. Each side claimed that it had caused tremendous casualties to the other. The Greeks took three 100-mm. guns. Next day the Italians counterattacked. Yugoslav reports state that the Italians wiped out the previous Greek gains in the north area. Near the Adriatic, the Greeks made a slight advance. On the 13th, the Greeks renewed their general attack. Yugoslav reports are to the effect that the Greeks reached Tepelini, but were thrown out by an Italian counterattack launched with strong artillery support, and with considerable loss. Italian GHQ announced that their armies had now reached the line selected for permanent

occupation, and that there would be no further withdrawals.

At this date the Greeks revised their estimate of the situation. They estimated the Italian strength in Albania as 16 divisions, including divisions in reserve. The Greeks had just about the same number of divisions, aggregating about 200,000 men in line. Four hundred thousand more Greeks were mobilized in rear areas as replacements and in the services. Considering their total strength, they were greatly superior to the enemy, who could reenforce but slowly owing to the danger of sea movements across the Adriatic. This situation indicated that the Greeks should continue on the offensive, in an effort to crush the Italians with their superior numbers, before they could be materially reenforced.

The original plan of piercing the Italian center had not been accomplished. There had been hard fighting, all to the advantage of the Greeks, but the enemy line held and was continuous. It rested on impassable obstacles—the sea on one side and a neutral country, Yugoslavia, on the other. The only maneuver possible was to make frontal attacks, either on selected sectors or on the entire front.

The decision was to attack all along the line, insofar as supplies and materiel enabled this to be done.

Supplies were difficult for Greece to obtain. A poor country without war industries, she wished the United States to procure, deliver and finance war supplies for her. She particularly needed airplanes (the Italian superiority in the air was a great handicap). She had already received a few American planes from British depots, but found these to be of an unsuitable model. According to an American correspondent, Mr. W. L. White, the landing gear of American planes was poor for such a rough country as Greece. Most casualties to RAF and US planes had been caused by landings at night, without lights, on rough fields. There were but few airdromes in Greece, and these were largely unusable because of repeated bombings by the superior Italian air forces.

On 7 December, President Roosevelt assured King George of Greece:

"It is the settled policy of the United States to extend aid to those governments who defend themselves against aggression. I assure Your Majesty that steps are being taken to extend such aid to Greece, which is defending itself so valiantly."

Statements of U. S. war correspondents were that the morale of the Greek Army at this time was high, and that they thought they could defeat the Italians provided they received needed arms, munitions and air support. The sentiment of the country was decidedly pro-British, notwithstanding that British aid had been negligible. Contrary to the expectations of most people, the Albanians showed no great enthusiasm for the Greek cause. They did not resent the loss of their liberty, but did resent, quite bitterly, requisitioning by both contending parties in their country.

A revised estimate of the situation was also made in Rome. Mussolini became convinced that the failure of the Italian armies in Albania was not due to local commanders so much as to a faulty plan of operations drawn up by the General Staff. The number of divisions required for two separate offensives had been underestimated, and the assumption that the territory between the two Italian flanks was impassable was obviously incorrect.

On 6 December the Italian Chief of Staff, Marshal Pietro Badoglio, resigned. He was replaced by General Ugo Cavellero, who was to draw a new plan and then put it into execution himself.

On 17 December the Allies heard that large German forces were moving south into Italy. German soldiers stated that they were en route to Athens. Transports were located at Naples, Taranto and Trieste. Embarkation of troops had begun at Bari. The total number of Germans in these movements was estimated as about 65,000 men. Yugoslavia reported that she had identified strong German forces mobilizing opposite her north frontier. It seemed that Germany was preparing to reenforce Italy in Albania and at the same time was either going to attack Yugoslavia or was taking measures to insure that Yugoslavia did not interfere in Albania.

In view of this situation, the Greeks decided to make a concentrated attack so as to overwhelm the Italians before the Germans arrived. The British Mediterranean Fleet was ordered to the Adriatic to intercept troop and supply movements from Italy to Albania.

The Greek attack was launched on 18 December. In the mountains the temperature dropped as low as 22º below zero Fahrenheit. Snow in places was 10 feet deep. The wounded froze to death. The attackers wore white sheets over their uniforms, and notwithstanding the weather, went bravely forward. A special effort was made to capture Chimara on the Adriatic coast, where it was warmer and there was no snow. Through stubborn fighting the Greeks made gains, but lost them to counterattacks due to exhaustion of their own men in the severe winter weather. The battle continued during the next two days. Only slight changes in the line resulted. The Greeks did not take Chimara, but toward the east they advanced slightly beyond it. They considered this an important gain as a preparation for an eventual attack on the Italian base at Valona.

The British Mediterranean Fleet entered the Adriatic, but was unable to find any troop or supply movements during three days in which it operated in these waters. Not wishing to return to their base without doing something for their Greek ally, on 19 December the British heavily shelled Valona. They then withdrew. On the way out they found and sank two Italian ships off south Italy. At no place had they met opposition.

It is now known that the German troops passing through Italy were destined for north Africa. None appear to have gone to Albania. Italian reports are that replacements for Albania were sent by air transport,

using German planes. The capacity of the line was 3,000 men per day.

On 22 December another Greek attempt was made to take Chimara and advance on Valona. After some progress east of Chimara, the Greeks claimed 200 prisoners taken here and 2,000 in the entire week's offensive to date. The advance was, however, practically stopped on the main Italian line of resistance.

In succeeding days partial attacks were made in various sectors. The Greeks made their main efforts on the mountain ridges overlooking the valleys. These heights were so deep in snow or slush as to make movements difficult. In general the weather was getting worse. The Greeks were short of blankets, and in the sub-zero temperatures of the mountains, the men lived in caves, in holes laboriously dug out of frozen soil, in huts made out of rocks, anywhere a little shelter could be found. From time to time the men came out and, by stamping and running around, endeavored to avoid frost bites. Burlap, excelsior, anything available was used to envelop the feet to avoid their being frozen. No fires could be kept, as the slightest sign of activity brought shell fire from the enemy artillery or bombs from his air force.

In a belief that the soul of the Italian people was opposed to the war, the British Prime Minister on 23 December in a radio broadcast appealed directly to the Italians to repudiate Mussolini.

Certain reports in Yugoslavia located considerable numbers of German troops in Rumania opposite Yugoslavia and opposite Russia. The base for these reports appears to be observations by border agents, and were probably correct. The distribution of Germans generally through Rumania was appropriate to their training mission of preparing for war with Russia. Their presence, however, caused much uneasiness in Yugoslavia. The Russians, however, showed no signs (outwardly, at least) of being suspicious or disturbed.

In the last week of 1940 there were minor actions in Albania. As usual the Greeks appear to have captured many prisoners, claiming 1,000 this time.

The year 1941 opened with restricted activity in Albania. Reports from James Aldridge, American war correspondent with the Greeks, and from the American military observer in Greece, agree that an inspection of the front indicated that there was more or less constant air, artillery and patrol activity, but that no major movement was contemplated. North of Corizza, lakes were open and roads covered with wet snow. South of Corizza the country was generally frozen.

The Greeks estimated that the enemy on the north front, concentrated in depth along the road to Elbasani, consisted of the Venezia, Parma and Piemonte Divisions, which had been in line since the commencement of the war. Tanks were operating, but Italian activity was not great. Their artillery shelling and air bombing was very accurate and caused considerable losses. Italian supplies were coming forward regularly. Reports indicated that the Italian soldiers suffered from the cold. No enemy offensive was expected.

Short but frequent advances had enabled the Greeks to reach the vicinity of Klisura and Tepelini by 4 January. Around Klisura the fighting had been bitter. The Italians delivered no less than six counterattacks to recover the small amount of ground lost in this sector.

On 6 January, the Greeks attempted to advance to Elbasani. With prodigious labor they posted the supporting artillery on tops of high mountain ridges, from where they had a wide field of fire and excellent observation. Newsmen in Yugoslavia state that this attack made progress at first, the artillery preparation having made it possible to enter into the enemy lines. After this success the men seem to have lost morale or cohesion, owing to the cold. An Italian counterattack, led by tanks of a German model and preceded by strong artillery concentrations, caused the Greeks to break. They left 89 killed and 153 wounded on the field and another 222 men taken prisoners.

Yugoslavia continued to worry over German troops around her frontiers. Latest reports were that in addition to the 4 German divisions in Italy, another 4 divisions were in the vicinity of Timisoara, on the east. This might indicate an intention to encircle the country. A new feature was that the troops on the Rumanian side had received bridge trains containing 700 pontoons. Other European dispatches indicated that Germany war constantly increasing her forces in Rumania. What were they for? The presence of the Bulgarian Prime Minister in Berlin suggested that Bulgaria might join Germany in some new aggression. Yugoslavia thought that this might well be against her, and that the main attack would be from Bulgaria and north thereof. Emergency orders were issued directing the First Army* to take suitable measures to defend the northern part of the Morava valley against any attack from the east. The Fifth Army, with CP at Nis(h), was ordered to extend the line south to the Vardar valley, inclusive. Greece having heard that the Germans passing through Italy had stated they were headed for Athens, thought this might be so. None of these troops had yet been identified in Albania, but if they were coming it was necessary to consider the advisability of attacking the Italians, notwithstanding the winter cold and snow, and defeating them before they could be reenforced.

Russia, having become aware of German movements in the Balkans, recalled her ministers to Moscow for a conference on 5 January. A note was delivered to Germany many on the 7th. After calling attention to the fact that German troops were said to be moving into Bulgaria. Russia pointed out that she had previously given notice that Bulgaria and the Straits were within the security zone of the USSR. She could not, therefore, remain a passive spectator of events taking place in these territories

*Yugoslavia had no corps organization. Her peacetime armies contained 3 divisions, which in war might be increased to 6.—Editor.

when these became a menace to such security. Consequently she took this opportunity to give warning with regard to the appearance of German troops either in Bulgaria or on the Straits.

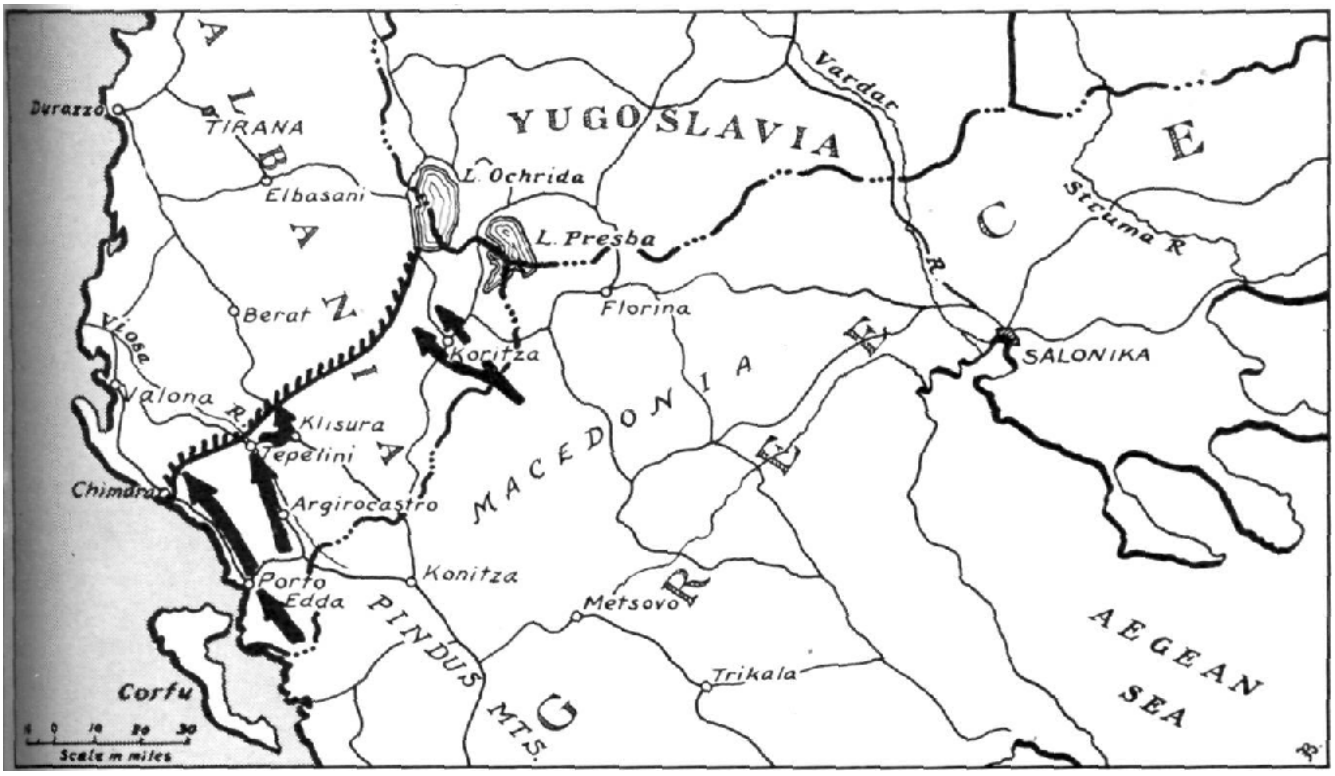
Germany promptly replied. She made no denial as to her alleged intention of sending troops to Bulgaria. Certain measures were in fact about to be undertaken there, but they had no relation whatever to Russia or Russian interests. Whatever was done would be temporary and would be directed against landing of British troops in Greece. Germany had not the slightest desire to secure a permanent foothold either in Bulgaria or on the Straits. She wished only to prevent interference with supplies she received from the Balkans and the protection of the lines of transportation over which these supplies moved to Germany. On the 12th Russia accepted this explanation.

On 7 January the Italian Council of Ministers met at Rome. They considered a report from Italian G-2 as to the probable intentions of the enemy, in view of recent defeats of the Italian Army in North Africa, where the British offensive was still in progress, and the lack of progress in Albania. The report stated that the British war plan appeared to be:

a. 1941: clear the Mediterranean, while holding out in Great Britain;
b. 1941-1942 winter; concentrate troops and supplies in the Near East and in North Africa;
c. 1942, spring; U. S. intervention, and invasion of Europe, probably through the Balkans.

It is not yet known whether this estimate was German or was original with the Italian General Staff. The decision of the Council was to announce "unshakeable faith in the Axis, and the no less unshakeable decision to continue the struggle." The enemy's intentions were to be opposed by denying him bases in North Africa, and through occupation of the Balkans prevent the possibility of any invasion from this direction.

The Greeks occupied Klisura in Albania on 10 January. The town had been deserted, pillaged and burned. About 600 prisoners, including some 20 officers, were taken, together with a battery and considerable materiel. This had been a minor operation in the great war and there were other actions around places without names and of no particular importance. The Albanian front was alive with raiding parties from both sides and with shelling and bombing. The Greeks seem to have had the best of the raids, the Italians of the shelling and bombing, for they had superior artillery and air forces.



On the 12th Yugoslavia discovered that the 4 German divisions, previously identified near Timisoara, had now increased to 4½ divisions and the number of pontons to 1,700. However, this force had commenced to leave and had been found reassembling near Craiova. This reduced the danger to northern Yugoslavia and correspondingly increased it on the south. Troops were relieved from Slovenia and sent south to cover a possible attack, now thought as possibly coming on both sides of Nis(h). It was decided, if war with Germany came, to abandon Croatia, whose loyalty was suspect, and also Slovenia and Banat.

General Ugo Cabalerro, Italian Chief of Staff, had by this date completed his plan for a campaign in Albania.

It provided waiting until spring set in and then launching an offensive all along the front. In the meantime the present line would be held. On 13 January, Mussolini approved the plan. He appointed Caballero C-in-C in Albania, in addition to his other duties. In his dual capacity of Chief of Staff and C-in-C in the field, there should be no further question as to authority and responsibility. General Soddu was relieved, and Caballero assumed command in Albania on the 22d.

