

*The*  
**FIELD ARTILLERY**  
*Journal*



IN THIS ISSUE:

*Artillery in Special Operations*

FEBRUARY, 1942

# THEN—



*Equitation instruction—1917*

# —AND NOW?

**For the answer, read "Signposts of Experience"**

**World War Memoirs of Gen. William J. Snow  
Chief of Field Artillery, 1918-1927**

★ ★

### WHAT AUTHORITIES SAY ABOUT "SIGNPOSTS OF EXPERIENCE"

I neglected the first two issues of General Snow's reminiscences thinking this was just one more case of a retired Brass Hat telling how he won the World War. For some reason or other I happened to read the third installment, and became very excited about it, dug out the back issues and read those through and have been persistently recommending the thing ever since. It seems to me that no one today can fail to benefit by these reminiscences; and I don't mean people actively concerned with ordnance production alone, but with the general public, which wants to know why we don't have 100,000 guns before breakfast tomorrow. I am glad to tell everybody I can about it.

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Both as an historical document of the World War and as a reference guide to armament production problems past and present. General Snow's book is of the first importance, and should prove especially valuable to libraries.

ROBERT E. RUNSER,  
*Readers' Adviser in Military Science*,  
Public Library, Washington, D. C.

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LT. COLONEL W. S. NYE, *Editor*  
 LIEUTS. H. S. FORD and A. V. RUTLEDGE.  
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OF VARIOUS measures which units and individuals may take beforehand to prepare themselves for combat, two seem preeminent. First is perfection of technique. A great piano virtuoso daily does his long hours of finger and scale exercises. A champion football team throughout the season continues to practice punting, passing, blocking. So it must be with the military team. The executive should not only "be familiar with" methods for laying the battery, but be able to execute them quickly and accurately under all conditions. The battery commander must not only have been instructed in the rules for conduct of fire, he must be an old hand *at shooting*. The battalion commander must be able to formulate practical plans for the support of his associated infantry or armored unit. And so on. Implicit is continuous and intensive practice in the fundamentals, even long after they have been scheduled on the training program. Stress must ever be on the *simpler* methods, those which are most readily understood, most easily performed and longest remembered. The reward for all this will be polish, high morale, professionalism.

THE SECOND IMPORTANT preparation for war is familiarity—even though vicarious—with terrain in theaters in which one conceivably might be called to serve. This will point the way to special measures of physical conditioning, acquisition of special items of equipment (or modification of standard ones), and to special *methods* imposed by such terrain or climate. In this, as in many other ways, the JOURNAL will continue to render aid. Readers should pay strict attention, for example, to descriptions (in our various features) of certain desert, jungle, mountainous, and frigid localities. These are not being printed merely as travelogues or for general entertainment. Units serving outside the continental limits of the United States can help, too, by sending us, for publication, notes describing their daily life and activities. In this way we can keep the members of our widespread artillery family in touch with one another, and supply some useful hints to those who may join you later.

THE TINTED photo herewith shows the standard 155-mm. howitzer in action Compare this photo with those on pages 126-7, which illustrate the latest weapons.

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# The Field Artillery Journal

"Today's Field Artillery Journal is tomorrow's training regulations."

FEBRUARY, 1942—Vol. 32, No. 2

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# Pack Artillery

The need for pack artillery for special operations lies in the fact that it can operate in terrain inaccessible to any other type of artillery. Were this not true, a pack artillery battalion would be an uneconomical organization, since 689 mules and 117 horses are required to transport and supply twelve 75-mm howitzers. An immense amount of time and work is required to train and harden men and animals, and a continuing effort is necessary to keep both in condition to march at their prescribed rate of three and one-half miles an hour to cover twenty miles a day. Considerable tactical mobility is the result, however; and strategical mobility may be attained by the auxiliary use of sea, rail, or motor transportation.

## PACK ARTILLERY AS SUPPORT FOR AIR-BORNE UNITS

During the past year, the writer has participated in two special operations designed to expand the possible uses of pack artillery. The first was for the purpose of developing reference data and operational procedure for the air transport of pack artillery. The approach to this problem was made according to the following general principles:

*a.* That for howitzer batteries, the howitzer section should be the basic unit.

*b.* That each howitzer, with as much of its personnel as possible, should be transported in a separate airplane, sacrificing extra men in order to carry more ammunition.

*c.* That the load of such planes should be self-contained units, and that the personnel thereof should be capable of:

- (1) Executing direct or indirect laying.
- (2) Establishing signal communications between the howitzer and the OP.
- (3) Subsisting for at least two (2) days without extra rations.
- (4) Purifying the water supply.
- (5) Protecting themselves against inclement weather.
- (6) Performing necessary pioneer work.
- (7) Rendering first aid and simple medication.
- (8) Executing close defense of landing field and howitzer position.
- (9) Cleaning and lubricating the howitzer.
- (10) Parachuting.
- (11) Distress signalling by radio, flares or rockets.
- (12) Transporting the howitzer, ammunition and equipment in draft, by hand, animal or motor.
- (13) Transporting the howitzer, ammunition, equipment and personnel in trucks or commercial cars.



- (14) Firing fifty (50) rounds of 75-mm. ammunition upon landing.
- (15) Remaining afloat on water in case of over-water flights.
- (16) Protecting themselves against gas.

Several airplanes were tested as to their suitability for this purpose. One answered every purpose. Details of loadings and operational procedure are purposely omitted from this article.

Loading experiments showed that the howitzers, signal equipment, fire-control equipment and certain personnel could be split into four operating units, each unit having a total weight that the airplane could carry with a considerable safety margin. These units comprise the first echelon and were called the first howitzer group, second howitzer group, third howitzer group and fourth howitzer group, respectively. The howitzer itself is the basic unit of each group; the minimum personnel necessary to operate it, establish signal communications and perform the other missions outlined was assigned to each howitzer group, sacrificing extra men to make room for more ammunition.

The purpose in assigning the howitzers, fire-control equipment, signal equipment, personnel and ammunition into operating units allotted to separate airplanes was to make the load of such plane self-contained and

The plan was that upon landing, all personnel of the second echelon would revert to their proper sections at once, thus enabling the battery to reorganize along functional lines. This plan does not contemplate the transport by air of animal equipment or men whose duties are confined to handling animals. Neither does it propose carrying medical personnel, as it is believed that such personnel could be made available to the artillery upon landing, or could be flown in any type airplane.

Loading tests showed that the time required for loading the howitzer and reinforcing groups was twelve minutes. Personnel of comparatively little training was used in those tests. For the howitzer groups an additional ten minutes was consumed by the plane crew chief in safety wiring the howitzer parts to prevent shifting. The unloading time was considerably less. Flight tests showed that the load was well distributed and that the airplane was not unbalanced in any way.

Personnel and equipment of the Battalion Headquarters and Headquarters Battery was divided into five groups called, in the order of their importance, the first headquarters group, the second headquarters group, etc. These groups comprise the first and only echelon of the Battalion Hq. and Hq. Battery and contain all the personnel and equipment considered necessary for the task force. Equipment and personnel was divided in such manner that

# For Special Operations

independent of any other airplane, so that the loss of one plane would not affect the proper functioning of the remainder of the battery except by the loss of fire power contained in the lost airplane.

The second echelon consisted of four reinforcing groups, called the first reinforcing group, the second reinforcing group, and so on. These groups contained all personnel, not transported in the first echelon, considered necessary for the task force. They contained additional cannoneers, detail men, ammunition and rations, the field kitchen, maintenance personnel and baggage. The total weight of each of these groups was well within the weight-carrying capacity of the plane.

All personnel of both echelons were allowed to take with them in the plane an individual roll containing two days' emergency rations and those items authorized to be carried into combat. The remainder of the items authorized to be taken into the theater of operations were packed into barracks bags in the case of enlisted men, and into bedding rolls for officers; this constituted the baggage carried by the second echelon. A gas mask for each passenger was contained in his plane. These masks were packed carefully into a barracks bag or bags, according to the number of men involved.

By Lt. Col. E. M. Edmonson, FA.

each group could perform in a general way the functions of any other group, except those of command. The first headquarters group is in general for command and survey, the second for liaison, the third also liaison, the fourth a command and operations group and the fifth a maintenance group. Each group has a total weight that the airplane can carry safely.

Tests were also conducted with reference to dropping dummy loads by means of parachutes attached to each load. It is believed practicable to attach parachutes to the howitzer parts and drop them in the same manner, as the heaviest part weighs only 234 pounds and each part has apertures through which the parachute harness can be threaded and firmly secured. Certain parts would have to be wrapped and padded, but this would present no great difficulty. When it became practicable to manta and drop by parachute the remainder of the equipment carried by the various groups, there was opened the possibility of dropping a battery or battalion of pack artillery near the tactical locality from which it would operate. Supplies and ammunition could be delivered

readily by plane and handled to the best advantage by the parachuting method described above.

#### PACK ARTILLERY AS SUPPORT FOR WATER-BORNE UNITS

The second special operation in which pack artillery might be useful is, as everyone has known for years, a support for a landing operation—either to establish a beachhead or a bridgehead.\*

Tests proved conclusively that an adequate battalion headquarters is essential, and should land with the infantry regimental headquarters. Thus the batteries initially with the landing teams can be brought under centralized control to support a regimental scheme of maneuver and deliver more effective massed fires. As a matter of fact, during one phase of the exercise, three batteries were placed under the control of the three observers, and with a small radio detachment, functioned as a battalion in support of a coordinated divisional attack.

The final phase, a reembarkation at night, was completed with smoothness and speed and seemed to be the most successful operation of all. Doubtless the desire of all concerned to get on board and start for home stations had considerable influence.

The howitzer is highly satisfactory for landing operations. Its construction facilitates speedy transfer from ships to boats and, provided large enough howitzer crews are furnished, quick landing from boats to beach.

The standard fire-control and communications equipment is satisfactory. However, oil silk or equivalent wrappers or covers must be provided for optical equipment, telephones, switchboards, radios, etc., to protect them from water and spray during the movement from boats to beach. Inexpensive commercial shower curtain have been used for this purpose during exercises. Standard equipment other than the foregoing types proved satisfactory. The pack artillery kitchen equipment (buzzy cots with tent flies) was used, with good results.

The following suggestions represent the consensus of opinion of several experienced officers as to the organization and method of procedure which should be employed by an artillery battalion, equipped with the pack howitzer, used as supporting artillery with a landing team.

#### *Battalion Headquarters Battery with Service Section:*

This unit to consist of 12 officers and approximately 88 enlisted men, less chauffeurs, the number of chauffeurs depending upon the type of transportation determined.

Officers to position as follows:

Bn comdr	S-1	RO & S-2	S-4	Ln O No 2
Bn Ex O	Asst S-1 (Pers)	S-3	Ln O No 1	Com O
Mun O	Mot O			

Unit to be organized into subdivisions as follows:

Bn Headquarters	Operations Platoon
Hq Btry Hq	CP and Survey Section
	Two liaison sections

Communications Platoon	Bn Maintenance Platoon
Platoon Hq	Supply and Munitions
Wire Section	Section
Radio Section	Motor Maintenance Section
	Maintenance Section

#### *Howitzer Batteries (75-mm. Pack How.)*

Each unit to consist of 4 officers and 135 enlisted men, less chauffeurs. The number of chauffeurs will depend upon the type of transportation provided.

One additional officer with reduced liaison detachment from Bn Hq Btry to be attached to each howitzer battery initially, while battery is part of the infantry battalion LTM; and to revert to artillery Bn Hq when howitzer batteries are brought under battalion artillery control, when infantry regimental and artillery battalion headquarters have landed.

Unit to be organized into subdivisions as follows:

Btry Hq.....	5 EM	
Btry Detail.....	26 EM	
Firing Btry		
Hq.....	1 EM	
4 How Secs.....	76 EM	(16 cannoneers per how sec)
5th (Amm) Sec .....	15 EM	
Maint Sec.....	12 EM	

135 (chauffeurs not included)

#### *Transportation for FA Bn Hq and Hq Battery:*

Sufficient trucks, ¼-ton, and ½-ton weapons carriers, to carry a reduced battalion commander's party, two liaison sections, certain personnel of the detail and motor and supply sections (see suggested organization), and the necessary equipment. All other personnel walk.

#### *For 75-mm. Pack Howitzer (M1, A1) Batteries:*

6	¼-ton trucks
2	½-ton trucks
6	light tractors
8	1-ton trailers

Tractors to be of track laying type, capable of hauling approximately 2 to 2½ tons pay load, with low-sided cargo body capable of carrying about ¼ ton pay load (section equipment).

Trucks, ¼- and ½-ton, for BC detail, and certain motor and maintenance personnel and equipment. All personnel to walk except BC party and certain detail and motor personnel.

The suggested organization for a field artillery battalion contemplates its use for landing operations, where ordinarily it will not be far from supply points. Therefore neither personnel nor transportation are provided for the quantities of supplies and ammunition ordinarily carried in the organic transportation of the field artillery battalion as given in current tables of organization. Because of lack of ship space, the absolute minimum personnel is provided for in the suggested organization. Likewise the minimum possible transportation is provided; enough only for reconnaissance and communications purposes, and to move the howitzers, howitzer equipment, and necessary ammunition forward from the initial beach positions. Howitzer battery transportation

\*A German article reprinted in this magazine last year showed the value of pack artillery in a river crossing—Editor.

should then be pooled under the Bn Supply and Munitions Personnel to move up additional ammunition and supplies. This will be possible when the distances involved in the average beachhead (to include the Division Beach-head Line), are considered. In the event that standard supply and ammunition loads are desired, additional transportation may be attached.

Plans should provide for the landing of a 75-mm. howitzer battery with each infantry assault battalion, after the assault echelon attains a line that will keep hostile small-arms fire off the beach. The batteries with reserve infantry battalions should follow as soon as possible, and be placed in position to fire in support of the assault battalions. Heavier artillery, if available, should follow, as the beach head is advanced and as unloading facilities are developed.

Loading plans should provide for fire - control, communication and section equipment, and also certain other equipment (water cans, etc.) to be loaded on ship with or close to battery personnel. Howitzers should be loaded on deck or below upper deck near hatch. This

not only facilitates loading into boats but permits the necessary constant care and cleaning while on ship.

Official experience tables (FM 6-130) indicate that the 75-mm. howitzer, firing observed and scheduled fires *during an attack*, may be expected to fire an average of 140 rounds per howitzer per hour during the first two hours. It is obvious, therefore, that not only must one unit of fire be landed with the battery or within a very short time thereafter, but unloading plans must provide for additional ammunition within two or three hours.

Despite any reasonable and practicable amount of naval gunfire support, as much field artillery as is available should be landed as soon as practicable, in order to take over at the earliest possible moment the close-support missions that are not within the capabilities of naval gunfire. This has been demonstrated on many occasions, particularly in the Dardanelles landings.

The foregoing is equally applicable to the battery landed as part of an infantry battalion combat team, and to the battery landed separately in rear of a combat team to

assume a supporting mission. This because artillery should be placed into position to fire whether the infantry battalion to which it is attached is thrown into the line or kept in reserve. No artillery should be kept out of action and in reserve.

*Loading from Ship to Small Boats:* Howitzers should be assembled in traveling position and held in this position by cinchas and rope lashing. They should be loaded from ship to boats with a rope sling passed under the trail and axle and with one bight of rope passing through the opposite bight and over the tackle hook. They should NOT be loaded with a net. The use of a net sets up stresses and



strains that might damage the howitzer. Four slings per battery should be provided, so that there is no delay in loading the four howitzers. Two guide ropes per howitzer, one to the ship and one to the boat, should be provided. Sufficient large nets should be provided to facilitate and speed up the loading of the ammunition. The ammunition net should hold 100 rounds and be lined with canvas to prevent ammunition from slipping through the mesh of the net. Smaller (and finer mesh) nets should be provided for loading howitzer section equipment into boats. Special means should be provided for loading motor vehicles. The simple ropes and slings used in the recent exercises damage the body, running boards and fenders, or when fastened to spring shackles, place an unwarranted strain on them.

The liaison officer, with reduced personnel, should load in the same Y boat with the infantry landing team commander. The artillery battery commander and detail, with their fire-control, survey and communication equipment, should load into a separate Y boat and go in

with the same wave. The firing battery, under the battery executive, should load into six Y boats and form the last combat wave of the landing team.

The howitzer is loaded into the boats in the traveling position. After the ammunition and equipment is loaded, the howitzer is broken down into its component loads, and upon arrival at the beach is taken ashore, by loads, and set up above the high-water line or at the initial battery position, if not too distant.

Positive measures must be taken by the battery commander (who precedes the firing battery and selects the battery position) to insure the battery's arrival on the beach opposite or near the battery position to be occupied. The battery cannot be moved along the beach at this time without many casualties and great loss of time. While en route to the beach constant radio communication between battery commander and battery executive should be maintained. Personnel on the beach should mark the landing place with guidons or flags.

The task of quickly unloading ammunition and four howitzers with equipment from six boats and movement to the initial position is an extremely difficult task. With the reduced battery personnel used in the test exercises and no other assistance, many trips were made from boat to position by each member of the battery. The beach party personnel were unable to assist as the parties were apparently not large enough to handle the landing boats and other duties. The shore parties also were unable to assist because of reduced personnel and other duties. As the shore party personnel were drawn from the landing teams, which were barely strong enough for the operation without furnishing the beach parties, the beach parties were of necessity reduced. It is believed that the shore parties should be furnished by the Force personnel, attached to the LTMs, and later revert to Force control when Force Headquarters lands.

#### CONCLUSION

The two operations outlined above proved only that the 75-mm. pack howitzer is adapted to air transportation and landing operations. Any trained artillery unit, equipped with this weapon, could have done just as well. The fact that a pack artillery battalion was used resulted only in letting the mules get soft, thereby necessitating a reconditioning of animals at the expense of further tactical training.

The motor platoon of the Service and Ammunition Battery should be activated and remain activated. Assuming that a theater inaccessible to motors will eventually be reached, this platoon will have a valuable function in establishing supply points nearby, and in operating between such supply points and rear installations.

The whole question of present organization needs further examination and test. Certainly pack artillery has the same failings as other artillery battalions, being charged with all the administrative and supply functions formerly performed by the regiment.

The writer believes that an additional staff officer, in the grade of captain, and entirely divorced from any battery administrative duties, should be provided to function as an S-4. The battalion commander and his entire staff (except the S-1) are tied down and fully occupied by tactical duties, especially since the development of the modern fire-direction center. The vital question of ammunition and other supply now devolves upon an officer also charged with the administration and tactical handling of a large and complicated Service and Ammunition Battery.

Battalion liaison officers should be captains. The latest doctrine at Fort Sill teaches that liaison officers and infantry battalion commanders should work out the details of close supporting fires on the ground. These liaison officers are therefore a vital link between the infantry and its supporting artillery. Officers of insufficient background, training and experience will inevitably fail to plan the most effective support and thereby nullify long months of training; and worse, may cause the failure of an operation.

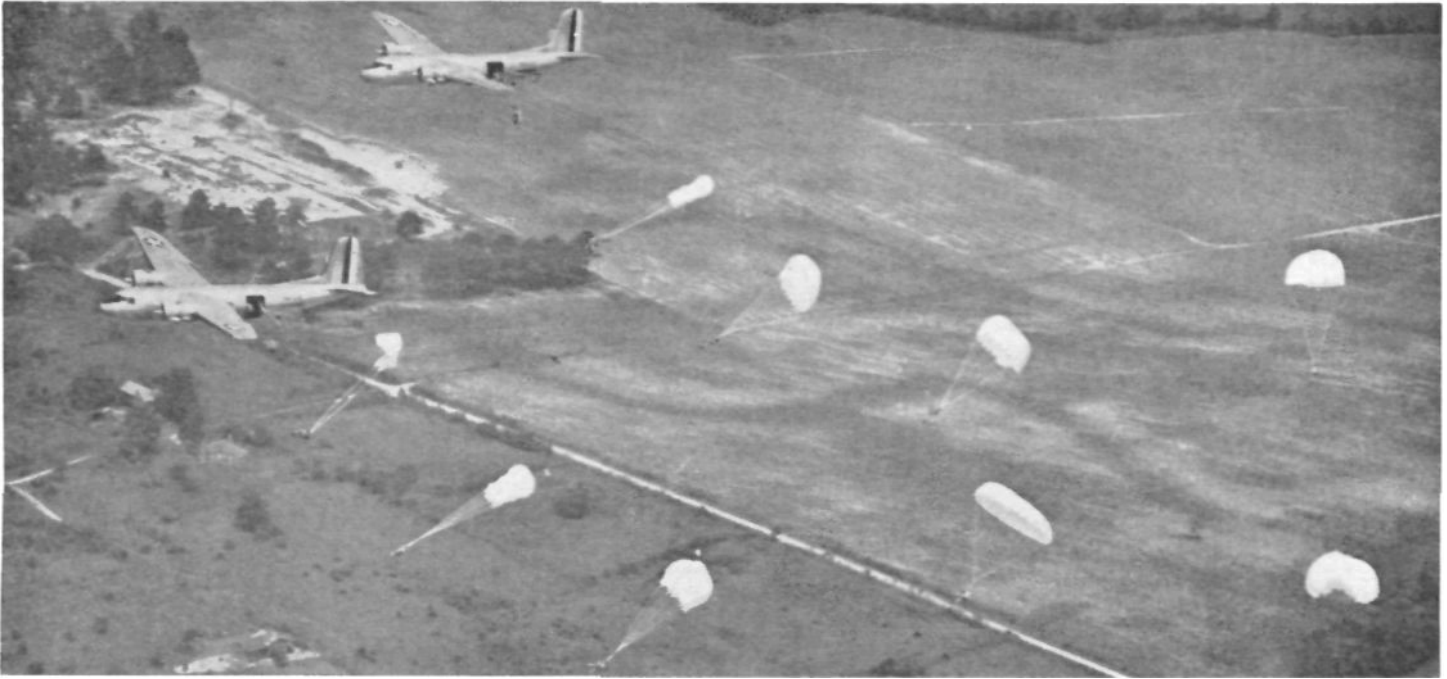
Communications personnel, especially telephone operators, do not have adequate grades and ratings. Such men should have a tactical background, understand the exact meaning of military terminology and its application. Without this understanding much time is lost in transmission and absurd mistakes occur.

Certain aspects of pack artillery differ from those of other light artillery battalions. In view of the fact that batteries may frequently be required to function alone, they must be prepared at all times, both by training and equipment, to operate both the firing chart and the observed-fire chart. Displacement may be by platoon or even by individual gun. A high degree of specialized skill is required of personnel to pack the necessary materiel, equipment and cargo upon the backs of the animals, and to deliver these loads day after day, at the proper place at the proper time. Personnel should be selected for size, strength and bodily vigor, in addition to the other attributes of a soldier.

Cargadors, who are responsible for assembling and packing miscellaneous supply loads, should be sergeants instead of corporals. Battery pack-masters, who are responsible for establishing and maintaining the fit of cargo saddles on animals of varying degrees of conformation, condition and flesh, should be technical sergeants instead of staff sergeants. Such men require years of experience to attain even a reasonable degree of skill and, if really expert, their services are invaluable.

As parts of mountain divisions, used as direct-support artillery for mountain-trained infantry, the pack battalions should find their justification. They are colorful troops of high morale, with tradition behind them. They glory in outmarching the infantry and enduring the greatest hardships. Being kicked by a mule is just a part of the day's work. And a mule will wait many years for an opportunity to kick his best friend.





# COMBAT TEAMS AGAINST PARACHUTISTS

By Lieutenant Colonel Royal L. Gervais, FA.

Parachutist menace in the Carolina maneuvers was serious in the beginning, not so serious at the end. All commanders were held responsible that necessary steps were taken to provide adequate local defense against the "Men from Mars." All rear area installations such as ordnance and quartermaster were required to provide their own defense. The army, however, passed this job over to Anti-Airborne No. 1, which was a special force of army troops. Anti-Airborne No. 1 was given the mission, first a static one, of protecting army headquarters from the embarrassment of being overrun by the enemy; second, that of a task force, to operate against an enemy which had landed and seized an area important to the army.

## ORGANIZATION

We arrived at Hoffman, N. C., to find that we were coupled with one regiment of infantry, less two battalions, one battalion of antiaircraft, and one platoon of mechanized cavalry. With this force a detachment headquarters and three combat teams were organized. The detachment headquarters consisted of a staff, an observation and communication group, and the cavalry. This headquarters controlled and supplied the combat teams. By operating a system of observation posts within a radius of five miles of army headquarters, it provided a warning service. Its wire section usually laid about 80 miles of wire on each problem. Detachment headquarters

was connected directly to the antiaircraft and antitank section of G-3, First Army.

## THE COMBAT TEAM

Each combat team consisted of battalion headquarters, one company of infantry, one battery of field artillery, one battery of 37-mm. C. A. (A. A.), one platoon .50 cal. C. A. (A. A.), and ammunition trains and kitchens. Infantry fire power was augmented by a section of heavy weapons, an antitank platoon and one mortar platoon. This gave each combat team fire power of approximately 536 units against personnel. To this should be added the fire power of the artillery battery, the antiaircraft 37-mm, battery and the antitank platoon for which no personnel fire power credits were allowed by the umpire manual. These combat teams reported an enlisted strength of approximately 530 men and 30 officers. They were able to get into action quickly because they had the absolute minimum number of vehicles. Each team averaged 70 vehicles that were broken down into three echelons. First the infantry and heavy weapons, next 37-mm, antiaircraft, then ammunition, supply and maintenance vehicles.

## MISSIONS AND FIRE POWER

Each combat team was a fighting element of Anti-Airborne No. 1. They were kept on the alert in concealed

bivouacs. Each team covered a sector of the army area and was ready to move out on very short notice. Utmost concealment in bivouac and speed in traveling to the landing field were required. Whether all three combat teams would be ordered out on an anti-parachute mission depended upon the situation as known to Detachment Headquarters at the time. If the teams arrived at landing fields before the parachutists had landed, the problem was simple. If the parachutists landed without being captured or destroyed, they immediately escaped to nearby cover, remained concealed until darkness, then got away to perform their missions. The combat teams were so tremendously strong in fire power that the anti-parachutist problem was minor, providing we did not have to conduct a "rabbit hunt." If the parachutists landed in an area, without opposition, before the teams arrived on the scene, tactics required that one team hold a line and the other teams drive the parachutists into that line. One team was able to effectively cover a line 3,000 yards in length in open country.

Very exciting work was experienced in handling reconnaissance and security elements which preceded the teams into action. Each element, a patrol, consisted of an officer, a light car, a few riflemen, and a SCR 194 radio set. These patrols, or scouts, were immensely valuable to the team commander because of their ability to get forward quickly to the area where the parachutists were landing. Over the radio they sent back information of the roads, terrain and any enemy dispositions.

#### THE FIELD ARTILLERY

Here the role of the parachutists and air-borne troops in the attack on Crete was taken as our guide. As the first parachutist troops immediately occupied points previously selected on the map, these points were anticipated in accordance with our mission. After they landed they were expected to protect the remainder of their platoons by organizing their positions with machine guns and light cannon. We also knew that the combat engaged in by the first elements would increase in intensity, that their fire power would develop with the arrival of new platoons; and, as soon as sufficient area had been cleared and distant protection assured, transports would arrive with air infantry.

Therefore, in the first echelon of each combat team, we placed one 75-mm. gun section as an infantry accompanying weapon. It was to bring direct fire on the parachutists' position organized with heavy weapons, or if the parachutists had taken up a defensive position in buildings, it was to shell them out. The battery commander and his party were in the first echelon of trucks and within reach of the team commander.

The remainder of the firing battery would go into position close to the concealed bivouac and about 2,000

yards from the landing field. Artillery fire was then conducted by forward observation methods, using the firing battery's SCR 194 sets.

In this anti-parachute work, artillery fire was possible within the time that it took the team to get to the landing field; however, artillery fire was not always necessary. If transports were landing on the field with airborne troops, the mission of the artillery was to destroy these planes or deny the landing field to them. This was accomplished by direct fire on the transports from positions at the edge of the landing field or indirect fire at a greater range. Attempting to shell-pock the landing field in addition to the destruction of the landing transports was part of a normal mission. Protection of these guns from parachutists was a task of the team infantry.

Our anti-parachutist work was a game of cat and mouse. The three combat teams were located in separate, concealed bivouacs surrounding army headquarters. We were always ready to pounce on any attempted landing within that area.

#### A LITTLE ACTION

A parachutist battalion dropped out of the sky at Pope Field one day. All but a handful were seized. This group hid in the surrounding woods that day, commandeered transportation and moved on army headquarters that night in repetition of the Louisiana affair. There the security forces of Headquarters, A. B. No. 1, rounded them up. But not before they had cut old communication lines at abandoned base camps and captured a few caretakers. Their maps showed Hoffman, N. C., as the location of First Army Headquarters. But it had left about a week earlier when the army moved south. Army Headquarters always moved to some inaccessible place, usually hilly and wooded, in attempts to foil all parachutist landings nearby. Each location was such that planes could not possibly land in the immediate vicinity.

#### CONCLUSIONS

For training and experiment against parachutists and air-borne infantry a highly mobile and heavily armed force of mixed troops was organized. The training and development phase was immensely interesting and the results most gratifying. We started from scratch. Experience, authentic information, and accurate data on the subject were entirely lacking. But with our mission always in mind we organized and trained, using as guides intelligence bulletins, observers from Louisiana, the probable force to be used against us, and vivid imaginations. I believe our training was sound and when the combat teams were handled efficiently their results were spectacular.

## A French battalion of pack artillery in the Alps during the operations of June 1940



*Mountain gun, 75-mm. Schneider-type, drawn in draft. Illustration shows some details of the pack harness. In the foreground a fallen mule is being stripped of his saddle.*

# MOUNTAIN GUNS IN TODAY'S WAR

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By Lieutenant Charles Taquey, 93d R.  
A. M., French Army

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Now that the last hectic weeks before the fall of France in 1940 can be viewed in retrospect, the Alpine operations of the 5th Battalion of the 93d Regiment of French Mountain Artillery, to whose headquarters the writer was assigned as liaison officer, are of special interest. Not only did its activities illustrate a type of mountain warfare but also its history depicts in vivid colors some of the reasons for the French collapse.