On 18 January, the British opened a naval base at Suda Bay in Crete. This immediately became known to the Italians. From excellent air bases in the Dodecanese Islands they started to give Suda Bay an almost daily bombing. Consequently the British were unable to keep ships at this base. Vessels had to slip in and out quickly between raids. The British explained through the press that, with the occupation of Crete, they were now in a position to bomb oil wells in Rumania as well as other critical points. They had heard that small parties of Germans had already entered Bulgaria and that new airfields and antiaircraft batteries were being installed in both Bulgaria and Rumania. These countries should therefore take notice as to what they might expect.

On 19 January several reviews and estimates of the situation appeared. A new British estimate was that the Axis, unable to afford to play a waiting game, was preparing to deliver a mighty blow somewhere. If Hitler was going to keep Italy in the war he would have to figure out some way of restoring the balance of power in the Mediterranean, and offset the effect of increasing United States aid to Great Britain. He had several alternatives. The least expensive, and a very probable one, would be to give increased air support in the Mediterranean. It was thought improbable that Germany would extend her Balkan operations; more likely she would curtail them. She might seek to arrange a separate peace between Greece and Italy.

An Italian estimate was published in the *Popolo d'Italia*, which paper was supposed to represent Mussolini's views. It stated that the Axis had a plan which involved a great attack in the spring. It might be towards Britain, in the Balkans, or elsewhere. Preliminary movements were in progress already.

A Turkish estimate from Ankara was: the concentration of German troops in Rumania undoubtedly was a prelude to some offensive which would occur in the spring. It seemed most probable that this would be against Yugoslavia and Bulgaria, in order to force them to join the Axis, which neither of these states wanted to do.

Next day Mussolini and Hitler, with their respective Foreign Ministers, had a conference. No information was given out as to what was discussed.

London reported that in spite of repeated efforts to establish more friendly relations with Russia, absolutely no progress had been made. Russia insisted in remaining aloof from both contending parties in the war, apparently in the belief that she herself was in no immediate danger. Serious riots which started this day in Rumania, and in which the Germans were not involved were charged by the Rumanian government as Russia inspired, with a view to establishing by force a Soviet communist state at Bucuresti. The riots were extensive and required the employment of large military force to suppress them.

On 20 January, the American Colonel William J. Donovan arrived at Sofia. His exact mission was not made public. He stayed with and worked with the American and British diplomatic missions in the Balkan countries which he visited, and traveled for a portion of his trip in official British planes. He was commonly reported as a United States emissary on a confidential mission. The German secret service doubtless paid close attention to his travels.

At Sofia, Colonel Donovan conferred with King Boris his Premier and his Foreign Minister. Nothing was published as to the results of these meetings. While they were in progress, the passport, letters of credit and other papers of Colonel Donovan were stolen. According to reports from Belgrade, supposed to be based upon what Donovan later told them, King Boris and his Ministers discussed with Donovan the possibility of a joint Balkan movement against the Axis. It envisaged cooperation with Yugoslavia. Bulgaria is alleged to have demanded the cession by Yugoslavia of 9 districts claimed by her as the price of her aid. Donovan naturally made no promise as to this, but is said to have assured the Bulgarians that provided they did not join the Axis in their aggressions, the United States would give full consideration at the peace table to this and other Bulgarian claims.

Donovan then moved on to Belgrade, where he immediately conferred with Prince Paul, the Regent, and his Premier and Foreign Minister. There are no official reports yet as to the substance of these conferences. It may be inferred that Donavan at least assured Yugoslavia that, if she resisted the Axis, she would be eligible to become a beneficiary of the Lend-Lease Act. The latter was then pending in Congress, but its passage seemed certain.

While all these diplomatic moves were in progress, the Greeks were still fighting in Albania. They continued to limit their efforts to occasional raids. On the 25th, they thus captured, near Corizza, 530 prisoners. They now estimated the Italian force as 13 divisions in line, plus 7 in reserve. They had not yet sufficient materiel for a major offensive. They were clamoring for planes and urging the British and Americans to hasten their promised support before it was too late.

On 29 January, British opinion was that Italy was no longer a menace, except as affording an opportunity for German infiltration. The Italian people did not have their hearts in the war, and were not going to fight. The probable mission of the German force in Rumania, now

estimated as about 18 divisions, was to seize Bulgaria. Turkey was known to have notified Greece, and to have warned Germany, that she would not allow the Germans to use Bulgaria as a base to attack Greece. Yet it was uncertain whether Turkey really would fight, unless she herself were attacked. Should Germany attack Greece, and succeed in occupying it, Yugoslavia would then be surrounded by the Axis. It was hoped that Yugoslavia would see this, and rather than permit such a situation to arise would enter the war first. If Yugoslavia did so, it was to be assumed that she would expect the democracies to furnish and finance arms and equipment. This would be a problem.

The Turks still were unable to decide what was the mission of the Germans in Rumania. They considered that there were 200,000 to 250,000 German troops there. This was too large a number if they were intended solely as a guard for the oil fields, and too small if they were intended for an attack in the Balkans. Turkey sent an inquiry as to whether British troops would be available to seize and hold Salonika.

Hitler made a speech on 30 January. He had agreed with his friend Mussolini as to the next move. The Axis stood on the Continent, and nobody was going to oust them. When the time came, a decisive blow was going to be launched. He had considered every possibility, including American intervention. He had never had any interests in the American continent, but if the Americans attempted to come over to Europe, he could and would change his objective.

Colonel Donovan was at Ankara conferring with the Turkish authorities. According to press reports his resolute presentation of the cause of the Free Nations vs. the Dictators, and of the part that the United States intended to play in this struggle, had a tremendous effect in stiffening resistance to the Axis. Turkey made it clear that she was opposed to Bulgaria annexing that part of Greece which was adjacent to Turkey. The Turks seem to have stated that in their opinion Bulgaria had no intention of opposing German penetration.

On 2 February, the Greeks made a deep raid north of Klisura, taking 270 prisoners. The Italians claimed to have repulsed the Greeks, alleging that they left about 200 dead on the field.

Yugoslavian reports of 5 February were that British supplies and war materiel in quantity were regularly landing at Salonika, and were moving west in long columns of trucks, some going as far as the Adriatic. They included guns and ammunition which had been captured from the Italians in North Africa. The Greeks had been badly in need of these supplies, which enabled them to launch (on the 7th) a heavy attack west of Tepelini. Supported by all available artillery and air forces, it started off well. Contrary to expectations, the weather named warm, and blinding rain and lightning occurred. This interfered with both the artillery and air support and greatly hampered the offensive. No important gain was attained.

On the 9th the Italians, having learned about the truck trains out of Salonika, made a big air raid over that city. They destroyed a lot of tanks recently unloaded and some railroad and road facilities.

According to American war correspondents, the Italian Army in Albania had now completed its reorganization. It was estimated as having 14 divisions in line, 4 in reserve, and 2 watching Yugoslavia—a total of 20 divisions, with an aggregate strength of about 300,000. Italy was waiting for spring, to open her offensive.

The Greeks also had reorganized. They expected the Italians to make a major effort in the spring, and believed that this would come in the north sector. Consequently they placed their own reserve on that flank, in the vicinity of Corizza. Each of the Greek divisions in line had about 6,000 mules for transport. This was enough, if the number could be maintained, but there were no more mules at the depots. The local supply was exhausted, and the British stated that they had already furnished all the mules they could spare from their forces in the Near East.

The Greek air force had been reorganized. The Greek mountain artillery also had been strengthened. It was receiving constant firing practice, and was improving daily in efficiency. It was considered the backbone of the army.

Former Greek expectations that the Albanians would welcome them to their country as liberators, and would assist the Greek Army, were now found to be incorrect. The Albanians disliked the Greeks as much as they did the Italians. They wanted their country for themselves, and were opposed to both combatants as fighting for what belonged to neither. The Greeks considered the Albanians as untrustworthy.

Greek troops were reported as having good morale. Offsetting the reports, it appears that sanitary conditions were bad. Typhoid and lice were present. Supplies of ammunition and of clothing and equipage were still low. The enemy air force was manifestly superior; it bombed the Greek rear areas every day, making life miserable. The Italian artillery shelled everything they could locate, and according to Greek reports was remarkably accurate. Life at the front was hard.

Greece received a warning from Germany on or about 9 February advising that, while she did not intend to intervene in the war with Italy, no landing of British troops at Salonika or anywhere else in Greece would be permitted. The Greek general staff took note of this threat. According to their estimate, there might be 300,000 Germans in Rumania, which would be quite a force to reckon with should they attack through Bulgaria. Notwithstanding promises and treaties, Greece did not believe that either Turkey or Yugoslavia would move to help her, if the Germans marched south.

Russia and Great Britain were working strongly to secure the cooperation of Bulgaria. They had hopes of being able to detach her from German influence before German troops occupied that small country. Russian reports are that she sent Bulgaria on 4 February a strong note of protest against the presence of Axis troops in her territory. Bulgaria later announced that she never received such a note.

On 8 February Bulgaria did acknowledge receipt of a British note to the effect that British air forces would bomb the country should German troops be permitted to enter. Strengthening this note, the British Prime Minister on the 10th in a speech stated:

A considerable German army and air force is being built up in Rumania, and its forward tentacles have already penetrated Bulgaria, with we must suppose the acquiescence of the Bulgarian government. Airfields are being occupied by German ground personnel numbering thousands. . . . Many preparations have been made for the movement of German troops into Bulgaria. . . . Of course if all the Balkan people stood together, aided by Britain and Turkey, it would be many months before a German army and air force of sufficient strength to overcome them could be assembled in the southeast of Europe. And in those months much might happen. Much will certainly happen as American aid becomes effective, as our air power grows, as we become a well armed nation, as our armies in the east increase in strength.

One of our difficulties is to convince some of these neutral countries in Europe that we are going to win. We think that it is astonishing that they should be so dense as not to see it as clearly as we do ourselves.

The British press took this occasion to suggest that the Balkan countries join with the British. For if German troops stayed in Rumania, or moved into Bulgaria, the British would surely bomb both countries. Great Britain withdrew diplomatic representation from Rumania.

The day after Mr. Churchill's speech, the United States Minister at Belgrade called on the Yugoslavian Premier. He invited attention to the fact that his country was convinced of Britain's ultimate victory, and would do everything possible to support her.

Greek mountain artillery which was used so effectively in the winter campaign against the Italians. Acme photo.

Yugoslavia consulted the Russians. Russia had a special agent at Belgrade. He advised Yugoslavia that Russia was aware of German intentions to penetrate into Bulgaria, and disapproved of this. However, as Russia was not ready for a major war, she would not at this time interfere. The Belgrade government then asked for an interview with Hitler.

The British decided if possible to force the situation in the Balkans. It was the general opinion in London that Hitler did not know what to do next. The most probable thing was for him to strike suddenly in several directions at once. Therefore the most suitable action seemed to be to use strong influence with the Balkan

states, and make them understand that it would be greatly to their ultimate advantage to line up with the democracies.

Supplementing the warnings already plainly given to Rumania and Bulgaria as to their continued cooperation with the Germans, Great Britain on 15 February declared Rumania enemy country and under immediate blockade. It as decided to wait awhile as to Bulgaria, as German troops had not yet actually been identified in that country Perhaps Bulgaria would see the light.

General Wavell first steps on Greek soil. Acme photo.

With regard to the remaining Balkan states, Greece was already allied and fighting. Turkey was allied, but not fighting. Yugoslavia was neither allied nor fighting. according to a statement by Mr. Churchill, it seemed that if these three threatened states stood together, they could have at their disposal 60 to 70 divisions, which with a combined plan and prompt united action might confront the Germans with a resistance which might well deter them altogether from further adventures in the Balkans.

It was decided to send Mr. Anthony Eden, Secretary of State for Foreign Affairs, and General Sir John Dill, Chief of the Imperial General Staff, to visit these three Balkan states, and attempt to bring them into line with British ideas.

When asked whether the visit of these two officials would be agreeable, Yugoslavia declined to receive them. She was already aware of the British and Russian points of view, and was now trying to see what could be done by direct negotiation with Hitler. A visit from these two high-ranking British gentlemen would at the moment be embarrassing.

Turkey and Greece were willing to discuss matters with these British representatives. The latter were instructed, however, that while the British plan was to be presented, it should not be too strongly urged upon the Greeks. As it was realized that as the Greeks were already at grips with the Italians, they might not be in a position to undertake a new plan.

In the meantime German occupation of Bulgaria was progressing according to a careful plan. On 10 February, 15 Bulgarian divisions were identified concentrating on the south boundary. Roads connecting the Danube with the south boundary were being diligently improved and repaired, particular attention being given to the road, including bridges which were being strengthened, in the Struma valley. A large number of German "civilians" were working on airdromes and had nearly completed 11 airports and some 50 landing fields. The Danube was free of ice. Nine bridge trains heretofore

reported in Rumania were ready at five different places. There were reports that German antiaircraft batteries had arrived in Bulgaria. About 50 OPs, manned by Germans, had been established.

Some persons in Yugoslavia estimated that there were perhaps 23 German divisions in Rumania, of which 5 were mechanized divisions. Four or five divisions were east of the Danube in Dobruja. Assuming that 5 bridges were laid across the Danube, taking about nine hours each, it was calculated that the entire German force could be on the south Bulgarian frontier within 4 days of commencement of work. Their supplies were apparently already there, under supervision of the "civilians" estimated as numbering some 5,000 persons.

Mr. C. L. Sulzberger, noted American war correspondent, under date of the 12th reported that the Bulgarians were increasingly bitter against the British, especially resenting the idea that the democracies should set themselves up as the police power of the world.

Minor fighting continued in Albania. On 13 February, the Greeks in a raid took 200 more prisoners. As usual the Italians claimed that the raid had been repulsed with heavy losses. Two days later bitter local fighting occurred near the Adriatic coast. Again the Greeks took 250 prisoners.

Meantime Hitler accepted the Yugoslav proposition for an interview. On 14 February he received (at Berchtesgaden) M. Dragisha Cvetkovich, Prime Minister, and M. Cincar Markovich, Foreign Minister. According to the report of Arthur Bliss Lane, U. S. Minister at Belgrade, based on what these two statesmen said after they had returned home, Hitler proposed that Yugoslavia join the Axis and the New Order. He did not give any ultimatum. Neither was the proposition accepted. It was taken under advisement. The Yugoslavians made it plain that if they joined the Axis, under no circumstances would German *troops* be permitted to cross their territory to attack Greece, which was an ally of Yugoslavia, both being members of the Balkan Entente. Hitler on his part was equally clear. In no uncertain language he stated that the influence of Great Britain in continental Europe must be destroyed, and that at the outset the British must be expelled from Greece. Germany was willing to accept Yugoslavian neutrality in case it became necessary for Germany to move against Greece. If Yugoslavia accepted this he would in return guarantee their territorial integrity. M. Cvetkovich, in relating this commented that in his opinion a guarantee by Hitler had no value.

From what has later occurred, it seems probable that following similar action in the case of Rumania, Hitler discussed the advisability of Yugoslavia ceding to Hungary and Bulgaria territories claimed by these two nations. As compensation, there would be no objection to Yugoslavia occupying Salonika.

According to despatches of the Hungarian government, on the same day as the Berchtesgaden interview, the U. S. State Department sent for the Yugoslav Minister at Washington. He was told (the despatches say that it was time to put an end to the successes of the Axis. The American Government, through the Lease-Lend Bill, would soon have the means to curb the efforts to establish any "new order" in the world. Any European state which would refuse to submit to this idea would receive assistance.

Press despatches of 15 February stated that both the United States and Great Britain had advised Russia that according to their information Germany was preparing to attack her. She was invited to join the democracies before it was too late. Russia, not convinced that she was in immediate danger, ignored this invitation.

On 17 February, the French Government at Vichy had reports that, in view of the brilliant campaign just won by the British in North Africa, there was now available a considerable force of Tommies for use elsewhere. The indications were that these troops would soon be used to construct a new front against Germany in the Balkans. The source of these reports indicate that their substance was known to Germany. This day Bulgaria and Turkey signed a non-aggression pact, which protected the German left flank, should an invasion of Greece from Bulgaria be needed.

Next day, Yugoslavia so far accepted Hitler's proposition of the 14th by announcing that while intending to maintain the strictest neutrality in the war with Greece, her railroads were available, on a commercial basis, for the shipment of any stores, military or otherwise, en route to or from Germany. She would also agree to selling Germany an increased quantity of foodstuffs.

The Russian government claims that, not having received any reply from Bulgaria to the note delivered on the 4th, disapproving of German infiltration, another note to the same effect was sent on the 20th. No answer was ever received to this. Bulgaria afterwards explained that she had no record of receiving either this note or the first one. Russia was right as to German infiltration. Also on the 20th, German troops laid two bridges across the Danube, one each at Ruschuk and Nikopol. No troops, except the engineers of the bridge trains, crossed. Work was being pushed on improving lines of communications in Bulgaria. Nine new commissary depots had been established. Bulgarian commissary units, bakeries, butchers, etc., were mobilized; so also were railroad units. Rumania mobilization was reported ordered to be completed by 15 March, without information as to its objective. Strong German propaganda in Croatia was having considerable success. Two days later roads in Bulgaria were marked with signs in German.

Greece apparently paid little attention to what was happening in Bulgaria. She had fortified very strongly her frontier with that state. There were but few approaches, and these led through narrow passes, which it was believed could be defended by relatively weak forces. It was thought that Yugoslavia really would be neutral.

Under the circumstances, it was felt that she could hold out against a new attack. She went ahead with the campaign in Albania, by wearying the Italians by frequent raids. On the 19th, 200 more Italians were so captured.

On 22 February, Mussolini stated that Italy had mobilized two million men. He added that he could mobilize double this number, but did not yet need them. Losses in Albania to date had been "limited to a few thousands, mostly wounded." He admitted as exasperating recent Italian losses in Africa. But the Italian capacity for recuperation was formidable; the last battle would be the winning one. In the spring the fun would begin. He affirmed the determination of Italy to stick with Germany.

Next day, Russia having failed to reply to the suggestions of the democracies as to closer relations, predicated on a predicted attack by the Germans, the United States and Great Britain placed certain economic restrictions into effect against Russia. They refused to release ships they had seized and which formerly belonged to the Baltic states and which Russia now claimed properly belonged to her.

Hitler delivered a speech on the 24th, responding to Mussolini by stating that he also would stick to Italy. Italy had immobilized strong British air, land and sea forces in Africa, and was entitled to credit for this. It had given Germany an opportunity to rest, which had been advantageous. Now it was the time to act. He had learned to wait, but he never loafed during a waiting period. As to his future intention, if the British landed anywhere in Europe, German troops would encounter them. He spoke about air and naval warfare, but said absolutely nothing as to war on Greece or on any other European country.

By this time Mr. Eden and Sir John Dill had arrived in Turkey. It was necessary to send them instructions. The British Cabinet discussed what had now best be done. There were two propositions: First, the one on which the emissaries had been sent to the Balkans, to erect and maintain a Balkan front against Germany. Second, there was proposed, apparently on recommendation of the British High Command in the Near East, to substitute for this a continuation of the wonderfully successful campaign in North Africa until all of Tripoli had been conquered.

This would connect the British with the French in Tunis, who might in this case join them. There would then be an excellent base available for an eventual invasion of Italy, which appeared to be tottering, and might easily be knocked out of the war. This would make a better front against Germany than the Balkans.

Greece was worrying the British. She had twice rejected offers of British troops. If Greece seriously foresaw a German attack through Bulgaria, her action would seem to be without explanation. The British estimate was that eight divisions was the maximum which the Germans would be able to supply over the existing road net into Macedonia, east of Salonika. It was believed that considering the strength of the permanent works on

that frontier, 6 divisions in addition to the fortress troops would suffice to guard that front. It was understood that the Greeks had 3 divisions already there, consequently 3 more divisions, which the British might be able to spare, should be able to stop the Germans.

No decision was made. In view of the divergence of opinions, it was thought best to wait for a report and recommendation from Mr. Eden and Sir John Dill.

On 25 February, Mr. Eden and his companion commenced a series of conferences at Ankara with high Turkish officials which continued during the following two days. Neither the British nor the Turks made any announcement of the results attained. According to American advices, there were no results; and Mr. Eden and Sir John Dill left for Athens apparently rather depressed. Still the British did not lose hope. Sir Stafford Cripps, their ambassador at Moscow, had attended the Ankara conferences, and when these broke up, he flew back to his post, apparently under instructions to attempt to get Russia to put some stiffness into Turkey and brace her up. At the same time, Mr. George Rendel, British Minister at Sofia, warned Bulgaria that Great Britain might withdraw diplomatic recognition. There was no intention of permitting what happened in Rumania to be repeated in Bulgaria. If he went, that country would be a theater of war.

Germany knew that Mr. Eden and Sir John Dill were leaving Ankara for Athens. There was a fair idea as to what they were trying to do. Just before the arrival of these two gentlemen at Athens, the German Minister advised the Greek government that if Greece allowed British troops to land anywhere in their territory they must expect a German attack. Greece must choose between accepting additional British aid or accepting German mediation in the Italo-Greek conflict. The "advice" was practically an ultimatum, although it did not call for an answer by any specific date.

On 1 March, Bulgaria formally joined the Axis by a treaty signed at Vienna. Great Britain then withdrew her Legation from Sofia as she had threatened. Sir Stafford Cripps, having returned to Moscow, lost no time on his mission. He asked Russia to join with Turkey in a joint neutrality declaration, covering possible entry of Turkey into a Balkan campaign. The Russian reply was that because of the seriousness of the situation, she did not wish to commit herself at this time.

Mr. Eden and Sir John Dill arrived at Athens on 2 March. The first British troops, other than air forces, also arrived. Their transportation, heavy weapons, and supplies had preceded them, and were soon available when the troops debarked. The German Intelligence Service seems to have been functioning well in Greece, for, within the day, German columns marched south into Bulgaria by land from Dobruja, and over the Danube bridges. By next day they had reached the Greek frontier.

It was under these circumstances that Mr. Eden and Sir John Dill on 3 and 4 March consulted with King George II, his Prime Minister, M. Alex Korizis, and General Papagos, Greek C-in-C. According to explanations subsequently made by Mr. Churchill in the House of Commons, M. Korizis spontaneously declared that Greece was resolved at all costs to defend her freedom and native soil against any aggressor, and that even if left totally unsupported by her three allies, Great Britain, Turkey and Yugoslavia, she would remain faithful to her alliance with the British, which had become effective upon the opening of the Italian invasion. She would fight both Italy and Germany to the death.

The British representatives agreed with General Papagos that a sound military plan having good prospects of success could be made. It was decided to recommend to London that additional British and Imperial troops and supplies should be rushed to Greece.

London appears to have referred this recommendation to General Wavell, C-in-C in the Near East, for remark General Wavell was in favor of continuing the North African campaign, and failed to approve detaching troops needed for this purpose to go to Greece. He preferred one line of operation. General Wavell was overruled, and was directed to send 3 divisions, with usual accessory troops, to Greece without delay. The first of these troops left Egypt on 10 March.

Having accomplished their mission, Mr. Eden and Sir John Dill left Athens on the 5th for Egypt, to arrange (with General Wavell) the details as to troop movements. Greece announced:

The army and Greek people have decided to face events, no matter from what direction, and to fight on with the same undying will for their liberty and their Fatherland.

Great Britain extended the blockade to include Bulgaria. Her minister in withdrawing from Sofia invited attention to what had happened to Italy for joining the Axis, and indicated that Bulgaria could now expect the same fate.

On 4 March, Russia delivered a third note to Bulgaria. This time she commented on the arrival of German troops. The note read:

The Soviet Government can not share the opinion of the Bulgarian Government as to the correctness of the latter's position in this matter, since, irrespective of the desire of the Bulgarian Government, the situation does not lend itself to preservation of peace, but rather to extension of the sphere of war and to Bulgaria being involved in it.

Bulgaria has acknowledged receipt of this note. It had no effect. Bulgaria had joined the Axis. General von List, a distinguished German officer, arrived and assumed command of the forces in Bulgaria. There was no longer any pretense of disguising the German movement. Troops were arriving in a steady stream, and were concentrating on the south frontier, with apparently major forces on the two flanks.

Yugoslavia was alarmed. The concentration of German and Bulgarian forces might be against her. Mobilization of additional forces was ordered to be completed by the 9th instant.

According to Mr. Arthur Bliss Lane, U. S. Minister at Belgrade, Prince Paul (the Yugoslavian Regent) was worried over the turn of events. He left his capital on the 4th, ostensibly to hunt and rest on his country estate, which happened to be only a few miles from the German boundary. Instead of staying there Mr. Lane says he dashed on to Berchtesgaden and had an interview with Hitler. The Prince belonged to the old Imperial Russian family, many members of which had been murdered by the Communists. He had owned valuable property in Russia which the Soviet Government had confiscated; he was anti-Soviet.

Prince Paul feared the Axis. He foresaw that in case of war, Hungary and Bulgaria would join the Axis, in order to divide up Yugoslavia between them. This combination not only had overwhelming strength, but had an encircling position. The Prince could see no way by which the democracies could save Yugoslavia. Mr. Lane fails to state what Prince Paul and the German Chancellor agreed to on this occasion, and which is not yet otherwise reported upon.

While this was going on, Marshal Goering (No. 2 Nazi) consulted at Vienna with General Antonescu, the Rumanian leader. An official statement explained that the meeting concerned political and economic matters. Through what has subsequently occurred, and the fact that only military personnel appears to have taken part in the conference, it seems probable that the "political" matter was the prospective participation of Rumania in a war on Russia. Promptly after the conference Russian troops commenced to close in on the Russian frontier.

The 6th saw Prince Paul back in Belgrade. He told his Ministers that there was no way out of it. They must come to terms with Germany on the basis of proposed agreement made on 14 February—that is, join with the Axis, with the reservation that Axis troops would not pass through Yugoslavia for use against Greece. He knew there would be opposition to this, and it might be possible to limit the treaty to a simple non-aggression pact—he could not say. Alternatives were to join the Axis without reservations; oppose the Axis by war, in which case the democracies would presumably be allies with doubtful ability to be of much value; or plain submission to the Axis without joining or agreeing to any treaty or pact.

A harrowing session followed—with differences of opinion, coaxing, threats. No agreement was arrived at. Five ministers resigned. The remainder agreed then as a compromise, and as best possible solution under the circumstances, to Prince Paul's suggestion to accept a non-aggression pact if it could be had, or else join the Axis with reservations. Prince Paul was authorized to conduct necessary negotiations along this line.

On this day Mussolini was in Albania making an inspection of his soldiers. He had in fact 26 divisions, new well equipped and waiting for spring before resuning the offensive. Four divisions were in reserve, 2 were watching Yugoslavia, and 20 were available in line. The Greeks, hearing about Mussolini's visit, wished to let him know that if he thought the war was over, he was completely mistaken. They launched a powerful limited attack in the mountains, near the center of the front. It does not seem to have had any particular objective. With strong artillery support, the Greeks broke into the Italian front and took 1,050 prisoners.

Being now certain of the arrival of British troops, the Greeks went ahead with the sound military plan devised by the Athens conference. This called for the evacuation of East Macedonia, less certain strong points blocking roads out of Bulgaria. A defensive line was to be established by 3 Greek divisions along the Nestos River. This would cover Saloniki and afford space behind which the British divisions could assemble. The required troop movements started on the 6th.

On 8 March, the Italians in turn launched a strong limited offensive near Tepelini. It made little progress, and the Greeks then counterattacked, taking 391 prisoners. During the next two days the Greeks took 750 more prisoners. On the 11th the Italians extended the attack to both sides of the Viosa valley on a front of 20 kilometers. There was very heavy artillery activity, and some bitter fighting. Losses were heavy on both sides. The Greeks took 415 more prisoners.

On both the 12th and 13th, the Greeks counter-attacked in force. So did the Italians. Both armies used intense artillery fire. The Italians bombed extensively; the Greeks not so much, as they had few bombers. In savage fighting neither side took prisoners. All attacks were repulsed; neither contestant was able to gain any important objective. The net result of the six days' battle appears to have been slightly in favor of the Greeks. Each side claimed to have inflicted losses on the other equal to about 1 division.

In the meantime Prince Paul's Council of Ministers was still trying to solve what appeared to be an unsolvable problem.

As rumors of the difficulties of the government spread in Belgrade, the British Minister, Sir Ronald Ian Campbell, advised the Yugoslavs that he had been in Athens and had attended the conference held by Mr. Eden. He gave out hints as to probable assistance coming from Turkey and Greece, should war with Germany result. The Turkish Minister seconded that by advising that Ankara favored Yugoslavian resistance to Germany, and would back her in case of war. Mr. Lane called in turn, and stated that the Lease-Lend Bill was now a law, and that the United States was prepared to furnish planes, ships and guns as needed.

To further complicate the situation, ugly rumors spread through Belgrade that the Croatians, forming some 30 per cent of the population, favored joining the Axis. They were reported to be in direct, secret communication with Germany, with a possible view of seceding from Yugoslavia. Prince Paul's council continued to deliberate.

Information received at Washington during this period, indicated that relations between Germany and Russia were becoming cooler. Russia had desired that Bulgaria resist the entry of the German army into her country, as her notes had plainly hinted. She had not dared to openly advise Bulgaria to fight. She was now anxious that Turkey enter the war, but again did not dare so to advise Ankara, for fear that this might bring on a German attack. Russia had already advised Yugoslavia of her displeasure over the prospects of her making some kind of a deal with the Axis. She now stopped the supply of arms and munitions which had been regularly going forward (camouflaged) over the Danube route.

On 17 March, Yugoslavia reinforced her Fifth and Third Armies on the defensive line, already equipped with pill boxes, through Nis(h) and Skoplje. Because of the hints of the British and Turkish ministers as to probable Turkish assistance in case of war with Germany, an extraordinary crop of rumors was in circulation. It was understood that Turkey already had 500,000 troops west of the Straits, and when war came would advance into Bulgaria with the initial mission of seizing Philippolis. Consequently, the mission of the two Yugoslavian armies was, when the Turks reached this point, to attack south along the Vardar and Nestos valleys, where they would meet a British offensive coming north from Greece. Details for this maneuver were to be worked out at a meeting with the Turkish Chief of Staff, who was supposed to be en route to Yugoslavia.

Next day the Yugoslavians' estimate was that the bulk of the German army in Bulgaria was in the southwest sector, faced to advance south down the Struma valley. The proposed maneuver therefore appeared to promise success in surrounding these Germans and capturing them. An understanding with the British, Greeks and Turks was all that was necessary. It was known that the Germans had at least one mechanized division located at the head of the column in the Struma valley. Five large and 28 small airdromes had been identified in Bulgaria, plus 2 seaplane bases on the Black Sea.

British troops were now rapidly arriving in Greece and concentrating southwest of Saloniki. In Albania the Greeks made another raid, capturing 165 Italian prisoners.

In somewhat distant Cyprus, Mr. Anthony Eden made a final effort to have Turkey accept the project of entering the war. A Turkish army advancing west from Adrianople would greatly assist the cause of the democracies. M. Saracoglu did indeed fly from Ankara to confer with Mr. Eden. Mr. Eden failed to convince him. Saracoglu is as the saying goes "from Missouri." He had to be shown. In this case he was unable to see how Turkey could benefit by entering the war.