These events are now matter of record. There is no point in hiding either the good features of our military organization, which account for our local victory, or the

mistakes which, even so much smaller in our own sector did so much harm on the rest of the front. As to the morale it is enough to say that the "Armée des Alpes" withstood enemy's attacks on its main position until the last minute and even stopped

detachments of the German Army near Grenoble and Valence, (Map No. 1).

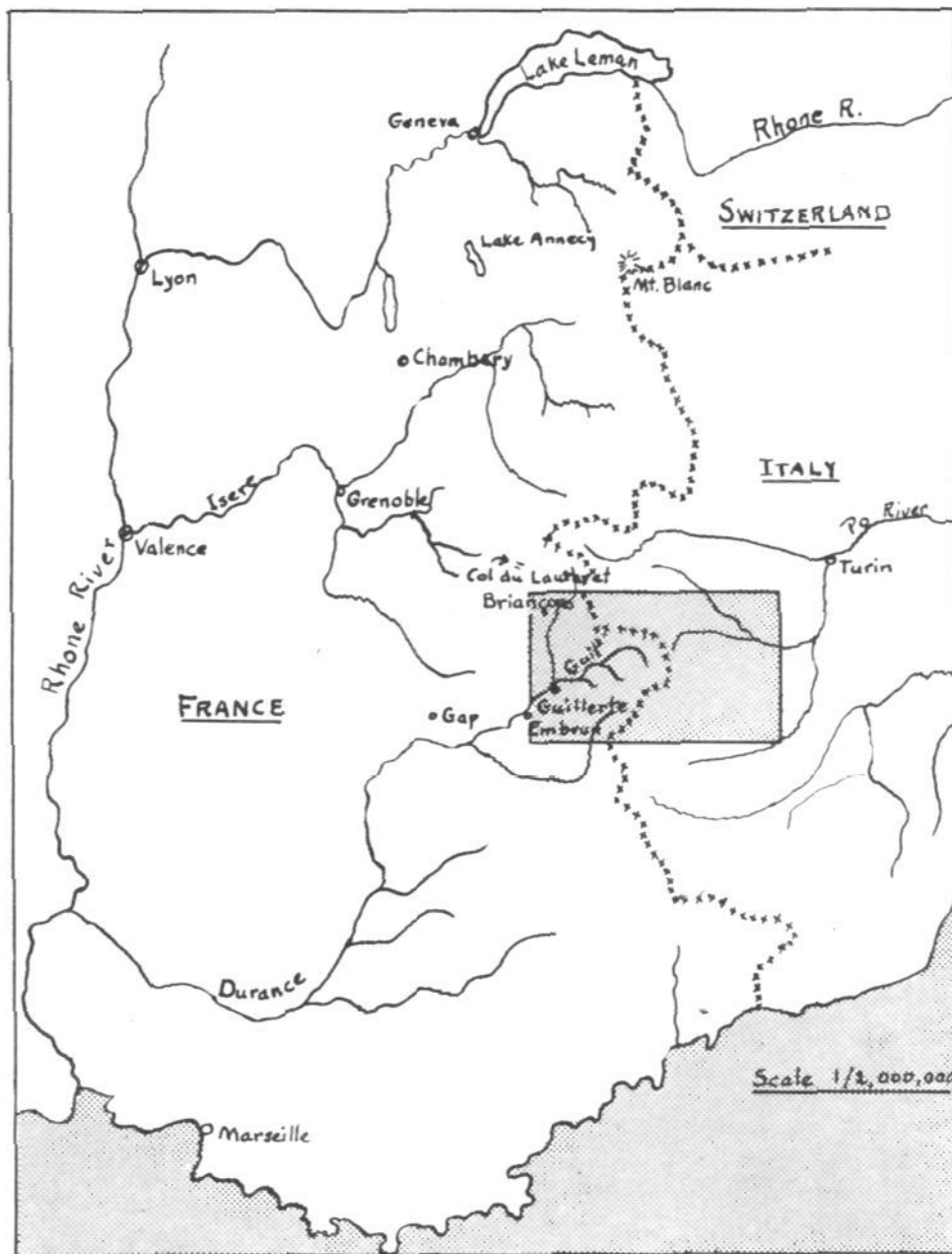
The 5th Battalion of the 93d was armed with the 75-mm. French mountain gun, Schneider type, which can be packed on mules or drawn in draft. For transportation it used both mules and trucks. It consisted of Headquarters, three four-gun batteries and one entirely motorized

Supply and Ammunition Battery. The contingent of the entire battalion contained 20 officers, 127 NCO's, 269 cannoneers, 323 mule drivers, 86 car drivers, 350 animals and 68 motor cars.

At the beginning of 1940, the battalion was assembled at Uchaud near Nîmes as a unit of the General Reserve of Artillery held at the disposal of the General Staff for emergency transfer to places of need. It comprised men of the old classes, mostly drawn from the district, a flat region of the southwest of France. Thus, the majority were peasants, and few of them had ever even seen mountains. Many had been found unable to march and, therefore, had been rejected from the Infantry! Many of them were former *Affectés Speciaux*,<sup>1</sup> young men without any military training, elderly bearers of *Fascicule jeune ou bleu* mobilized some months after the general mobilization in August, 1939. The officers were one major and several subalterns, seven of whom had served in the World War; and all others, with the exception of five, were over thirty years of age.

As for the animals, the mules had been chosen mostly from a shipment from Yugoslavia. Their selection was made by cavalry NCO's of the Remount Service, who knew more about equitation than about mules. To them the best mule was the one which most closely resembled a thoroughbred! This dangerous misconception explains why the 5th Battalion received so many lanky, thin-legged and narrow-hipped animals instead of the smaller, lower and tougher, if not so elegant,

<sup>1</sup>Men mobilized at the rear for civilian defense work.



Map showing the theater of the war in the Alps. The small shaded square covers the area shown in the aerial sketch. The valleys are convergent towards Italy and divergent towards France. This always makes an invasion of France from Italy more difficult than the reverse. Nevertheless, if no counterattack was to be expected from the southwest, as was the case in June, 1940, the invader could have met success by selecting one direction only; for instance, Briançon—Grenoble through col du Lautaret to join the Germans in Grenoble or Guillette, Embrun Gap towards the south to help other Italian troops progressing through the Maritime Alps in cutting the retreat of the French armies toward North Africa.





75-mm, gun descending a mountain trail. Note ropes attached to axle's ends.

mule which should be used in pack artillery.

The cars, and particularly the trucks, were just out of the factory. The Renault Works were beginning at that time to manufacture vehicles for the Army in sizable quantities. In that respect it was fortunate for the battalion that it had been formed late.

The final organization of the battalion took nearly three months; three months during which the men were idle, and the officers exclusively occupied with obtaining materiel. The procurement of each piece required endless visits to the nearest supply units, such as *Intendance* (equipment), *Parcs d'Artillerie* (guns), *Depôt d'Artillerie* (Personnel), *Remonte* (Mules). The commander of the Supply and Ammunition Battery even had to go as far as Paris, to the Renault Works, to get the cars. More than once the battery commanders would quarrel amongst themselves to get the best equipment; the habit of the Reserve Officers was to look upon supply depots as regular business enterprises, and they would compete against each other to make the best bargain. This resulted in new delays. The situation was further aggravated because of other units being organized at the same time around Nimes. No coordination was ever attempted, for each CO thought it more expedient to defend "the interest of his unit." This policy may be explained by the scarcity of materiel and the comparatively too great number of mobilized men whom the General Staff did not know how to use.

Of course, the effect of this situation on each individual unit was the almost complete absence of any serious training. The officers were otherwise occupied, and the NCO's busy with routine matters. Apart from a few marches to train the mules, and one firing school, there was nothing noteworthy achieved for nearly three months.

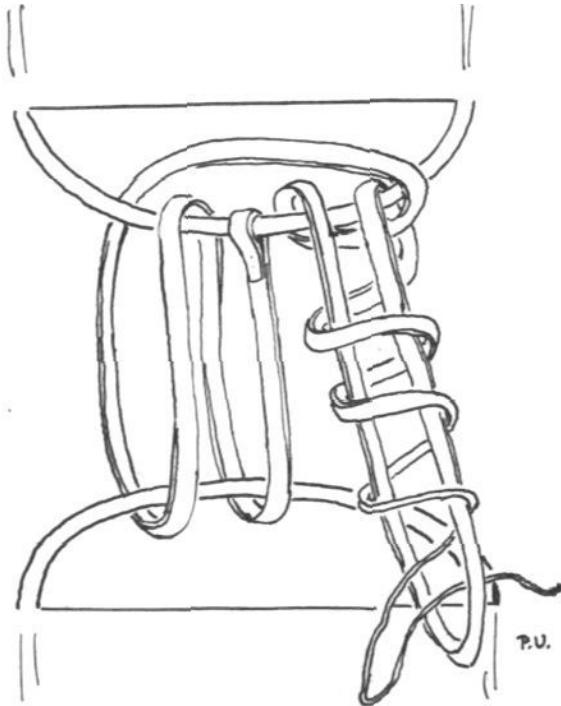
There were rumors that the battalion was to be sent to General Weygand's army in Syria. Once ready to move, however, troops were no longer being sent to Syria. The battalion were therefore assigned to the 93rd Regiment of Mountain Artillery, and sent to Coise, near Chambéry, to join the troops of the Army of the Alps.

The 93rd Regiment, a Regular Army unit, was composed of our battalion and four others. The 1st, 2nd, and 3rd battalions remained in the Alps throughout the campaign. The 4th was sent to support our B.H.R. (Brigade de Haute Montagne) with the Allied Forces in Norway. Like other units, the 93rd Regiment had *Batterie Hors Rang* (something like a hq. btry.), composed mostly of signal personnel, and a repair plant for the motorized equipment.

In certain respects the contrast between the first three Regular Army battalions and the 5th, was striking: the latter had the best ammunition and supply service, under the command of a man who, in a short period of time, had succeeded in making this unit as efficient as its material was up to date. The first three had motorized

equipment, made up essentially of jallopies requisitioned haphazardly at the time of the general mobilization; but they had far better mules, of the sturdier mountain type. And the men, born around Grenoble and Briançon, had been accustomed since childhood to the hardships of life in these regions.

The three first battalions also had more able officers and NCO's in their firing batteries. Instead of elderly Reserve Officers, peacefully engaged in trade or the professions before the war, these young men were fresh from



*Hungarian knot. The Gordian knot of the French pack artillery is shown here. It can be untied readily with one pull of the strap.*

Polytechnique, physically fit, good skiers, accustomed to outdoor sports.

Moreover, the esprit de corps was much better in the old regiment than in the new battalion, where it was a saying that only a few bombs would be necessary to weld the battalion into a unit.

It is interesting to go into the details of all the equipment, because in the mountains very small things may be of deadly importance. Here are a few practical indications.

The French mountain artillery got standard military clothing. The only essential exception, and their special pride, was the beret instead of the *bonnet de police*, which the men could use when not obliged to wear helmets. Of course in the winter the standard equipment was supplemented by the short top-coat, made of waterproofed

fabric lined with sheepskin, called the *Canadiennes*, and by heavy gloves. The men were encouraged to buy their own heavy mountain shoes; they were supplied only with regular army shoes. In summer, the men wore the *trellis*, light fatigue clothing made of blue or khaki cotton. In some units they wore a large flannel belt under the *ceinturon*, which is the most important permanent part of the French uniform. Certain progressive *Chefs de Corps* had promoted the fashion of shorts for the summer, and even the suppression of shirts and undershirts, weather permitting. But unfortunately this fashion was not generally accepted, and too often heavy uniforms under the brightest sun were considered a mark of soldierly virtue.

The signal equipment was heterogeneous: the old wooden telephone was used in competition with a more modern, lighter, but less-sturdy one made of metal. Radio equipment was little used since we were in a defensive position, and had the time to put up as much telephone wire as we wanted! This radio equipment, R11, ER17, ER22, ER40 was good, gave satisfactory results on flat land and in the hands of trained personnel. Its employment in the mountains, however, was not put to the test; up to the armistice, orders were not to emit radio signals near the border!

For topographic equipment we had of course the old *goniomètre boussole*, the well-known binocular, and a new gadget, a simplified theodolite, which was simply an improved *goniomètre boussole*, but very accurate and useful because of its large vertical field. Moreover, two "S.O.M." Theodolites, very precise instruments, giving an accuracy of 1/1000th of grade (approximately three sexagesimal seconds) were theoretically assigned to each battalion. In fact, the 93rd had only two "S.O.M." platoons. Normal use of this theodolite was to adjust fire by observing high bursts.

We were entirely lacking in proper antiaircraft defense. Men were armed with a shortened rifle, or "mousqueton," even the mule drivers who, according to the regulations, should have received pistols. The machine guns (one per battery) and submachine guns (two per battery) were antiquated instruments. True, the St. Etienne machine gun is a mechanical wonder, but it is exceedingly fragile and regularly gets out of commission. Infantry had been supplied with the much sturdier Hotchkiss machine gun, but the artillery had to be satisfied with left-overs. The only move to provide antiaircraft defense for these units was the addition of a few new pages in the regulations.

Now to describe the gun and its transportation. The 75-mm. mountain howitzer, Schneider type, may be dismantled into seven loads weighing around 100 kgs. each. Therefore, this weapon may be carried in a number of ways. First, and this is what it is meant for, it may be packed on mule back. Second, it may be drawn in draft. Besides these standard means of transportation, many others can be improvised: by truck, as we often did in the Alps; or even by plane, according to reports on the German experience in the Crete campaign.

The French pack saddle is sturdy but extremely heavy; the frame is made of wood or steel. Some are adapted to a single part of the gun, others can be fitted, with slight modifications, to each single part. A third type, used for loads other than the parts of the gun, has a wooden frame with trays on the bottom of each side. These trays make skilled training in packing less necessary. Nevertheless, we often regretted not having skilled packmasters such as those of the American pack artillery at our disposal. One of the most interesting features of the French saddle is that the

of the shafts. Ropes can also be attached to the axle and used as brakes on the way down.

In European operations the drawing of mountain guns in draft is as important as packing. Strategic roads have been built very high in the mountains and the materiel can be drawn up to almost any position. In my experience, this mode of transportation is the normal one, and movement in pack is only incidental. Of course, the packing cannot be dispensed with, but generally it is used only for very short distances. Therefore, a suitable materiel for such kind of



*French colonial mountain troops using 65-mm, gun, old model. (Photo from European)*

cinches are attached to the saddle, through narrow sealskin leather straps fixed by a "hungarian knot." In case of emergency, these knots can be untied in a fraction of a second (see drawing).

The fact that our mountain gun can be drawn for long distances over roads, no matter how bad, deserves special mention. This feature, common to the pack artillery of every European country, adds a great deal to the tactical and strategical mobility of our weapon. It permits very definite savings in the use of mules, as a single mule can easily draw the gun over flat terrain. One of the mules carries shafts. To enable two or three mules to pull the gun on slopes, ropes may be attached to hooks fixed on the tip

operations should be as easy to draw as it is to pack, and this may be achieved by slight modifications in the axles.

The caliber of our gun was 75-mm. Experience shows that this is the most suitable for mountain operations. It represents an excellent compromise between the old 65 and the 105-mm. Schneider. The 65, in which the recoil was controlled by a spring, and which had to be "armed" as an arquebuse before the first fire, had a tendency to jump, and its efficacy was very limited. The 105mm, is too heavy (especially the ammunition), which impairs its mobility. Also its range is shorter (8,000 yds. against 10,000). Our terrain being supplied with excellent roads, and since we were in a defensive position, old "Siege et Place" materiel, 95 and 155 de Bange and

also 105 L. Schneider, was placed in position in our sector. Use of this materiel should be discarded in mountain warfare where mobility is the first prerequisite. Nevertheless, it gave us good service, the nature of the materiel being congenial with the situation we were in.

#### OPERATIONS

The 5th Battalion of the 93d R.A.M. joined the three first groups on March 27, 1940, at Coise, near Chambéry (Savoie). The rest of the regiment had come a few weeks earlier from its winter positions facing Geneva, defending the Rhône Valley. For them it was rest; for us, the beginning of real military operations! We were the only mountain artillery regiment in direct support of the 64th Infantry Division, charged with three other divisions to supplement the units composing the steady *territorial defense* of the Alps. Those units were called Fortified Sectors. The mission of the 64th was to take position inside the zone of one of these territorial defense units, the "Secteur Fortifié du Dauphiné."

For tactical purposes one of the artillery battalions of the 93d R.A.M. was later placed at the disposal of the Secteur Fortifié du Dauphiné; on the other hand, the 64th was supported in the actual operations by several artillery battalions of the S.F.D.; 7th and 8th of the 162d Regiment of Fortress Artillery, placed under its authority. These four divisions and three fortified sectors were all part of the Army of the Alps, under the command of General Olry, with headquarters in Valence.

The first thing we learned about the situation was the motto: "La division est très paperassière," the division is fond of red tape and paper work. And we very soon knew what it meant. All of us, officers and men, badly needed some extensive training. Physical training was primarily needed, since most of us had never in our lives seen mountains. This training was provided by repeated marches over all sorts of terrain. The natural self-esteem of our peasants and "bons bourgeois" rose. They wanted to match the "Montagnards" (hill billies), and they did quite well. But technical training in the use of signal materiel, topographical materiel, and light and heavy weapons was even more needed. This training could not be gotten simply by theoretical exercises; it required continuous and realistic maneuvers. The easiest job was to learn the use of topographic instruments. This was well done.

But many factors limited the most important part of our training. The High Command did not plan any large-scale maneuvers. The accredited scheme was to do nothing that might give the Italians the impression that we were, in any way, hostile to them. Last, but not least, in the Alps, as on the Northern front, we were under strict orders not to deplete our supply of ammunition. It is beyond comprehension how the General Staff could expect without large scale maneuvers and fire practice, to train soldiers,

and especially mountain artillery, in a kind of warfare which more than any other requires experience rather than theory. The absolute necessity of such maneuvers and fire was obvious—not only for our battalion (consisting mostly of reservists), but also for the rest of the regiment. Even the Regular Army had not learned skilled signal work and the habit of making rapid movement under any conditions, which rank among the first requirements of mountain warfare.

Regarding signal work, for instance, a special training school was established near Chambéry for signal and liaison officers. I went to that school, which lasted for three weeks, and there I learned most interesting data about electric current, high frequency, modulations, etc., but almost nothing about the organization of communication in actual operations, or the working of the apparatus itself. One more mistake which has been fatal to our Army: too much text-book theory, and not enough practice.

Because our time was not spent in maneuvers, we had to ease our guilty consciences in the dutiful performance of paper work. To describe it would be to write an Essay on Red Tape. The lazy people in our Army have always had a motto, "Rendre compte et s'en fiche," make a report and don't give a damn. Unfortunately our whole military organization seemed to be established on this principle. We had to give periodic accounts of the absent, the sick, the dead, ordinary leaves of absence, and leaves of absence for agriculture. We had to answer calls for "Affectés Speciaux" which came in almost every day. Each unit had to submit weekly statements of materiel on hand, guns, weapons, clothing, other personal equipment, animals, cars, tires, batteries, bicycles, motorcycles, signal equipment, topographic equipment, and so on, even if no change had occurred since the last "compte-rendu." Headquarters of each unit had to check up statements from the subordinates and to transmit them up along the line. We had to make up plausible time schedules, one for each specialty, which gave much scope to the imagination of the authors, but which were not practical because of lack of coordination. Another duty was to check up on men suspected of revolutionary activities. Reports had to be sent, ten copies, to Divisional G2 concerning their leaves of absence, one copy for Sureté Générale, one for the police of their domiciles, etc. By the grace of God, we did not have more than one or two AWOL, because making out reports in such cases kept the entire staff of the battalion busy for several days.

The pay-off was our conception of games. The Division had decided to favor games. Of course this was done in true French fashion, with scheduled competitions between trained men, without ever training possible new participants. Then the staff of each unit had to discover among its personnel football, tennis, and hockey players, and send them to distant competitions at unpredictable times. This always required thousands



of telephone calls between headquarters of the division, the regiment, the battalions and the batteries. Since such communication was transmitted by the civilian network, it did not even have the advantage of training our telephonists.

I shall not deal with the administration of the units, the mess, the pay and the requisitions, and all the endless questions which seem to have been complicated expressly to keep our supply officer and his important staff busy, as well as officers of battalion headquarters who had to be appointed to help him.

All this was our daily bread. But from time to time, the

Syria, had worked itself into a state of excitement and adventure.

So much for red tape. Our sitzkrieg lasted until April 26th. Owing to the situation in Norway and ominous news from Italy, it was decided that the division should move toward its spring war positions earlier than had been planned. We arrived in Briançon on the 28th, and were first assigned to support the S.F.D. north of Durance, with our headquarters at the Guibertès, on the Guisane (Map 1). A comical detail of our disembarkation in Briançon was the precaution taken to conceal our existence from the Italians. The Italians had a very



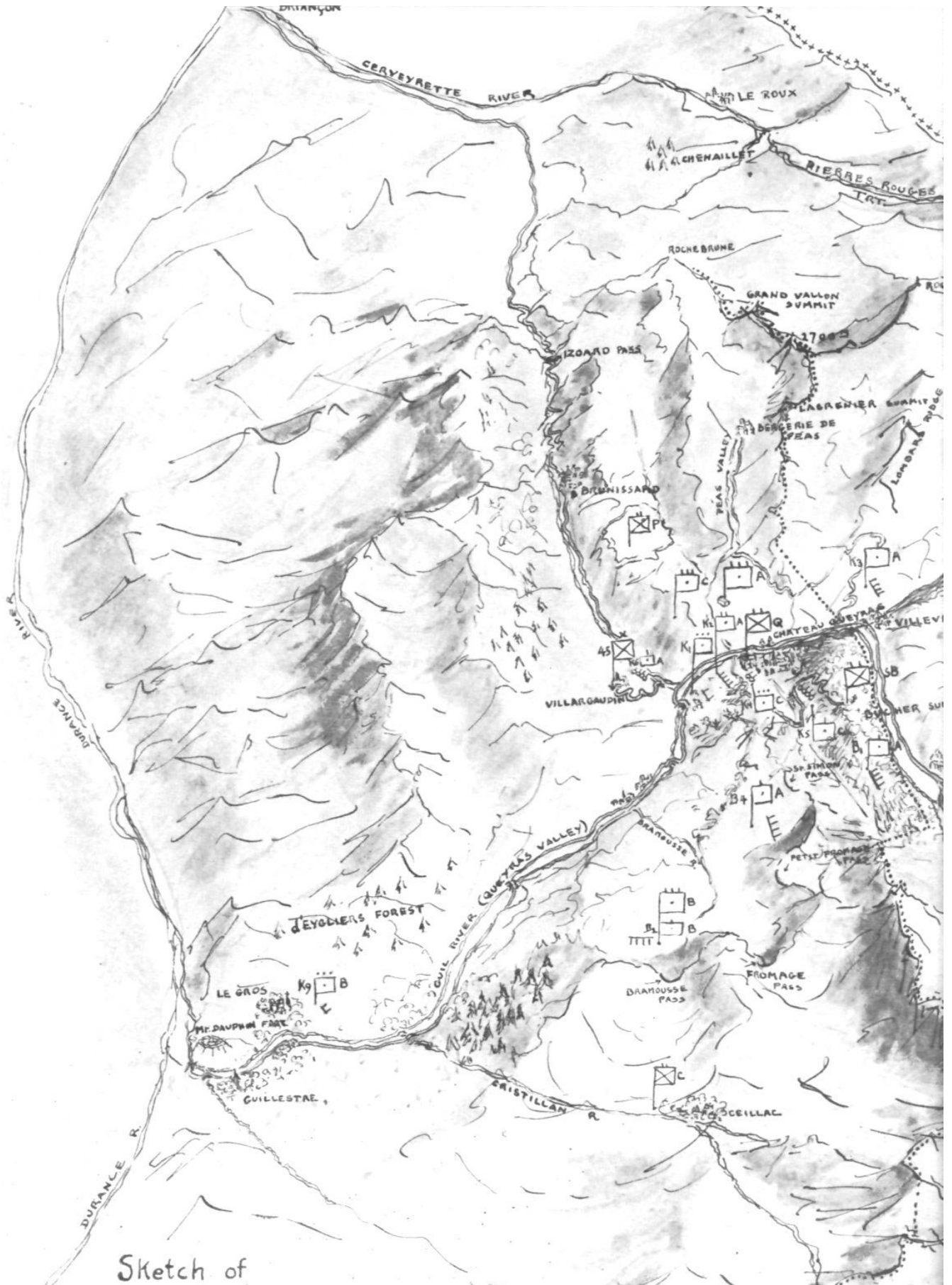
*French mountain artillery in mountains of Haute Savoie. (Photo from European)*

General Staff would discover that it needed some vital information on the training of men in charge of coding, on the number of shoe strings at our disposal, often things of which we were already giving periodical account. Then an order would come requiring information within a specific period of time. Usually the order had been delayed so often on its progress through the intermediary units that it was impossible to meet the dead-line, and we shivered, waiting for the penalties to come. They never came.

This state of affairs was especially disheartening for our battalion which, with the expectation of going to

strong fort and excellent observatory at Mt. Chaberton, which dominated Briançon. We had very strict orders to camouflage ourselves, and to that end an intricate disposition of railroad cars, and a carefully planned itinerary had been provided. This secrecy does not reveal a very good psychology. The best way of keeping the Italians out of war certainly would have been to impress them with our military power, but we constantly overrated their strength, and we lived under the delusion that they could be won over to our side.

The 5th Battalion, 93d Artillery stood for twelve days in the Guisane Valley, north of Briançon. Our



Sketch of



only task there was to build stables for the mules. To accustom us to changes and counter orders, our colonel decided to make us exchange positions with the 3d Battalion. This unit, better acquainted with warfare in the mountains than we, did not hesitate to destroy our beautiful stables and use the wood for cooking. Mules should be left in the open as early in the year as possible. Our comrades were very sad about it, but the lesson was worthwhile, if costly. Toward the end of our stay at Les Guilbertes, leaves of absence were canceled and we moved on the very day of German invasion of Holland and Belgium, on May 10th.

Our new position was in the Queyras, or Valley of Guil, tributary of the Durance, south of Briançon. Once in the Queyres Valley, our actual positions could not be occupied at once because they were still under snow. We were billeted in Guillestre, and the survey and liaison officers of the regiment, together with the S.O.M. platoons, were immediately assigned to mapping the Queyras and neighboring valleys. The accuracy of our maps, even those of 1/20,000 scale, was no better than sixty meters, and there were only a few geodetic points for which we had accurate coordinates. The complete job would have taken several years. It was the beginning of May, and despite the ominous rumors, the war was still far away!

When it ultimately came on the front of the Alps on the tenth of June, battery positions and observation posts had been cleared of snow and occupied. Everything was ready, including telephone lines. As by some miracle, each man was in his war position. Civilians in the danger zone were evacuated over night.

The map and aerial sketch which illustrates this article will make our position plain. As to the strategical situation (Map 1) it was very simple: prevent the enemy from moving into a position of resistance established across the Queyras Valley, along the eastern slopes of Bucher Summit, and east of Villevieille, Croix de la Crèche, Pic de Lagrenier, summits bordering the Vallon de Peas on the northeast, and Rochebrune. As we will see, the menace of infiltration was of two kinds: the enemy could break into the Valley du Queyras (or du Guil) toward Guillestre and the Durance (route Briançon-Embrun), or infiltrate close to the summits of Malrif, Rochehaute, and the Vallon de Peas, and then cut the road of Col Izoard toward Briançon. There were not sufficient troops between Brunissard and Briançon to stop them. Anyhow, Briançon to the north, and Gap and Embrun to the south, were the necessary objectives of an attack. Once reached, nothing could prevent the invader from getting further west, to Grenoble through Col du Lautaret (Map 1). We discovered later that their orders were to join the Germans in Grenoble.

Defense of Queyras had been entrusted to a unit of 64th Infantry Division (DI), the 45th Half Brigade of Alpine Jaegers (Demi-Brigade Alpine de Chasseurs a

pieds). The regular elements of the 45th were two battalions of jaegers: the 107th and the 87th, one company of scouts with motorcycles, one company armed with 37-mm. guns and mortars. They were reinforced by units of Fortified Sector of Dauphiné: one company of 92d Battalion of Fortress Infantry (BAF), 3 mortar sections of 92d BAF, also three mortar sections borrowed from a half-brigade assigned to defense positions, south of ours, the 75th.

All these units were until June 10th under orders of a colonel who was commander of the Valley, with his CP at Guillestre. At the declaration of war by Italy, they came under direct command of 64th DI. For tactical purposes, Queyras was divided in 4 "Quartiers" with CP indicated on the drawing showing the aerial view of the valley. Quartiers Peas, Queyras and Sommet Bucher contributed to defense of Queyras Valley. The 4th defended the Valley of Cristillan, a tributary of Guil; its troops could be called in case of need to assist the defense of the other quarters.

Between the border and position of resistance were sections of ski scouts, whose mission was to spot the enemy's movement and advance, and to retreat when necessary without attempting to defend their position.

It is readily seen from the sketch that the greater part of the troops had been stationed in places on both banks of the Guil, on nearby slopes and in a stronghold at Villevieille. The main provision in the defense of Queyras was the defense of the bottom of the Valley, and of the road from Abries to Chateau Queyras. Most of the automatic weapons, the mortars and the 37-mm. gun of the 87th BACP had been concentrated in pill-boxes around Villevieille and in front of the Fortress of Chateau Queyras. This fort, an ouvrage of the 17th Century, located on a rock dominating the Guil, used to be the "bolt" of the Valley. It is of no military use today and most of the defensive organization aimed only at replacing it.