At 9.30 PM, 20 March, the Yugoslav Council of Ministers, which had not yet been able to agree on any plan, met once more. The army gave them a new estimate. It was now known that the reported numbers of Turkish troops west of the Straits had been grossly exaggerated. Not over 100,000 Turks were there, and it was very doubtful whether they would do anything except defend themselves if attacked. There was no truth as to the Turkish Chief of Staff being en route for consultations, it would be necessary to consider that Turkish assistance was "out." Turkey had, however, advised that she did not believe that the Germans would attack south from Bulgaria. The roads in that area were unfavorable for mechanized troops; and an attack by other types of troops against the strong Greek defenses would be too costly.

News, believed to be reliable, had been received from Albania that Italian morale was low. The men did not want to fight; divisions were disintegrating; some units were in wild and headlong flight towards the Adriatic. If the Greeks furnished a force of 100,000 men to attack north from their lines in Albania, a Yugoslav attack on the Italians from the north might result in quickly capturing that entire country. As the Greeks were understood to have 500,000 men under arms, they should be easily capable of furnishing such a force, and at the same time hold north of Saloniki.

Yugoslavia when completely mobilized would have possibly three quarters of a million men in uniform. With the Greeks, and the expected British assistance, the combined armies were considered sufficiently strong to ensure victory against the Germans, Italians and Bulgarians.

The council adjourned without action, but reconvened next morning. A hot discussion followed, as to whether Yugoslavia should join the Axis, with reservations, which it was now known Germany would accept, or whether she should defy the Axis, and join the democracies. Feeling was very bitter; there were strong arguments for and against each proposition. Eighteen ministers were present, and Prince Paul made it plain that the discussion had to end, for Germany would not wait longer for an answer. The question had been before the council since 14 February, and presumably everybody had had time to form an opinion. A vote would be taken.

The Minister of War announced that as he represented the Army, which was vitally interested in the decision, he considered himself disqualified to vote. The Prime Minister and the Minister for Foreign Affairs, also considered themselves disqualified, by reason of the fact that it was they who had proposed the matter to be voted on. The foregoing abstentions were in accordance with the Yugoslav custom, that ministers would not vote on their own measures. Two more ministers declined to vote on the ground that they had had insufficient time to properly consider the question. Thirteen voted on joining the Axis with reservations. Ten voted YES, and three NO. The ayes had it. Prince

Paul was authorized to conclude the negotiations with the Axis; those who had voted *no* resigned, and were to be replaced by new ministers who approved of the decision, so the Cabinet would be unanimous.

After the meeting was over, the British and American Ministers visited the Belgrade government in an unsuccessful effort to obtain reconsideration of the decision to join the Axis.

By the 23rd it was generally known throughout Yugoslavia that the government was preparing to unite with the Axis. The army was strongly opposed to this. The Axis was a hereditary enemy. There were demonstrations in several states. Only Croatia appeared to be in favor of the proposed movement. During the day, the British radio broadcasted four appeals begging the Yugoslavians to disavow the intent of their government, and reject terms with Germany. There was intense activity by the American, Turkish and British Ministers in a last effort to prevent Yugoslavia from joining the Axis. The American Minister saw Prince Paul, who stated that he had until midnight to officially inform Germany that Yugoslavia had definitely decided to join the Axis. He gave Mr. Lane to understand that he would do so.

On 24 March, the discontent in Yugoslavia, outside of Croatia, was so intense that rumors of a revolution were prevalent. The British Minister advised the Government that if they thought the British would condone Yugoslavian adherence to the Axis they were deluding themselves. Russia, seeing that a new war in the Balkans was brewing, with good prospects of its engaging Germany in a major enterprise, now issued the statement which Sir Stafford Cripps had requested since the first of the month. Russia announced that if Turkey should be attacked, Russia would not take advantage of such a situation, and would remain strictly neutral.

Notwithstanding the discontent in their country, the Yugoslavian delegation left by the night train for Vienna, to sign up with Germany and the Axis.

On 25 March, the discontent throughout Yugoslavia seemed to be general but unorganized. At noon, with great ceremony, at Vienna, the Yugoslavian representatives formally joined the Axis. A protocol, or reservation, provided that

Axis power Governments during this war will not direct a demand to Yugoslavia, asking for the march, or transportation, of troops through Yugoslav territory.

In London, a British Minister, Lieut. Colonel Leopold S. Amery, broadcast another appeal to the people of Yugoslavia, urging them to resist the betrayal of your honor and independence. . . . If the people clearly show that accession to the Axis pact is regarded by them as a betrayal of their honor and independence then surely it is the duty of the government to consult the people before the pact is ratified. It is not too late for that.

The stage was now set for another war in the Balkans.

COMMENTS

1. Although the democracies noted coolness in the relations between Germany and Russia, there was a general failure to realize that the major German effort in 1941 would be an attack on Russia.

2. The British opinion of 15 February, 1941, that Hitler was undecided as to what to do next, but most probably would strike in several directions at once, is contrary to German precedents in this war. They have been most careful to strike in only one direction at a time.

3. The Axis campaign in the Balkans was a preliminary movement to protect the right flank of an attack against Russia. Strategically it was similar to the war in Norway, where the occupation of that country prevented a north front being opened against Germany. For the Axis, war in the Balkans was a minor but necessary operation. It prevented the formation of a south front against Germany.

4. The original Axis plan appears to have been to limit the war to Greece, where the British already had a foothold. Italy was detailed to attend to this. The Axis sought to bring the other Balkan state within its orbit by negotiation. This succeeded with Rumania, which was anti-Russian and needed a friend; and with Bulgaria, which on account of old scores, was anti-British. It almost succeeded with Yugoslavia.

5. In Albania, neither Italy nor Greece realized their programs during the winter 1940-1941. The Italians were defeated in their attempts to invade Greece; and the Greeks failed to invade Albania. In both cases there was a lack of numbers and lack of equipment. The original Italian attempt was made with forces inferior to those of the Greeks, and was rather easily driven back. The Greeks in attacking in their turn, had some superiority in numbers, but not in equipment, and were unable to pierce the Italian main line of resistance. Neither side showed any outstanding leadership; but both sides showed that the men could fight under most difficult conditions. Both sides lacked the special clothing and material required for prolonged fighting in high mountains deep with snow. As a result the winter halted major operations. For months only raids and minor attacks were made.

6. The winter war between Russia and Finland had previously proved that it is possible to conduct military operations even in arctic climates, despite cold and snow. The Russians and Finns had had the equipment and training needed for this; the Italians and Greeks did not. The lesson is that nations need to have winter-trained troops if opposed to an enemy who has had the foresight to provide them for its use.

[EDITOR'S NOTE: *In an early issue Colonel Lanza will describe the German attack on Greece and Yugoslavia*.]

Campaign of Flanders, 1940

French artillery column moving on road under protection of British antiaircraft battery. The AA guns, predictor and range finder were set in the open without any protection or camouflage. A British staff car coming out of a side road is trying to cut into the line of French vehicles.

MAY 27TH

In spite of the precarious situation, the night was perfectly quiet: not a gun flash to be seen nor report to be heard; the traffic on the highway N 70 was limited to two liaison cars going to Ypres, which our sentries challenged. Before daybreak, a motorcyclist from Brigade H.Q. brought us the operation orders for the day. We were to move at once to occupy a position north of Vlamertinge to defend the Yser canal north of Ypres, in direct support of the 1st "Dragons Portés."

Another unit, apparently, was in charge of organizing the resistance south of Ypres; I rather regretted at the time not to be given the opportunity to work again in this southern sector which I had known back in October, 1914, during the first battle of Ypres.

The reconnaissances left at 5:30 AM, the batteries at 6:30. The Luftwaffe was already at work, bombing crossroads and towns; but whereas in the early part of the campaign the German craft had complete control of the skies over our heads, now we enjoyed the watchful protection of the RAF and of the up-to-date AA materiel of the BEF. A direct consequence of this new situation was that the German bombers were more erratic; also they seemed to have more or less abandoned transient objectives such as columns on the move or batteries in action for permanent ones: towns, crossroads, railroad stations, and the like.

Our itinerary followed the small paved roads, Halle-bast-Ouderdam, then Ouderdam-Vlamertinge. I halted the head of the column before entering Vlamertinge. We waited there over one hour, until completion of the reconnaissances. The terrain in this flat country affords only a few good battery emplacements. The artilleryman has therefore two solutions to his problem: if only a short time is available, he occupies the most accessible position even if it embodies obvious defects or drawbacks. When on the contrary, enough time is allowed, our conscientious

V—The Retreat Northward

By Captain Leo Framery, French Army
Illustrations by Andre Jandot

colleague undertakes to examine meticulously *all* the possible emplacements in order to determine which is the *best*. This is liable to require a long time in the plains of Flanders, where the terrain is criss-crossed by hedges or ditches. In pre-motorized days, one's faithful "charger" was of considerable help in such circumstances and saved many a step. Nowadays, most of this pacing to and fro has to be done on foot, as even the best of reconnaissance cars has its limitations as far as hedgehopping, ditch jumping or marsh wallowing are concerned.

In the case under consideration, the reconnaissances were completed in a little more than an hour. Each battery was led to its selected emplacement.

The positions were north of Vlamertinge crossroad, near a place shown on the map as Pottenhoeek, along a narrow brook. Base deflection: 1600 mils. The 4th Battery was 300 yards from the crossroad proper. The 5th was 200 yards north of the 4th, close to the Elverdinge road. The 6th was, once more, on the wooded grounds of the local "Château."

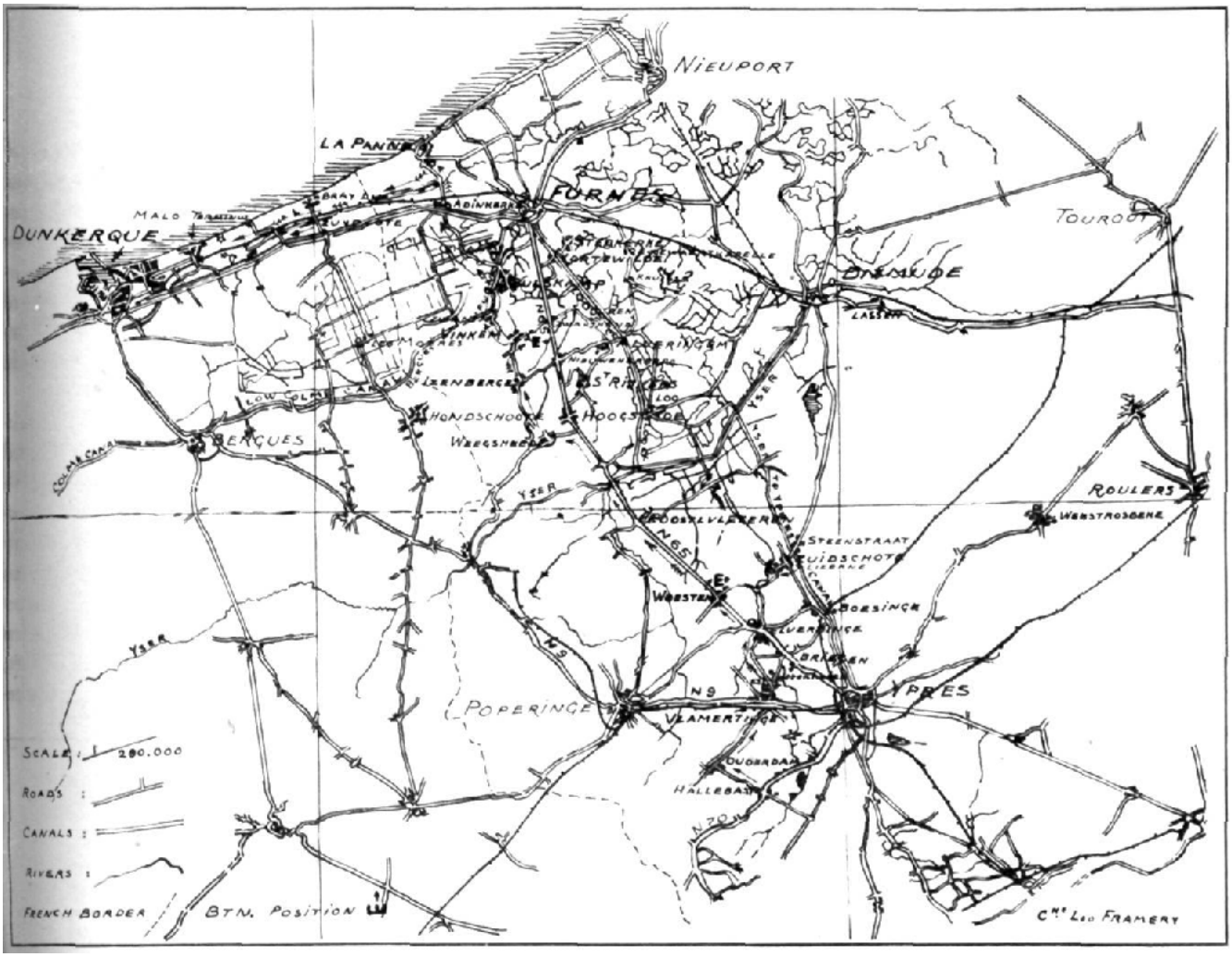
I established the CP in a large farm east of the Elverdinge road, 400 yards in front of the batteries. The farmer, his family and thirty refugees still occupied the premises when we arrived. They moved away before noon, leaving the headquarters battery in charge of numerous cattle, chickens and pigeons.

Finding a good OP was difficult in this flat region and entailed a long reconnaissance east of Brielen.

At noon the Germans began a vicious bombing and shelling of the Vlamertinge crossroad; the shells were 105-mm. HE. They seemed to come from very far, direction southeast. The fire was rather erratic and covered a large zone. The 4th Battery received few projectiles, without damage. Unfortunately, the refugees still filing by on Highway N 9 did not fare to well; our doctor was kept very busy taking care of the many casualties occurring among them.

The tactical situation in the sector was as confused as it had been the night before. The 1st "Dragons Portés" was holding, north of Ypres, the west bank of the "Yser to Ypres" canal, with a few British units and elements of the French 60th Infantry Division. The BEF, it seems, was still defending the city proper. The Belgians had their front line along the railroad track Ypres-Roulers. But the junction between the Allies and the Belgians was far from being secured and enemy patrols were reported as trying to filter through.

One of these patrols—eight troopers led by a second lieutenant—was actually captured by our dragoons while



coolly attempting to cross one of the bridges over the canal.

The fattest horses were turned over to the needy Belgian refugees to be slaughtered for meat. Whence this German cavalry patrol came and how it managed to slip through the various defenses is still a mystery to me. Be that as it may, it was a sign that German units were approaching and our observers were eager to be given the opportunity to fire. Data was prepared for points most likely to become eventual objectives.

In the meanwhile, British artillery columns, all motorized, were passing on the road in front of our batteries, going north at good speed, an unmistakable sign that large units were being displaced.

At 3 PM we ourselves received an order for movement. We were to proceed to Woesten, on Highway N 65, three miles NW of the position we were then occupying, to be in direct support of a British infantry unit. The reconnaissances left immediately. The battalion followed at 6 PM, only after completion of the surveying work.

The new positions were in farmyards and orchards located on the eastern edges of the village of Woesten. Base deflection: 1600 mils.

The infantry we were supporting was a battalion of the Middlesex Rt. There was a British infantry brigade H.Q. in Woesten where I reported at once for orders. I was informed there that we were to defend the "Yser to Ypres" canal, north and south of Steenstraat; I was told:

a) That for the present, contact had not been established with the enemy, who seemed to be still some distance away.

b) During that very afternoon, German units had succeeded in piercing the front in several places: Maldegem, east of Bruges, Wisel, southeast of Bruges, and between Thielt and Roulers.

c) The Belgian troops holding the line at these points had been annihilated, so there could be no hope of closing the gaps created;

d) Roulers being only 16 miles away, we should expect to see the enemy reach the Yser Canal within a short time.

This information prompted me to go at once to Zuidschote, where the Middlesex battalion we were supporting had established its CP, and report to the CO—a lieutenant colonel. My search lasted a little longer than I expected, as while I was endeavoring to find him, he was making the round of the various posts his battalion was occupying; I covered the same ground, but ten minutes back of him. This gave me the opportunity to examine our supported unit.

It had all the appearance of an excellent outfit, well equipped; the men had the military bearing of fully trained soldiers. I was greatly impressed with what I saw and heard. I ended my round with a feeling of satisfaction to have been given the opportunity to cooperate with this battalion.

It was only after the lieutenant colonel had returned to his CP that I succeeded in joining him. This CP was the back room of a farm, dimly lit by a few candles, the electricity having been cut off everywhere during the afternoon.

With the CO was his battalion executive officer; I had with me our liaison officer, a lieutenant whose mission would be to receive the infantrymen's instructions and requests and transmit them to us.

The meeting lasted a good while; when I came out, I had all the elements for a well-planned schedule of fires and a comprehensive system of signals and rockets for emergencies.

I went back at once to our battalion CP — a small house east of Woesten, and issued the orders the situation required: telephone connections with the infantry lookouts for rockets, etc. It was about midnight when I came back, and pitch dark. An incessant crowd of refugees was passing the CP on the narrow Zuidschote road. All these people were on foot, some carried children and a few belongings on wheelbarrows or pushcarts. Eager to secure information, I questioned a family: The had left their home near Tourout shortly after noon when the Germans' heavy artillery had begun shelling the city their goal was Poperinge, 6 miles further ahead. I did not have the heart to tell them that Poperinge had been bombed heavily during the past three days and was much damaged.

MAY 28TH

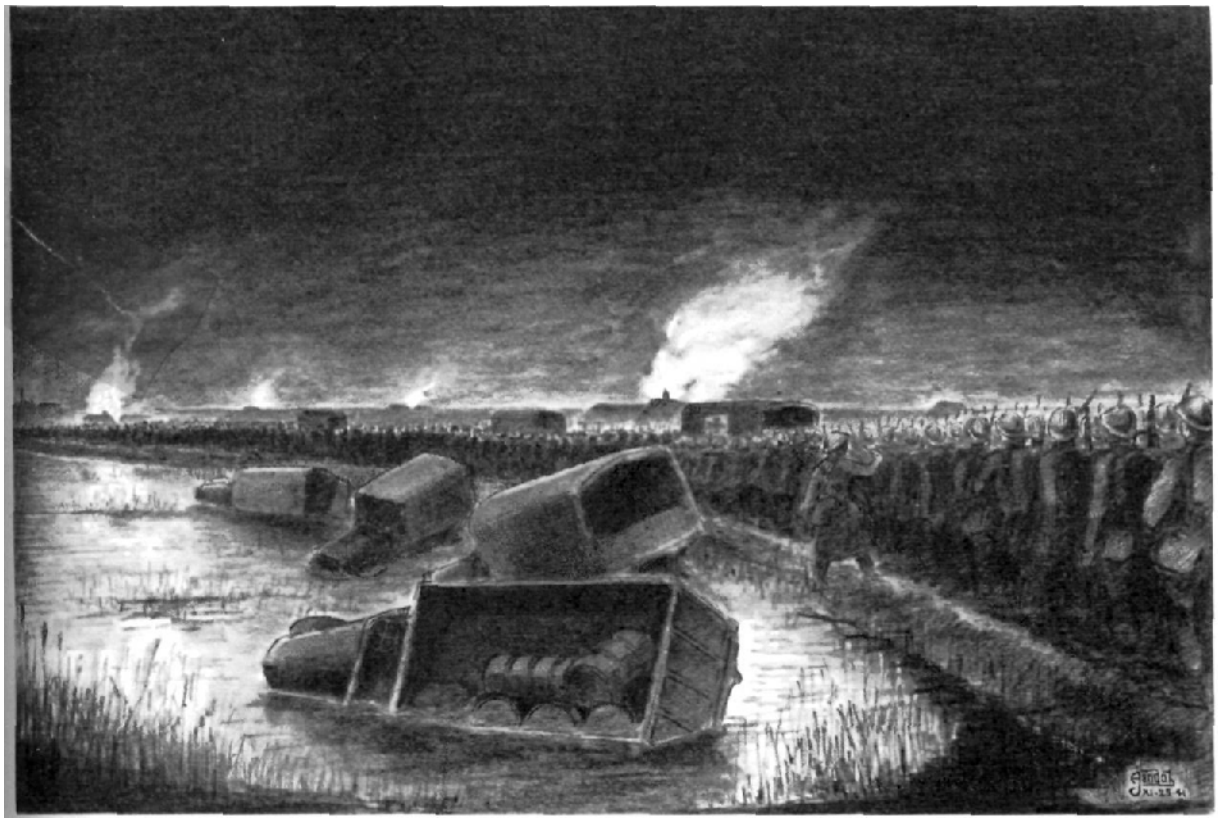
The night wore off quietly: dawn of May 28th came without any sign of the approach of the enemy. At 5 AM I was officially advised by telephone from divisional artillery headquarters that the King of the Belgians had signed at midnight an armistice with the German HIGH Command. It was an unconditional surrender. The cease-firing had taken place at 4 AM, just one hour before. The officers of the battalion were notified at once, with instructions to disseminate the news among the ranks in a terse and matter-of-fact way to avoid stirring any untimely reaction.

It was a hard blow, no doubt, shattering any hazy hope one might have kept of being able to avoid being pushed into the sea. It aroused, at first, a feeling of bitterness which soon subsided and within a few hours the battalion had regained its usual morale status, mixture of quiet complacency and fatalism.

As a consequence of the Armistice, the bridges on the Yser canal were blown up. This stopped at once the flow of refugees.

Early in the morning the 1st "Dragons Portés" took position along the canal to relieve the British units. We therefore resumed our mission as direct support of its 2d Battalion. The weather was decidedly bad and heavy showers precluded large-scale activity of the Luftwaffe over our heads. No sign of the enemy on land, none in the air; it was most unusual.

At 4 PM a dispatch carrier from Divisional Artillery



Night evacuation of French troops on a levee along canal in the low and marshy fields. Motorcars set afire by the British in retreat, burning in the scattered farm yards, are lighting up the country. French camions are ditched along the levee; ambulances are moving along the flow of troops.

Hq. brought us the order to proceed at once 10 miles further north to Vinkem, via Highway N 65, Oostvleteren. Weegscheede and Izenberge. The reconnaissances moved forward at 4:15 PM. The batteries left Woesten at 5 PM accompanied by salvos of 105-millimeter HE which the German artillery was throwing on the village. With our usual luck, we went through unscathed except for a few splinters which damaged the ambulance and punctured a tire on a truck.

The traffic on Highway N 65 was not as dense as I expected it to be. It was mostly composed of French units moving north. There was also a remarkable number of Belgian troops unarmed and on foot; in the fields and in the ditches on both sides of the road, disabled vehicles of the BEF could be seen; most of them had been overturned or set afire.

We arrived at Vinkem at 8 PM. The positions, east of the village, were armed at once and the battalion was ready for action a short time before nightfall. Base deflection 1600 mils.

We placed the pieces along hedges, the only cover to be found in this flat terrain.

The CP was established in a small farm already inhabited by a large number of refugees. A BEF base had been previously located on these premises and hastily destroyed materiel and supplies were dispersed in adjacent fields.

The Division had the mission to defend the Loo Canal from Loo, in the south, to Furnes, inclusive, in the north.

This Loo Canal runs in a direction NW-SE, at an average distance of six miles west of the Yser. I have already mentioned that the bridges spanning the Yser had been blown up in the morning, with the exception, however, of the Dixmude bridge. A few elements of the 68th French ID were still east of the Yser; hence the bridge at Dixmude was to be destroyed only after their crossing. The low country between the Loo Canal and the Yser was in course of being flooded, the locks controlling the water level of the region had been let open, as in 1914.

Our first battalion, in direct support of the first battalion of "Dragons Portés," had its position east of St. Rijkers; its sector extended from Loo to Alveringen, both inclusive.

My battalion (the 2d), placed as already stated east of Vinkem, had its sector from Alveringen to Kortewilde, both inclusive. It supported the 2d Battalion of the 1st Dragons Portés.

The 3d Battalion, with its 105-millimeter howitzers, had this time also a direct-support mission instead of the general support which usually was its lot. It supported the 3d Bn of Dragons Portés defending Furnes. Its position area was north of Bulskamp.

Three platoons of our AT battery (47-millimeter guns (were deployed and occupied the following positions: One platoon on the south edge of Hoogstade; one piece facing south, barring road N 65, the other facing east, one platoon defending the Alveringen bridge, one platoon at Kortewilde. The 4th platoon was held in reserve for emergencies in Hoogstade where the CO of the 47th Btry had his CP.

The CO of the 1st Dragons Portés stationed his CP at Niuweherberg on Highway N 65.

The Divisional Artillery CP was at Zwarthend, 1 mile and a half north of Nieuweherberg on road N 65. It was one of the highest points of the sector, which meant that its altitude was merely 10 or 12 feet above the low ground. Nevertheless, it afforded some observation over the swampy terrain east of the Loo Canal.

The Division, including men and materiel, was deployed on the new positions early at night, with the exception of the telephone connections which had to be completed by daylight the next morning.

The night 28/29th was calm; a light rain was falling, transforming the already soggy ground into quagmire, which may explain why the enemy apparently refrained from pushing ahead.

MAY 29TH

The search for an OP began at dawn the next day. It was a difficult undertaking; facing east, we had the sun against us; the terrain was uniformly flat, our zone of fire was marshy with many canals over which, on that morning, hung a white mist. Anyway, a place was selected close to road N 65, from which the principal points of our sector could be seen.

Shells, 105-mm. HE, kept falling near Zwarthend, a salvo every 10 minutes or thereabouts, probably a form of harassing fire. The only victims were a few cows grazing in a field nearby.

A plan of eventual fires was worked out and sent to the batteries and observers. We were running short of large-scale maps; the only one we had of the present sector was a 1/50,000 British map; unfortunately, its northern limit was slightly south of the north end of our zone; consequently a few objectives had to be plotted on the margin of the map, using either the coordinates if it was a point listed in the official table of coordinates, or the data determined by our surveying officer, for the others.

Masses of refugees were still on the east side of the Loo Canal; they crowded the narrow roads to such an extent that they precluded any movement of our troops coming back. A horse-drawn battery of 75's belonging to the 68th Division was thus stopped a long while on the road leading to Alveringhen bridge. In despair, its CO asked our Division for help and we were instructed to send a salvo of shrapnel on this road, adjusting the height of burst at 300 yards, to avoid accidents.

The effect was astounding; the road was cleared in an instant and the battery was able to proceed to the bridge without more ado.

After 6 PM, the swarm of refugees who earlier in the afternoon had crowded all the roads and ways east of the canal had completely vanished. The region appeared deserted, but the Germans were approaching.

We caught a glimpse of grey-colored armored cars and swift tanks now and then at some of the crossroads. The result was that the sector instantly woke up; the dragoons along the canal began firing their rifles and machine guns. Finally we ourselves were called to action to place concentration fires on conspicuous village: Steenkerke, Eggewaartskapelle, Kruisse, etc. This was done under the strict control of our observer.

We had then the impression of being perfectly able, in this sector, to cope with any frontal attack. But I was already cognizant of the fact that our moves would thenceforth depend not on what was happening in front of us, but rather on the events occurring in the region back of us. I knew that since several days ago, the BEF had been embarking from Dunkirk and neighboring beaches. A secure bridgehead had to be maintained at any cost to cover up these difficult operations. Obviously successive lines of resistance would have to be held, closer and closer to Dunkirk as the area to be inhibited decreased with the number of its defenders.

The outer line, behind which we stood on May 29th, was delimited on the east by the Loo Canal; on the south by the Yser River; on the west by the Aa River. The next and shorter line of resistance, as a glance at the map will show the reader, would be marked on the east by the "Bergues to Furnes" Canal; on the south by the "Basse (Low) Colme" Canal, the "Colme" Canal, and the "Haute (High) Colme" Canal; and on the west by the River Aa.

From information given me in the morning by artillerymen of the 68th Infantry Division, I inferred that their unit, placed at the extreme right of the French forces (west of Dunkirk), was already inside this shorter position of resistance. It led me to expect for us an order to move within the next few hours. As a matter of fact, we had been instructed, early in the afternoon to send our combat trains to "les Moëres," well within the second position. They had been bivouacking at Hondschoote, 1 mile south of the Colme Canal, since the 27th.

Anyway, the day was drawing to its end. A German battery kept sprinkling shells on Highway N 65. Around 7:30 a second battery opened up and sent a salvo of 105's which fell much closer to our position. But what I considered as worth being recorded is that whereas the first battery was located southeast of us, somewhere be yond the Loo Canal, the second seemed—according to

the sound of the arriving projectiles—to be almost due south of us. It tended to demonstrate that the enemy had crossed the Yser.

At 8 PM, while we were firing a concentration on Steenkerke, reported especially effective by our observer I received from Artillery Headquarters by telephone, the order to "cease firing." A few minutes afterwards, a motorcyclist brought us the written confirmation, requesting us, furthermore, to blow up the guns, destroy completely the materiel and remaining ammunition, burn the archives, then, with the individual arms and light equipment, proceed on foot to La Panne beach to embark.

This order transmitted at once to the batteries was received with justified emotion. Persuading the gun crews to carry it out proved to be a bitter ordeal for the officers.

The wrecking required one hour and a half; at 9:30 PM, in full darkness, the battalion started on the road, on foot, in double file, one on each side of the way. Each individual carried his side arms, carbines and pistols; on his back a haversack contained the small equipment he wanted to save.

It was the end.

But, as I remember our state of mind when we left the position, we did not feel that this distressing outcome of the combats in Flanders would in any way be final. We had lost the first round; we could and would win the second.

Ours was certainly not the psychology of beaten troops. We had fought 19 days and nights, fired 15,000 grounds of ammunition, covered 800 miles, according to the odometers on the gun tractors. It left us with the comforting impression of having hit stinging blows. The intercepted radio messages of the enemy seemed to prove it; furthermore, the dragoons we supported had manifested nothing but satisfaction over our work. Our faith in the future was not impaired.

Be that as it may, the battalion, hitherto so proud of its modern equipment and fast tractors, had to proceed on foot at the slow pace of old-time infantry. The prescribed itinerary went through Vinkem, Zwaantje, Bulskamp and Adinkerke. Progress was easy as far as Bulskamp for we were practically alone on the road. Most of the troops had already been withdrawn inside the 2nd line of resistance marked by the "Bergues to Furnes" canal.

After Bulskamp, where the canal is spanned by a narrow bridge, we had to walk on a sort of narrow levee meandering through a soggy terrain crossed by drainage ditches. Thousands of men, French and British, were on this levee, moving in silence towards the sea. The darkness of the night was relieved by the red glare of innumerable burning cars reflected in the water of the canals and ditches.

On our right, towards Furnes, a battery of 75's, on watch, was firing rapid salvos. A few German shells were bursting at irregular intervals, probably on Highway N 65.

In Adinkerque our pace, already slow, was still much reduced by the increasing number of troops converging from many directions. We were even halted 20 minutes by a battalion of horsedrawn French field artillery on its way to a position north of Furnes.

MAY 30TH

However, at 2:00 AM, May 30th, after 12 miles, we reached the main crossroad just south of La Panne. I

Bivouac of troops halted at Bray Dunes

halted there to re-group the battalion—now divided into many sections by the difficulties and obstacles encountered during the last mile of our progress. We found our way almost blocked by the materiel left by the BEF units already embarked. Cars, tractors, trucks, tanks, guns, etc., were parked along the road, sometimes in five or six parallel files. In each file, the vehicles were tightly wedged one after the other. We had to filter through this maze of materiel. At 2:30 AM the battalion was re-assembled. We learned then, direct from General Bougrain, CO of our division, that we could not embark at La Panne. There were no ships available. German bombers had, during the preceding afternoon, sunk those which we might have used.