As to artillery, the units of 93d RAM and 162d RAF were merged into Groupement A (subdivided in Sous Groupements G & S) and B & C. The aerial sketch shows the battery emplacements. This map shows clearly the preoccupation of the High Command to provide the bottom of the Valley with as great a concentration of fire as possible. Battery K3 at Les Meyries played the same part as the ski scouts of the infantry. Its mission was to give alarm rather than to do any real harm to the invader.

Most of the forces were on the position of resistance or very close to it. Nevertheless at Le Gros, near Guillestre the infantry had a 47-mm. naval gun to be used as an antitank weapon. At the same place a platoon of 95-mm. guns (K9) had a mission difficult to perform for such a small unit; to check the invader in case the Italians had penetrated into the Cristillan Valley, or deep into the Guil Valley.

Antitank defenses were established at the cross-road near Guillestre when came the first news of the deep



infiltration of German Panzers south of Loire.

Ammunition from Gap and Embrun was brought very near to the battery emplacements by night in trucks and carried up to the pieces on mule back. A depot of sizeable importance located in Montdauphin Fortresse near Guillestre was partially blown up by a direct hit from an Italian bomber, the only one we saw during the whole campaign.

Biggest headache for the command was the length of our lifeline along the Guil from Guillestre to Chateau Queyras. This road is in most places exceedingly narrow, and a single bomb could have caused irreparable damage, as all supplies came through it. The road of Col Izoard to Briançon was blocked at Brunissard by large, permanent antitank obstacles.

The only signal network consisted of telephone lines established first by the 162d, later on duplicated by the Jaegers. Our axis of signal communications was Valley of Guil. OP's and batteries were connected to observation switchboards and the switchboards connected, sometimes through complicated networks, to the "Axe des Transmissions." Use of wireless was prohibited because of proximity to the border; it was to be used in case of emergency during actual operations. No practical use was made of it then because of lack of training.

The fire map of the sector included counter preparation and defensive fires, both outside and inside the position of resistance. All along that position defensive fires were provided for at the entry of Peas, between Peas and Rochehaute, east of Lagrenier, across the Guil Valley at Torrent du Villard, northeast of Villevieille, and south along the Aigues. In case the invader penetrated the position, defensive fires were to cut infiltrations inside the Vallon de Peas, at the Bergerie and at the Col de la Crêche. In case the stronghold of Villevieille were taken, fire was planned behind Villevieille. Orders had also been given to prepare a number of concentrations outside and inside the position, in places advantageous to the assembly and preparation of enemy units, especially in the small valleys south of Rochehaute, where an enemy position threatening Peas might have been prepared. Unfortunately, the disposition of the artillery made it necessary for the fires of the Peas area to be at extreme range, limiting their efficacy.

The fires were prepared from maps. Even after the declaration of war at midnight on Monday, June 10th, orders were *not to shoot first*. The policy was still one of not arousing the Italians. The battery commanders were not allowed, therefore, to adjust fire in advance, nor even verify their range and deflection by firing a few shots at an auxiliary target. Not until the 18th of June, after the Italians had wasted several tons of shells destroying the non-existent Chenaillet, and when they began attacking the Valley, were we allowed to shoot. And still, we could only fire on the points in vicinity of which Italians were spotted. Finally, on the 23d of June. I was allowed to adjust fire

around Vallon de Peas, which could have been of very great importance indeed.

As a matter of fact, the only intelligent tactic on the part of the Italians would have been *not* to try breaking into the Queyras Valley, which was very heavily defended by Batteries K1, K2, K4, K5, and B1. It would have been infinitely more astute for them to attempt an infiltration along the summit of Rochehaute, and attack the positions of Peas localized at A, B, C, and D. Our chasseurs had at their disposal on these points only one 37-mm. gun, two Brandt mortars, three machine guns and six or seven sub-machine guns, plus seventy rifles. If such an infiltration had been attempted with contingents strong enough, it would have been quite possible for the invader to get a foothold in Vallon de Peas and, notwithstanding artillery fire at extreme range, later on to proceed toward Bergerie. By remaining on the summits it was not over difficult for them to get around Rochebrune through Col du Tronchet and to gain control over route of Col Izoard near Brunmissard. By so doing they would have outflanked completely the valley's defenses.

This situation was a great problem for the major of the 107th, in charge of defending Peas. He knew well that his troops were not strong enough to resist a powerful attack coming from Col de la Croix. Obviously the "bureau" who planned his allowance in men and materiel had not a familiar knowledge of the terrain. Moreover they had forgotten the principle that in mountain warfare an attacking party should use as many avenues as possible and not limit itself to the easier one.<sup>2</sup> By mere chance the Italians themselves forgot about that principle.

In our case it happened that the mountain chain running from Pic de Malrif to the Vallon de Peas and Pic de Rochehaute provided an easy access to our lines. Therefore, the first task of the major commanding the 107th Battalion, with whom I was in liaison, was to fortify his position as much as possible. He wanted to place his limited resources in such an advantageous position as to be able to resist overwhelming fire. The fortifications of the summits bordering Vallon de Peas were easily built, because the terrain consisted of slate, which could easily be piled, and afforded fairly complete protection. The slates were placed on the top and sides of *abris-metro*, i.e., half cylinders of corrugated steel about 1/8-inch thick.

On the other hand, the major of the 107th was urging the Command of the Artillery of the valley to place one of the 75-mm. batteries, or at least one platoon, close enough to be able to support him by fire. This was to supplement the fire of Battery K6 which had other missions to perform in the Guil Valley. Positions were reconnoitered in the zone of Col du Tronchet, and ultimately one was tentatively established at F. The best

<sup>2</sup>Cf. Cyril Falls, *The Nature of Modern Warfare*: also de Bourcet, and Revol: *La Victoire de Macedoine*.

solution was to transfer part of Battery B1 to F. Events moved too quickly, and by the time the decision was made the Italian attack had begun. The attack came not in the direction of Peas, as we had expected, but toward the bottom of the Guil Valley.

On June 19th, the Italian attack began all along the border. From Menton to Modane the Italians crossed the border in large units, but without any suitable equipment nor supply. They did not bring any mobile artillery to support them. In our sector the enemy went over Col de la Croix and to the south Col de St. Veran, du Longet, and d'Agnels. The platoons of ski scouts, located in St. Veran, retreated slowly according to orders, after having made a stand. And it was decided to bring to Eygliers, near Aiguilles a platoon of 75-mm. to check the Italian entry into the Guil Valley, before the Italians could reach Abries. This section was in place and opened fire on the morning of June 20th. This was our sector's first firing experience of the war, and there was great excitement around the OP of the Abries platoon. As the bridge at Aiguilles had been cut, the operation took a very adventurous turn. All the officers of the valley were there, which did not improve efficacy of the first fire. In spite of the confusion, however, adjustment of fire was made, shells were well placed, and the Italian advance checked on the slopes coming down from Col de la Croix. Then, as the infiltration of the Italian elements continued, and for fear they would ultimately bring artillery through the Cols, the retreat of the Abries artillery platoon, which had done a very good job, was decided upon. The platoon of ski scouts of Abries also retreated, as well as the 65-mm. battery at Villars. For three days, the batteries had guarded the Guil Valley and prevented the Italians from occupying Abries, destroyed by conflagrations originating from fire of Italian infantry. In the meantime, the scouts of the 107th Battalion watched the approaches of Vallon de Peas, but had nothing to spot except the very successful fire conducted by an armored train at Briançon, against the Chaberton: four out of five of its cupolas we had the pleasure of seeing blown up.

The armistice with Italy was signed on the 24th of June, and warfare ceased at zero hours, 35 minutes, on June 25th. According to the terms of the armistice, we retreated slowly toward Grenoble, leaving most of our munitions behind, but keeping our weapons with us.

#### CONCLUSIONS

"The French military collapse was not primarily due to treachery or to a lack of morale or to the inadequacy of democratic institutions or to a lack of individual intelligence. It was due chiefly to the failure of organized intelligence. . ."<sup>3</sup>

In the experience of the author there is more than one fact to support the preceding statement. My battalion was

certainly not among the best of the French Army: it had been organized very late and the military value of its contingent was not excellent. Nevertheless every man did his duty, and even after the armistice we had no complaint about discipline. Our successes, moderate as they were, occurred among materiel and moral circumstances which do the men great credit.

On the other hand our organized intelligence was poor. Committed to a policy of *Defensive a outrance*, the bureaux (as it was plain in our sector) had not the necessary vision to make that defensive iron-clad. We had time to train ourselves physically and we knew something about topography and camouflage, but our shortcomings in basic training—firing, signal practice, wording, transmitting and carrying out orders accurately—were appalling.

Our equipment, if excellent for the war of 1914, was entirely inadequate against aircraft, parachutists, tanks, etc. Our deficiency cannot be excused by the special knowledge that our Intelligence Bureau had of the Italian's situation. German reinforcements could have been sent to the Alps; if an attack had been made on us by planes and parachutists, we would have been cut down in no time.

Moreover the defensive doctrine was more dangerous in mountains than anywhere else. As pointed out by writers on mountain warfare it is a mistake to rely too much on small parties of "determined men well entrenched" to make lasting stands in mountain passes. The essence of mountain warfare is maneuver, feints and diversions made by marching and counter-marching. It is difficult to imagine a more static position than the one we were in. The only advance during all the "campaign" was made by a platoon of 75-mm. howitzers. Our easy success can not be explained except by Italians' ignorance of maneuver. Instead of using every avenue for their march and outflanking us by taking over our comparatively weak position of Col de Peas, they threw themselves deliberately under our main fire concentration, at the bottom of Guil Valley.

Not only was the static defensive ill adjusted to our strategic mission, but it was a serious psychological mistake. The great endowment of French soldiers, officers, NCO's and privates, is a native shrewdness which has been called "system D" or "débrouillage" although it is of broader scope than that. This shrewdness is an ability to make the best of circumstances, an ingenuity which permits men to achieve great results with inadequate means. Do not let us be deceived: this ingenuity is not out of date in these times of mechanized warfare, nor it is incompatible with carefully planned operations. The Germans, who lack such natural character, have made every effort to develop it artificially through education. In France, quite to the contrary, all efforts were aimed at the limitation of individual initiative, or of a natural shrewdness which had no place whatsoever in the government's "defensive a outrance."

<sup>3</sup>Stephen T. Possony: "Organized Intelligence" in *Social Research*, May 1941.

Of course the natural acumen of officers and men did not disappear but it was misused; it destroyed our military virtue, as it was employed only to improve our comfort, to make more intricate the details of military administration, and the personal quarrels among individuals more and more cumbersome.

In short, when the war came the weakness of France was exactly what the rest of the world thought to be her strength. Plenty of materiel but over-age; a strong military organization, but depriving the individual units of any kind of adaptability; plenty of men but lacking in training for their specific task. In other words lack of realism and lack of imagination on the part of the men who had been the masters of our destiny.

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Concerning mountain artillery in general, the conclusions to be drawn from this experience are the following. Artillery is indispensable in mountain operations. Artillery units should be exceedingly mobile and adaptable. Each one should actually *support* infantry.

This is true for moral reasons: The feeling of isolation is abated when foot troops know that artillery is ready at hand. An easy success in the Alps for the French derived to a great extent from the absence of Italian light artillery. The Italian forts were comparatively distant from our sector, where only the sound of our guns was heard. It is easy to understand the effect of that circumstance on the Italians and ourselves.

Technically the trajectory of the mountain gun is of enormous value to check, at sizeable range, infantry attacks. When the attack comes within range of infantry weapons, it may be too late.

Therefore three problems are important. First, the liaison between infantry and artillery; second, the adaptability of the organization of artillery; third, the facility of transportation.

It has been discovered in German regulations (issued during this war) for the artillery, that the commanding officer of the battery must in most cases remain with infantry, and if possible at the head of Panzer units. Of course the CO's are thus taking a high risk, but they are in a position to spot the terrain and to reconnoiter at close range. They can locate battery positions for further advance and give orders which accurately follow the requirements of the situation. This really means that artillery is actually

at the disposal of infantry and can make the best possible use of its resources.

This tactic, which is not congenial with all calibers and all situations, seems nevertheless to be the best to follow for mountain pack artillery. In mountains the liaison officer and, if possible, the CO himself of each light mountain unit should be close to the first line of infantry, ready to observe fire and to send orders directly from these positions.

Second requirement: Mountain warfare sometimes obliges units to be divided to permit infiltration and support of infantry proceeding through narrow passes; in other circumstances concentrations are necessary to defend these passes or to attack outstanding obstacles. This division and reunion of forces should be made easy by granting to each section, platoon and battery a large measure of self-sufficiency. Nevertheless this autonomy should be limited by a very strict hierarchy and a very strict obedience to the orders of the superior unit. Means placed at the disposal of each piece to assure that autonomy should not overburden them.

Third requirement: as to transportation, the problem of mountain artillery still is to achieve a maximum of mobility. To have guns which can only be packed would have been a great mistake in European warfare, because roads are usually available, and provide less painstaking transportation. But it is not enough to provide for the drawing of mountain guns in draft. Provision should also be made for their rapid transportation in trucks or aircraft. They should be supplied with supplementary wheels and axles (bogies) permitting them to follow motorized units, being taken in tow by trucks or jeeps.

The question of mules should be carefully studied. In our Army, each battery had a specific allotment of mules. This was sensible in a static position but, as soon as maneuver is desirable, headquarters of battalion or groupement should be authorized to apportion mules among the battery in accordance with specific needs of each one of them. Transportation of mules by trucks, or use of civilian animals found on the spot, could also increase the strategic mobility of mountain artillery.

After the men, mules are the backbone of mountain artillery. It is better if men and mules are recruited in the very region where they will be used. But our experience proves also that men from flat regions can in a few months be trained for the job.

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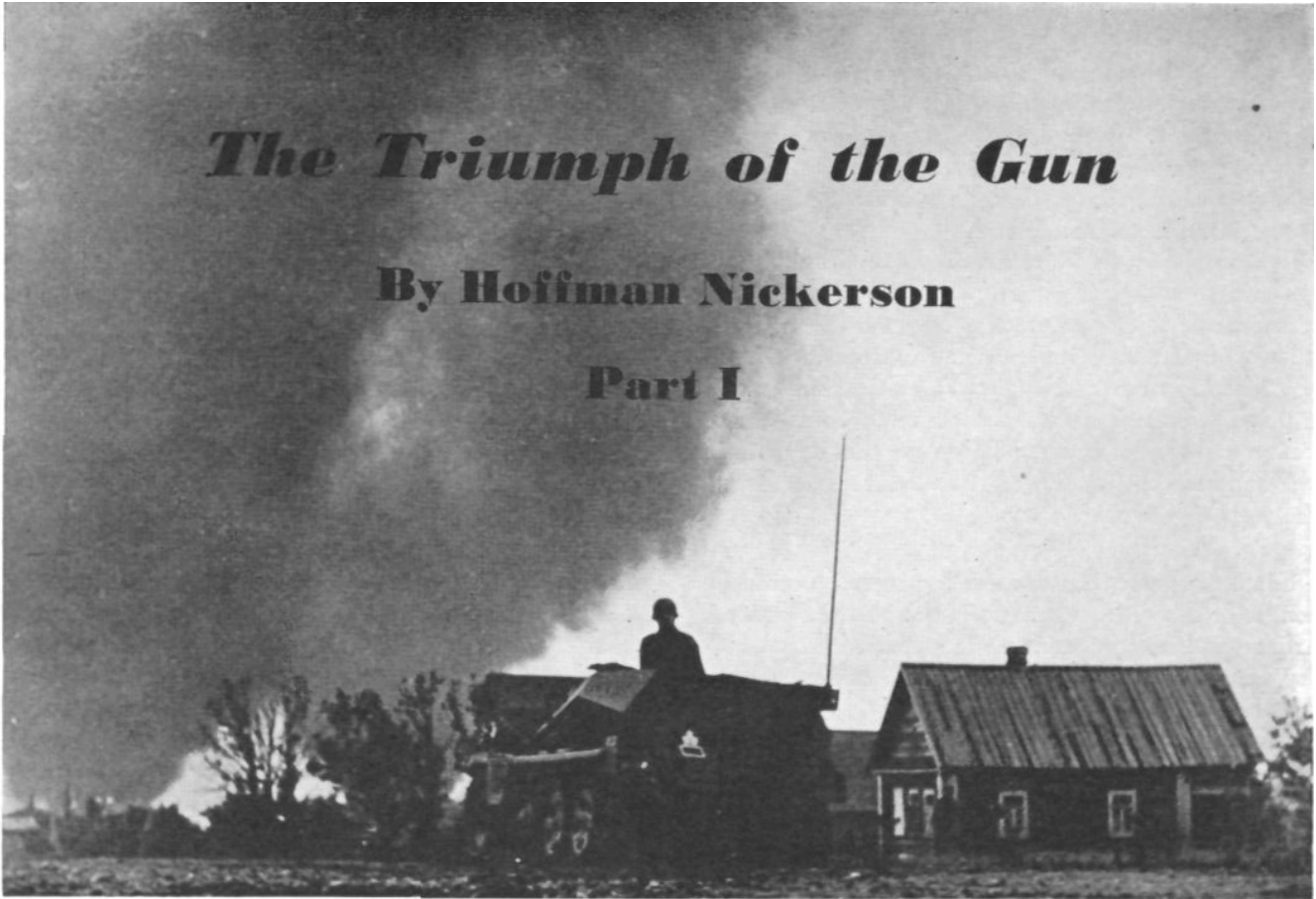
## NOTICE

**The U. S. Field Artillery Association and *Field Artillery Journal* have moved from 1624 H Street, N. W., to 1218 Connecticut Avenue, N. W., Washington, D. C.**

# *The Triumph of the Gun*

**By Hoffman Nickerson**

## **Part I**



*German armored gun (not a tank, but similar) during the attack on Novgorod. This weapon is useful in destroying organized nests of resistance, and is especially suitable for fighting in and around buildings. (Dever from Black Star.)*

The more widely we consider the history of war, the greater appears the recent transformation of tactics by means of the plane-tank team. Only two other such transformations of which we have full record—the beginning of the cavalry era in the Fourth Century A. D. and the Swiss creation of an attacking infantry in the Fourteenth Century—can compare with it in universality and in suddenness. Even the use of gunpowder took effect more slowly, and until our own day made no change in the principal arm—infantry.

If we look for a phrase which will begin to explain the reasons for the present momentous event, we can hardly do other than call it: "The Triumph of the Gun."

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Of course no military change, however sudden and sweeping, is total. Older military instruments, even though they may seem momentarily submerged, always retain some value, often a high and lasting value. Accordingly before discussing the hotly disputed question of the value of the plane-tank team as against the older arms we may illustrate the meaning of the expression "tactical transformation" by glancing at certain examples from history sufficiently remote to make dispassionate consideration possible.

Most tactical changes result from the effective use of some new material instrument of war. Exceptionally they may be due only to a new formation; we may instance the French Revolutionary-Napoleonic skirmishers who had exactly the same sort of muskets as had been carried in the rigid ranks of Frederick the Great. Usually, however, such changes involve some new means of increasing either weapon power, protection, mobility, moral effect or more than one of these four.

This has been true since the beginning of history. About 2000 B. C. the use of horses, until then unknown to the high Egyptian civilization, enabled a body of Asiatic nomads called the Hyksos to conquer Egypt. The tremendous moral effect of the sudden appearance of these swift and powerful beasts upon Near Eastern battlefields is still preserved in the Thirty-ninth Chapter of Job: "Hast thou given the horse strength? Hast thou clothed his neck with thunder? . . . He saith among the trumpets: Ha, Ha; . . . the thunder of the Captains and the shouting."

Similarly the mere phrase of Herodotus, "brazen men," reflects the terror inspired in the half naked warriors in the Near Eastern world by the coming of the Greeks, invulnerable in their metal helmets, cuirasses, shields and leg-guards.

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**A tank — or a plane — is in effect a mobile gun platform. Hence it is neither cavalry nor infantry but, in the strictest sense, *artillery*. The defense against these new weapons is likewise a gun—*artillery*.**

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Turning now to the two unquestioned transformations of the principal arm within fully recorded history—the beginning of the cavalry era in the Fourth Century A. D. and the reappearance of attacking infantry in the Fourteenth Century—we find in each case that that which had previously been the decisive arm had either weakened or had become unsuited to existing conditions.

For nearly a thousand years before 300 A. D. infantry had dominated Greco-Roman warfare. At Pharsalia, Caesar's tough legionaries, in loose formation and with only short throwing spears and short swords for weapons, had not only resisted horsemen but had advanced against them and broken them. With Augustus' resettlement of the Roman World, however, the chief function of the Roman Army had ceased to be that of fighting and had become that of policing the frontiers against barbarian raiders who long remained contemptible antagonists. Against bandits there is little need for high combat power, but mobility is imperative; consequently cavalry increased in importance compared with heavy infantry. Meanwhile, as the material side of civilization declined, it became harder to pay the troops, and discipline was correspondingly lowered. Lowered discipline decreased the power of infantry to resist cavalry charges. If the defenders stand firm, horses will invariably halt or swerve before contact, but—before the general introduction of the infantry rifle—only highly disciplined infantry could be persuaded to do so unless closely bunched and covered by a hedge of long pikes. The close formations and pikes, in turn, reduced infantry mobility and power to maneuver. Still another cause worked in favor of cavalry; for centuries Rome had recruited her horsemen outside of her citizens. Her cavalry had long been barbarian, and now her impoverishment—together with the comparative cheapness of hiring barbarians as compared with civilized men—tended to decrease the relative numbers of her heavy, legionary foot. At last in 378 A. D. the battle of Adrianople was lost by the inability of the legions to change front quickly enough to resist an unexpected charge of armored horsemen, and thereafter cavalry was recognized as primarily the offensive arm and therefore the principal arm.

During the cavalry era infantry by no means disappeared. Solid immobile or almost immobile masses of tolerably armed foot or of armored horsemen dismounted could seldom be broken. Archery often helped to decide fights in which one side was more or less immobile, and in general commanders who could effectively support their

armored horse with foot troops were apt to defeat opponents who could not do so.

The cavalry era was ended in the Fourteenth Century by Swiss pikemen and halberdiers. English archers, although effective auxiliaries to armored cavalymen either mounted or defensibly dismounted, could not stand alone unless covered by field fortification in the form of pointed stakes. The Swiss mountaineers rediscovered attacking, independent infantry. These mountaineers, too poor to buy armor and therefore mobile, designed powerful two-handed weapons, long pikes and heavy halberds, and simultaneously achieved an extraordinary perfection of drill. Meanwhile late medieval cavalry had lost mobility and flexibility somewhat as the legions had done. Having covered himself and often his horse with heavy plate armor, the mounted man-at-arms could no longer turn at a canter. The precise and rapidly shifted formations of the Swiss, together with the long training which enabled them to wield their clumsy but powerful weapons, made them invariably the master of such clumsy land turtles.

Interestingly enough, the Fourteenth and Fifteenth Century Swiss victories owed practically nothing to gunpowder. Nor was cavalry promptly banished from the battlefields of the infantry era any more than infantry had been during the cavalry era. Mounted charges remained possible until after the general introduction of the infantry rifle shortly before the American Civil War. Up to that time horse could immobilize foot by compelling them to "form square," i.e., to take up an all-around defense, and could destroy them if they could not "form square" in time.

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We have called the present transformation of tactics "the triumph of the gun" and not "the triumph of artillery" for several reasons. Those new fighting vehicles—planes and tanks—mount guns, and only guns are effective against them. Further, military habit today loosely labels as "infantry" many soldiers who are not true infantry but gunners, i.e., light artillery.

To distinguish between infantry and artillery according to principles and not labels compels us to consider only the weapons used. Thus true infantry fights on foot with weapons each of which can be carried and employed by a single man. Conversely, soldiers using weapons, each of which requires a team of two or more men to carry and fight it, are artillerymen or gunners. Thus automatic riflemen are true infantry, but machine gunners firing from fixed mounts, trench mortar

men and antitank gunners are all artillerymen.

Since team weapons are more powerful and almost always have greater range than any one-man weapon, one might wonder why they have so long been thought mere auxiliaries of infantry.

Even pre-gunpowder artillery was important. Team weapons played star parts in ancient and medieval sieges. Indeed the city wall of Imperial Rome was probably designed for defense chiefly by catapults. In position warfare in the open, Alexander forced a crossing of the Jaxartes River in 329 B. C. under cover of catapult fire. Ancient catapults tended also to become field artillery; they were so used at the battle of Mantinea in 207 B. C. and according to Vegetius by the Roman Armies of the Fourth Century A. D.

Moreover, about the middle of the Fifteenth Century, cannon greatly helped to decide the last actions of the Hundred Years' War in France, and did the like in the Italian battles at Ravenna in 1512 and at Marignano in 1515, while the first big fight in which musketry was conspicuous was that at Pavia in 1525. Finally, in naval warfare the gun replaced infantry weapons as the principal arm as early as the defeat of the Spanish Armada in 1588.

The reasons for the long postponement of the triumph of the gun were mobility and expense. At sea a gun carrying ship could be as fast and handy as her infantry carrying sister. Individually the English ships were both more mobile and more heavily gunned than those of the Armada. On land the weight of cannon and their munitionment was a serious handicap. In positional fights this was not prohibitive; the last English defeats in Fifteenth Century France were of this sort, and so was Ravenna, while the field of Marignano was cut by obstacles which held the Swiss under the fire of the French field-pieces. But when infantry began to thin out the deep formations which had originally been adopted for defense against cavalry, they became less attractive artillery targets.

Besides being heavy, artillery is expensive; many infantrymen can be equipped for the cost of a single gun. The radius of action of the early solid shot was limited, and explosive bombs could be fired only from short barrelled mortars in which their fuses could be lighted from the muzzle just before discharge. Accordingly it would have been financially ruinous to provide, and technically almost impossible to concentrate, a number of guns sufficient to keep a large target thoroughly under fire for any considerable time. The financial difficulty was increased by the impoverishment of Europe through the horrible Sixteenth and early Seventeenth Century Wars of Religion.

Not until shortly before the French Revolution did the tide begin to run in favor of the gun, thanks to the improvements made by Gribeauval in the materiel of the French artillery, by Guibert and the du Teil brothers in its tactical theory, and in general by the increasing wealth of Europe. As a cadet Napoleon was taught the new idea of

breaching a battle-line by concentrated gunfire, and it is a commonplace of military history that after he had put French finances in order the battles of his middle period—Friedland, Wagram, Borodino—were largely artillery actions.

Less familiar is the extent to which Napoleon went in generalizing upon the importance of the gun. He wrote: "He who can rapidly bring on to the field a mass of artillery at the crisis of the battle and at a decisive point is certain to carry it. . . . The better the infantry the more one must husband it and support it with good batteries"; and "In siege warfare, as in the open field, the gun plays the chief part; it has effected a complete revolution . . . it is with artillery that war is made." (*Correspondance* XXXI, 328; XXX, 447.)

It would be difficult to put the matter more strongly, and yet the Emperor's cannon were only muzzle loading smooth-bores, and their one quasi-explosive projectile was case-shot, consisting of a number of bullets in a cylindrical box which broke and scattered them upon impact.

For some decades after Waterloo, European impoverishment again restricted artillery. During the American Civil War, paradoxically enough, the advance of physical science momentarily advantaged the infantry musket over cannon, because the former was generally fitted with rifling sooner than the latter and therefore had an equal if not greater effective range.

This anomaly, however, was corrected before 1870: the rifled gun recovered a normal superiority of range relatively to the infantry rifle; while both became breech loaders. Before 1900 there was a further increase in density of infantry fire due to the magazine rifle, but the relative importance of the gun was maintained by great improvements in artillery projectiles and by a greater rapidity of fire due to the introduction of automatic recoil mechanisms. Meanwhile increase in the material wealth of civilized countries made possible an unprecedented multiplication of expensive weapons.

With the beginning of the Twentieth Century others besides Napoleon began to recognize artillery as the decisive arm. In the Russo-Japanese War of 1904-05 military observers noted two tendencies. First the quick-firing field gun showed signs of replacing infantry as the principal weapon. A British attaché, Colonel W. H. H. Waters, wrote: ". . . by the light of my . . . experience I can see no reason why artillery should not often be . . . decisive . . . and it certainly was at Telissu." The British Major J. M. Home wrote after returning from duty as an observer with the Japanese: "The great impression made on me by all I saw is that artillery is now the decisive arm and that all other arms are auxiliary to it. The importance of artillery cannot be too strongly insisted upon, for, other things being equal, the side which has the best artillery will always win. . . ."

"So strongly am I convinced of the immense importance



of artillery that it seems almost a question for deliberate consideration whether artillery should not be largely increased even at the expense of the other arms. Infantry can, if necessary, be trained in about three months, whereas artillery cannot be so improvised. . . .

"With the extraordinary development of artillery it begins to appear as though infantry fire . . . cannot usefully be employed at ranges beyond 600 yards, as beyond that distance . . . guns ought to be able to prevent infantry from using their rifles." ("The Russo-Japanese War, Reports from British Officers", III, 117 and 209-210.)

The second tendency observed in the Russo-Japanese campaign was that automatic machine-gun fire was better than musketry for infighting. Once in position, the machine-gun and the single man needed to fire it offered a target not much larger than a rifleman. Accordingly it had the great advantage always possessed by infantry relative to artillery, i. e., that a single man can conceal himself with comparative ease and can shelter himself in a small space, much as insects can crawl into tiny cracks in a floor. At the same time the machine-gun can deliver a volume of fire greater than that of many infantrymen. Machine guns were first appreciated by the Germans.

As we have seen, however, machine-guns are not true infantry weapons. The gun alone without mount or ammunition is a difficult load. Thus human or animal muscle power cannot give it the mobility, obstacle-crossing power and instant readiness for action characteristic of one-man weapons. When so moved it is therefore primarily a defensive arm.

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In April, 1914, a talented British infantryman, J. F. C. Fuller, visited an artillery practice camp and reported in writing as follows: "The . . . lesson which I learnt . . . at this

camp . . . accentuated what reading had already led me to suppose, namely, that artillery is to-day the superior arm, and that, consequently, battles will become more static, i. e., entrenched. . . . its power is so great that the infantry assault will be chiefly rendered possible by the demoralization of the enemy by means of artillery fire. This logically leads to penetration in place of envelopment as the grand tactical principle of the attack, because . . . maneuver will be limited by wire and field works; to an enormous expenditure of ammunition at the decisive point, and to consideration whether a special motor ammunition column should not be formed to supply . . . the guns taking part in the decisive artillery attack."



*German self-propelled howitzer in action in Russia. These weapons represent a development in artillery materiel which is coming into more and more prominence as the war continues. The advantage of such a weapon is that it gives instant support to advance elements, whereas ordinary towed artillery usually must sit for hours in column on the road waiting to get into action, only to find that its supported infantry has entrucked and is already out of range. (Acme Photo.)*

In the same month, April, 1914, Fuller also wrote in a memoir on *The Tactics of Penetration*: "To-day we have, besides the magazine rifle, the characteristics of which are understood, two, comparatively speaking, new weapons: the quick-firing field gun and the machine gun. Realizing this, we can predict with . . . certainty that the general who makes the truest use of these weapons . . . so . . . that their fullest power is attained, will win

unless . . . hopelessly outnumbered.

". . . of all the changes introduced since the Russo-Japanese War, the general adoption of quick-firing artillery by civilized armies is . . . the greatest. This gun, if correctly employed, will . . . revolutionize the theory of war by substituting penetration for envelopment as the leading tactical principle.

"On account of the rapidity of fire of the modern field gun, there will be no necessity either to hold back guns in reserve, or to withdraw them from their position . . . all that will be necessary will be to mass ammunition opposite a definite point . . . so that the guns commanding this point . . . may pour a continuous and terrific

deluge of shells on . . . (it), and so enable the decisive attack to proceed against it. Admitting that this is feasible, then the problem resolves itself into one of supplying these breaching batteries with sufficient ammunition; this . . . should not be . . . difficult . . . now that motor transport is in general use." (*The Reformation of War*, Fuller, Hutchinson & Co., London, 1923.)

He might have added that the enormous size of Twentieth Century armies was also making successful envelopment more difficult, and therefore increasing the relative importance of attempts at penetration. Further he might have noted that the comparatively low training of the European masses of conscript infantry was working in the same direction; compared with penetration, envelopment on a large scale is a complex maneuver difficult to time. This point had already been seen in 1913 by R. M. Johnston, who had suggested in his *Bull Run* that McDowell with his raw infantry might have done better to use his powerful artillery to penetrate the Confederate front rather than try to turn it with foot troops.

Although Fuller's conclusions fell upon deaf ears, they were promptly confirmed by events. In the trench warfare which so soon developed on the Western Front, the importance of the gun increased by leaps and bounds. After losing six hundred and fifty thousand men in '14 and '15, the French Command in its "Instruction" of January 8, 1916, confirmed that "infantry has no power of taking obstacles. . . . It is incapable of offense without artillery. . . . Artillery crushes, infantry sweeps over. . . . Battle is not waged with men against material . . . order takes precedence over rapidity."

Throughout 1914-18 the importance of the infantry masses steadily decreased relatively to that of artillery. Superior numbers of German guns permitted their possessors to roll back and at long last to break the spirit of the numerically superior millions of courageous Russian foot. In '17 and '18 first the Germans, then their opponents began to supplement the offensive action of their infantry by accompanying each unit with field pieces more or less permanently attached. Each German infantry regiment which attacked in March, 1918, had a battery of light artillery and six light horse-drawn trench mortars attached. Ludendorff's "Note" of May 15, 1918, went further, prescribing the organization of "mixed battalions" with a section of artillery assigned to each, and continued: "The idea that success is won by masses of troops must be absolutely destroyed. Such methods result only in useless losses. Not numbers but fire power is decisive." The same idea was put forward in his "Note" of June 9 which, while emphasizing the need for boldness on the part of the infantry, went on to say: "The most vigorous resistance is broken much more readily by reenforcing the artillery than by reenforcing the infantry . . . greater infantry density only increases losses." His General Order of August 1 again insisted that "the infantry must never be deprived of powerful artillery support."

With the enemies of the Germans copying the latter's infantry-artillery teams, it was clear in November, 1918, that the gun had triumphed, but equally clear that the decision, which had been largely one of exhaustion, had been purchased very dearly. One, although of course only one, of the main causes of this unhappy result had been the defensive strength of guns—including machine guns—in position, and the offensive weakness of guns moved by animal or human muscle power. Accordingly, intelligent soldiers everywhere, Fuller in England, Von Seeckt in Germany, Douhet in Italy, Johnston in America and de Gaulle in France, began to consider how future victories might be won by some means quicker and less costly than the mutually ruinous process of exhaustion. All these men, in their different ways, proposed intensive use of the two new weapons, the tank and the plane, which the internal combustion engine had made possible. Over Douhet's fantastic idea of winning wars almost overnight by air bombing alone, we need not linger here. Suffice it that the imaginative Italian was at least wise enough to see that air superiority would greatly facilitate surface actions should these become necessary. All the others just mentioned, Fuller being the first and the most far-seeing, studied how to combine the two new weapons with each other and with the old-fashioned artillery plus infantry team.

Our reason for calling the infantry-artillery team an "old-fashioned artillery plus infantry team" is because both planes and tanks are, in a sense, new forms of artillery. Both are highly mobile gun mounts. Both are also means of reconnaissance and transport, but primarily they are land-ships and air-ships carrying team weapons more powerful than any infantry weapon. Thus both have highly offensive value: first because both can quickly concentrate in considerable force opposite any section of the hostile front, second because planes always and tanks frequently can attack hostile rear areas. Further, although tanks can sometimes be disabled by one-man weapons in case the men using these can get close to the machine, yet with this exception—which will seldom occur in large-scale operations — both tanks and planes are invulnerable to infantry, the safety of the tank being due chiefly to its armor, that of the plane chiefly to its speed. Thus, except for operations in exceptionally difficult terrain, the infantry era is over and the triumph of the gun is complete.

Henceforward infantry seem destined to become "land marines," moppers-up, sentries, troops of occupation, mountaineers, and guerrillas. Indeed with the increasingly heavy armor of tanks and the use of armor in certain planes, not only true infantry weapons but also the lightest types of antitank guns and antiaircraft machine guns are becoming obsolete—a tendency reminiscent of the gun versus armor competition long familiar to naval design. In any case the tactical question today is that of the relative effectiveness of different sorts of gun mounts.

On the other hand, artillery other than that mounted in tanks and planes—including antiaircraft guns and pieces of all calibers which unlimber for action in traditional fashion—retains considerable advantages as against either of the new instruments. Tanks and planes, although hard to hit, are fragile to projectiles of sufficient power. They cannot readily conceal themselves, whereas old-fashioned guns can be hidden or entrenched with ease. Thus planes attacking areas adequately defended by antiaircraft batteries must expect to be shot down in great numbers, unless they fly so high that their bombs can be sure of hitting only enormous ground objectives. Similarly, tanks cannot hope to break fronts held in sufficient density by field pieces or antitank guns of sufficient power. Nor could tanks prevent a slow leap-frog advance of such pieces, a part of the guns advancing at a time and for short distances, covered by the fire of the others as in an infantry advance by rushes—provided that no gaps appeared in the front and that the flanks of the advance could not be turned. Moreover, heavy losses in tanks and planes are more expensive and consequently more difficult to replace than losses in guns. Thus the plane-tank team is by no means a cure-all; antiaircraft guns and old-fashioned pieces possess defensive power, and the latter still have a certain offensive power.

At the same time, these advantages of the comparatively immobile gun-mount are not absolute. The terms "a sufficient density of guns of sufficient power" are somewhat vague generalities. In practice it will usually be hard to tell in advance how many and how heavy guns will suffice to hold a given front against tanks or an area against effective action by planes. Indeed certain officers who have closely studied defense against tanks believe that such defense can seldom be air-tight, and should normally limit itself to canalizing hostile tank penetrations by means of strong points.

Next we must note the extent to which the impotence of the plane to hold ground and the near-impotence of the tank to do so makes the plane-tank team dependent upon the older arms. An army composed only of planes would be defeated by the capture of its ground bases. As to tanks, the writer once heard it solemnly argued that horse cavalry still excelled the new machines in exploiting a

success because a force of tanks alone could not have turned the Turkish defeat in Palestine into a rout as Allenby's cavalry did, since such a force—without defensive power and unable even to provide for its own security overnight—could not operate far from its main body!

This last hob-goblin was laid to rest by the simple expedient of attaching to each tank brigade—among the Germans they numbered about four hundred and fifty machines apiece—a motorized ground holding brigade of infantry and old-fashioned artillery, including antitank guns. As their name implies, these attached brigades were to be used not only as "land marines"—i. e., for incidental duties such as the service of security at night, for mopping up after tank attacks, etc.—they were also available for rapidly setting up defensive positions in the enemy's rear in the wake of the tanks when the latter had penetrated deeply into the hostile zone of defense. Thus against an enemy composed chiefly of infantry and old-fashioned artillery the offensive power of tanks could be combined with the defensive strength of the older arms.

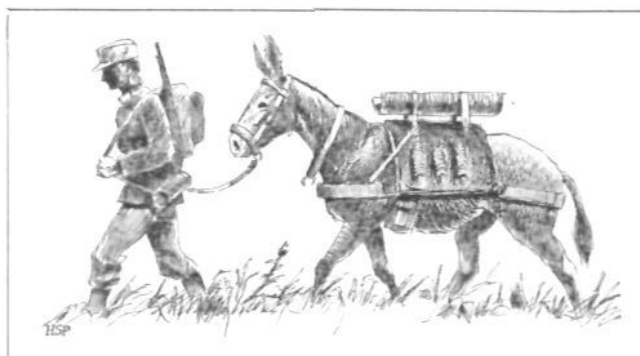
Hence the tank-plane versus artillery-infantry debate, which we first defined in terms of the relative effectiveness of different sorts of gun-mounts, must be somewhat enlarged. We must ask whether an army superior in armored divisions and planes will probably defeat one superior in old-fashioned artillery and infantry.

In pure theory the answer seems to favor the new arms. A commander superior in planes and armored divisions will have the advantage in reconnaissance; he will be able both to screen his own dispositions and to know much about his opponents'. His air power will also permit him to hinder hostile movements alike in the approach march and the movement of reserves during the action. When battle is joined the commander inferior in planes and tanks will have to weaken his front by holding out considerable forces in order to parry sudden air landings in his rear areas or almost equally sudden—and more formidable—tank penetrations into those areas. Finally, plane-tank superiority will permit a rapid exploitation of success and will at the same time prevent the exploitation of hostile success.

(TO BE CONTINUED)



# ARTILLERY IN MOUNTAIN WARFARE



Major Langrock, in *Artilleristische Rundschau*, August, 1941. Translated by P. W. T.

When the morning papers on March 3 announced that German troops had entered Bulgaria on the preceding day, and when shortly thereafter our troops were known to have reached the Bulgarian southern border, few of us thought that it would be as late as April 6 before action started. It was only after we had observed conditions with our own eyes—only after we had seen the steep, winding Bulgarian roads, partly blocked by snow; the traffic bottlenecks in the Kresna Pass behind which were jammed supply trains, columns of motorized infantry, and columns of artillery, all of them waiting for empty supply trucks moving in the opposite direction to pass—it was only after we had seen these conditions that we realized that three weeks was a very reasonable time for the march through Bulgaria. In fact, we could only wonder that the march was made so quickly.

Our own Corps advanced as the leading element down the most westerly of the various routes. Our particular road ran south from Sofia, through the valley of the Struma River. The road passes through the Kresna Pass, a narrow and rough valley, six miles long, cut through the foothills of the Pirin Mountains. Leaving the Kresna Pass, the road follows the wide Struma valley to Kulata, where the river breaks through the massive Belaschitza and Cingelion mountain ranges to the coastal plain (Map 1). This passage through the mountain ranges (which form the Bulgar-Greco border) is called the Rupel Pass. Our road ran through the Pass. The latter had been fortified in great depth by the Greeks during recent years.

Our Staff had moved out ahead of the marching columns, in order to reconnoiter conditions along the border. The results of the staff

reconnaissance are described below.

## SITUATION

At this time, German plans were concerned exclusively with Greece and with British activity in that country. It was to be expected that the Greeks would defend their strongly fortified

"Metaxas Line." The Bulgar-Greek border extended along the crest of the Belaschitza Range, which rose to as much as 6,000 feet in elevation, with the upper levels still covered with snow. To the east, the range was somewhat lower and flatter, with many ridges extending to the south, and a few to the north. East of the Rupel Pass, the Cingelion Range, lower and less rugged than the Belaschitza Range, carried the border eastward.

The ridges extending to the south and southeast, and the peaks along the main ranges, were the sites of the Grecian fortifications. Along the Struma, the Bulgarian border

forms a reentrant into Greece. Here, the main Greek defenses were sited somewhat further southward, with outpost lines forward. The valley was covered by works located on the heights along the flanks of the reentrant. All Bulgarian routes of approach lay under direct Grecian observation.

According to the fortifications-maps at hand (old ones), and according to information from Bulgarian sources, we could expect to encounter well-built field fortifications, reinforced in places by concrete pill boxes. However, as our own reconnaissances progressed, it became clear that we had to do with a completely fortified position. We were constantly discovering additional pill boxes, obstacles, and even works with armored turrets. Even so, we realized the full



Map No. 1

strength of the Greek line only after our first assaults.

#### PREPARATIONS

The Commander of the Corps Artillery insisted—and with complete justification—that the artillery commanders be advised at the earliest possible moment as to the corps plan for the attack. The reason for this insistence is clear: in an attack on deliberate fortifications, the artillery has especial need of time for preparations. It was necessary to consider many things: how long it would take to bring the artillery through the Kresna Pass; how many days of fire must be on hand; how much time would be required for essential reconnaissance.

The Corps had decided that the main effort was to be

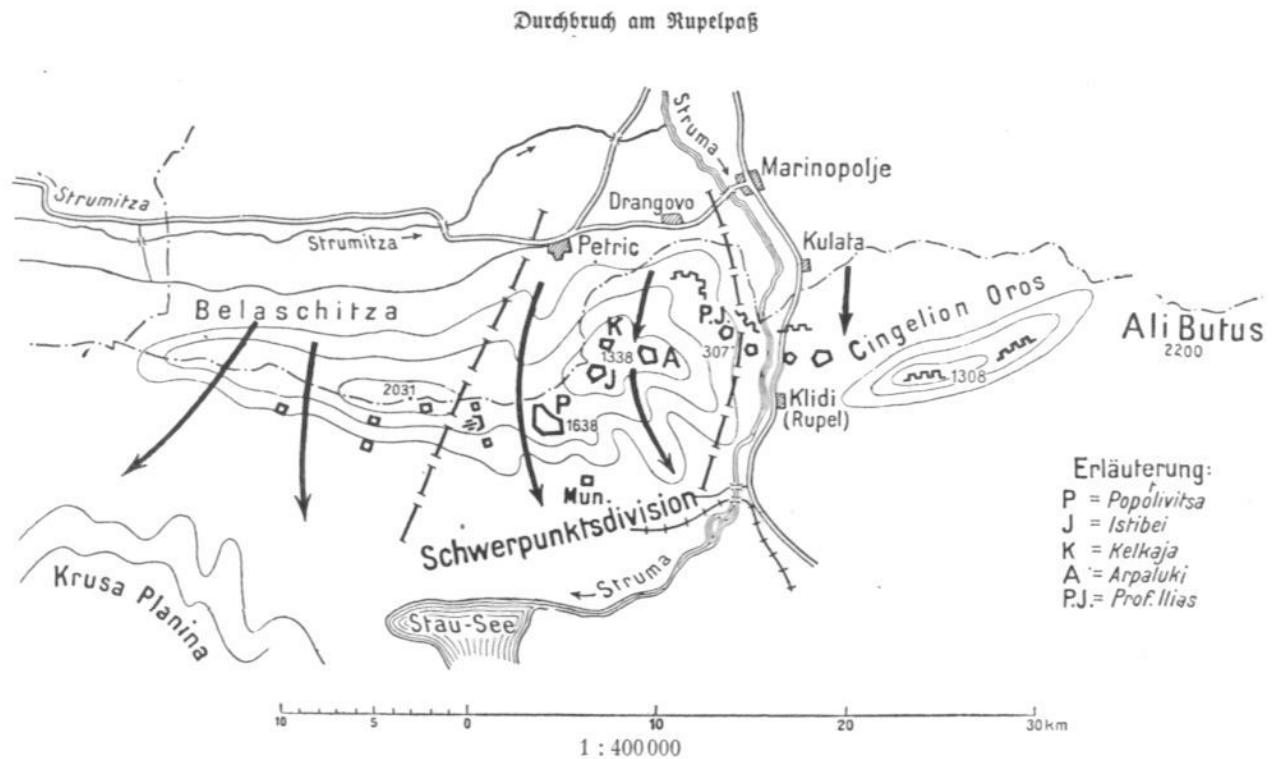
and so clearing the way for the operation described in *c*, below.

*c.* A reinforced infantry regiment was to attack straight down the Rupel Pass, with the mission of forcing a breakthrough, and clearing the way for the advance of a Panzer division.

*d.* Further to the east, in the vicinity of the 6,600-foot high Mt. Ali Butus, an infantry division was to attack, with the mission of advancing in the direction of Serre.

#### ADVANCE OF THE ARTILLERY

The corps artillery commander now had to consider whether or not the corps commander's plan was satisfactory from the standpoint of the artillery. That is, in



made by a mountain division. This division was to attack in a sector where road net and terrain offered the best chances for success. As a matter of fact, the sector in question was blocked by fortifications; but the terrain was such as to permit the use of forward assembly close to the enemy works. Details of the Corps plan follow (see Map 2):

*a.* On the right, a mountain division was to attack over the pathless and snow-covered crest of the Belaschitza Range, with the mission of rapidly traversing the mountains and moving on the other side against the Krusa Hills, where the main Greek reserves were thought to be.

*b.* To the left of the division described above, another mountain division was to make the main effort, advancing against the fortified heights P, J, K, and A, with the mission of gaining the rear of the Rupel Pass defenses

view of the terrain and other aspects of the situation, would the corps artillery be able to support effectively the operation which had been designated as the main effort; or would it be better able to support some other operation? The decision was not simple, and could be made only after thorough-going reconnaissance in the course of which many artillery officers worked their way up to within very short distances of the enemy works. Finally, the artillery commander was able to report to the corps commander that he could support the operation as planned.

There then were constituted two artillery groupments. Terrain and the enemy situation dictated radically different missions and functions for the respective groupments.

One of the groupments, consisting of an artillery regiment, had the mission of supporting the reinforced

infantry regiment's attack down the Rupel Pass, on either side of the Struma River. The terrain through the Pass was rough, but of course not mountainous. On either side of the Pass rose the mountains. The latter gave the enemy ample facilities for observation and action. On the other hand, the mountains on the Bulgarian side of the border provided us with good observation of the Pass. The other artillery groupment, commanded by the artillery commander, and consisting of two regiments, had the mission of supporting the mountain division making the main effort. This support was to be effected chiefly from prepared positions in the foothills on either side of Petric, and was to be so arranged that each of the two assault infantry regiments would have the support of one regiment of artillery.

Meanwhile, a special artillery assault groupment, consisting of one battalion of 100-mm, (105-mm.) gun-howitzers and one battalion of heavy field howitzers (15 - cm.), was brought up to the vicinity of Drangovo. There the batteries went into position.

The mountain division which was to make the attack over the mountains further to the west was to be supported by its own divisional artillery (less certain horsed light field howitzer units), reinforced by one battalion of mountain artillery. In this case it was necessary to provide only such supporting artillery as could be pulled over the mountain trails and paths.

The artillery groupment supporting the attack down the Rupel Pass had a relatively simple task. The terrain there was relatively flat, and, as has been noted, observation against the enemy works was good.

However, the case of the groupment of the artillery commander, supporting the main effort, was quite different. Here there were great differences in elevations on the lines of site to be considered, the observation situation was bad, and the installation of the communications net presented great difficulties. It will be recalled in this connection that most of the batteries of this groupment were in position in the foothills, just north of the



*German pack artillery spends much time practicing in difficult mountainous terrain. Note the light-weight pack saddle with frame of metal tubes. (Photo from European.)*

mountains. The situation was improved somewhat when it proved possible to move two battalions of light field howitzers over a mountain road up to positions on the ridge. However, the bulk of the batteries still remained below.

In the sector of the main effort, the border was drawn so as to give the Greeks all the good observation. Thus the enemy was able to observe our approach marches in detail. For our part, before we could establish observation posts we had to capture them. Even then, the OP's invariably were very far forward of the firing positions, and often they were far to the side of the line of fire.

To illustrate some of the points just made, it may be stated that most of the batteries of the commander's groupment were in positions at elevations

of about 600 feet. The targets were at ranges of from 7,000 to 10,000 yards, and at elevations upwards of 5,000 feet!

The signal sections of the batteries, and the signal platoons of the battalions, were faced with most difficult tasks. The distances between firing positions and OP's, and the differences in elevation, demanded wire circuit lines of great length. The Artillery Assault Groupment, near Drangovo, had to be tied in by wire to the left



regiment of the commander's groupment, this in order to insure that the fire of the special groupment was effectively used, and to insure that its fire would not fall on our own infantry. This demanded a line more than six miles in length. In addition to the lateral communications up ahead (between OP's), the laying of communications between firing positions was ordered. Meanwhile, the radio operators were encountering trouble. They found that whenever they began the descent from the crest of the range down the other side, both their reception and their sending power decreased greatly. It was attempted to alleviate this situation by stationing relay radio operators along the crest but without much success.

#### PREPARATIONS

March 30 had been set as the zero day for the attack. Good weather, accompanied, however, by fresh winds sweeping down from the snow-covered slopes of the Rhila and Pirin Mountains, facilitated our advance toward the border. In every fold of the terrain we saw bivouacs, tents, vehicles, weapons. Along the skyline of the bluffs which lined the wide Struma Valley, we could see the tubes of the heavy AA guns, pointed skyward, ready to protect our marching columns. Ammunition DP's were established, one of them in Drangova, 1,500 yards from the border—and partly within sight of the Greek OP's.

The days between March 20 and March 26 were devoted to detailed reconnaissance, through which we learned more and more about the fortified positions ahead of us. Parts of a flash-ranging battery were detailed to do nothing but observe the enemy terrain. In this way, we received a running account of enemy activity (including entrenching operations).

Security was provided by special platoons of infantry.

The mass of the troops went into bivouac a short distance from the border.

By means of constant conferences the infantry and artillery commanders laid their plans, down to the last details. Our detailed preparations were greatly facilitated by the failure of the enemy to interfere with our approach marches. These were carried out as though on a peacetime training field.

The situation changed sharply in the tense days of the

*Putsch* in Jugoslavia. New preparations were made, firing positions were carefully camouflaged, and ammunition was placed close at hand. The zero-day (March 30) came and went, but nothing happened. The political events certainly had affected our plans. There was now no reason for not using the routes around the Belaschitz Mountains, through Serbia.

On April 3, orders naming the day of the attack (April 6) were issued. The plan of the Corps was altered in the following respects:

a. The Panzer division was to attack to the west along the Strumitza River, was to reach the Vardar Valley, and then advance south against Salonika.

b. The right mountain division was given a free hand:

after crossing the mountains, it was to advance westward as rapidly (and as far) as possible.

c. Certain elements of the AA artillery were reassigned ground objectives.

d. Details of dive-bomber support for attacking infantry were to be worked out through conferences between the commanders concerned.

There was no change in the "main effort" of the attack south, nor in the provisions for the handling of the corps artillery.

The mountain roads leading out of Petric were the scenes of great activity on April 5. Motorized and



*Nazi parachute troops assembling their pack artillery and equipment after landing in Crete. (International News Photo.)*

horse-drawn columns worked their way upward in clouds of yellow dust. Staffs moved forward to their long - since reconnoitered CP's. The CP of the commander of the division making the main effort and the CP of the corps artillery commander were located close together, within 500 yards of the border, in a small wooded ravine. During the night, everyone was tense; but still nothing happened. A shining moon lighted the approach routes for the advancing infantry.

#### ARTILLERY PREPARATIONS

Very early on the morning of April 6, the artillery had the opportunity of registering on its targets. Registration fire was absolutely essential, since the targets lay high up on knolls and ridges for which it was not possible to calculate accurate firing data. This was true despite all our intensive efforts to obtain survey data in the preceding days.

The infantry advance began at 5:00 AM. The registration fire began at 5:20 AM, and the fire for effect at 5:45 AM. The fire for effect was to continue until the first dive-bomber attacks, and was to be conducted in strict accordance with the carefully prepared fire plan.

#### THE ATTACK

The attack was a difficult operation. During the course of the years the Greeks had constructed what may be called a modern fortified position in every sense of the word. They had made full use of the rough mountainous terrain, and had taken advantage of every opportunity for



*In the German pack artillery, the men do not hesitate to carry the materiel where necessary, (Photo from European.)*

flanking fire. The strength of the works was developed only as the attack progressed. There were no apparent entrances to the fortified works, all of them being connected to central works through tunnels. There were works with armored turrets at elevations up to 5,000 feet, and even antitank ditches, too. Thus, despite great expenditure of artillery ammunition and despite the heaviest dive-bomber attacks, at the end of

the first day the reinforced infantry regiment attacking in the Rupel Pass had overcome only the outpost line, and the mountain division making the main effort had overcome only advanced machine-gun emplacements at P and K. Units of the division indeed were on the peak at I, but under their very feet the works were still active. In many cases, the firing ports of pill boxes were taken under direct fire and destroyed; but even then the Greeks within the works waited until the fire lifted and then brought out their machine guns, firing.

About noon of the second day of the attack, the great work on the peak at I finally hoisted the white flag. It developed that the 360-man complement of the work had

yielded only because the air within the work had become too polluted to breathe. The fall of this vital fortification was the beginning of the end. Thereafter, the Infantry reduced work after work, pill box after pill box — always after bitter fighting, and always after precision firing by the artillery. The artillery observers of course were keeping up with the foremost infantry.

Meanwhile, the weather had changed for the worse: it was



*Improvised sleigh for transporting food or other supplies. (Dever from Black Star.)*

now rainy and foggy. This change in the weather, while disagreeable, worked to the advantage of the infantry assaulting the works.

The ammunition supply for the artillery was now becoming critical; and, furthermore, the mass firing which had been delivered since the beginning of the attack had not had the desired effects on the fortifications. Accordingly, mass firing was suspended in favor of precision point-firing against definite observed targets.

By evening of the third day of the attack, the division making the main effort had reduced the works in the sector P — A, and had pushed on down the Struma Valley. It was

The mass of the corps artillery could not be taken across the mountains; and so, as the attack progressed beyond the ranges of the guns it was necessary to suspend the artillery fire. However, the mountain artillery, and in the case of the division making the main effort, one battalion of light field howitzers, were pulled up and across the mountain trails.

The action just described is of great interest to artillerymen, inasmuch as it marks the first important employment of mountain troops in this war. It is interesting because it involves not only mountain artillery which can be packed along with the infantry, but also artillery of all calibers which was of use because it could fire from the



*German army winter maneuvers. Packing artillery on sleighs. One sled carries the tube (a 105), one carries cradle, another the trail, and so on. At least six sleighs per weapon seem to be required. (Press Association.)*

now intended that the left assault regiment of the division attack north against the fortification at Point 307—this being one of the major works controlling Rupel Pass. The assault units of the reinforced regiment attacking down the Pass had not been able to reduce or even to reach this work.

As a matter of fact, the main fortifications of the Rupel Pass never were reduced. The complements manning the various works came out only after the general surrender of the Greek Thracian Army. The complement of the fortification at PI totalled 1,400 officers and men. The other works were garrisoned by battalions.

It was on the evening of the third day of the attack that we received the good news of the fall of Salonika to the corps' Panzer division. This of course sealed the fate of the Metaxas Line.

foothills onto the targets in the mountains. We can be proud of the manner in which our arm succeeded in overcoming many difficulties (differences in elevations, distances to OP's, long signal communications) in order to give the assault units invaluable support.

#### EDITORIAL COMMENTS

1. Prior German information concerning the fortified Greek line was neither up-to-date nor accurate. Much of the popular stuff we read about the fifth column activity and espionage must be hooey. The detailed *military* reconnaissance which the corps staff made just before the attack rectified the deficiencies in intelligence and had prime influence on the plans of the commander.

2. This reconnaissance was supplemented by an artillery

reconnaissance arduously conducted, and in great detail. The corps artillery commander was no yes-boy, but made sure that he could fulfill his mission before he told the corps commander that he could do so.

3. Note that mountain divisions were given the leading role, that of turning the position from the west. Three regiments of corps artillery were available. Two were assigned to support the main effort and one to support the reinforced infantry regiment which was to force its way through the pass. This seems like an S-Ex to us. In addition, there was available a "special assault groupment" of one battalion each of 105s and 150s. Unfortunately the article does not go into details as to this groupment. We assume that it consisted of armored self-propelled artillery which the Germans thought would be useful in storming the Greek pill boxes. However, it initially went into position and was employed like ordinary artillery.

4. Note the technical difficulties of gunnery and communications.

5. The ammunition DPs were within 1,500 yards of the front line!

6. Local security was not overlooked—important in the mountains. Platoons of infantry were assigned to the artillery for this purpose.

7. Greek interdiction fire would have hampered the Germans greatly, according to their own statements.

8. Close air support, by dive bombers, was worked out between the commanders concerned, just like artillery support.

9. There was no artillery registration until twenty minutes after the infantry jumped off.

10. Note that massed artillery fire had to give way to "precision point firing." This is important. Fortified works do not yield always to mass firing and heavy bombing. Direct, short-range artillery fire is necessary. This is contrary to World War tradition, where the solution was to get more artillery and bigger calibers, and to prolong the fire. Today we must be ready to push individual weapons up close and to shoot flat-out at very small targets like openings in bunkers, embrasures, observation slits, etc. We must practice this, and must convince ourselves that such fire will be necessary in reducing a fortified position. Like so many other things, we admit that it is needful, but are doing nothing about it.