We were requested to await there further orders. We received them shortly afterwards, and, accordingly, resumed our march, this time parallel to the beach, towards Zuydcoote and Bray Dunes. We followed the narrow road along the railroad track Furnes-Dunkirk. It formed a long stream of men headed by generals and officers of their staffs, tramping the soft sand, all equals in these trying events.

The French border was re-crossed at 4:30 AM. At 11 AM we arrived at Bray Dunes where we halted three hours. The seashore in this region, from La Panne to Mardyck west of Dunkirk, is fringed by high sand dunes, extending for a width of one to two miles. At Bray Dunes we camped in the midst of the sand ridges, half a mile from the sea.

To ascertain whether we could embark from this spot, I went to the beach. The sight there was not encouraging: two ships were indeed visible, a quarter of a mile away, but both sunk in shallow water; they were but derelict wrecks.

Coming back to our camp, still pondering over what I had seen, I found that after all we were not to embark from Bray Dunes. Orders had been received to prepare for an eventual embarkation at Malo Terminus, 4 miles farther toward Dunkirk. The personnel was to be divided in equal sections of 50 men.

The sections formed, we proceeded to Malo Terminus. However, as the place was bombed and shelled diligently by the enemy, we were instructed to await nightfall in the dunes, a mile before reaching Malo.

(*To be continued*)

POINT-DESIGNATION GRID FOR FORWARD OBSERVERS

It is reasonably certain that in campaign we are unlikely to have any large-scale maps, unless we do our campaigning in Europe. If we are lucky we shall get airphotos; if very lucky, controlled mosaics. The recent maneuvers have illustrated the "very lucky" condition, in which controlled mosaics having a military grid were available as firing charts. Serious thought should be given to the merely "lucky" condition in which single airphotos—wideangle, or the older type K-3—are furnished.

If the infantry is to receive artillery support it must have some system for designating targets on the airphotos; the forward observer, likewise, must have some means of designating these points, and any others, to the fire-direction center or the battery. Such a system must be fool-proof, simple, and lend itself to the transmission of data by telephone.

In paragraph 28, of TM 6-200, Field Artillery Survey, is a description of a point-designation grid which was designed to meet these needs. It appears with a slight variation in the recent revision of F.A. Book 161. It has the virtue of flexibility, for it can be applied to any map or mosaic, gridded or ungridded (as a measure of secrecy), or to any airphoto of any size or scale. It is definitely not suitable for measuring or computing distances, but serves admirably the purpose of target designation.

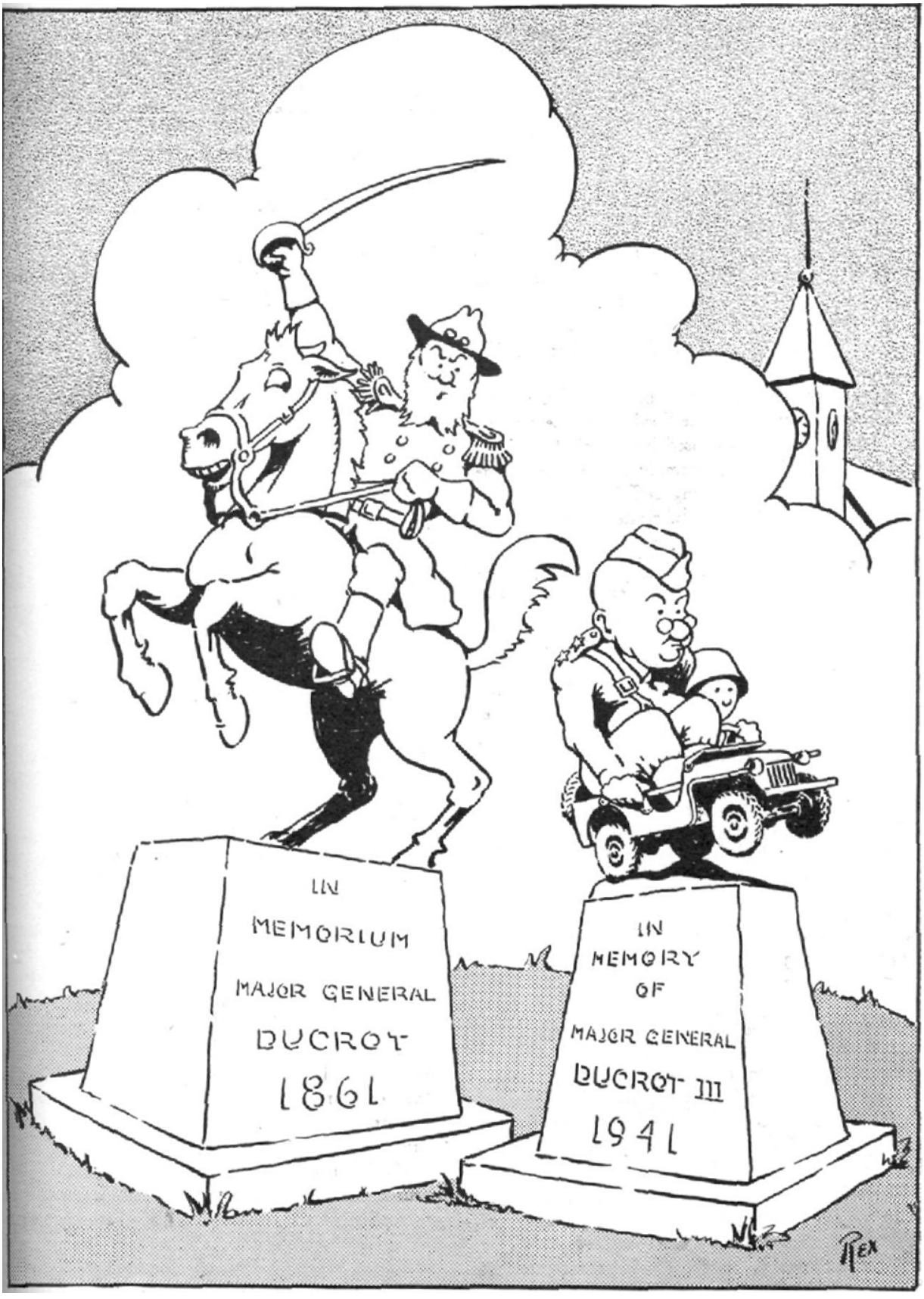
It can be overprinted on an airphoto; in such case it is centered at the intersection of the two lines joining opposite pairs of collimation marks which appear on the edges of most airphotos, and is oriented along these lines. It can be used in the form of a transparent template; in such case it is centered at any prearranged point, or grid-intersection on a map or mosaic. This procedure is current in the German Army; it makes for secrecy since the orienting point can be changed at the will of the commander.

The grid is suitable for use by telephone; its letter prefixes warn the addressee that the coordinates are not map coordinates—there can be no faulty shooting on that account. Yet, the squares being 1.8" by 1.", they can be easily subdivided into tenths and hundredths by the use of the 1/20,000 plotting scale.

Here, then, is the common tongue of the infantry, the forward observer to whom it looks for help, the artillery which gives it.

This point-designation grid is still in a test status; tests will perhaps suggest improvements. Observation squadrons have the cameras; Corps Topographic Engineers have the means for reproducing the pictures and overprinting the target-designation grid. It is up to the Field Artillery units to call for the pictures.

—T. N.



"TIME MARCHES ON"

After the recent maneuvers—new statuary for the town square

FROM  THE CHIEF'S OFFIC??

MOTOR MAINTENANCE Now that the maneuvers are over, time is available to organizations to pay more attention to maintenance of vehicles. The following comments have been gathered from miscellaneous sources and are furnished so that organizations can have available items which may have escaped their notice in other training literature.

1. There have been reports of binding of the shaft in the distributor housing of the Ford ¼-ton, because of lack of lubrication. It is caused by the oil felt (Part No. 40-12141) in the oiler assembly in the base of the distributor housing not allowing sufficient lubricant to soak through to keep the shaft lubricated. Bend a piece of wire into a hook and remove the oil felt from the passage-way. After removing the felt, fill the oiler with oil. Cut off a ¼″ length of the old felt and replace in the passageway to prevent dirt entering.

2. Early production of the GMC 2½-ton 6×6 was issued with defective floating oil intakes to the oil pump of the engine. Under certain operating conditions, the float may strike the crankshaft. Free-of-charge replacements to correct this condition were furnished by the manufacturer. Check your vehicles to be sure the new type float has been installed. Do not wait for an engine failure to occur, but submit requisition for the new parts and install them as soon as received. The numbers of the vehicles which had the defective oil float are included among the following:

Chassis Model Number	*Chassis Serial Numbers (Inclusive)*
ACKWX - 353	3604 - 6224
CCKWX - 353	001 - 7150

3. An observer during maneuvers saw a truck driver chasing a snake with the fire extinguisher from his truck. Wire the extinguisher to its bracket by means of a very light wire. Governor seal wires are fine if you can get them. This will discourage its improper use, but when necessary a quick jerk will free the extinguisher from the bracket.

4. Many 1-ton trailers have been observed in operation with the new safety chains dangling. The replacements kits for applying the safety chains to old-type trailers included two ⅝″ by 2″ eye bolts for insertion in the lower inside bumper bolt holes of the towing truck. These eye bolts were not furnished in numbers greater than two per trailer. In order to be able to tow your trailers behind any truck, the lower inside bumper bolts on all 2½-ton trucks should be removed an eye bolts substituted.

5. The Field Artillery School has developed a method of adjusting the brake master cylinder on the GMC 2 ½ ton truck to prevent the dragging of brakes caused by improper adjustment of the operating linkage of the master cylinder. Write to the School for a copy if you do not have one.

6. Technical Memo No. 21 of the Field Artillery School gives details of a method of adjusting the Chevrolet and GMC steering gears. The method described is an amplification of the instructions given in the Maintenance Manuals of these vehicles.

7. There have been reports of inability to keep the hold down bolts of the transfer case on the GMC truck tight. Loosening can be prevented by spot-welding the bolt heads in place on trucks where chronic loosening of the bolts occurs. Be sure the spot weld is small enough so that it can be broken with a wrench, if necessary.

8. Early production of the Chevrolet 1½-ton had oil seals in the front axle hubs which were not satisfactory and they have been redesigned. Until such time as the new type oil seals are installed, use No. 3 grease on the front wheel bearings, even though the Maintenance Manual calls for No. 2 grease.

9. Many of the early Dodge ½-tons were delivered after inspection tests which included driving with the parking brake set. These tests, in some cases, damaged the front axle shaft at the outer end where a shoulder was cut on the shaft. As soon as this was discoved, the shaft was redesigned to eliminate the shoulder. Reports of failure of the front axle shaft have been traced to this design characteristic.

10. There have been reports from maneuver area of serious injuries to personnel mounting repaired tires on rims caused by the side ring flying off when air is in the tire. After mounting a tire on the rim, turn it over so that the side ring is underneath, before inflating the tire.

11. There have been reports of carburetor difficulties caused by flakes of rust in the line. This has been traced to rusting of the inside of the auxiliary gasoline filter, which is of cast iron. To correct it, remove the filter body and treat with Metal Conditioner, Concentrated (Q.M.C. Tentative Specification ES - No. 431a) which will be available on contract in the near future. If you do not wish to wait, suitable commercial products are "Metal Prep" (Neilson Chemical Co., Detroit, Michigan

) and "Dioxidine" (American Chemical Paint Co., Ambler, Pennsylvania).

12. There have been some reports of wheel bearings in new trucks not properly greased. It should be pointed out that wheel bearings on original installation are greased by a machine which forces the grease all through the bearing and does not leave a great amount on the outside. On new vehicles, check the wheel bearings but do not be disturbed if there is no great amount of excess grease present.

13. Many GMC's were shipped without a protective shield on the fuel line at the fuel tank. Packages containing parts and complete installation instructions for this item are available. See Circular Letter 96 - OQMG for details of requisitions.

14. Early production of the Willys ¼-ton had interference between the drag link and the oil sender on the engine at sharp cramping angles. Details of corrective measures are given in Technical Service Bulletin No. L-8. Likewise, there was interference on some vehicles between the fan blades and the radiator shroud. For corrective measures, see Technical Service Bulletin No. F-1.

15. Many Z-5 reports are arriving at the Holabird Quartermaster Depot with insufficient information to identify either the vehicle contract or the name and station of the organization reporting the defect. The vehicle registration number must be given. The Motor Transport Division is aware that many failures are not being reported and corrective action cannot be taken unless this is done. In one case recently, a personal letter revealed that twenty-five of a certain type unit had failed at one post. A canvass of the Z-5 file showed that only two had been reported to the Holabird Quartermaster Depot.

16. Reports have been received of failure of the welding in the front corners of the Diamond-D body and of loosening of the tire brackets. This is being investigated by the manufacturer to determine what corrective action can be taken.

17. If your organization is not receiving Quartermaster Corps Technical Service Bulletins or other essential publications, get in touch with the Field Artillery Liaison Officer at Holabird.

18. When draining the GMC in cold weather to present freezing, be sure to open not only the drain cock at the bottom of the radiator, but also the one at the left rear side of the cylinder block. Don't find a GMC engine on your payroll. It is good practice in draining any cooling system to check the cylinder block for additional drain cocks.

19. With cold weather, don't forget to set the manifold heat control valve on the GMC for winter operating conditions.

20. Reports have been received from the maneuver areas of improper use of the Holmes Anchor Stake Set (Unit Equipment Set No. 9). A special Technical Service Bulletin, No. X-10, was issued to cover the use of this equipment. The instructions contained in the Technical Service Bulletin No. Z-10 refer to the old type anchor stakes, the issue of which has been discontinued.

21. Many Dodge ½-ton trucks have been observed operating with the metal hook which is used to bolt the frame and the rear springs together for rail shipment still in place. These hooks should be removed from vehicle and discarded. If left in place, spring breakage is apt to result.

22. There have been a few reports of failure of the clutch plate in the Dodge ½-ton. This has usually occurred in vehicles which are operated in high gear at a low speed. The Dodge power plant has a critical speed at about fourteen (14) miles per hour in high gear and the clutch can be heard to rattle if the vehicle is driven at this speed. To prevent this type of operating failure, shift to third gear.

REPORTS OF SERVICE PRACTICE

The following is an extract from War Department Circular No. 239, dated November 18, 1941:

IV—Report of field artillery service practice.—1. Reports of field artillery service practice will be made semiannually as of June 30 and December 31. Reports of service practice for the last half of the calendar year 1941 will be rendered as prescribed in letter August 30, 1940. (A. G. 353.16 (8-22-40) M M-C), subject: Analysis of Field Artillery Service Practice Reports.

2. O. O. Form No. 820-A (Report of Service Practice) is discontinued, effective January 2, 1942.

3. Effective January 2, 1942, report of service practice will be made on O. O. Form No. 821-A (Report of Service Practice). One copy of this form, giving the required information for all problems fired, and accompanied by O. O. Form No. 820 (Semiannual Reports of Field Artillery Firing Practice), in duplicate, for all the batteries of the battalion, will be forwarded by battalion commanders to the Chief of Field Artillery through military channels.

4. O. O. Form No. 821-B (Record of Service Practice) and O. O. Form No. 821-C (Service Practice Work Sheet) will be used to record data from which O. O. Form No. 821-A is made.

[A. G. 353.16 (10-13-41).]