11. The heavy corps artillery could not move across the mountains. Only the pack artillery (and one light horse-drawn battalion) was able to participate in the exploitation. We must have plenty of these weapons available in the GHQ reserve.

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## HE KNEW THE REGULATIONS

A friend of ours, whom we will call Lieutenant Colonel "X," was in Honolulu on the morning of December 7. As the enemy bombs began to wham into Pearl Harbor, the Army went smoothly into its predetermined plans for the defense of Oahu. Colonel X was at once designated czar of civilian commodities. One of his first and most important duties was to commandeer all available lumber, cement, sand bags, etc., to augment the existing fortifications by immediately starting construction of air raid shelters and other similar works. He badly needed a certain type of large iron bolt of which practically none were on hand in the civilian establishments in Honolulu. On happy inspiration he dispatched a lieutenant posthaste to a military supply depot not far from Schofield Barracks. Sure enough, there was a warehouse full of the much needed bolts. Said the lieutenant to the fat major in charge of the depot, "Colonel X will surely be glad to know that these iron bolts are available here. We will send a truck to get them."

In the distance could be heard the crash of bombs as the Japs continued their attack.

The fat major in charge of the warehouse snapped back: "Your colonel may be happy if he likes, but he can't have any of these bolts."

"Why not?"

"Because," said the guardian of bolts, sternly, "They are to be issued only in case of an emergency!"

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## FIELD ARTILLERY BOOK 120—Automotive Instruction

Since the 1941 edition of this excellent text was announced in the FIELD ARTILLERY JOURNAL (in the December, 1941, issue), a later edition has been printed at Fort Sill. Some new material has been added, and the instructional data go into more detail. The price is still 75c per copy, obtainable at the Book Department, FAS, or through the FIELD ARTILLERY JOURNAL.

# Ammunition Supply: An Illustrative Problem

By Lt. Colonel John H. Sampson, Jr., FA.

## FOREWORD

Too little has been said and done concerning ammunition supply. Even in maneuvers thorough training in handling ammunition is never given. Boxes filled with sand are an aid. Frequently the supply of them is inadequate. But even where there are plenty of boxes the best efforts only approach reality—never actually reach it. It is relatively easy and requires little time to load and unload a given quantity of ammunition boxes into or from a truck. The time-consuming job is opening the boxes and otherwise preparing the ammunition for instant and ready use by our ammunition-eating guns. That part is never played in practice "war." The result is that our ammunition servers get very little real training. A hasty review of military history will reveal the fact that each succeeding war consumes more artillery ammunition than its predecessor. Artillery ammunition expenditures are on the increase and we do little about studying in detail the ammunition supply problem. The high command realizes the importance of increasing ammunition expenditures because there is only one known place where the primary duty of all artillery officers is indicated. And that is in connection with ammunition. Paragraph 205, page 171, FM 6-20, says: "A primary duty of all artillery officers and artillery commanders is close supervision of ammunition supply and expenditure." Thus, the job is not alone that of the S-4 and his ammunition train commander. Too often the battalion commander at his fire direction center is prone to command: "Fire the battalion, 10 volleys," without a thought of ammunition resupply. In combat the problem is a real one.

## SITUATION AND REQUIREMENTS

You are S-4 of the — Field Artillery Battalion, 105-mm. howitzer, truck drawn. At 3:00 PM, 10 January, the three howitzer batteries are in position and the ammunition on hand within the battalion is as follows:

	Shell, HE	Shell, Smoke	Fuzes, M-46
Battery A .....	182	17	199
Battery B.....	165	10	175
Battery C.....	103	14	117
Ammunition Train	0	0	0
<hr/>	<hr/>	<hr/>	<hr/>
Total for battalion	450	41	491

At this same time your battalion commander directed that you submit by 4:00 PM, 10 January, a plan for the resupply of ammunition, so that the battalion could move, if necessary, at 9:00 AM, 11 January, with all ammunition carrying vehicles filled with their prescribed ammunition loads. You were in possession of the following information:

a. All movements to be during darkness without lights.

b. The division ammunition office is near the Division Command Post on the Main Supply Road to the Ammunition Supply Point.

c. The average distance from the howitzer battery positions to the ASP is 18 miles.

d. 3.2 units of fire are available at the ASP for your battalion for operations until 2:00 PM, 11 January.

e. Darkness is at 6:30 PM; daylight is at 7:00 AM.

f. The MSR is hard surfaced and except for about one mile for each howitzer battery off the MSR all the roads are good.

g. The MSR is reserved for use by the Division Engineers from 11:00 PM, 10 January, to 3:00 AM, 11 January.

Before starting on your ammunition plan you contacted your battalion S-3 and from him secured the following predicted ammunition expenditures, all HE shell:

Period	Btry A	Btry B	Btry C
3:00 PM-6:30 PM, 10	8 rds/gun	6 rds/gun	4 rds/gun
January .....	per hr	per hr	per hr
6:30 PM-12:00 M, 10-11	2 rds/gun	2 rds/gun	2 rds/gun
January .....	per hr	per hr	per hr
12:00 M-5:30 AM, 11	2 rds/gun	2 rds/gun	2 rds/gun
January .....	per hr	per hr	per hr
5:30 AM-6:30 AM, 11			
January .....	120 rds	110 rds	140 rds
6:30 AM-8:00 AM, 11			
January .....	70 rds	100 rds	90 rds
8:00 AM-9:00 AM, 11			
January .....	50 rds	60 rds	70 rds

### NOTES:

1. Ammunition-carrying vehicles, with capacities (See FA School IM T-1, issued to all units as Conference Course Bulletin No. 2):

For each howitzer battery	
1 executive's truck .....	40 rds. each
4 prime movers .....	40 rds. each
2 Fifth Section trucks .....	60 rds. each
2 Fifth Section trailers .....	40 rds. each
For Ammunition Train	
12 trucks .....	100 rds. each
12 trailers .....	40 rds. each

2. Unit of fire for 105-mm. howitzer is 225 rds. per howitzer. (Par. 92 a FM 101-10, Staff Officers Field Manual, Technical and Logistical Data.)

3. For other requirements, use (in addition to references given) FM 6-130, FA Reference Data.

FIRST REQUIREMENT: What is the predicted ammunition expenditure for each howitzer battery? For the battalion?

SECOND REQUIREMENT: What is the prescribed ammunition load for each battery of the battalion? What is the total for the battalion?

THIRD REQUIREMENT: How many rounds of ammunition will have to be hauled?

FOURTH REQUIREMENT: How much ammunition is available at the ASP?

FIFTH REQUIREMENT: What is your detailed plan, with time schedule, for the resupply of ammunition within the battalion?

SIXTH REQUIREMENT: What is the weight of one round of 105-mm. ammunition packed for shipping?

(Solutions are on page 168)

# "DESERT ENCOUNTER"

By Lieut. Col. David Larr, GSC

Editor's note: The author, who has recently returned from Libya, went over the scene of the action described, and talked to all survivors, soon after the battle.



*British 25-pounder troop in action near Omar Nuavo in Libya. Note dispersion and staggering of guns.*

"During limited offensive operations carried out by our troops, two German medium tanks were destroyed and many casualties inflicted on the enemy."<sup>1</sup> Behind these cryptic words, which we often see in the official communiques of the various headquarters, are many small unsung fights which are just as bitter and leave men just as dead as the battles which are written up in such detail by the historian. And from these same small combats may often be learned the lessons which will help us to win the decisive battles of the future.

The desert along the Egyptian-Libyan frontier is quite different from the Hollywood version with which we are so familiar. On the Egyptian side of the frontier a triangular coastal plain shimmers in a pitiless summer sun or crouches in a freezing winter wind. Low, rocky, utterly arid, it is a waste of small scrub and hummocks of tawny sand. From a base which stretches some thirty miles southwestward from Sidi Barrani, it comes to an apex at Salum on the border.

From Salum, extending on a long arc southeast and east, a bald escarpment from 250 to 600 feet high sharply divides the coastal plain from the table-land of the interior. This escarpment is deeply eroded by wind into arroyos and gulches and is reminiscent of many similar scenes in Arizona and New Mexico. For some sixty miles from

Salum it forms a military barrier, pierced by only three roadways that have been laboriously constructed to accommodate the transport of the various armies which have blistered and frozen, suffered and died in this heartless land. South and west of the escarpment for 200 miles the desert is a featureless plain. Near the escarpment it is covered with limestone shingle, not unlike flagstones, which are scattered loosely on the surface of the ground in areas which sometimes stretch for miles. Between these stone patches are shallow depressions known as "ghots." Geographically these ghots are sink holes of the type familiar to all who know the limestone country of Tennessee. However, since the plateau was originally lifted up from the sea, and since there has been but little rain in this country, the ghots are extremely shallow and oftentimes will be a mile or more across with a depth of perhaps ten to fifteen feet. In these depressions drifted sand collects, grass grows, the roots catch more sand, the sand absorbs dew, the vegetation increases, and the result is an area which is practically impassable to motor vehicles at speed. These hummocks are known as "camel hump," the simile being obvious. The scrub which grows in the camel hump resembles the mesquite of Western Texas, but seldom develops to a height of more than three or four feet. All sorts of reptiles, snails and crawling things find their

abode in the camel hump. Considerable numbers of gazelle survive on the dew which saturates the foliage of the scrub, and furnish subsistence to flourishing tribes of foxes.

South and west of the stony belt along the escarpment we find huge areas of hard clay with occasional



*British light gun in action in Libya. The British have modified old caissons for motorized transport of ammunition. (Acme Photo)*

<sup>1</sup>British Official Communique, Cairo, 15 May, 1941.



expanses of hard sand overlaid with a thin layer of loose gravel. South of the limestone shingle area maneuver is impeded though vehicles may be operated up to forty or more miles an hour in many places. The shingle, where present, slows down the maneuver of motor vehicles but does not restrict it. There is little cover from ground observation and none from the air. However, the imperceptible undulations of the desert, in combination with the mirage and heat waves which normally exist from midforenoon to midafternoon, often combine to reduce the range of visibility to two thousand yards. During the early morning and late afternoon, visibility is only limited by the scant cover afforded by the folds of the ground.

During mid May, the British Army in the Western Desert was deployed some fifteen to thirty miles inside the Egyptian frontier. A security screen of armored cars was manned by the 11th Hussars, who have been on desert duty since 1933. A more competent and desert-wise force of its kind does not exist in the world today. Backing up this screen, which extended from Buq Buq on the Mediterranean coast to Maddelena (about fifty miles south along the frontier from Salum), was a series of small very mobile self-contained task forces built about the fire power of the British 25-pounder field piece. These task forces, known as "Mobile Columns," each consisted of a troop (4 or 6 pieces) of 25-pounders, a company of motorized infantry for local security purposes, a troop (4 pieces) of 2-pounder truck-mounted antitank guns, a section of Bofors (two 40-mm. anti-aircraft), a platoon of motorized engineers (with demolitions and pioneer material) and service detachments.<sup>2</sup> There were normally three such columns above (south) of the escarpment, with a fourth in

<sup>2</sup>The 25-pounder is the standard divisional gun-howitzer of the British service. This piece is a box trail weapon habitually used with a platform giving all around traverse. has thirteen thousand yards' range and is justly famed for its ruggedness and stability. The 2-pounder antitank gun is the current British service weapon, permanently mounted on a 1½-ton truck. Those in use in 1941 had about 270 degrees' traverse around the rear of the truck and normally functioned therefrom. They could be dismounted for employment on the ground but this was seldom done.

### FIELD ARTILLERY AS PART OF SPECIAL TASK FORCE IN DESERT WARFARE

reserve in the vicinity of Sofafi. These troops, though few in number, were experienced, wise in the ways of the desert, thoroughly trained, and extremely self-reliant.

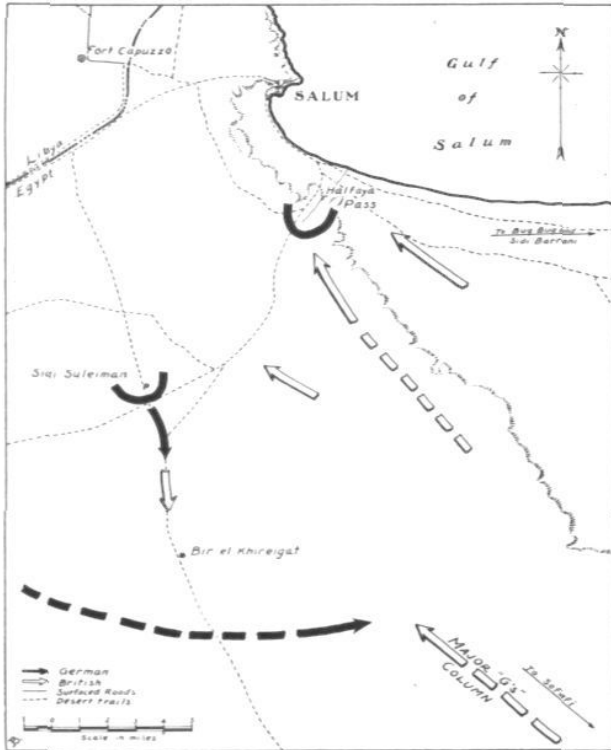
On the morning of the 14th May the British launched a coordinated attack above and below the escarpment with the mission of capturing Halfaya Pass. This pass controlled the entrance to the coastal plain just below Salum. The two left-hand mobile columns and the reserve column were assigned the mission of covering the left flank of the attack. The progress of this assault on Halfaya Pass is not part of the present narrative, but it was in full swing on the morning of the action described below.

Shortly after the local German command formed its estimate of the British operation, a body of German tanks advanced down the desert track from the fortified post of Sidi Suleiman and drove in the left-hand flank-guard column, posted near Khireiget. The British reserve column, Major G commanding, was directed to proceed without delay from its position at Sofafi and reinforce the column which was retiring before the advance of the German tanks.

Let us look at this special unit as it proceeded across the desert in a northwesterly direction from Sofafi. Three hundred yards ahead of the leading wave of vehicles rode Major G in his "eight-hundred-weight" command truck. Dispersed at about 150-yard intervals across a front of some six or seven vehicles were the four 25-pounders with their G.P.O. (Executive) in his "eight-hundred-weight."<sup>3</sup>



*German shells fired by artillery supporting a Panzer unit fall close to advance vehicles of a British Mobile Column.*



On each flank was a 2-pounder antitank gun. Lurching along behind at irregular distances but with approximately the same width and dispersion of not less than 150 yards was the remainder of the unit. There was a total of some seventy vehicles, each trailing its plume of dust as it sought its own pathway through the stones and patches of scrub. The other two 2-pounders and the anti-aircraft guns brought up the rear. No regular formation was or could be maintained. Each driver constantly sought to prevent regularity so that sudden air attack would never find more than two vehicles in any one line. Each vehicle carried two air sentries, one facing forward and the other aft. This was the lesson of bitter experience with the Stuka.

Vehicles carried a weird-seeming cargo of men and material. Uniforms, if such they could be called, were conspicuous by their variety and battered character. Almost every truck had appended somewhere a salvaged Italian machine gun or automatic arm of some description and all personnel had rifles or tommy guns handy. These troops were extremely hard men, tough and battlewise, confident of their ability to take on any opponent and make him pay for the experience. The formation could instantly maneuver in any direction. No air attack could be driven home with casualties to more than one vehicle per plane per dive.

Now let us follow the fortunes of our "column" as it ran "flat out" across the stony plain toward the distant dust

cloud which was beginning to mount into the morning sky. As they bumped along they could discriminate between the heavy "crumps" which constantly shook the air from the direction of the cloud from those coming from Halfaya. They sounded as if someone were dropping bricks into a barrel, sometimes dying away only to be renewed in sudden bursts which often mounted into a dull roar.

As Major G topped a slight crest after traveling several miles from Sofafi he suddenly saw on his left front a line of distant heavy black dots, each trailing its plume of dust. Major G halted, and his unit from long training instantly followed suit. Through his field glasses he identified the dots as tanks, not, as he had thought as he rode along, a supply train making its get-away. They were approaching on a course which in a few minutes would intercept with his own. The British had no tanks in this area, hence they were hostile ones which must have swept wide around the left flank and would in a few miles take the force attacking Halfaya squarely in the rear. There were apparently about thirty of them, some 4,000 yards away at the time. (Lieutenant A, what would YOU do?)

I seriously doubt that Major G indulged in an estimate of the situation in the Leavenworth manner. However, a number of factors must have beat upon him as he made his decision. A direct retreat of his unit (which had perhaps no more mobility than the Germans), even with its limited defensive power, would leave his mission unaccomplished and open the road to the flanks and rear of the main British force. There was no time to deploy and fight the delaying action for which his column was equipped and designed. Any attempt to detour the German menace would also open the rear of the main force to the enemy, and probably would result in Major G being driven off in a fruitless direction. He could not accomplish his mission unless he extricated himself in some way, and yet this new enemy must be delayed until the force commander could make disposition for it. The enemy was approaching him at about 900 yards per minute.

Major G ordered: "ACTION FRONT!"

He then directed the infantry company commander, who had driven up beside his vehicle, to withdraw all except the forward wave at maximum speed until contact was broken, then carry on with the original mission. As he returned to the guns Major G directed his radio operator to contact Force Headquarters, announce his action, and request assistance. (He knew perfectly well that no help was available.) Then he mounted on a caisson (yes, the British use caissons and to good advantage too), and opened with volleys at 2,000 yards. From discovery to first round had taken little more than two minutes. Every man there knew all too well that his own life and that of his comrades depended on the way the guns were served during the next few moments. They had dropped trails where they had halted, with the antitank weapons on the flanks. The distance to the low crest in front was about 700 yards, while on the left flank it closed in to little more than 200 yards. The prime movers withdrew some 150 yards to the rear and halted facing the front with motors running. Major G

<sup>3</sup>In the forward areas of desert combat, personnel shun unarmored tops on vehicles as being almost synonymous with suicide in preventing warning of air attack. The light half-ton open truck from which a constant lookout can be kept is the preferred officers' transportation, in which he sleeps, works and lives.

continued with "gun fire" (volleys) until the German tanks broke defilade over the crest in his front.

At the first volley the group of German tanks had divided into three parties. The Number One (Chief of Section) of Number Three states that he counted 17 tanks in the center group when they were coming head-on at the guns. The two flank groups swung away and the gun crews, if they saw them, paid little if any attention as they loaded and fired at the steel gray targets which came on and on directly to their front. With fuze caps left on and full charges, as fast as they could fire, those guns were served as every artilleryman hopes his will be in his hour of trial.

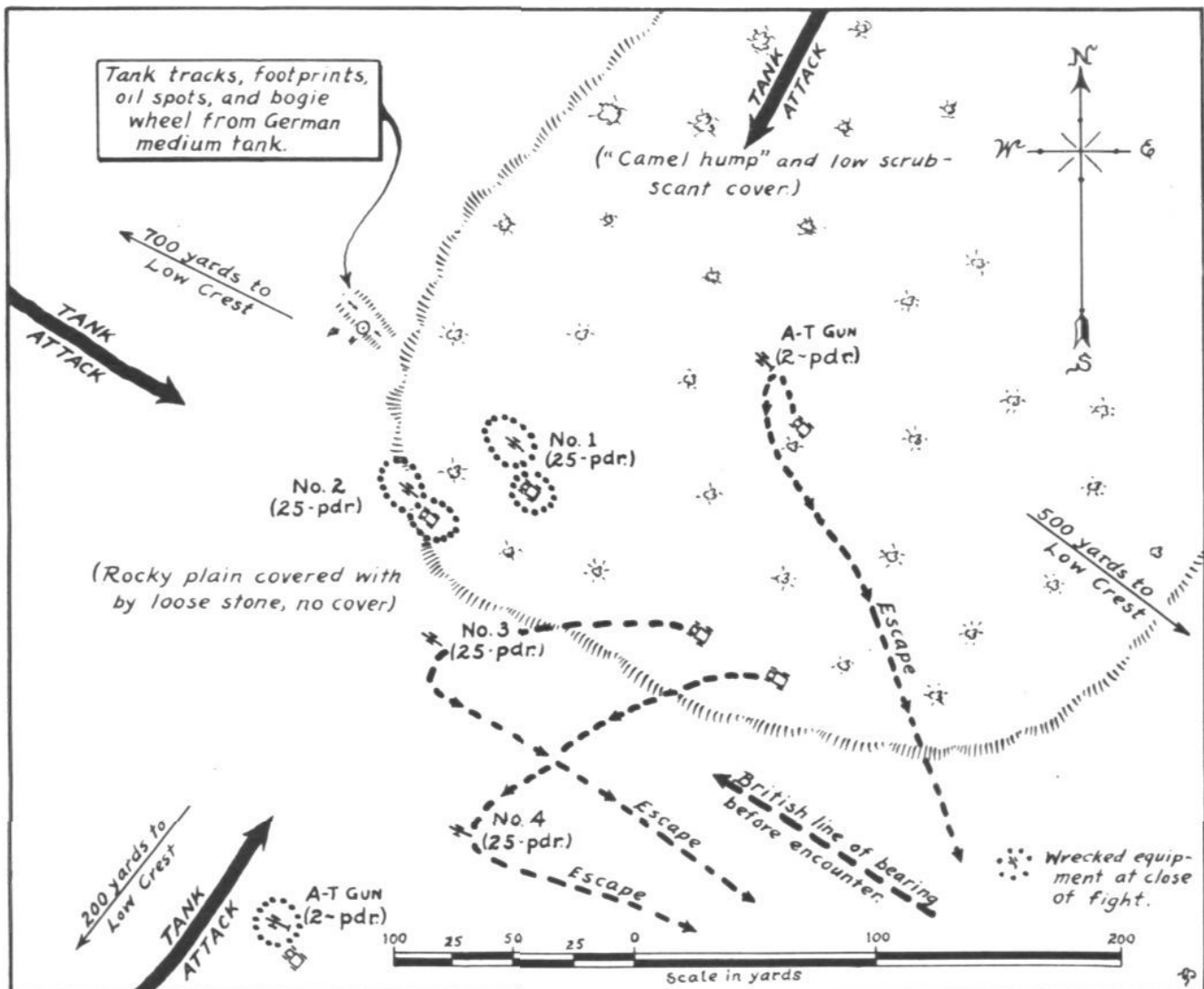
Suddenly the 2-pounder antitank gun on the left front was demolished by a direct hit from a weapon of 75-mm, caliber and a withering blast of machine-gun fire from the left flank. The gun crew of Number Four instantly saw that they were about to be ridden down by a group of German tanks looming up just beyond the crest on their left. Fortunately the drivers of Numbers Three and Four prime movers had observed the approach of this new menace and were dashing up to the guns as fast as roaring motors would bring them. Miraculously the sections got away in the direction taken by the infantry, leaving tools,

ammunition, and all manner of assorted gear and equipment scattered on the ground. The drivers of Numbers One and Two prime movers had realized the situation a few seconds later when they saw their mates start forward. They were just approaching their guns when both trucks were knocked out from the front and left hand simultaneously. At the same time the tanks which had last been noticed going across the front towards the right were discovered to have swung in and were approaching the right rear of the position. While Numbers One and Two prime movers were being wrecked by the converging fire of the German tanks, the 2-pounder antitank gun on the right flank, which had first observed the menace on its right, made off following Numbers Three and Four.

The crews of Numbers One and Two stuck to their guns, as tanks from three directions roared down upon them. Neither flesh and blood nor guns could survive in such a rain of steel. A last shot from Number One knocked out a medium tank just 75 yards to the front.

Then there was sudden silence.

Two men of the crews who were still on their feet after the guns had been wrecked attempted to flee in the direction of the retreating antitank gun on the right



flank. They were cut down by a burst of machine-gun fire before they could reach the edge of the camel hump.

German losses in this fight are unknown, as all the English in position to observe were either killed or are prisoners. After the battle almost all evidence of effect of British fire was cleaned up by the exceedingly efficient German recovery system. Footprints, oil spots, and a bogey wheel from a medium tank lying in front of Number One gun bore mute testimony, not only to the courage of the gun crew, but also to the stamina of attacking tank men ready to drive their attack home to the muzzles of the guns. The British lost almost exactly fifty per cent of the force engaged, that is, two guns, two prime movers, one antitank gun, one officer and eleven men captured, one wounded survivor, and four killed who were buried on the spot. All the captured were wounded. This out of two officers and thirty-four men who were serving the six guns.

If one were to pass a staff school judgment on Major G, it might be said that he only partly accomplished his mission in that he did not render a maximum of direct and effective assistance to the column he was to reinforce. His infantry did arrive, but its two Bofors and two 2-pounders were small comfort to a commander praying for guns, heavy guns and lots of them. But unfortunately battles are not in the habit of developing along the beautifully simple lines of the textbook. Major G suddenly encountered an unexpected menace to the existence of the force of which he was part. And after his fight was finished, those tanks

took no further part in the general action. They spent about two hours in cleaning up the battlefield, then moved slowly north for a few miles, where they re-fueled and re-serviced. Thereafter they turned northwest, away from the flank guard which awaited their advance, and returned to the Axis fortified area in the vicinity of Sidi Suleiman.

Major G's delaying action was also successful in that he covered the withdrawal of his lighter elements. The Germans did not pursue (in this connection it should be noted that there were apparently no armored cars with the German column, an unusual occurrence). The action was costly and in retrospect it is quite apparent that the escape of half the unit was little short of miraculous. In desert terrain where maneuver is impeded, any attempt to shoot it out with a tank force which has appreciable preponderance in numbers over the guns involved is bound to incur great risk of disaster. Largely as a result of this and similar actions, standing orders were issued in the Western Desert Force requiring field guns of 25-pounder and similar types to break off action and withdraw whenever tanks came within 6,000 yards. Under no circumstances were they to allow tanks to approach closer than 4,000 yards unless there was thorough protection from mines or obstacles.

The principal lesson from this fight is, of course, written in every Field Service Regulation in the world: "Don't let 'em inside your guard." Security is the responsibility of every unit commander. Of course you would never be caught short. That's what Major G thought, too.

## ARTILLERY SUPPORT OF TANKS

By Major M. J. Renton, R.A.

(Reprinted from *The Gunner*)

My battery was required to give close support to a tank attack over absolutely flat and very dusty country. I tried every means to get observation and failed so the only way was to get hold of a tank, get into wireless touch with the battery and go myself in the forefront of the attack. So that was decided upon. I got my tank, I got into wireless touch and the attack went off. As I was only observing I hung about where I could see best. Sometimes when the dust was bad I had to roar right through into the very front, sometimes I held off and watched the progress of the attack. I had a lot of fun and games and must have done tremendous damage. Not only did I have the armament of the tank itself at my disposal, but also I had twelve guns on the end of the wireless. I was in one of the very latest and heaviest armoured tanks we have, absolutely impregnable except at point blank range, and then only from certain guns. All was going well until I ran into one of those particular guns that was very cunningly concealed—and then we took it!

But it shows how wonderful our armour is that the *damage* was not worse. Anyway we took three at point blank range. The shells penetrated and burst inside the tank, but with so little force that a shell bursting within six inches of my elbow only smashed my arm and covered me with flesh wounds. Normally it should have blown me into a thousand pieces. We were all wounded about the same amount, but managed to keep our guns going and blew the other fellow to bits. He was

concealed but not armoured. But the three hits had put us out of action and we were on fire. That means abandoning the tank about two miles ahead of our front line, with numerous boche infantry between us and home. The driver was trapped, as his door was badly bent and would not open. I managed to get this chap out and we had a look round. We suddenly saw three of our own tanks about 200 yards from us. That accounted for the fact that the boche had not come up to collect us. We made a dash for it and arrived intact after dodging the odd machine gun burst. Then the really terrible thing happened. We were so blackened, bloody and unrecognisable that our chaps didn't know us. We might so easily have been enemy trying to get a tank to open and then lob a bomb into it. The next hour doesn't bear thinking about! We each climbed on to a tank and hung like limpets while they fought their way back. To leave the tank was a 50% chance of being killed, and a 100% chance of being captured—to stay was an 80% chance of being killed, but no chance of being captured—so we stuck. Bullets hit between my legs, a shell landed between my body and my arm and bounced off. Then one caught me direct on the fingers of my left hand, which was three inches from my head. Then we reached our own lines—and quite time too! On the whole quite a unique experience, but I think one is enough!

Editor's note: Major Renton died August 2, 1941, of the wounds which he received in the action described in the foregoing.

# HELPS FOR EXECUTIVES

By Lieut. Samuel D. Foster, Jr., FA.



ESPITE the fact that the problem of night lighting in the firing battery has always been open for discussion and thought, perfection has not yet been achieved. Here are a few ideas that we have tried in our battery, some good, others better.

Regarding aiming stakes, we have found that a difference in color of aiming stake lights is a great help to the gunners in quick location of their proper stakes, i.e. red lights for first section, green for the second, etc. Automobile tail light lens may be had for this purpose and will fit in the present issue lamps. Colored, transparent paper may also be used. A method that we have found that increases accuracy in laying is to black-out part of the lens on either side of the center of the lens so that there is only a vertical line about 1 inch in width showing, the vertical line being more accurate than the round lens.

First experiments along the line of sight and aiming circle location lights were carried out with flashlights with covered lens, but these were found to be unsatisfactory due to the gunner, or the instrument operator having a light in one hand while trying to lay the piece: besides the inaccuracy of the position of the light when sighted at by another instrument.

We branched away from electric lights altogether and painted the top of the instruments with a luminous paint. This worked fine on a very dark night and at closer distances. But on a "light" night the glow of the paint was difficult to pick out, and at greater distances this material was unsatisfactory.

By chance we came across a flashlight that has worked perfectly. It is of the "pocket-pen" type, except that in the place of a lens in the light end it contains a rod of a plastic that resembles glass. This plastic will carry light in any direction and exude very little through the sides of the rod. However, the light that comes out of the end is very powerful. These lights are used by doctors for throat lights, etc. They may be purchased in any drugstore or hardware store. They may also be had in many shapes and sizes. We used a straight tube about four inches long. It was necessary to black-out the end from which the light came, in order to prevent aerial observation. However, the light

that comes from the sides of the rod is very satisfactory for sighting.

One light tube is clipped to the sight and the other on the aiming circle. This gives the exact location of the instrument, and forms a straight edge for the crosshairs of the instrument to guide on.

Another thought on the sights: A small hooded light may easily be clipped on the sight, thus enabling the gunner the free use of both hands in laying.

During gas attacks while firing, the chiefs and gunners in each section have a great deal of trouble in understanding the executive's commands through the training gas mask, which has no diaphragm. To overcome this difficulty we used a small blackboard, chalking the deflection changes and elevations on it and holding it in a position that could be seen by all sections. In the procedure we had the telephone operator write the data on the slate, thus the recorder could copy the slate data onto his sheet, when ready the operator gives the slate to the executive who holds it up.

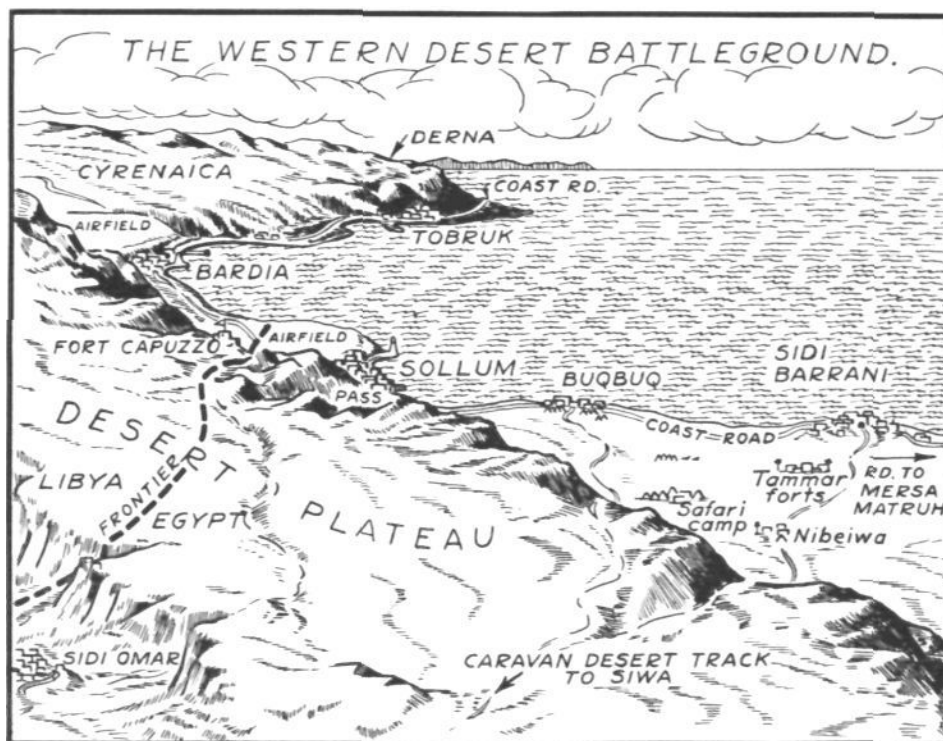
During black-out marches, and in the absence of black-out lights on the guns, we have found that by painting the recoil cover ends under the tubes, the truck driver following the piece could easily spot the piece and avoid collision. For night marches with lights on the highways, reflector buttons attached to the canvas muzzle covers of the pieces are very handy.

During the period of specialized training most elements of the battery lose sight of what the other components are doing and sometimes fail to appreciate their worth. The cannoneers fail to see the use of a lineman, the instrument operator at the OP cares little for the truck driver and so on. One rainy day when it was necessary to carry on training inside, the idea struck us to use tin soldiers and set up a complete battery layout throughout a whole tactical problem.

Each man explained to the rest of the battery just what he did during the problem. Starting from the bivouac area to the rendezvous to the installations and finally march order, little trucks, guns and soldiers maneuvered over the ping-pong table in the battery recreation room. The men later commented on the idea and expressed the thought that they had gained a better knowledge of what went on during a problem, besides being a pleasant diversion from the average rainy day lecture.

# A TACTICIAN'S PARADISE

By Lieut. Col. Riley F. Ennis



*"For Allah created the English mad—the maddest of all mankind."—KIPLING.*

Cairo is Egypt and Egypt is Cairo, and the narrow strip of green running through the desert along the Nile is cultivated by the fellahs to feed the politicians.

The population of the country (14,000,000) has been humorously divided into seven million fellahs, or cultivators, and seven million government officials. The rulers, however, appear to be striving for a more ideal state of affairs wherein there will be one million fellahs and thirteen million officials.

When I arrived in Cairo from Suez it was enshrouded in a "Gyppie" blackout, so I smelled Cairo before I saw it. Street lights were out. Automobiles careened madly about with dim blue lights, and darted around carriages with squawking horns. However, any Gyppie who wanted to enjoy the scents of the streets had no hesitancy about throwing open the windows of a lighted room.

I put up at the Continental-Savoy Hotel on the advice of a young British major. He had rescued me from a ship in the harbor at Suez where I had languished for two days after being at sea for almost eleven weeks. The Continental is a dusty, old barn of a place, haunted by the ghosts of thousands of British and American tourists. My benefactor and I had dinner on the roof garden, which was playing to a full house, with only

slightly subdued lights in utter disregard to the possibility of an air raid.

Tucked into the center of the U formed by the hotel is a large sidewalk cafe raised some four feet above the level of the street. Here on a Saturday afternoon one may watch a fair per cent of the British soldiers in the Middle East parade by:

Dark, tall, handsome, full-bearded Sikhs from India, who for religious reasons never cut their hair. Vain as women, they are immaculate soldiers.

Stalky, little Ghurkas, on whose Oriental heads felt campaign hats rest at precarious angles.

"Auzzies," tough, rough and ready, with a broad sense of humor which their English cousins never quite grasp. Their broad-brimmed felt hats, turned up on one side, are always in the thick of an excitement in Cairo or on the battlefield.

New Zealanders—whose sharp "Montana peaked" campaign hats seem to symbolize the height of their courage in Crete. They and the Tommies are understanding cousins.

The South African—his smart, narrow-brimmed sun helmet, Norfolk belted bush skirt, and his neatness, distinguishes him in the crowd.



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**In this, the third of a most timely series, Colonel Ennis points out some important lessons for any troops which may be called to serve in the desert or similar terrain.**

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The British Tommy reminds one of an old tweed suit—quiet, dependable and amenable—he senses the gravity of the situation in which his nation finds itself. With fine morale, he endures the hardship of campaigning on the Western Desert of Egypt. He, however, does not think much of Egypt, and for that matter has a pretty poor opinion of most of the British Empire that lies beyond the English Channel.

Men of the Royal Tank Regiment (a corps) usually discard their sun helmet for their smart and practical black beret, and swagger by as members of a corps elite.

All wear cotton shorts, short sleeved shirts which are open at the neck, and wool stockings most of the year. Many of the cotton shorts have a four inch cuff held up by two buttons—usually weighted down by cigarettes and trinkets.

In a crowd there is always a goodly sprinkling of the swarthy soldiers of the Egyptian Army. Seniority among the officers appears to be entirely by weight, and the red tarbush, which looks like an overripe tomato, does not add dignity to the high ranking and heavier officers. Although British trained and quite well equipped, the Egyptian Army maintains with aloof dignity a chilly indifference concerning the defense of their country.

Egyptians speak Arabic and the peculiarity about the language is that it is spoken one way, written in another, and used for speeches and addresses in a third form. The trouble is that no one seems to understand anybody else's Arabic.

The Egyptian fly and "Gyppie tummy" are no respectors of persons or dignity. The fly is a vicious little fellow who comes into the world with one set purpose in view—to drive some human being into a lunatic asylum, or to his grave. Many of the British officers and soldiers carry horsehair fly switches and slash at the flies with vicious abandon. "Gyppie tummy," a mild form of dysentery, is an almost universal complaint among new arrivals. It strikes viciously at the pit of one's stomach and leaves one completely exhausted after a week's tussle. It is closely related to Haifa, Jerusalem, Baghdad and all the rest of the tummies of the Middle East, which one must endure in turn: for they apparently are created by a slightly different breed of "bugs." Each person you approach for sympathy has his pet cure. Among the more popular are castor oil, sedatives, and a bath towel wrapped around your stomach at night to prevent its becoming chilled. In Haifa some British officers tried to cure me with Palestinian brandy, and to this day I do not know whether the brandy or the Haifa stomach put me to bed for three days.

Among the other pests of Cairo are the Dragomen who frequent the steps of all the leading hotels and acquire and

appropriate tourists as they arrive. I must have been included in the tourist class for one by the name of Arizona, who spoke perfect English, demanded each time I left the hotel to take me to the Pyramids or the bazaars—where, of course, he would get a handsome rake-off on my purchases.

In spite of the fact I am the world's worst tourist. I was ashamed to leave Egypt without seeing the Pyramids. So, when a shipboard acquaintance. Lt. Myers—the singing Arabic instructor of a preceding installment—offered to take Jug Cornog, Dave Larr, and me on a trip to the "Step Pyramids," I accepted. As a noted British Egyptologist he assured us that they were of the greatest historic significance. Hence we clambered down long tunnels and narrow passages, had history carved in stone read and interpreted for us and dutifully admired ancient blue tile work. Dave Larr maintained a polite, intelligent flow of questions to evince proper interest: while Jug Cornog, as the heat of the day increased, lagged farther and farther to the rear. We were exposed to a most learned, interesting and animated discussion of Egyptology, which, unfortunately due to our scanty background, we did not properly appreciate.

Millions of private and institutional funds have been spent upon "diggings" to uncover the wealth of Egyptian history which lies buried beneath the desert sands. Unfortunately, the "Gyppie" government has taken over the projects and sands again have started to drift in to cover up the remains of a great historic civilization. Lt. Myers half-humorously complained that his efforts had been largely rewarded by uncovering a countless number of sacred bulls.

The grouping of offices in Cairo and the massing of government officials there has left the rest of the country pretty much alone to rule itself. Egypt is a very extensive country which reaches from the Wadi Halfa to the Mediterranean, some 680 miles, and from the Italian Cyrenaica to the Palestine frontier, another 680 miles.

There are three large oases in the Western Desert of Egypt—Siwa, Dakhla, and Baharia. The most famous and the one which has most frequently hit the headlines in recent months is Siwa. It lies 70 feet below sea level and is inhabited by some 5,000 of the dirtiest and most degenerate natives in the world. Recently it has been used by the British as a base for long-range desert patrols. The temple of the Oracle, which Alexander the Great visited, is still standing, although it is in a bad state of repair. The hundreds of miles of desert which surround Siwa are its greatest protection. In the 4th Century B.C. Cambyses' army of 40,000 was engulfed in a sand storm when moving across the desert from Dakhla

on Siwa, and completely disappeared into the blue haze of history.

Between Siwa and Cairo lies the great Qattara Depression. Being considerably below sea level, several projects have been proposed to open a channel for the water of the Mediterranean to flow into the depression to create hydro-electric power. It has been estimated, if the evaporation rate of the water is considered, that an immense hydro-electric plant could be operated for more than 100 years.

The Western Desert of Egypt, and for that matter practically all of Egypt and Cyrenaica, is a most desolate theater of war. At times when the wind is off the great Sahara Desert, the air is filled with dust and sand and feels like the blast from an open furnace. In May I visited some automotive maintenance establishments on the desert between Ismailia and Cairo. The temperature was over 120 degrees and we huddled behind buildings to keep out of the scorching blast of the wind. At four in the afternoon they served scalding tea in the officers' mess. While I politely struggled to down the stuff, and beads of perspiration popped out all over me, the British officers carried on a long discussion about the merits of hot tea on an extremely hot day, while tar dripped from the roof onto the table.

The whole Mediterranean coastline of Egypt west of Alexandria, as far as the Libyan frontier, is now a vast beehive of British military activities. In peacetime, Bigush, Mersa Matruh, Sidi Barrani, Tobruk and the few other coastal towns are placid little places with a cluster of white houses facing on the Mediterranean separated by wide stretches of silent desert. Mersa Matruh had a presentable little resort hotel and is famed for the visit of the Duke of Windsor and Wally.

Cyrenaica, Libya's eastern province, has three terrains; the comparatively green and fertile coastal fringe; the semi-arid, boulder-strewn and gullied plateau which covers most of the peninsula; and the wasteland of the desert which rolls away to the southward.

The so-called "Western Desert Battleground" is a region one hundred and fifty miles square, traversed by the fence along the Egyptian-Libyan border and the Escarpment. This high barbed-wire fence, built to control the movements of the Bedouins, stretches southward mile upon mile across the desert. Gaps in the fence are repeatedly used as important landmarks in military operations. Gaps 42 and 38 will find a prominent place in the history of the present war. The Escarpment, an ancient shoreline of the Mediterranean, skirts the Cyrenaica coast until in its eastward course, it leaves the coastline at Sollum, swings sharply southward until it turns eastward again near Safafi, and then parallels the coastline at from 30 to 75 miles. In Egypt, motor vehicles may move freely up and down the Escarpment except for the stretch between Sollum and Safafi. In this rough and precipitous area there are only the two passes at Halfaya

and Halfway which have become important military objectives.

The Western Desert battleground is not the long, rolling series of sand dunes of Beau Geste, but mostly hard surface, with only blowing sands. It is strewn with broken rocks which are about 8 inches in diameter and have shaken many a good Ford and Chevrolet to an untimely end. General Ravenstein, the captured German general, recently described the Libyan battleground as "a tactician's paradise but a quartermaster's hell."

Ground is of comparatively little value in an area like the Western Desert of Egypt unless it contains either water, administrative installations, or means of communication. Whether a unit is pushed back twenty miles or is advanced twenty miles does not matter as long as there is space for maneuver. This is in complete contrast to the highly developed European battlegrounds where every yard of ground is of value, either economically, politically, or from a military standpoint.

There is water at Sidi Barrani, Mersa Matruh, Bug-Bug, Sollum, and in the few other towns and oases. So, in the towns and around the passes are found the islands of defense in a sea of sand. Water is the ever-present problem. A little white two-gallon water tin can be seen on every abandoned camp site and in every vehicle. The ration is normally one gallon of water per man per day for all purposes, and at one time during the campaign of the past winter, this ration was cut to one-half gallon. Water is carefully blended to obtain the highest possible potable saline content. Those who have lime juice mix it with the water to make it more palatable. A can of fresh water from Cairo is guarded as carefully as two gallons of whiskey. When we had to put Cairo water in "Droopy Drawers" to keep her rolling after one of her frequent radiator blow-ups, Dave Larr and I cursed, while Stanfield mournfully watched the proceedings.

"Droopy Drawers" was a Ford station wagon with weak springs in her after extremities. She was the grave concern of "Dickie" Creagh, the armored division commander, and of every maintenance establishment we encountered.

Stanfield was a second line replacement from a Royal Tank Battalion. His black Royal Tank Regiment beret proved to be of inestimable value as a badge of identification when we were about to be captured by British troops in our wanderings on the battlefield.

On a memorable morning we took delivery of "Droopy Drawers" in front of the Legation in Cairo and made ready to start westward into the desert. She was well-equipped with gin poles to lift her out of the sand, and with pans, tents, fancy tools, and what not. In a prominent place above the windshield was a salvaged altimeter, which, of course, was of little value for we never had over a hundred foot change in elevation. With large desert tires and the speedometer in kilometers, there was a double correction to make for mileage in our desert

navigation, and we never quite figured it out. With all of the desert equipment Droopy Drawers carried, a good tire wrench and a jack were lacking.

After taking delivery, we put Stanfield at the wheel and directed him to drive us to our hotel. Within a couple blocks he took a step off a carriage, clipped a grey horse, and gently brushed, I believe, a "Gyppie" off a street car. So Dave Larr took command and rarely thereafter trusted Stanfield or myself to drive our valued steed.

With Droopy Drawers' radiator boiling, rear springs sagging, and rear fenders bumping the tires with resounding smacks, we turned off the Cairo-Alexandria road and headed westward on the coastal route toward the western desert. Stanfield, who had never been out of Cairo, was our wise and faithful counselor and I am sure did not give a damn whether he ever saw the desert or not.

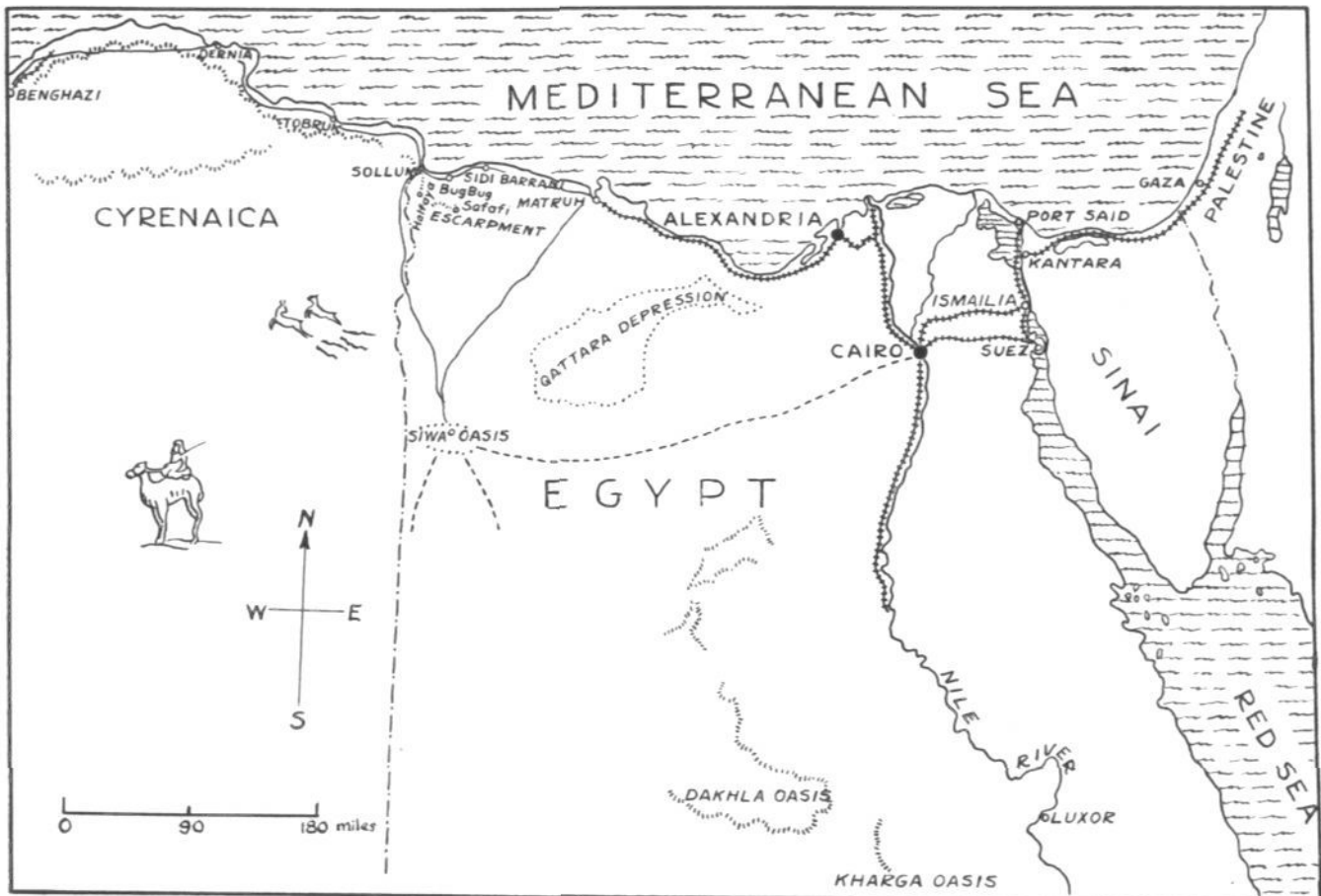
The road as far as Sidi Barrani is a macadam road in various stages of disintegration. The first night we reached Bigush, where we enjoyed the luxury of an officers' mess and a night in a tent with its floor cut four feet below the surface of the ground for antiaircraft protection.

On the next day a British officer was to meet us in Mersa Matruh, which had been repeatedly and quite thoroughly bombed, to guide us across the desert to an armored division. After waiting two hours for him (his car broke down on the edge of town) we proceeded alone.

Our first lesson in desert navigation was a simple one for we moved westward between the Mediterranean and the Escarpment. Practically all movements on the desert are by compass bearing; large mounds of dirt are, in most cases, used as points on which bearings are made. Nearly all British trucks are equipped with sun compasses which are a bit too complicated for the average soldier, who prefers to depend on a magnetic compass, his organization's navigator, or by guess and by damn—by which he may reach a dry eternity.

With Droopy Drawers shaking violently and with clouds of dust rising through the floor boards, we timidly headed westward over the rocky desert. We passed truck columns moving like great convoys on the ocean with clouds of dust rising high behind each vehicle and with antiaircraft sentries standing alert on front seats or sitting on top of truck covers. Before dark we reached the rear headquarters of the armored division, where after dinner, we pushed the stones aside and bedded down for the night. The desert nights, cool and clear, make up for a lot of the dust and rocks.

There is an artistic routine about a morning toilet in a half of mug of water—first one cleans his teeth, then shaves, and with the few remaining drops of water, after the lather has been skimmed off the top, rubs off a layer or two of dust with a wash cloth.



Major General Michael O'Moore Creagh, MC—Dickie to everyone out of earshot and many within earshot—was the dapper and beloved little commander of the armored division we visited. He permitted us to wander freely between the leaguers in which his outfits were camped. Many were separated by from 20 to 30 miles of desert. Vehicles in the leaguers were from 150 to 200 yards apart and beside each vehicle were the slit trenches which the men had dug for anti-aircraft protection. On the desert, anti-aircraft protection is largely gained through dispersion and not cover. There is little need to camouflage vehicles, for the dust does an excellent job.

In armored and motorized units cooking is done *by vehicle*. The wide dispersion of vehicles on the battlefield, the need for making them self-sustaining and to prevent the men from gathering in groups, makes vehicle cooking a necessity. Some crews have little gasoline stoves, others fashion stoves out of gasoline tins and burn scraps of wood; and in some parts a popular fuel is a paste made of mud, sand, gasoline and water. The desert ration is primarily bully beef, hard or fresh bread, a few vegetables now and then, and tea. Tea of course is by far the most important item. Units on the march invariably halt at noon and in the late afternoon to brew their tea.

Stanfield was to be the cook, but he had too many things to learn about becoming a soldier; so, in time, I became the cook and Dave Larr the driver, while Stanfield with his six-shooter attended largely to soldier business. Stanfield, the proprietor of a bicycle shop in a small town in England, was most provincial and one of the most courteous and upstanding youngsters I have ever encountered.

One afternoon "Jock Campbell," commanding the Support Group of the armored division, took us up to his reconnaissance screen. The three vehicles of our group formed a flying wedge. Brigadier Campbell, standing in his fifteen hundred weight truck, led the way. With her radiator ready to pop, we struggled to keep "Droopy Drawers" in her position some 300 yards to the right rear. One of the squadron commanders we visited was seated beside his Rolls Royce armored car in a comfortable canvas chair under a huge, brightly colored beach umbrella. With a folding table and a bottle of beer in front of him, he was the most comfortable man I saw on the desert, despite the fact that his outfit was in contact with the enemy on the eve of battle.

On the way back to the Support Group command post we took a look at a German light armored car which had been captured that morning. The best feature of the vehicle was its 20-mm. gun, mounted to fire both as an anti-aircraft and as a ground weapon. It had a pedestal mount with a bicycle seat fastened to either side for the gunner and assistant gunner. The German crew was dressed in cotton shorts and wore "ski caps." One claimed to be quite a famous German movie actor. In

spite of the numerous orders and instructions concerning the questioning of prisoners, every officer who could speak a little broken German was interrogating the prisoners, who talked freely and gave much accurate information.

There is a spartan-like simplicity about life in a desert leaguer. There are no movies. For amusement there are only a few well thumbed copies of old English newspapers, worn Penguin-series paper-back books, and "darts." Men must stay close to their vehicles to guard against surprise and keep well scattered for anti-aircraft protection. Rarely can they buy anything from the NAAFI, the great centralized canteen system which had pretty well collapsed.

There is perpetual dead silence in the desert.

Thousands of pieces of Italian equipment are scattered about—remnants of the unhappy occupation of Western Egypt by the Italians. The loosely piled stone walls of the old Italian desert posts are filled with dozens of destroyed or burned motor vehicles. The Italians had many pieces of fine equipment. Among the best was a large, heavy-duty Fiat cab-over-engine truck — powered by a Fiat diesel engine, one of the best in the world. Many, salvaged by the British, are greatly prized as heavy-duty maintenance trucks among armored units.

Italian soldiers were afraid of the desert, and during the campaign of last winter, huddled together in stone forts and in the coastal towns while the British defeated them with ridiculously inferior numbers and frequently inferior equipment. In the startling conquest of Cyrenaica, Wavell proved himself the best general the British have produced in this war. And I believe that history, after it reviews the scanty means which Wavell had at his disposal while in command in the Middle East, will place his name among the greatest of British generals.

"Guinea-a-Word Wavell," a great student of war, has written several excellent books. The methods he used in conducting maneuvers in England before the war shook the conservative British Army to its very foundation. He knows how to use speed in warfare. He expresses its advantages as "speed is armor" and its disadvantages "speed is an expensive commodity: in battleships, motorcars, race horses, and women, a comparatively small increase of speed may double the price of the article."

Desert warfare is a war of space—the purest form of mobility wherein the greatest problem is getting to and destroying the hostile tank formations. The mere occupancy of a stretch of desert is of no more importance than the freedom to steam to and fro over a stretch of open water. As in naval warfare, tank units engage one another at long range. And again as in naval warfare, tanks with the longest ranged, hardest shooting guns endeavor to destroy the opponents' armored vehicles at a safe distance. Tank units often maneuver in naval formations.

Many are too prone to pass lightly over desert warfare

and dismiss it as a highly specialized type of operation. Whereas, it might well be seriously considered as the pure form of mobile warfare of the future which may be approached in other sections of the world as the speed, cross-country mobility, fire-power and technique for the employment of armored units are improved or increased.

At this time, because of Allied intelligence considerations, one can only attempt to point out trends in the development of the employment of armored armies, based on the operations of General Rommel's army in North Africa.

Administrative establishments and lines of communication must, in armored warfare, be strongly defended by islands of defense. These areas must be characterized by depth of defensive organizations and be honeycombed with smaller defensive islands. Foremost consideration must be given to their antitank defense. At night, antitank units must sally forth, surround hostile tank units in leaguers, and at daylight destroy them. Long-range antitank weapons, like the German 88-mm. AA guns, must destroy tanks at a distance as they approach. The light antitank guns such as the 37-mm., are the "hand to hand" weapons that must depend for success on surprise fire at close range. Too many hits are required to immobilize a tank with these light guns; hence the trend is toward the heavier gun which will do a "bang up" job when its projectile hits a tank. The islands of defense within the position must hold, at all costs during the armored attack, to meet the oncoming infantry; and engage hostile tanks as they approach and after they pass the position. The mobile counter-attacking force, the tanks, may be required to eject hostile tanks from the position. The Axis defense of the pass at Halfaya, which was held during the British attack of 15 to 18 of June and which held so well during more recent actions, may be taken as a small-scale example of this organization for the defense.

The mobile striking force built around armored units must be protected by the armored reconnaissance screen. The German "eight wheeler" is a popular type of reconnaissance vehicle, for it has great speed and a gun which can knock out the reconnaissance vehicles of the opponent. At the same time—and this is very important—it provides complete armored overhead protection from air attack.

The reconnaissance screen should be backed up by highly mobile antitank units which may be thrown across the path of hostile tank units passing through the reconnaissance screen. Or they may, when located in the forward areas, surround armored units in bivouac, particularly at night, and destroy them. Often it may be desirable to combine the reconnaissance units and the antitank units under one commander and allocate him air units for air support. Where practicable such a commander should have tank units as a mobile reserve, equipped primarily for tank versus tank action.

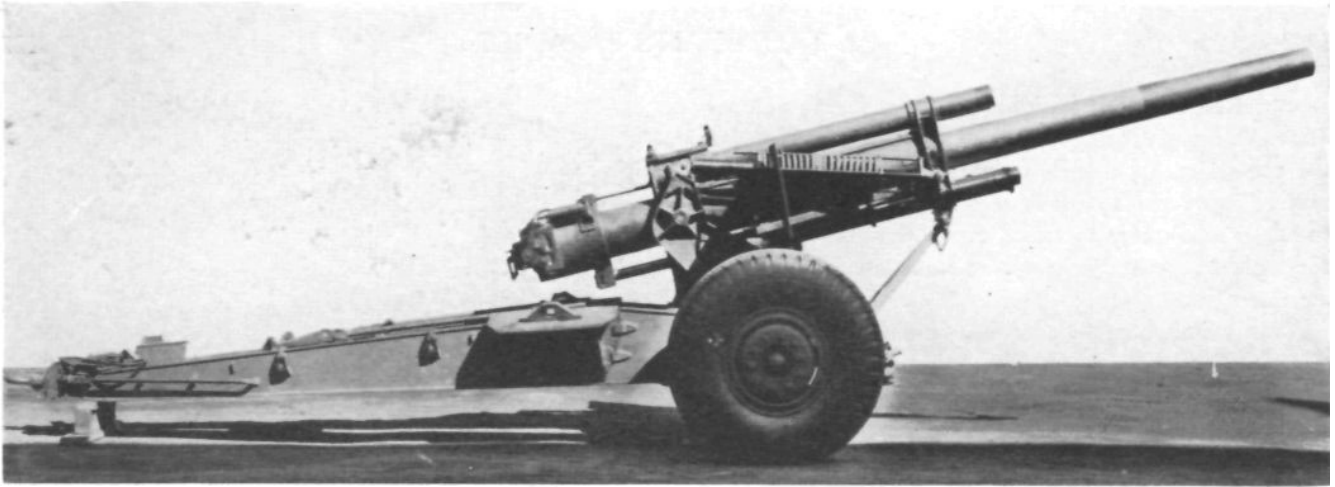


*An unprotected field piece is cold meat for the tanks. Here is an Italian howitzer with one of the crew lying dead beside the abandoned piece. Note the German type magnesium wheels and the puncture-proof tires; the latter are a necessity in the desert. (Acme photo.)*

The armored striking force moves forth from its harbor which must be covered by motorized infantry divisions strong in antitank guns. Its advance is screened by the reconnaissance and antitank units until a favorable opportunity develops for it to strike. Antitank units acting in such a role must be prepared to aid in the destruction of hostile antitank guns and should be so equipped. The motorized infantry division rapidly follows armored units and mops up islands of defense. To enable the armored units to rapidly advance, air units must be prepared and highly trained to perform close support missions, particularly those requiring prompt neutralization of hostile antitank guns and artillery holding up the attack.