The new forms 821-A, B and C are now being printed. Since it is doubtful that routine supply of forms will place these forms in the hands of troops by the time they are needed, the Office of the Chief of Field Artillery will obtain and forward an initial supply of these forms to all field artillery battalions prior to January 1, 1942. In the meantime a facsimile of these forms, together with instructions for their use, is reproduced herewith in order that all concerned may have timely information concerning this matter prior to the beginning of the coming service-practice season.

WAR DEPARTMENT
Office of the Chief of Ordnance
Form 821-A
1942

REPORT OF SERVICE PRACTICE
(See instructions on back)

Battalion ____________________
Weapon ____________________

Period_________ to __________

OBSERVED FIRES, REGISTRATIONS, TRANSFERS, AND METRO DATA FIRES

Type (Note 1)			Number of problems	Average number of rounds per problem	Number of problems in which battalion was brought in (Note 2)	Average Times: For preparation and announcement of initial data (Min Sec)	Average Times: From assignment of mission to the opening round (Min Sec)	Average Times: From assignment of mission to the first round of last battery to open fire for effect (Min Sec)	Average Times: From announcement of initial range to completion of adjustment (Min Sec)	Average Times: From completion of adjustment to first volley of last battery to open fire for effect (Min Sec)	Percent fired with airplane surveillance (Note 3)	Average errors (Note 4): Deflection (Mils)	Average errors (Note 4): Range (Yds)	Percent of solutions (Note 5): Superior	Percent of solutions (Note 5): Excellent	Percent of solutions (Note 5): Satisfactory	Percent of solutions (Note 5): Unsatisfactory	Number of problems in which 37mm sub-caliber was fired (Note 6)
Registration	Precision	Axial (Note 7)			—	—	—	—		—	—							
Destruction	Precision	Axial (Note 7)			—		—	—		—	—							
Registration (100 yd bkt)	Bracket	Axial (Note 7)			—		—	—		—	—							
Neutralization	Bracket	Axial (Note 7)					—	—			—							
Registration	Precision	Small-T lateral (Note 7)			—	—	—	—		—	—							
Destruction	Precision	Small-T lateral (Note 7)			—		—	—		—	—							
Registration (100 yd bkt)	Bracket	Small-T lateral (Note 7)			—		—	—		—	—							
Neutralization	Bracket	Small-T lateral (Note 7)					—	—			—							
Registration	Precision	Large-T lateral (Note 7)			—	—	—	—		—	—							
Destruction	Precision	Large-T lateral (Note 7)			—		—	—		—	—							
Registration (100 yd bkt)	Bracket	Large-T lateral (Note 7)			—		—	—		—	—							
Neutralization	Bracket	Large-T lateral (Note 7)					—	—			—							
Precision	Forward Obsn. (Note 8)				—	—	—	—		—	—							
Bracket	Forward Obsn. (Note 8)					—	—	—			—							
Center of impact	Combined Obsn. (Note 8)				—	—	—	—	—	—	—	—	—	—	—	—	—	
High burst	Combined Obsn. (Note 8)				—	—	—	—	—	—	—	—	—	—	—	—	—	—
Precision	Air Observation (Note 8)				—	—	—	—		—	—							—
Bracket	Air Observation (Note 8)					—	—	—			—							—
Center of impact	Air Observation (Note 8)				—	—	—	—	—	—	—							—
K	Transfers (Note 9)			—		—			—	—								—
Metro	Transfers (Note 9)			—		—			—	—								—
Metro data (Note 10)				—		—			—	—								—
Map	Firing charts used	For Transfers and Metro Data (Note 12)	( )	—	( )	—	—	—	—	—	—			—	—	—	—	—
Air photo	Firing charts used	For Transfers and Metro Data (Note 12)	( )	—	( )	—	—	—	—	—	—			—	—	—	—	—
Mosaic	Firing charts used	For Transfers and Metro Data (Note 12)	( )	—	( )	—	—	—	—	—	—			—	—	—	—	—
Grid sheet	Firing charts used	For Transfers and Metro Data (Note 12)	( )	—	( )	—	—	—	—	—	—			—	—	—	—	—
TOTALS				—		—	—	—	—	—	—	—	—					

ANTITANK FIRING (Note 13)

Battery (Note 14)	Number of one-gun problems	Number of battery problems	Average speed of targets	Average range of opening fire	Average time target is under fire	Average number of rounds per gun	Percent of targets with hits which should disable tank	Number of problems in which 37mm sub-caliber was fired (Note 6)
		—						
	—							
		—						
	—							
		—						
	—							
TOTALS								

SUMMARY (Note 15)

Total of Axial and lateral problems	
Total of other types	
Grand total all types	
Percentage of Axial and lateral problems	
Percentage of other types	
Average number of problems per officer	

(Sign) ____________________
(Type) ____________________

Commanding Battalion

Instructions (For use of Form 821-A)

I. One copy of this form will be prepared and submitted semi-annually on January 1 and July 1, accompanied by "Semiannual Reports of Field Artillery Firing Practice," O.O. Form No. 820, for all firing of service ammunition by the batteries of the battalion during the preceding period of six months.

II. Notes:

1. The classifications under "Type" apply to time fire as well as percussion fire in cases where both kinds are used.

2. When more than one battery attacks a target, the fire will be considered as one problem, except when each battery is adjusted separately. In the latter case, the fire of each battery will be considered as a separate problem.

3. Every effort should be made to obtain airplane surveillance of unobserved fires.

4. Average errors: Difference between data announced in initial commands and correct data as proved from the firing. When the battalion is brought in the deflection and range errors for that problem will be the average of all batteries firing.

5. Each problem will be rated as Superior, Excellent, Satisfactory, or Unsatisfactory. Two critical questions should be applied to every firing problem when rating is made:

(a) Was the fire effective, i.e., was the mission accomplished?
(b) How long did it take?

No problem will be given the rating indicated if the mission was not accomplished or the times exceed those listed in Table 1 on opposite page.

6. No other column on this form will be used to show 37-mm. sub-caliber firing.

7. In the preliminary phase of service practice, all adjustments made by axial, small-T lateral, and large-T lateral methods will be made with the observer working directly with the battery. In the final phase when one battery adjusts and the whole battalion fires for effect, the observers' commands will be relayed through the fire-direction center.

8. Problems utilizing an air observer, a forward observer using air-ground methods, or combined observation should be conducted through the fire-direction center.

9. Transfers should be fired through the fire-direction center. A firing chart will be prepared. When firing battalion concentrations, registration for determination of corrections should habitually be made by one, preferably the center, battery.

(1) K-Transfers. Registration will be completed, a deflection correction and *K* determined before the assignment of a transfer mission.

(2) Metro Transfers. Registration will be completed. The change in the deflection correction and the change in *K* (or VE correction) will be determined before assignment of a transfer mission.

(3) Ordinarily battalions should be practiced in the use of two or more check points from which transfers are made.

10. Metro data should be fired through the fire-direction center.

(1) Fires for which no prearrangement has been made should be given precedence over prearranged fires in order to develop speed and accuracy in the execution of fires which have not been planned in advance.

(2) Prior to the assignment of a metro data mission, the firing chart will be prepared, and deflection and range corrections will be computed for at least one point in the target area.

11. Center of impact and high burst registrations, *K* and metro transfers, and metro-data problems are conducted through the fire-direction center; no one officer is responsible for the problem and no officer should be given a rating for problems of these types. The fire direction center should be rated on *K* and metro transfers, and metro data problems. The air observer should be rated on center of impact problems (air observation) when a ground check can be made on his accuracy.

12. Firing chart. Opposite the appropriate type of chart will be entered, in parentheses, the total number of problems (*K*-transfers, VE-transfers and metro data) for which the chart was used. These totals will not be included in grand total of problems fired.

13. This section of report will include only the antitank firing with the basic artillery weapon (principal weapon of the battalion) in training for close defense.

14. When the range and moving-target equipment permit the simultaneous movement of four or more targets, two lines will be devoted to each battery. The first line for each battery will show the problems in which the targets were engaged by only one gun; the second line for each battery will show the problems in which the targets were engaged by more than one gun of the battery at the same time.

15. Problems in which 37-mm. sub-caliber was fired will not be included in the Summary.

16. Problems that do not seem capable of classification on this form will be explained in letter of transmittal giving fo reach problem so much of the data herewith called for as may be practicable.

III. Battalion and higher commanders may attach endorsements covering details of the practice, the preliminary training, and any conditions which would assist in judging the adequacy of the results obtained.

TABLE 1
(See paragraph 5, section II, Instructions Form 821-A)

Preparation and Rating announcement of initial data	From announcement of initial range to completion of adjustment					
	Precision			Bracket		
	75-mm.	105-mm.	155-mm.	75-mm.	105-mm.	155-mm.
Superior	3′00″	8′00″	9′00″	10′00″	4′00″	4′30″	5′00″
Excellent	4′00″	10′00″	11′00″	12′00″	5′00″	5′30″	6′00″
Satisfactory	5′00″	12′00″	13′00″	14′00″	6′30″	7′00″	7′30″

Office of the Chief of Ordnance
War Department

Form 821-C
1942

SERVICE PRACTICE WORK SHEET

1. HEADING
   a. Unit ..... Place ..... Date ..... 19 ..... .
   b. Officer firing ..... Service ..... Yrs. Component .....
   c. Graduate Field Artillery School .....

2. CONDITIONS OF PROBLEM
   a. Nature of target .....
   b. Mission ..... Type of problem .....
   c. Type of registration ..... *
   d. Type of firing chart ..... *
   e. Was airplane surveillance employed *
   f. Unit firing: Battery—Battalion—One Battery adjusts, battalion fires for effect.**

3. PREPARATION OF FIRE
   a. Time for preparation and announcement of complete initial data .....Min.....Sec.*
   b. Time from assignment of mission—to the opening round—to the first round of last battery to open fire for effect.** .....Min.....Sec.*

4. CONDUCT OF FIRE
   a. Time from announcement of initial range to completion of adjustment .....Min.....Sec.*
   b. Time from completion of adjustment to first volley of last battery to open fire for effect .....Min.....Sec.*
   c. Number of rounds for adjustment ..... Total rounds .....

5. RESULTS
   a. Errors—Average of errors of each battery** ..... Deflection ..... mils. Range ..... yds.
   b. Was mission accomplished.....Rating of problem.....
   (YES OR NO)

INSTRUCTIONS

This form is for recording data, at the firing point, for use in making up O.O. Forms 821-A and 821-B.

The completed form will be filed with O.O. Form 821-B.

* Fill in if applicable.

** Strike out words not applicable.

RECORD OF SERVICE PRACTICE, PERIOD _____
Names of officers firing, types of problems, and ratings.

	Years service in FA	Axial: Precision: Registration	Axial: Precision: Destruction	Axial: Bracket: Registration (100 yd bkt)	Axial: Bracket: Neutralization	Lateral Small T: Precision: Registration	Lateral Small T: Precision: Destruction	Lateral Small T: Bracket: Registration (100 yd bkt)	Lateral Small T: Bracket: Neutralization	Lateral Large T: Precision: Registration	Lateral Large T: Precision: Destruction	Lateral Large T: Bracket: Registration (100 yd bkt)	Lateral Large T: Bracket: Neutralization	Forward Observation: Precision	Forward Observation: Bracket	Combined Observation: Center of Impact	Combined Observation: High burst	Air Observation: Precision	Air Observation: Bracket	Air Observation: Center of Impact	Transfers: K	Transfers: Metro	Metro data	Firing Charts used for Transfers and Metro Data: Map	Firing Charts used for Transfers and Metro Data: Air photo	Firing Charts used for Transfers and Metro Data: Mamie	Firing Charts used for Transfers and Metro Data: Grid sheet	Antitank: One gun targets	Antitank: Battery targets	Ratings: Superior	Ratings: Excellent	Ratings: Satisfactory	Ratings: Unsatisfactory
Totals																																

Total axial and lateral (including problems for destruction, neutralization and registration)		Total all other types	
Percentage of axial and lateral problems		Percentage of other types	
		Grand total	
		Average number of problems per officer	

1. This form is for the use of the battalion commander in keeping a record of the types of problems fired by each officer of the battalion. It may also be used as a guide in planning service practice.
2. On January 1 and July 1 of each year, one form will be completed for the preceding six months' period and filed with the records of the battalion.

Not in the BOOK

EDITOR'S NOTE: *This feature is devoted to ideas sent in by our readers describing methods or devices which, though not specified by official literature, have proved useful in service.*

THE VCO IN NORTH CAROLINA*

In the recent Carolina maneuvers a general reconnaissance of the terrain suggested a possible method of building of a VCO chart without an elaborate survey or calculation of the altitude of critical points. A wide-angle photo, which is now quite frequently available, is all that would be required. Using this as his chart the VCO marks thereon the entire zone of fire and locates the gun positions by inspection. He then proceeds to ridge- and stream-line the target area. Next he determines the altitude of each battery above the nearest stream in the vicinity of the gun positions. These altitudes, expressed in yards above the stream, are noted on the chart. To determine sites he makes the arbitrary assumption that the altitude of all streams within the area is approximately the same. As waterfalls and rapids are practically never encountered in that part of the Carolinas, and the slow-moving weary river is the general rule, it is reasonable to suppose that streams within an area of several thousand yards would, for practical purposes, form a basic horizontal plane. The second assumption is that the altitude of all ridges within the area is fifty yards above the streams. This also appears justified on the grounds that the gently rolling sand hills of central Carolina are quite uniform in size and regularity. With this data the VCO has only to locate the target on his chart according to the S-3's instructions and then determine its altitude by interpolation between the nearest ridge and stream line. This interpolation would, of course, be tempered by knowledge of reading photo maps and recognition thereon of abrupt changes in altitude.

The results of the above method cannot be proved on maneuvers where no rounds are actually fired but it is believed that on terrain such as was encountered in the Carolinas the method would be reasonably accurate and particularly useful in rapidly moving warfare where there is little time for the VCO to make a more accurate estimate of critical altitudes.

BY LIEUT. GEORGE C. SCOTT.

UNDERCOVER SURVEY

One of our most difficult problems in the last war was the accurate plotting of surveys to observation posts when these posts could only be approached through trenches. At first we seemed to have a choice between inaccurate map measurements or exposure to the enemy by running our lines overground.

Where trenches have been well designed against artillery fire, they present such a variety of legs for the survey crew that the probable error soon becomes very definite but entirely unknown.

Early in the action our detail worked out the following method of overcoming this problem.

We had the stadia man go fifty or sixty yards down the trench and hold up his rod where we could see the top of it with a B.C. scope which we used as a periscope with the arms placed vertically. He then extended a carpenter's rule above the stadia until we could get a five- or ten-mil reading from the top of the rule to the top of the stadia.

The following table of values enabled us to measure the straight-line distance to his position:

	1 mil	*5 mils*	*10 mils*
⅛ inch	3.47 yds.	.69 yds.	.34 yds.
1 inch	27.2 yds.	5.44 yds.	2.72 yds.
1 foot	333.3 yds.	66.6 yds.	33.3 yds.

Thus if the reading on the vernier is 5 mils and the carpenter's rule was held 2 feet 3⅛ inches above the stadia, the computation would be as follows:

2 feet = 2 × 33.33 or	66.66 yds.
3 inches = 3 × 5.44 or	16.32 yds.
⅛ inch =	.69 yds.
Distance of leg	83.67 yds.

Be careful to convince the highest ranking Infantryman on duty in the sector of the necessity of your actions before you start sticking stadia rods over the top of his trenches or you may wind up with a sock in the jaw.

—BY CORP. CRANE.

THE AIMING CIRCLE FOR NIGHT REGISTRATION

Let me speak for a neglected capability of that jewel of instruments, the M1 (new American) aiming circle. The usefulness of this miniature transit is by no means restricted to the demands ordinarily put upon it; I have found, for instant, that the aiming circle is vastly superior to the BC 'scope in observing night registration by high-burst and center-of-impact methods.