After some three or four days of action, armored units must withdraw to refit and reorganize. During this phase the harbor of the armored units must be covered by a motorized infantry division strong in antitank guns. General Rommel recently reorganized and put his armored divisions back into action after 6 days—a remarkably short time; for they had completed four or five days of hard and bitter fighting before they were withdrawn. In armored units the battlefield recovery of vehicles and their rapid repair and return to action cannot be over-emphasized. If it is effective one tank may be able to do the work of two or more and few tanks will fall into the hands of the enemy if the battlefield is lost. There is every indication that General Rommel, through rapid recovery and repair of vehicles, was able to maintain a satisfactory balance of power between his and the British tank units for a long time.

General Rommel's army was defeated recently because British armored units sought out and destroyed his tank units and at the same time made skillful use of the combined arms.



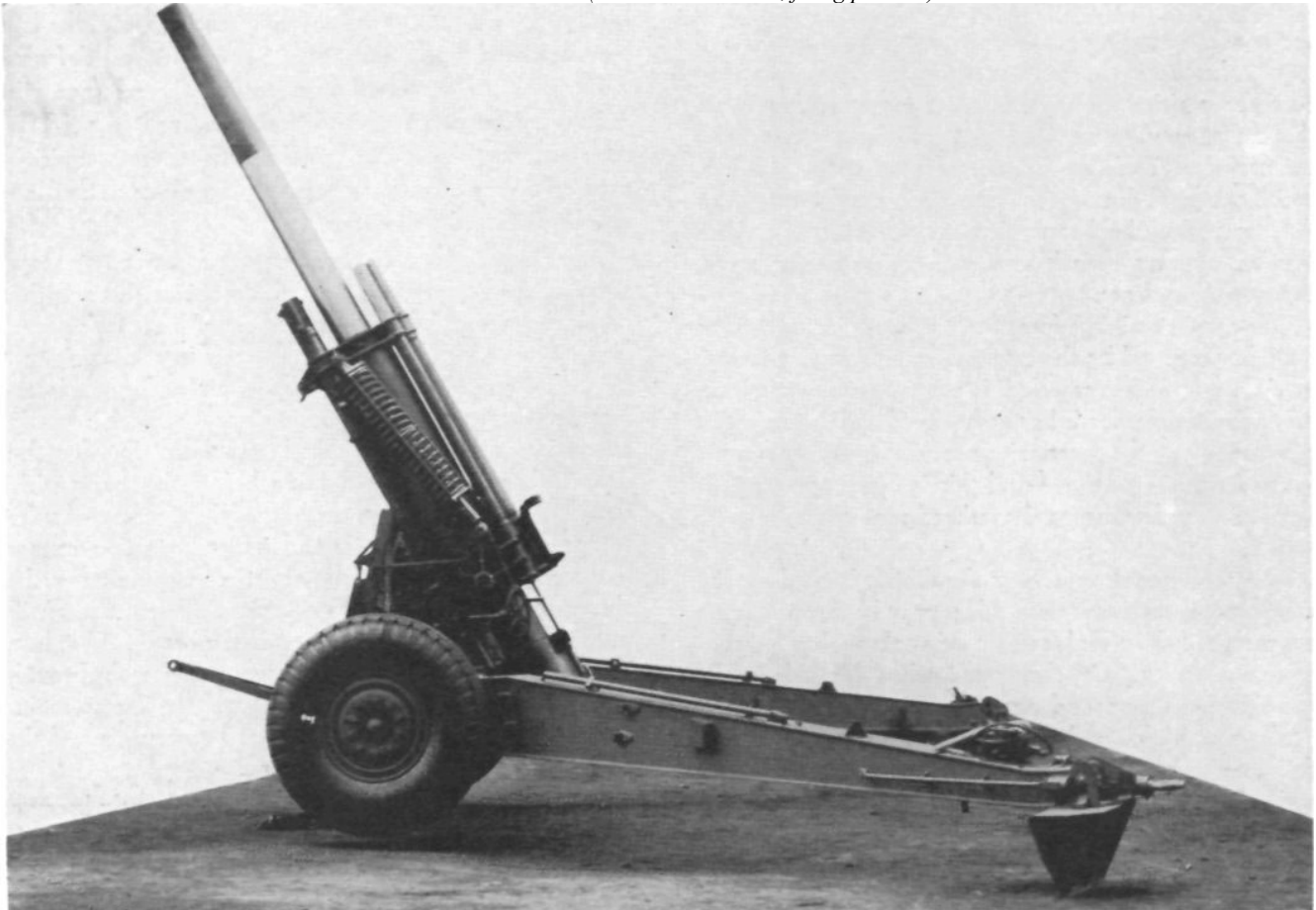
*The 4.5-inch M1 Gun (travel position)*

## **NEW FIELD ARTILLERY WEAPONS**

Two new Field Artillery weapons, a 4.5-inch gun and an improved 155-millimeter howitzer, have been standardized after extensive tests of pilot models at Aberdeen Proving Ground, the War Department has announced.

The 155-millimeter howitzer is a modern weapon which eventually will replace the French-type (Schneider) 155-mm. howitzer now in use. The new weapon is believed to be superior to any type howitzer of this caliber

*The 4.5-inch M1 Gun (maximum elevation, firing position)*







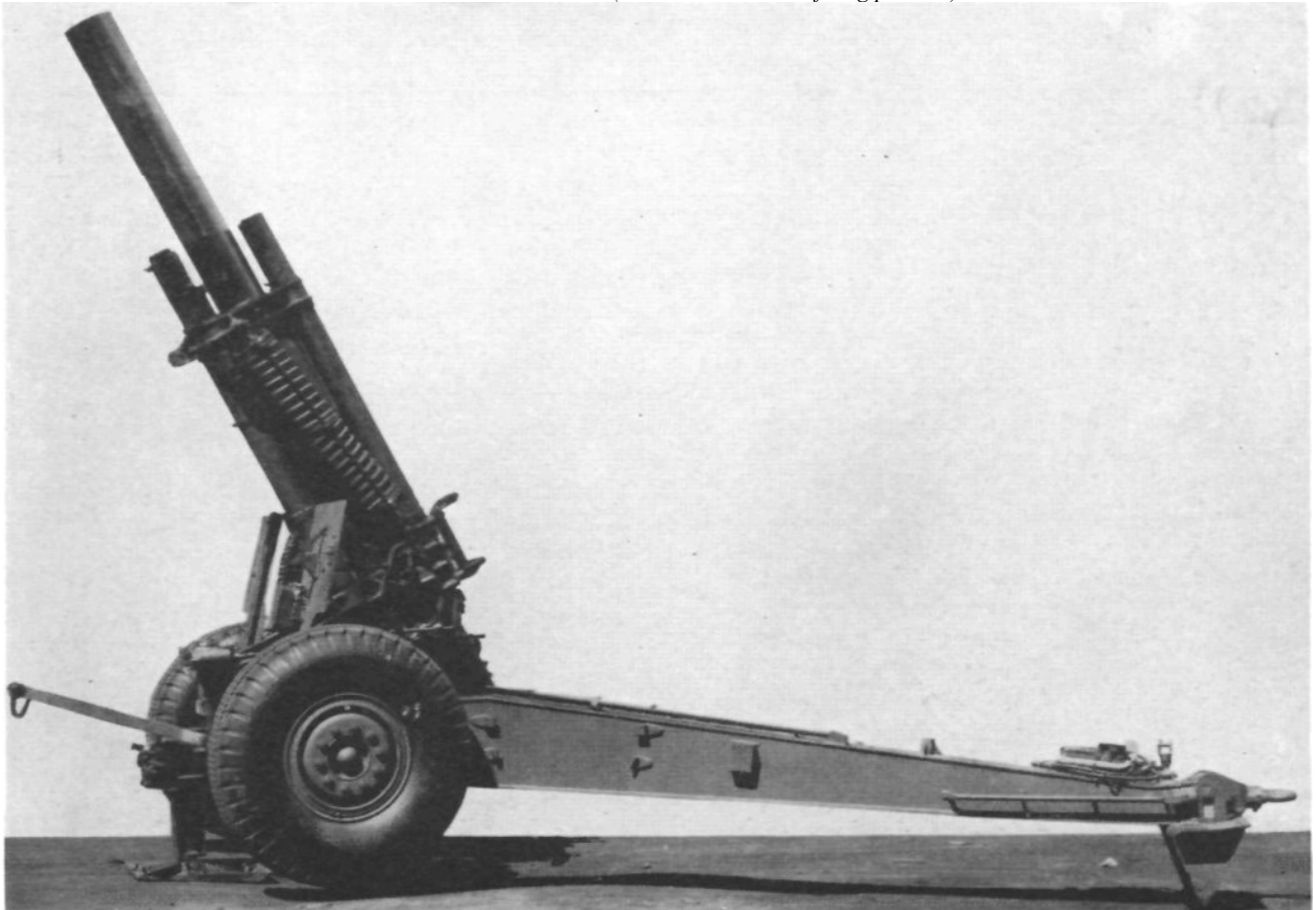
*The 155-mm. M1 Howitzer (travel position)*

now used in the present war. Howitzers of this caliber manufactured during the last war are still being modernized by private industry to make them suitable for movement at high speed; these will continue as substitute standard until the new howitzer is produced in quantity.

The 4.5-inch gun is a powerful, long-range cannon suitable for corps artillery as well as antitank missions.

The new howitzer and gun are interchangeably mounted on the same type of carriage.

*The 155-mm. M1 Howitzer (maximum elevation, firing position)*



# WAR in the BALKANS

By Col. Conrad H. Lanza, FA.

## The German Campaign in Yugoslavia and Greece

### EDITOR'S FOREWORD

Early in 1941 the Yugoslavian government of Prince Paul signed a pact with the Axis which immediately was repudiated by the Serbs. On 27 March a military coup d'etat overthrew the government and established Gen. Simovich in power. Since this step seemed certain to bring on war with Germany, plans and preparations therefor were immediately begun. These contemplated a swift thrust into Albania, aided by the Greeks and (it was hoped) the British, to knock Italy out of the war. The eastern frontier was to be held against German assaults. The British landed a force of two divisions and one armored brigade in Greece and were deploying along the Vardar; a British mission was in Ankara seeking Turkish cooperation or active aid; and the Yugoslavs themselves

had mobilized some 22 divisions of which 5 were to attack Albania. It was estimated that the Germans could not reorient their forces or alter their plans quickly enough to strike Yugoslavia prior to the middle of May. On April 5, however, it appeared that a German attack was imminent.

Col Lanza now continues the narrative:

According to Hitler's own report of 4 May, 1941, he and his headquarters were stunned by the news, on 27 March, that a handful of conspirators at Belgrade had overthrown the government, and were obviously determined to go to war with Germany. As the British Prime Minister had thereupon declared to the House of Commons that at last he had something good to report, and press messages had stated that the United States



was congratulating the new Belgrade government, he (Hitler) realized that the democracies were back of what had happened. He had no intention to allow them the time needed to follow their messages of joy with troops and materiel. He would act first.

Hitler at once gave orders to attack Yugoslavia. He claims that he had no plan ready, and that one had to be drawn. A new distribution of troops in and around the Balkans was necessary; new airfields were required; supplies had to be rechecked for the altered situation. He felt, however, that he could count on the aid of Bulgaria and Hungary. Naturally he counted on Italy. He directed Field Marshal Keitel, his chief of staff, to do whatever was necessary to carry out his order for an offensive to be launched at such an early date.

On the same day, Field Marshal von List, commanding the Twelfth Army in Bulgaria, was instructed to attack according to the following plan:

- (1) On 6 April
  - (a) A corps of 1 Panzer and 2 mountain divisions was to move south from Bulgaria towards the Aegean Sea, with main effort on its right. It had also to watch Turkey. Should Turkey intervene, about 10 Bulgarian divisions were available.
  - (b) A corps of 2 Panzer and 1 motorized divisions, under General von Stuemme, was to advance from Bulgaria, west on Prilep, and as quickly as possible establish connection with the Italians in Albania. It was then to march south into Greece. It was to protect the left of item (2) by separating the enemy forces at Prilep, and south thereof, from the enemy to the north.
- (2) On or about 8 April
 

A corps of 2 Panzer and 1 motorized divisions, under General von Kleist, was to attack from Bulgaria west towards Nis. It was estimated that there were about 6 hostile divisions in the vicinity of Nis, of which some would probably be absent, detached to attack Albania. What remained would be concerned primarily with maintaining contact towards the south in order to ensure liaison with the Greeks and British. Consequently the main German effort would be against their left, where opposition might be slight, thence down the Morava valley straight on to Belgrade.
- (3) On 10 April
 

A German force from the vicinity of Timisoara, Rumania, was to attack west towards Belgrade, to assist item (2), which would be moving up from the south.
- (4) On 11 April
  - (a) A Hungarian force would advance south from their country, east of the Danube, and including the Tisa valley.
  - (b) The German Second Army, under General von Weichs, would move south from former Austria into Croatia, and on into Bosnia, keeping west of the Drina.
  - (c) The Italian Second Army, of 3 armored and 3 motorized divisions, under General Ambrosio would advance from northeast Italy, and thence south, generally parallel to the Adriatic.
- (5) On 13 April
 

An Italian force at Zara, an Italian garrisoned town, was to advance east and assist the advance of item (4) (c).
- (6) The Italian Ninth and Eleventh Armies in Albania, already in close contact with the main Greek army, would by timely attacks prevent them from sending forces elsewhere, and hold them until German forces—item (1) (b)—advancing south had turned their right, and cut their line of communications leading through Geneva and Kalabaka to Athens.
- (7) An Italian corps of 3 divisions in North Albania would initially hold the enemy. About 11 April, pass to the offensive by an advance north into Yugoslavia.

The first German troop movements commenced the night of 27-28 March. The troops, who were without advance information of the plan, had to make a complete

set of reconnaissances. To prevent detection by the enemy, these were made by a few small parties, and largely under cover of darkness. The troops moved only at night, and were carefully camouflaged during the day. Special precautions had to be taken north of the Rodopi Mountains, for here the crest was in Greek territory. Greek OPs could see far into Bulgaria, yet they discovered nothing.

The "impassable roads" over the mountains were sufficiently improved by German labor parties as to make them practicable for motor vehicles for at least the initial trip across.

#### 6 APRIL

At 5:30 AM, 6 April, General von Stuemme's German corps advanced in two columns west from Bulgaria over mountain passes. Yugoslavia had considered these passes as impracticable for large forces. Consequently they were only lightly guarded.

The north German column (2 Panzer divisions) marched via the Stracin pass towards Kumanovo. Shortly after passing the frontier the advance met the Yugoslavia guard, consisting of a battalion of infantry and 4 batteries. The pass was narrow, and the Germans were halted. They could not themselves deploy more than one battalion, for lack of space. The German artillery was brought up. As its value had been foreseen, it was near the head of the column. 105-mm. and 150-mm. howitzers placed a heavy concentration of fire on the Yugoslav battalion. The burst of the shells in the restricted and crooked defile appears to have had considerable moral effect. German infantry took to the hills and turned the flanks of the Yugoslav defenders, while the Panzer artillery pounded their front. After a four hour engagement the pass was won. Over 600 prisoners, and all 4 batteries, with teams, were captured. By evening the Germans had made a total advance of about 25 kilometers, over execrable roads.

The south German column (the motorized division) advanced towards Veles, via the pass through Carevo Selo. In this town they found a small guard. The main point of resistance was a hill to the southwest. Here also, the German artillery forced the Yugoslavians to give away. By 10:30 AM the town was in German possession. By night the Germans were in the vicinity of Kocane.

Notwithstanding these two German successes, the main Yugoslav forces in the Vardar valley were not alarmed. They were convinced that only minor hostile forces could cross the mountains. Besides, they had troubles of their own.

The German Air Force had assisted its ground troops. It also heavily bombed the Vardar valley, paying particular attention to Pristina, Kumanovo, Skoplje, and to CPs and lines of communication. At Skoplje the bombing was most accurate. All lights, power and phones were out. The radio station was blown up. The corps CP was

hit, and moved out in such a hurry that it failed to give any orders to send forces to guard the passes over which the Germans were coming. A division CP which was here also, continued to operate. Its personnel were so excited that they too overlooked doing anything about the passes. Consequently no troops were sent out to help the defeated outposts. The casualties in town were about 30 killed and about 100 wounded.

Along the south boundary of Bulgaria, other German troops attacked at dawn through all passes. Strong

and had to lie down in the snow until night enabled them to withdraw. There were no serious losses to either side, and the Greek works of the Metaxas Line sustained no damage of importance.

East of the Nestos River, where passes were defended by single strong points, German troops by-passed these, and advanced down into East Macedonia via Rupel Pass, Nevrokop, and Komotine, leaving the strong points in their rear.

Farther north, a German detachment from the Timisoara



*German armored division advances near Mt. Olympus*

resistance was met at the Struma valley pass. It was a cold foggy morning. There was snow on the ground. As it was known that the pass was strongly fortified, and as in general the location of the bunkers and casements were known, the attack started with an artillery preparation fired by 150-mm. and 210-mm. howitzers. Then Stuka dive bombers attacked the targets, which were permanent steel and concrete structures. Under cover of all this, the attacking force, consisting of one battalion which was the largest force that could be used in the limited space available, moved forward. On account of smoke and fog, the advance got by the forward works, but the attack failed. The troops in front were unable to move in any direction,

force was at Orsova, where the Danube River flows through a narrow defile known as the Iron Gate. At 6:00 AM it attacked and captured the Iron Gate.

On this day the German ground troops used but small forces. Blitzkrieg does not necessarily require a general attack on a fan-like front. Instead, small selected, well-equipped detachments may attack just the key points. This is what happened. As far as now known, not more than about a battalion of infantry, with supporting troops, were in action at the same time at any one point.

The main effort of the Luftwaffe was against the Yugoslav Air Force, estimated as having about 500 first class and about 400 second class planes. Airdromes were

attacked, and numerous planes destroyed on the ground. Others were destroyed in the air.

The German Air Force repeatedly swept over Belgrade, savagely bombing that city. This nearly continuous action interfered with the conduct of government business. Both the Cabinet and GHQ left for the provisional capital. This change of station appears to have paralyzed GHQ.

The Italian Air Force attacked across the Adriatic. Ports along the Dalmatian coast were tremendously bombed; while airdromes in Herzegovina, including Mostar, were violently attacked.

Greece was not overlooked in the air attack. The harbor of Piraeus was heavily bombed; here the destruction of a British munitions ship caused enormous damage. This major disaster put Piraeus out of commission as a port and base for this war.

#### 7 APRIL

Germans east of the Nestos River occupied without opposition all of East Macedonia. The strong points in the passes in their rear held out. Fort Territori in Nevrokop Pass was attacked and captured, but the Greeks counterattacked and reoccupied it.

In the Struma valley, the Germans had during the night withdrawn their advanced troops. They made no further attempt to advance from the front, but by flanking action the Germans had, by nightfall, taken several defenses. The pass was crumbling.

During the morning the German Air Force accurately bombed Skoplje and Veles.

The German forces who had started across the mountains for Skoplje and Veles worked all night getting their equipment across the mountains.

The 9th Panzer Division met only slight opposition. Their real difficulty was the road. It took time to move the motor vehicles over it, but late in the day they were close to Skoplje. The Yugoslavs did not notice this approach. They had destroyed no bridges.

It was about 5:00 PM. Many Yugoslav soldiers were asleep in barracks. A considerable number were standing by laying out issues of clothing and arms for reservists who were expected to arrive that evening. Others were waiting for supper. It was getting dark, and there was no information as to the enemy being in the vicinity.

Suddenly a terrific attack of Stuka dive bombers disrupted the peaceful scene. At the same time the mechanized artillery of the Panzer division opened a heavy concentrated fire on the town. This combined attack was closely followed by tanks breaking from several directions. Yugoslav soldiers found running around seeking their arms were shot down. In a few minutes it was all over. Men who had not left their barracks surrendered in mass. Some fled, others gave themselves up.

The Yugoslav division at Veles did send out troops to meet the Germans reported the evening before as being at

Kocane. They failed to realize that the Germans were in great force. The Yugoslavs arrived one after the other, and were successively defeated in a series of short engagements. This Yugoslav division (Ibarska) was motorized, but it seems to have left its vehicles at Veles, on account of the assumed impassable roads to the east. The troops sent out failed to get word back that the enemy was coming, and left all bridges intact.

Also around 5:00 PM, German troops attacked Veles. There was little resistance. The majority of Yugoslavs surrendered. The fear of Yugoslav GHQ that the divisions which they had sent south were unreliable, appears to have been a correct statement of the facts. They were quite unintentionally at the critical point, as the intent had been to remove them to an area where a German attack was improbable.

The only other land operation reported this day was a Greek raid in Albania, which they state netted them 500 prisoners.

The German Air Force was again very active. Its major effort was directed at keeping Belgrade under fire, and disrupting communication and supply services. Enemy airdromes were heavily attacked. Harbors in Greece were visited, and mines dropped at their entrances.

The Yugoslav Air Force, completely disorganized, showed lack of leadership. Many airfields were unusable. The planes that took to the air followed no special plan. Some crossed into Germany on the north, and dropped bombs. Others flew into Bulgaria, still others into Albania. They failed to give information of value to the ground troops, and caused no particular damage to the enemy.

The British Air Force flew from Greece very early in the morning and bombed around Sofia, in Bulgaria, with emphasis on rail communications. They assumed that this point was the German base. As far as can now be determined, the railroads in Bulgaria were not much used by the Germans; motor transportation was depended upon for supply purposes. And they were not using supply trains.

Before nightfall, the British Expeditionary Force in Greece knew of the German arrival in the Vardar valley to their north, in prolongation of their left flank near Edessa. They felt disturbed as to the possibility of their line being turned. They were prepared to fight towards the east, but had not foreseen, and were not deployed suitably for an attack from the north.

As a precaution, a reconnaissance detachment, consisting of a machine gun battalion and a battalion of medium artillery, was detailed to proceed immediately to south of Phlorina to watch the pass leading to Bitolj and secure information regarding the enemy. Battle positions were assumed on the Edessa-Katerine line.

#### 8 APRIL

The German attack in the Struma valley continued all day. The battalion engaged was able to get around more



*German medium artillery (15 cm. howitzers) fording a Balkan river (Dever from Black Star)*

permanent works, and attack some of them from the rear and others from dead angles. By 7:00 PM the last defense was taken, and the way south was open.

The Germans in east Macedonia closed up to the Nestos River, but made no attempt to cross. In their rear, the passes were blocked by the Greek strong points which were holding.

The German corps of General von Stuemme in the morning found itself holding Skoplje and Veles, with the enemy in between, and his main forces in the mountains to the west. The 9th Panzer Division in the north and the motorized division in the south pushed out westerly. The troops advanced on all available roads and trails, in a fan-like manner, with the mission of,

- a. Establishing contact with the Italians in Albania;
- b. Definitely separating the main Yugoslav armies in the north from the British and Greeks to the south.

The commander of the Yugoslav III Corps, on leaving Skoplje on the preceding day, had gone to Bitolj. Almost as soon as he arrived there he decided that it was impracticable to make a defence. His corps order for the 8th, issued at 1:00 AM, ordered the place evacuated; a general retreat to the south was directed.

The German advance, meeting no serious resistance by evening had secured the line Skoplje-Tetovo-Kicevo-Prilep-Stip, all inclusive. It was estimated that four Yugoslav divisions had been practically destroyed, and that no further opposition in south Yugoslavia was to be expected.

The pass over the mountains from Bulgaria, which had been used by the advance of the motorized division on Veles, had been cleared by this unit early the preceding evening. The 2nd Panzer Division crossed during the night 7/8 April, and in the morning turned south before arriving

in the Vardar valley. Its main column marched west of Lake Doiran; a flank column went east of the lake. No opposition was met until arrival in the vicinity of Kilkis. Here a detachment of the Greek division guarding the Nestos attempted to bar the road. This was an extemporized force, as the main body was spread out along the Nestos, facing towards the east. The Greeks had not expected, and had no plan prepared, against an attack from the north. After a very poor defense, they were scattered in no time. The Panzers kept on to the south.

The British detachment ordered the evening before to the vicinity of Phlorina started during the morning under General Mackay. Its instructions were amended so as to direct it to the pass north of Phlorina. Alarming reports having been received at British GHQ as to German advances, coupled with statements as to no bridges having been demolished, it was decided to send a detachment of engineers to the Vardar valley to demolish critical points as necessary. The detachment was to fall back in time, to in rear of the British lines north from Katerine.

The engineer detachment proceeded by way of Salonika, where they appeared to have executed some demolitions which added to the excitement of the population, who set fire to the town, and destroyed important British and Greek supplies.

During the day, the British became more alarmed about the pass north of Phlorina. Reports of Yugoslav stragglers coming through indicated that the enemy might be close behind. Reinforcements of Australians were sent to General Mackay so that his detachment became a reinforced brigade. It was attached to the 2nd Australian Division.

The British Air Force made its major mission this day, the attacking of the Strumitsa valley, assumed to be



a major enemy supply line. As far as now known, there were no important German movements of any kind this day through this pass. Air raids were made also around Lake Doiran.

The German Air Force bombed an airfield, and attacked Yugoslav planes on the ground and in the air. Greatly superior in numbers they had considerable success, and by end of the day, had nearly driven Yugoslav planes from the skies.

The German Air Force bombed Piraeus in four attacks after dark. The port was already unusable owing to the explosion of the munition ship; the new bombing, although accurate, did not appreciably increase the devastation. Other planes mined harbors along the coast.

In Albania the Italian Ninth Army engaged in local fights with the opposing Greeks, in fulfillment of its mission of holding the enemy.

This day ended the first phase of the German attack—item (1) in their plan. It had accomplished the defeat of the Yugoslav Third Army, of 4 divisions, and had split the Allied armies into two groups—the Greeks and the British in the south; the Yugoslavs, less the Third Army, to the north.

Yugoslav GHQ noted that no attacks had developed to the north nor to the east, except the attack near Orsova. As this had not been followed up, it was now assumed that this was an isolated operation. It was believed that the Germans had not had time to prepare other attacks. The loss of south Yugoslavia was of course deplorable, but it was not irreparable. In view of the apparent lack of danger elsewhere, it might now be possible, after all, to go ahead with the plan to wipe out the Italians in Albania. This seemed to be a reasonably easy operation, and very promising as to results. Preliminary orders were issued.

#### 9 APRIL

The Germans in the Struma valley early resumed their attack on the Metaxas Line. This widened the breach they had accomplished on the preceding day.

The 2nd Panzer Division, just outside of Salonika, marched into that burning city, which capitulated at once, all allied forces having withdrawn the night before. A short time later a detachment from this division arrived at Seres, the CP of the Greek division defending the Nestos River line. A flag of truce was sent forward. The attention of the Greek commander was invited to the fact that he was surrounded. Across the Nestos, a complete German corps was in close contact in front. The Panzer division was in rear. Greek supporting troops at Salonika had abandoned their posts, and retired to west of the Vardar River, destroying the bridges after them. It was suggested that the reasonable thing to do was to surrender.

There had been no interruption of the telephone service. The Greek commander was invited to call Salonika himself, but he had already done so, and was satisfied as to the facts in the case. He felt that the German statements were undoubtedly correct. At 1:00 PM he surrendered all Greek forces, estimated at 15,000 men, east of the Vardar. This ended the fighting in Macedonia, and opened all lines of communications therein to the Germans.

The 9th Panzer Division moved from Skoplje to Veles. The German motorized division moved south from Bitolj. It intercepted a British radio message, apparently directed to General Mackay's detachment near Phlorina, reading, "Enemy on your left flank near Vevi. Retreat immediately." Vevi is southeast of Phlorina. In view of this important information, the German advance, consisting of 1 battalion, pushed boldly forward. As expected they found the British withdrawing, and they then marched into Phlorina. The main British forces made no move; they remained in their lines facing generally east.

Early this day, the German corps of General von Kleist, entered upon item (2) of the German plan by attacking west from north Bulgaria towards Nis. The corps' left was now well protected against envelopment, by the disintegration of the Yugoslav Third Army to the south. From Hitler's speech, this movement should have commenced on 8 April. Assuming that Hitler was not mistaken as to the date, the reason for postponing his movement to the 9th is not yet known.

Von Kleist had a sharp engagement at Caribrod, where a small Yugoslav outpost was encountered. Armored units attacked resolutely from the front, while mountain troops enveloped both flanks. Resistance was quickly overcome, and the advance pushed. At about 11:00 AM German Panzer troops arrived at Nis. The Yugoslavs had been so sure that mechanized troops simply couldn't cross their mountains, that no precautions had been taken. The Germans arrived before news had arrived that they were on the way.

The division in Nis had completed the usual morning drills and instruction, entirely unaware that the enemy was near. The men had fallen out and were in quarters. The cooks had just prepared dinner; mess call was about to be sounded. Suddenly and without any warning, in came the German tanks from all directions, shooting up the town. The Yugoslavs scattered in all directions. The railhead, the artillery, the trains, the depots, all were lost before the Yugoslavs knew what had hit them.