Like most field artillerymen, I had always considered "observing instrument" equivalent to "BC 'scope." But one night on South Arbuckle I stumbled sleepily to the OL instrument which had been set up during daylight—and discovered about fifty mils free play between the spindle and its bushing. Fortunately, I had an aiming circle in my car; even more fortunately, the direction of the reference point was staked out on the ground. By the time that registration was finished I had decided that I would never observe a night adjustment through a BC 'scope if an aiming circle was available. Here are my reasons:

In practice, if not in theory, the aiming circle has considerably less lost motion (backlash) than the BC 'scope. The 'scope is comparatively fragile; its optical and mechanical adjustments suffer seriously under the handling of unskilled personnel, and the instrument is notoriously hard to keep in serviceable condition.

The aiming circle can be carried more easily, set up more rapidly, and concealed with much less difficulty. The old saying is well known: "Nothing in nature bears the slightest resemblance to a battery commander's telescope." Particularly is this true on the skyline at dawn.

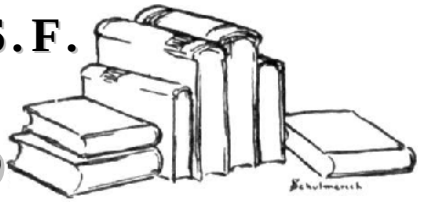
Greatest advantage of all, the aiming circle is a more efficient night observing instrument. Its field of view is over twice the diameter of the BC 'scope's (10 degrees as compared with 4.25 degrees). As a result, the initial rounds are seldom lost. The greater optical power of the 'scope offers no advantage in sporting the flash of a bursting shell; in fact, the smaller flash as seen through the aiming circle can be sensed more accurately. In this connection, the monocular design of the aiming circle eliminates stereoscopic effect; the image of the flash appears in the plane of the reticule. Furthermore, the reticule in the aiming circle is etched to include the whole field of view, both in deflection and in angle of site. The observer can read these elements of his sensing directly from the reticule; he need not manipulate any knobs or make any external scale readings.

Those are *my* reasons. For the skeptical there is only one real proof: comparative test. If such tests are made I should be very glad to learn the conclusion.

—BY CAPT. BERNARD THIELEN, FA.

* The method outlined herein may be considered an extension of that mentioned in FAB 161, par. 510.—Editor.

BOOK REVIEWS By H.S.F.



War is composed of nothing but accidents, and, although holding to general principles, a general should never lose sight of everything to enable him to profit from these accidents; that is the mark of genius.
—NAPOLEON.

MAP AND AERIAL PHOTO READING (Simplified), by Lt. Col. W. F. Heavy, C. E. Military Service Publishing Co., Oct., 1941. 3d Edition. 112 pages. $1.00.

The artilleryman lives by his maps, and by maps we mean any graphical representation of the terrain. Some years ago it was a part of an officer's basic education to spend many hours making area sketches or road maps—"chasing contours," as it was often called. This did not necessarily produce a competent map maker, but it did imbed in the recipient a fundamental understanding of terrain and graphical representations thereof. Today much of that knowledge is, perhaps of necessity, glossed over in training. As a result we have too many officers and NCO's who are a bit vague in the fundamentals of mapping and are not too well able to locate themselves on a map in strange country. Col. Heavy's up-to-date text fills a real need in making this basic training data readily available in one compact volume. It also contains questions and answers, is liberally illustrated with clear drawings, and is supplemented by some sample maps airphotos, scales, and a paper protractor. The book should be a valuable training aid, and a handy reference book for those who have little time to thumb through the numerous texts on topography and survey.

—W. S. N.

PLANNING THE WAR. By Lt. Col. Clive Garcia. With a foreword by Field Marshal Lord Milne. Penguin Books, Inc., New York, 1941. 25c.

The author's military service includes the Boer War and the campaigns in France, Salonika and Palestine during the Great War. This book is the end result of a series of condensations and revisions, and represents prolonged serious study. The author complains of the lack of a central planning agency not only for the combination of nations opposed to Germany, but also for Great Britain herself. In the latter case he feels that the concentration of the entire direction of the war in the hands of Churchill is dangerous, because of the dependence it places upon the life of one man. Much of the book discusses the organization of an ideal planning body and the way it should work.

Putting his own mechanism to use, the author estimates the situation, and concludes that for England the decisive theater of operations is in the air. Even though the bulk of the German army is now in Russia, Garcia does not think a British expeditionary force would be successful, and by implication he would not approve the present campaign in Libya. He believes that England can win by intensively bombing Germany from the air. The use which he makes of his own system illustrates the weakness of it. The author's estimate of the situation leads him to favor air bombing as the way to victory, but another estimate of the situation might result in an entirely different answer, and significantly Lord Milne confesses that he cannot follow Garcia in all his conclusions. It is not so much the plan or who makes it that counts: the question is, are the facts and premises upon which the plan is based sound and accurate?

THE MILITARY SERVICE POCKET REFERENCE BOOK. 1942 edition. By Major Peter Rodyenko, Corps of Engineers. $1.00.

This third edition of Maj. Rodyenko's handy compilation of military information, symbols, reference data, etc., is enhanced in value by the addition of a series of illustrations showing the British, Chinese, German and Russian uniforms and insignia.

CENSORSHIP 1917. By James R. Mock. Princeton University Press, Princeton, N. J., 1941. $2.50.

This book is written by the co-author of the celebrated "Words That Won the War." In the beginning, wartime censorship was based on a sound idea—the need to keep military information from the enemy. However, censorship in operation, to put it mildly, sometimes took peculiar form. So zealous were the censors in stopping letters that the Honolulu postmaster confessed: "About half of my time is now occupied in rescuing mail I believe to be innocent, from the clutches of my own censorship force." A letter from a Chilean who wrote that he would remain a Chilean citizen rather than become an American was held, for the censor considered this to be "rabid pro-German propaganda." An article in the Minneapolis *Journal* which referred to American victories in the Mexican War of 1846-48 was clipped, because it might offend the Mexicans. A film dealing with the Revolutionary War was confiscated because it might offend the British. Ambrose Bierce's famous Civil War stories were blacklisted on the grounds that they might lower the soldiers' morale. So also was a book by George B. McClellan, son of the Civil War general, because the author had stated that during a trip through Europe in 1915 he had found the Germans to have more resources than the Allies. McClellan was a former congressman and mayor of New York, and at the time of the blacklisting was a lieutenant colonel in the A. E. F. It is to

BOOK SUGGESTIONS

LEADERSHIP
By Major Edward Lyman Munson, Jr.

A helpful and brief discussion of the personal problems that the leader must meet in dealing with and directing the American fighting man. Packed with good, homely, sensible advice; gets down to cases. The perfect gift for the younger officer or the noncommissioned officer. $1.00.

CARBINE AND LANCE. The Story of Old Fort Sill
By Captain W. S. Nye

Everyone who has ever been at Fort Sill or expects to go there (as what Field Artilleryman does not?) should have a copy of this stirring account of the background and founding of the Field Artillery School. Several printings of this book have been sold, and it is still in demand. Profusely illustrated with rare old photos of early day Indians and other western characters who were at Sill in frontier days. University of Oklahoma Press. $3.00.

YOUR 1942 INCOME TAX
By J. K. Lasser

This latest edition of a perennial best seller will cover all the radical changes in the tax laws. Indispensable to the army officer in making out his annual income tax return. $1.00.

GENERALS AND GENERALSHIP
By Gen. Sir Archibald Wavell

In his lectures delivered at Trinity College in 1939, General Wavell considers the qualities required in a good general. These lectures reveal the theories General Wavell has put into practice in his recent campaigns. Macmillan, 1941. $.50.

BERLIN DIARY
By William L. Shirer

This is an uncensored and intimate account of Germany in the Second World War, written by a man who witnessed practically every important step in Germany's program of rearmament and dominance, and who combines knowledge of the facts with ability to tell them in full. Book-of-the-Month selection for July. Alfred A. Knopf, 1941. $3.00.

STATE DEFENSE FORCE MANUAL

The book for the training of State Defense Forces. Combines in one inexpensive volume practically all of the basic military subjects. 484 pages; flexible Fabkote binding. $1.00.

THE SOLDIER'S HANDBOOK

Published this year by the War Department as FM 21-100, *The Soldier's Handbook* has been widely hailed as finely written advice and information for the new soldier. It is valuable, too, for the older men and officers; combines in a compact, well-illustrated volume the basic military information required for the individual; and acquaints him with military customs and procedures.

THE FIELD ARTILLERY JOURNAL now offers an exact reproduction of the government text, and has added thereto a thick appendix containing worthwhile information for field artillerymen.

Price 50 cents per copy. 10-25 copies, 10% discount, postpaid; 25 or more copies, 20% discount F.O.B. Harrisburg, Pa.

THE MILITARY SERVICE POCKET REFERENCE BOOK
By Major Peter Rodyenko, *Corps of Engineers*

Third Year, now in its 1942 edition. British, Russian, German, Chinese, U. S. Army uniforms and insignia. Actual photos which provide a splendid means of learning to identify uniforms and insignia. Official Abbreviations, Military Symbols, Check List of Uniforms, New Infantry Division, Armored Forces, Parachute Troops, Uniforms of the Gestapo, Modern Camouflage Technique and *how* to do it! Map reading in the field, How to prepare a tactical exercise, Pay Tables for Officers and enlisted men, Pensions and Compensations, Reception Center, Signals and Codes, Transportation and allowances. All in one pocket size book. No other book contains all this information! 200 pages, flexible cover. Over 100 illustrations. $1.00 postpaid.

COURT-MARTIAL—PRACTICAL GUIDE
By Major T. F. McCarthy

Designed not to take the place of the *Manual for Courts-Martial*, but to supplement it, this book offers convenience in reference that will save crucial minutes. Spiral binding permits it to lie flat, open at selected page; arrangement of the book facilitates finding the needed page. Written by an officer of broad court-martial experience, $1.00.

MAP AND AERIAL PHOTOGRAPH READING
By Lieutenant Colonel W. F. Heavy

Written for the combat officer and the noncommissioned officer, this profusely illustrated manual has been well planned and effectively illustrated to make it a clear, concise, and easily understood text. Complete with maps and overlays, $1.00.

MANUAL OF MARTIAL LAW
By Captain Frederick Bernays Wiener

184 pages. $2.00.

OUTLINES OF THE WORLD'S MILITARY HISTORY
By Brigadier General W. A. Mitchell

An analysis of military operations and the causes of success and failure from 1500 B.C. to 1918—from Thothomes III to Pershing. A valuable reference book—covers more than 100 campaigns and battles. $3.00.

HOW TO SAY IT IN SPANISH

For the soldier who wants a *quick* introduction to Spanish, to make his needs understood. $.75.

S-2 IN ACTION
By Shipley Thomas

The technique of securing information about the enemy in wartime. Not a cut-and-dried textbook, this book draws heavily on the experiences of the author, who has "been through the mill." A necessity for the regimental intelligence officer. $1.50.

RIOT CONTROL BY THE NATIONAL GUARD
By Major Sterling A. Wood, Infantry

Flexible Fabkote binding, $1.50. Library buckram, $2.00.

ROOTS OF STRATEGY
Edited by Lieutenant Colonel Thomas R. Phillips

Contains selections from Sun Tzu (500 B.C.), Vegetius (390 A.D.), Marshal de Saxe (1732), Frederick the Great (1747), and Napoleon. The maxims of the military masters in one volume. $3.00.

Order from:

U. S. FIELD ARTILLERY ASSOCIATION
1625 H Street, N. W., Washington, D. C.

10% discount on the above, to members of United States Field Artillery Association

be hoped that the lessons of this book will not be lost on our authorities today.

WHAT THE CITIZEN SHOULD KNOW ABOUT THE MARINES. By Capt. John H. Craige. W. W. Norton & Co., New York, 1941. $2.00.

The author was a Marine officer from 1917 to 1935. He was editor of the *Marine Gazette*, and is now military analyst for the International News Service. Sea fighting for Marines stopped at the time ship boarding ceased to be a feature of naval warfare, and ever since they have constituted the land fighting branch of the navy. Essentially, however, they are soldiers, and their finest work in recent generations has been with the army — for example, the Marine Brigade of the A.E.F. Therefore, Marine organization and equipment generally parallels that of the army. In two respects, however, there are problems which are unique to the Marines. They must keep in mind that all personnel and equipment ordinarily will have to be transported by water. They must also devote a considerable amount of their time to training in landing operations, and to the development of new weapons and equipment therefor. This book describes the Marine Corps as it is now, outlines its past and points out its functions in modern war.

NOT ALL WARRIORS. By Capt. William H. Baumer, Jr. With an introduction by Lt. Col. R. Ernest Dupuy. Smith and Durrell, New York, 1941. $2.50.

The author's thesis is that West Point has produced a large number of men who have been successful in other fields than the military, and with this there can be no argument. It may be argued, however, that not all of the seven men he has selected illustrate the point. Baumer maintains that these men, despite their civilian achievements, were typical products of the Military Academy, and that, "though they had left the army, the were always West Pointers." Two of his selections are Edgar Allan Poe and James McNeill Whistler, both of whom were expelled from the Academy. In the first place, one does not ordinarily judge the work of an educational institution by the type of men it expels. And secondly, these two moody and temperamental artists certainly are not characteristic of an Academy where discipline and self-restraint are strongly emphasized.

In Poe the writer, Whistler the painter, Henry du Pont the business man, de Bonneville the explorer, and Jefferson Davis the statesman, the author has sketched five men who plainly meet his requirements—they are noted far more for civilian accomplishments than for their military careers. But is Leonidas Polk remembered as an Episcopalian bishop or as a Confederate general? And is Horace Porter remembered as an ambassador to France, or as Grant's staff officer?

Having said so much in criticism, praise must be given for the finely drawn portraits of these seven men. Some of the information is new, much of it is generally unavailable, and all of it is well presented. Without doubt, too, the book serves its purpose in demonstrating to the general public that West Point produces more than generals.

CHARLES DE GAULLE. By Phillippe Barres. Doubleday, Doran and Co., Inc., New York, 1941. $2.00.

The publication of de Gaulle's "Army of the future" familiarized Americans with his ideas, but little was known of his career. Therefore there was a need for a biography, but unfortunately this one is not complete. We learn that de Gaulle was born in 1890, and entered St. Cyr in 1911; that he was wounded three times in the Great War; that he was captured at Verdun, and held prisoner in Germany until the Armistice; that he served with Weygand in Poland, and later was Petain's aide; that he was a history instructor at St. Cyr, a graduate of the Ecole de Guerre, and a member of various missions to the Near East. But these facts receive only brief mention; no details are given. There is a good description of de Gaulle's work as a tank commander in the campaign of 1940, but nothing whatever is said about the Dakar and Syrian operations, on the ground that their details are still military secrets. Some sketches of other Free French leaders are included, but the author, a journalist, seems to be much more concerned in establishing the political merits of the Free French cause than in discussing the military career of de Gaulle.

HORATIO GATES. By Samuel White Patterson, With a foreword by Allan Nevins. Columbia University Press, New York, 1491. $4.25.

This much maligned Revolutionary general was born in England in 1727, and bought a commission in the British Army in 1754. The next year he came under fire for the first time in Braddock's disastrous expedition. He served in the Martinique expedition of 1761, and then went to England. In 1772 he returned to America, and became identified with the revolutionary party. When the war came few if any of the American generals surpassed Gates in previous military experience.

Gates' Revolutionary career has always been the subject of unfavorable comment, and Patterson does an excellent job of exploding a large part of this criticism. To Gates must go much of the credit for Saratoga. The Conway intrigue, as the author points out, was a trifling affair, by no means deserving of the attention it has received. At Camden the militia failed Gates, as it repeatedly failed other generals during the Revolution. Sound and well written, this book makes a valuable contribution to the military history of the Revolution.

Volumes XXX and XXXI (1940-1941)

INDEX OF TITLES

INDEX OF AUTHORS