At Nis had been the CP of the Sixth Army. It managed to get a despatch through to Yugoslav GHQ. The news was completely unexpected. They did not know what to do. The only reserves immediately available were one division of the Sixth Army, which had gone off towards Albania on the mission of wiping those Italians off the map. They had not yet started to attack, and were recalled and returned to the disposition of the Sixth Army.

During that afternoon, much more bad news arrived at GHQ. It was reported that

- a. A German force from the Timisoara area had forced the light frontier defense, and was obviously marching on Belgrade.
- b. The German Second Army had advanced south from Germany. Meeting with little opposition it had seized Maribor, including a bridgehead on the south side of the Drava.
- c. A Hungarian force had crossed the frontier east of the Danube and advanced south.
- d. The Italian Second Army had attacked west from Italy and seized Kranj.
- e. Croatia had offered no resistance to the invaders, in some cases welcomed them.

Yugoslav GHQ now saw themselves the center of a circle, with the enemy crashing in from all sides. There was no plan, and no reserves, to meet this totally unforeseen set of circumstances.

In Albania, the Italian Ninth and Eleventh Armies occupied the main Greek force by local attacks, which netted a considerable number of prisoners. From their statements, it was ascertained that the Greek Army was considering a withdrawal to the south.

In Turkey was the British Major General Creagh with his mission to induce the Turks to join the democracies. In view of the situation caused by the early German attack, and its initial astounding successes, there was gloom in Turkish military circles. General Creagh was now advised that Turkey had no intention of getting mixed up in the Balkan mess, and he was requested to confine his activities to advise as to how best to strengthen the Thracian frontier.

#### 10 APRIL

General von Stuemme's corps established contact with the Italians in Albania at Struga. The motorized division attacked, near Krivolac, what was left of the Yugoslav Third Army, equal to about a division. The Yugoslavs, nearly out of supplies, made but a slight resistance. In a short time the Germans had some 8,000 more prisoners. The last organized Yugoslav force in this area now ceased to exist.

The German motorized division continued on towards Phlorina, where they already had a battalion which had arrived the day before. It was found that the British, estimated as about a brigade, were strongly posted along the north slopes of hills about 3,000 feet high to the southeast near Vevi, and astride the main road towards the south. Small lakes in the valley in front formed serious obstacles to a frontal attack. It was decided to wait until next day. V. Kleist's corps from Nis started early towards the northwest. No opposition was met. The Air Force kept the ground troops oriented as to conditions ahead. The German advance reached Cuprija, having made about 55 miles. The principal trouble had been a continuous cold rain and mud. In all, 10,000 prisoners and 70 guns, practically a division, had been taken. Incidentally ample rations, gasoline and oil were found.

The forces from Timisoara continued their advance towards Belgrade. By evening they had reached the

vicinity of the Tisa and Danube Rivers, having met only minor resistance.

The German Second Army, in spite of the bad weather and difficult terrain, pushed south. The leading Panzer division reached Zagreb, the capital of Croatia. There were two Yugoslav divisions stationed near Zagreb, with the mission of defending the Sava River, designated as the main line of resistance. The Fourth Army CP was in Zagreb. Also present was the CP of the North Army Group. They seemed to have received no instructions from their own GHQ, which appears to have been completely paralyzed with a situation which they had never even dreamed of. The Italian Second Army reached Ljubljana, and beyond, and threatened with one or more armored divisions to turn any defense of the Sava River line.

The Yugoslav commanders consulted with each other. They soon decided that they were outnumbered and outmaneuvered, and that resistance afforded no prospects whatever of success. They thereupon surrendered.

The Italian Ninth and Eleventh Armies in Albania engaged the Greek forces. Contrary to expectations, they found no signs of any withdrawal, but were everywhere met with firm resistance.

North of Albania, the Yugoslav Fifth Army made a belated and unsuccessful attempt to carry out the plan to capture all the Italians in Albania.

#### 11 APRIL

The British plan to hold and defend the line Edessa-Veroia-Katerine, had been based on an assumption that the enemy would come from the east, towards which direction the line faced. Now the enemy was in the east, but he was also in the north. Stragglers brought information that the last organized Yugoslav force had disappeared in defeat or surrender. Germans were at Phlorina, opposed only by one extemporized reenforced brigade under General Mackay. It was to be expected that the enemy would attack south from Phlorina. From what had happened in Yugoslavia he must be in great strength. Any success in such an attack would place the enemy in rear of the British left. It would also threaten the line of communications of the Greek army in Albania extending southeast from Corizza to Grevenà.

General Sir Maitland Wilson, commanding the BEF, and General Papagos, C-in-C of the Allies in Greece, decided that it was dangerous to attempt to maintain the present front, and that a new front was necessary. The decision was:

- a. Withdraw the British left to the rear, from Phlorina to Grevenà; the right to remain at Katerine, and the line to pass around north of Mt. Olympus and thence along the Aliakmon River.
- b. With the Greek *right* to the rear, from around Corizza to Grevenà; the line to pass then westerly to Konitsa, and thence to the vicinity of Chimara on the Adriatic where it already was.

Necessary orders to start this maneuver at once were issued.

A corps of two Greek divisions was organized in the area around Kastoria. In support of General Mackay's left, and to maintain liaison with the Greeks in Albania.

Both were mountain divisions, with light mountain artillery only, and no motor transportation nor antitank guns.

The Germans did attack at Phlorina. The Adolf Hitler regiment advanced straight down the road against the pass. Vevi in the plains was occupied. The Germans moved with great caution and did not expose themselves. They soon found out the extent of the position. Orders were issued to turn both flanks. While the infantry was engaged in turning movements, the artillery commenced a violent shelling of the British lines, which was returned in kind. Due to the receipt of orders to withdraw without delay to the new line along the Aliackmon River, the British abandoned the heights before the turning movements were sufficiently advanced to attack. When the Germans arrived, there was no one there.

The Germans thereupon reformed, and followed south. General Mackay had considerable trouble getting away. The German artillery fire had been very accurate, and there had been many casualties. Much materiel had been abandoned; some more had been lost through enemy action. There was a shortage of transportation, and no air support for reconnaissance purposes. Nevertheless progress was made, and the command by night was part way back to its new line.

The British 1st Armored Brigade was started to Grevenà. British troops northwest of Katerine went back to the Aliakmon River. They made no attempt to occupy the north side of Mt. Olympus, as this high mountain, covered with deep snow, was assumed to be impassable. The same assumption was made as to the Aliakmon River, which

flower through a rough, wooded, rocky terrain. Only points of crossings were to be defended; the remainder of the line was to observe only.

The British had supply difficulties. Their main base had been at Piraeus. Due to the explosion of the munition ship, this no longer existed, and the advance base at Volos had to be used. This was now uncomfortably close to the front. Another advance base, and the airfield, at Larissa, had been attacked from the air. Thirteen bombers and three fighters and many supplies were lost, more from incendiary bullets than from bombs. Notwithstanding, the Royal Air Force was constantly in the air, attacking along the road from Phlorina.

General von Kleist's corps continued its advance towards Belgrade. Starting from Suprija, the opponents were first found at Kragujevac. The Panzers smashed down on the Yugoslavians, and ran all over them. In a very short time, all resistance was overcome. The Germans from here marched in two columns, each headed by a Panzer division. The left column followed a road generally parallel to the railroad to Belgrade; the right column marched by the Morava valley road to the Danube, and thence along this river.

By evening both columns were within 35 to 40 miles of Belgrade. Here they found determined opposition from the Yugoslav First Army, whose mission had been to oppose an enemy advance from the north, but was not facing an enemy coming from the south. As it was late, the Germans postponed an attack until next day. They had made about 90 miles since morning, including a fair



*British troops on Greek soil: when mechanized materiel and troops of the British forces arrived on Greek soil they received a very warm welcome from the inhabitants. A mechanized column being surrounded by crowds when passing through a town. (Photo from European)*

size action near Kragujevac, and some minor fights.

The Italian and German Second Armies finished mopping Slovenia, including the territory in and around Ljubljana and Zagreb. The German Panzer division at Zagreb moved southwest and reached Karlovac, where they met strong opposition from a Yugoslav Serb division. The left of the Germans reached Varazdin. The Italians closed in on the Yugoslav flank just north of Karlovac.

The Hungarians completed, practically without opposition, occupation of the territory between the Tiza and the Danube Rivers.

The advance of the northern Axis forces were covered by the Air Fleet of Aviation General Loehr. Planes preceded the troops, advised as to absence or presence of opposition, and bombed and machine gunned opposing forces. The action of this Air Fleet was of prime importance in enabling the ground troops to march rapidly. It avoided loss of time, for what would, in prior times, have required lengthy reconnaissances.

The German troops based on Timisoara reached the Danube. They were unopposed, as the Yugoslav First Army, charged with defense of this area, had been withdrawn to face the unexpected, and unprovided for, advance of the enemy from the south.

On this day, the new independent state of Croatia was proclaimed in Zagreb. The first Premier was Sladko Kvarternik. An appeal was broadcast to all Croats serving in the Yugoslav army, and who for the most part were assigned to divisions serving in the south, to lay down their arms and return to their own land.

#### 12 APRIL

General von Stuemme's corps sent detachments to round up remnants of Yugoslavs left in the mountains to the west. Italian troops in Albania sent troops east with the same mission.

The main effort of von Stuemme was to follow the retreating British who had withdrawn the night before from south of Phlorina. The British rear guard was posted south of the plain of Kozane, barring the advance through a pass to the south. The Adolf Hitler regiment captured a hill in the British advance line. The German corps artillery now placed a strong defensive barrage around the hill, to prevent any counter-attack. With this protection, the infantry pushed out from the hill, attacking and subduing one machine gun nest after another. By 6:00 PM enough progress had been made to enable the south exit of the pass to be seen. The troops observed British motor vehicles loaded with troops withdrawing south.

This German regiment was motorized, and their first idea was to mount and pursue. They started out, armored cars leading. It was soon necessary to stop, for the road was found to be full of mines. The best that could be done was to notify the corps artillery about the moving targets, with request that direct fire be brought on them. It took

some time to clear the road. After dark the advance was resumed, and Sotir was reached.

General von Kleist's corps attacked the Yugoslavs south of Belgrade. This seems to have been the most severe battle of the campaign. The Yugoslavs made a valorous defence, but were unable to compete with tank attacks, which came from flanks and rear as well as from the front. They were forced back 15 miles, and lost heavily in men and equipment. The weather which had been rainy and cold all week turned suddenly to fair and warm, and this facilitated the enemy's attacks. When night came the Yugoslavs still had a line, and the enemy was still 20 miles from Belgrade. But it was evident that the Yugoslavians were in no condition to continue another such battle. Realizing that the end was near, local forces in Belgrade destroyed the three bridges over the Danube and the Sava Rivers, and evacuated that city.

The Timisoara Germans, just across the river, observed the absence of enemy soldiers on the Belgrade side of the river. A patrol sent across the river verified that the city had been evacuated.

Italian and German Armies mopped the territory to the northwest. An Italian force moved out from Fiume and occupied the Yugoslav post at Susak. The garrison at Zara, in compliance with Item (5) of the Axis plan of campaign, advised that the Second Army advancing south from Karlovas had made preparations to move east. The artillery shelled the Yugoslav positions around Zara, and the Air Force bombed them.

#### 13 APRIL

During the night of 12/13 April, Yugoslav resistance south of Belgrade vanished. Von Kleist's Corps marched triumphantly into the city.

In Greece, the 2d Panzer Division, which had taken Salonika, crossed the Vardar (found abandoned), and arrived at the Aliakmon River near the coast. This was supposed to be part of the British defence line. Owing to the unexpectedly early German attack, no defences had been prepared. After a short fight the British fell back to near Katerine, where there was a narrow pass between Mt. Olympus and the sea. Further west a German mountain division reached the Aliakmon near Veroia, which was found defended by the British.

At Sotir was the Adolf Hitler Regiment. The British had identified this force but had not identified the 9th Panzer Division in rear. The British had not completed their withdrawal to their new line. To gain time it was decided to attack Sotir, and drive the Germans back. The British artillery fired preparation while the RAF raided the road north from Sotir. Led by 12 tanks, and preceded by an artillery barrage, British infantry moved to the assault.

The Adolf Hitler Regiment had noted the artillery preparation, and had expected an attack to follow. They only had 1 antitank gun with them. They sent an SOS

call by radio to their artillery. It happened that an antiaircraft battery was just a short distance to the north. It heard the SOS and hastened to a direct fire position on a hill. It had a remarkable success. In a few minutes after the British attack was launched, 8 tanks were in flames and the remaining 4 tanks headed for the rear. Other German batteries had received the SOS call. They were coming rapidly into action, and put down a very heavy fire on the British. It was now the turn of the Germans to attack. The Adolf Hitler Regiment, well supported by strong artillery support, captured the British position with 600 prisoners.

The 9th Panzer Division received orders to proceed south. The advance reached Ptolomais where it was stopped by a demolished bridge and artillery fire. The British were occupying a line on high ground across an irrigation ditch. After losing some time, the Germans found a detour through a swamp, and appeared on the British flank. They were received by artillery and antitank gun fire. This did not stop the German tanks, and British tanks entered the fight. The guns of the British tanks were found to be ineffective against the armor of the Germans. The German guns were better, and two British tanks went up in flames. Seeing this the remaining British tanks withdrew towards a village, protecting their withdrawal by emitting a smoke screen. The German tanks encircled the village. A very hard fight resulted. When night fell, the Germans had been unable to enter. It was now discovered that some of their tanks were out of gasoline; besides the ammunition had been nearly all expended.

After dark the British withdrew, continuing their movement to the Aliakmon River. While they had been

delaying the enemy, their engineers had been demolishing bridges and culverts. The road had been cut in several places, and in the night there was trouble getting back. Motor vehicles had to be abandoned, the personnel proceeding further on foot. It was hard going, as the grades were steep and the stream crossings deep.

During the day the RAF attempted to assist the ground forces by bombing enemy rear areas. On the way home, the main force of 6 bombers was intercepted by superior hostile air forces, and all bombers were lost.



*Victorious German troops parade in Belgrade, April 13, 1941*

In Albania the Italian Ninth Army attacked with main effort towards Konitsa, in order to prevent any early retreat of the Greeks. The Italian Air Force paid particular attention to bombing bridges in the Greek rear. In east Albania there was a further round-up of Yugoslav stragglers.

In north Albania, the Italians successfully attacked two Yugoslav divisions north of Scutari. The Italian advance by night arrived at a point about half way from Scutari to Cetinje.

The Italian Second Army pushed south to the line Senj-Otocac. The only resistance met was at Otocac. The Italian garrison at Zara struck the Yugoslav who had been encircling that city.

The German Second Army was engaged in mopping the country. North of Zagreb, in reconnoitering country not yet occupied,

motorcyclists located a division CP, surprised and captured the Yugoslav commanding general and his division.

The German Air Force was instrumental in locating the scattered Yugoslav forces. It thoroughly reconnoitered this day as far south as Sarajevo.

14 APRIL

Early in the morning, the 2d Panzer Division ran into the British position in the pass east of Mt. Olympus.

The 9th Panzer Division, finding Kocane vacant, advanced to the Aliakmon. The motorized division defeated the Greek corps near Kastoria, which was weak in artillery and deficient in transportation. At the end of the day, this Greek corps appeared to be about ready to dissolve.

The British had now completed their withdrawal to the Aliakmon line. They held only the points of crossing leading south from that river. These were:

- a. On the coast, between Mt. Olympus and the sea, the Pandeimon and Tembi passes, through which the railroad ran.
- b. From a small town, Eliason, west of Mt. Olympus, a trail ran through the Petras pass to Katerine.
- c. From the same Eliason, a fair road extended north to Kocane, through Servia pass.
- d. Near Grevenà the line was close to the river.

All bridges over the Aliakmon had been demolished. Passes had been prepared for defence. The intervening country was so mountainous and wooded, that it was assured to be impracticable for military operations. It was merely observed. Weather was cold, with considerable snow on the ground. The 6th New Zealand Division was on the right; the 2d Australian Division in the center, and the Armored Brigade on the left.

The possibility of holding this line depended largely upon the Greeks extending it to the west beyond Grevenà. The intention had been to withdraw the Greek right from Corizza to Grevenà, there to connect with the British. So far this had not been accomplished. When the British commander heard about the defeat of the Greek corps at Kastoria, he realized that the enemy might come right on around his left, towards his base, which was now at Larissa. He ordered the Australian Division to rush a brigade (4 battalions) to Kalabaka, which was the railhead for the Greeks in Albania, and an important supply depot. It would also cover the British left rear. After nightfall, the British placed artillery barrages constantly along the approaches to their front.

The Greek Army in Albania started its withdrawal. The plan was to have 3 divisions act as a rear guard, while 12 divisions marched back to the new line. That part of the plan which related to the rear guard worked fairly well, but the movement of the main body failed to make much progress. The Italians, observing the retreat, promptly attacked the three rear guard divisions. The Ninth Army entered Konitsa, which was on the line which was to have been held from Grevenà to the Adriatic. The Greek troops which should have been here, had been detoured by the Italians. Blocked roads had prevented the Greeks from arriving in time. They were now cut off.

South of Cetinje, the remnants of the two Yugoslav divisions notwithstanding their punishment of the preceding day, attacked again. This was repulsed, and the Italians attacked in turn, the 131st Centauri Division (mechanized) advancing. This was the division which had sustained such heavy losses on 9 November in the battle of

the Aaos (Viosa) River. It sent the 31st Tank Regiment forward. This attack netted 500 prisoners, plus enemy losses in killed and wounded, and left the battlefield in Italian possession. The Italian Air Force aided in this battle, and bombed the enemy base at Cattaro, and his air field at Mostar. Here 62 Yugoslav planes were reported destroyed on the ground, and 15 other planes damaged. This was about the last of the Yugoslav Air Force.

The Italians from Zara continued on into the interior. They met no opposition until they arrived before Krin. An attack on this town failed. During the day, numerous prisoners and quantities of supplies had been taken.

The German and Italian Second Armies resumed their advance south. By evening they were in the vicinity of the line Mostar-Sarajevo. The CP of the Yugoslav Second Army was taken, and the commanding general and his staff became prisoners.

The German Air Force again bombed Piraeus and other harbors in Greece. During the night of 13/14 April, the British Air Force, still under the impression that the Germans were based on Sofia and were receiving stores from there, bombed that place. As a matter of fact, the Germans who were in Greece on this date were not being supplied. They had not made any captures of rations for several days, were receiving none from bases, and were living on short rations.

#### 15 APRIL

The German 2d Panzer Division decided to force the coast passes, where about four battalions of New Zealand troops, with artillery support, were defending Podos gorge.

The Germans deployed their artillery at ranges of from 7,000 to 10,000 yards from the targets. Hills and trenches about the pass were systematically shelled all day. The British artillery replied, with some success.

While the artillery was firing, the Germans completed their reconnaissances. It was decided that a frontal attack, either with, or without, tanks would have little chance of success. The motorcycle troops were ordered to proceed towards the west, over the supposedly impracticable slopes of Mt. Olympus, and turn the enemy's left while the artillery kept his attention riveted to the front. The attack was to be launched at daylight next morning. The motorcyclists started off during the afternoon, hoping to cover as much of the country to be traversed as might be possible before night.

To conceal this movement, the artillery kept up a warm fire. As soon as it was dark enough, the batteries were moved up to about 3,500 yards of the targets, in order to be able to place intense concentrations of fire upon the enemy as soon as the attack of the motorcyclists developed.

This was the only engagement along the Aliakmon line this day. Elsewhere the Germans closed up, and



reconnoitered. A detachment from their forces in East Macedonia landed on the islands of Thasos and Samothrake. This was the initial movement in securing airfields in the Aegean Sea. There were only tiny garrisons on these islands, and they were occupied with but little fighting.

The Greek corps from Kastoria made effort to reach Grevenà. It was short of supplies, and very short of ammunition, due to lack of transportation.

The Germans gave the Greek corps no rest, but drove them back to Grevenà.

The Greek army in Albania made better progress in its withdrawal. They realized the need for speed. The Italians followed, occupying Corizza, and attacked the rear guards along the whole front, while their air force pounded away at bridges and critical points in Greek rear areas.

North of Scutari, the Yugoslavs struggled against the Italian advance. These men made a real and determined fight. They did not stop the Italians, but they prevented a rapid advance.

The Italian Second army marching south reached the vicinity of Krin, and joined the troops from Zara. The joint commands attacked this town, the Yugoslavians surrendering after being convinced as to the superiority of the hostile forces facing them. A motorized column of Italians pushed on following the railroad and reached Sebenico by night.



*German armored units advancing in the Mt. Olympus area despite destroyed roads*

16 APRIL

The German motorcyclists on Mt. Olympus had a bad night. They failed to find the enemy's left, and ran into one

machine gun nest after another. Armored units were sent up to help the motorcyclists. British machine-gun crews advanced right up to German tanks, who in the dark could not easily see them. The New Zealand machine guns and heavy infantry weapons were camouflaged, and the Germans could not locate them at night. Two battalions of Australians arrived at the pass to support the New Zealanders.

It was necessary for the Germans to wait until morning.

At about 9:00 AM the motorcyclists found the British left, and began to work around it to their rear. At about the same time, a detachment of pioneers, by wading, swimming and climbing, had worked along the rock-bound coast to in rear of the British right. The artillery intensely shelled the entire pass.

The German tanks were ordered forward. They went up a 30° slope, which indeed allowed their own artillery to fire until the last moment. But half way up, several mines exploded and one tank caught fire. Its ammunition blew up, and the adjacent tanks stopped to save the crew of the injured tank. The attack came to a halt, and the tanks stopped in defiladed ground.

The pioneers from the sea now came into action, and commenced to enfilade the British right. The motorcyclists were attacking the left

rear. German 105mm and 150mm shells were bursting all over the British position and causing serious losses. Several German tanks, which had wandered off, accidentally found a fairly level route, and suddenly appeared in the very middle of the position. The tanks stopped on the slope started up again, and reached their

objective. The New Zealanders and Australians retreated, and the pass was in German hands.

The Greek corps at Grevenà reorganized. It now had supplies. The British turned Grevenà over to Greeks, while they moved their Armored Brigade to the right to replace Australians who had been sent the day before to east of Mt. Olympus. This was an unfortunate move. The German motorized division attacked Grevenà. The exhausted Greeks failed to maintain themselves, and fled to Kalabaka.

Grevenà was a serious loss. It was not only a base, and on the line of communications for the right of the Greeks in Albania, but it was the junction point between the British and Greeks on the defense line. This now was pierced, and the two Allies separated by an enemy wedge at the very time that the right had been forced back east of Mt. Olympus.

In Yugoslavia the German Second Army occupied Sarajevo. The Italian Second Army arrived at Split. The Italian Ninth and Eleventh Armies followed the Greek retreat.

#### 17 APRIL

British GHQ found that with the loss of Grevenà and the pass east of Mt. Olympus, both of its flanks had been turned, and that quick action was necessary. It was decided to retreat without delay to a new line, extending from the vicinity of Lamia at the Thermopylae Pass, southwest across the mountains to the Gulf of Corinth.

The Germans did not wait for the retirement. They pushed on east of Mt. Olympus; southward through Grevenà on Kalabaka; in the center attacked Serbia, and its pass.

While this fight was going on, the German motorized division marched south from Grevenà, and during the day reached Kalabaka, very dangerous for the security of the British Army.

The German Air Force assisted their ground troops by an intense activity in British and Greek rear areas.

The main Greek army continued its retreat, the Italians following and occupying Klisura and Herseg. The Greeks did not have much transportation, and were forced to abandon vast quantities of stores in forward areas. The right of the army which had been based on the line Kalabaka and Grevenà was no longer receiving rations, ammunition or other supplies. The left was supplied through Arta, and was receiving what it needed, but there was no supplies to send to the right, nor transportation had there been any to forward it. Also there was a lack of roads parallel to the front by which troops or supplies could be moved from one flank to the other.

While the foregoing events were occurring in Greece, the Yugoslav armies were approaching the end of their resistance. The Italian Second Army continued its march south through west Yugoslavia, meeting nearly no

opposition. Other Italian troops advanced north from the vicinity of Cetinje. Convinced that there was no reasonable prospect of defeating the enemy, Yugoslav troops surrendered everywhere, or abandoned their position and dissolved their units, leaving the men free to return to their homes.

In view of the complete disappearance, through defeat and dissolution, of its forces. Yugoslav GHQ decided that a further prolongation of the conflict was useless. During the day they sent a flag of truce, asking the German High Command for terms and for designation of commissioners through whom surrender might be arranged. The Germans promptly designated commissioners. The terms were unconditional surrender. At 9:00 PM Yugoslavia GHQ signed the articles of capitulation.

In order to allow for time for the terms of the capitulation to be published to the scattered command, the surrender was made effective as on 12:00 Noon, 18 April, at which hour all fighting was to cease, and all arms were to be downed. Less than 12 days had elapsed since the war started.

#### 18 APRIL

The German reports indicate that including previous captures, the total number of Yugoslavs surrendered and taken was 6,198 officers, and 313,864 men. There are no statistics as to the number killed and wounded, but these do not seem to have been high. Possibly they did not exceed 30,000. As the Yugoslav Army had had some 500,000 men equipped, about 150,000 men remain to be accounted for. This represents the number who left the colors, with and without authority, and went direct to their homes. Many of them took their arms and ammunition. They are the nucleus of irregular units, since organized and operating in certain mountainous sections of the province of Serbia.

#### COMMENTS

1. The collapse of the Yugoslav Army in only twelve days needs explanation other than the military defeats suffered. There were several strong political and psychological reasons.

Notwithstanding the extraordinary enthusiasm for war in Belgrade, the country was not united on this question. Croatia, right on the German border, was pro-Axis. This province, containing about one-third of the population, promptly seceded, allowed the enemy to enter, and recalled those of its troops serving outside of its own part of the state.

When the German attack came, and within three days severed communication with Greece, it was at once evident that there would be no help from anybody, and that Yugoslavia would have to fight the mighty Axis Powers alone. This was more than they had bargained for. Despair promptly set in. The military situation rapidly developed into the Yugoslavian troops being attacked

from all directions. Gloom now replaced enthusiasm, and there arose a general feeling that they had been deceived by their Allies, and that it was useless for them to fight alone against what appeared to be overwhelming odds.

2. The long Yugoslav hesitation during February and March as to whether she would, or would not, join the Axis, coupled with two years' dangling as to whether to connect herself with the democracies, the Axis or with Russia, had enabled the German GHQ to foresee, and prepare for, a possible hostile attitude by Yugoslavia. Consequently when the test came the Axis was prepared. This does not preclude that they may have believed that when Yugoslavia formally joined the Axis on 25 March, that she was committed to their cause. The *coup d'état* of

- a. The German attack on 6 April, within 10 days of the *coup d'état*, was a strategical surprise. Yugoslavia was simply not ready to fight at this early date.
- b. The German attack on south Yugoslavia was a tactical surprise, in view of the assumption that the Germans in Bulgaria, known to be mechanized and motorized, would find the mountains impassable for their equipment. As a consequence, passes were madequately guarded, although troops were available for this purpose.
- c. After the passes in south Yugoslavia had been attacked, local commanders failed to reenforce properly their frontier guards. Small forces, or no forces, were sent, under the continued assumption that at most only weak detachments could possibly get across the mountains. When the Germans arrived at the Yugoslavia bases, troops were in quarters. At one stroke, and within a few hours, the arms, artillery, trains and supplies were lost, and after but minor fighting.
- d. Stationing Croat troops in south Yugoslavia, to avoid having them in contact with Germans, which would be normal had they been in their own country, turned out to be an error, as they were the first to be attacked by the Germans. As had been expected, these troops did not



*German column attacking pass near town of Servia, during action to pierce the British center.  
(Dever from Black Star)*

27 March may have been a surprise.

3. The German plan was ordered effective on 27 March, the very day the *coup d'état* took place, and then proceeded rapidly to completion, with war starting on 6 April.

On that same 27 March, the Yugoslav government had no plan. Days passed in discussions. The High Command made the erroneous and fatal assumption that the enemy could not attack until about 15 May, and that consequently they had until that time to decide on what to do, and to receive the expected reenforcements from their Allies. They decided to attack Albania, while waiting for the expected assistance to arrive, but when war started the details for this plan had not yet been worked out.

Military reasons for the defeat of Yugoslavia are clear. The principal ones may be summarized as:

- e. Axis armies had superior equipment. Yugoslavia had nothing to equal the Panzer division, or its Italian equivalent.
- f. Absence of supply trains and bases on the German side was another tactical surprise. It gave an unforeseen flexibility of movement to their troops. Only ammunition had to be forwarded from the rear, and this could be flown by air.

Wars are won by FIGHTING. The Axis applied this principle to their war in the Balkans. The democracies were not ready to fight in this theater of operations at this date, and their allies, Greece and Yugoslavia, could not carry on alone.

For the Axis, the first step had been taken in clearing their right flank from possible attack, while engaged in a war with Russia, intended to be the major event for 1941. Also Greece was not yet completely subdued. To accomplish this was the next step.

[In an early issue Col. Lanza will conclude this series on the War in the Balkans.—Editor.]

# JUNGLE WARFARE

By Lieut. Edward A. Raymond, FA.

Of the many changes which the European War has caused in our latest Field Service Regulations (F.M. 100-5, May 22, 1941), one of the most interesting is the stress placed on special tactics for special operations. For the first time United States Army principles are laid down for fighting in jungles, in deserts, and under ice and snow conditions. Consideration of mountain warfare is expanded greatly. Consideration of special operations is important to all artillery officers, since most theaters borrow here and there the aspects of such terrain. Heavily wooded swamps are like jungle, steep hills like mountains, and so on. Furthermore, any unit might be called upon for specialized service, and such doctrine is therefore of personal interest to each officer.

There is still an explicit assumption in the Field Manuals of the combat arms that the same principles of employment of troops and equipment that apply to lowland operations in temperate climates govern jungle fighting as well. There is no reference in the Infantry Field Manual (Organization and Tactics of Infantry—The Rifle Battalion—1940) to mountains or to jungles, although a discussion of fighting "in woods" is given. Clearly the writers did not have jungle in mind here. Scouts, for instance, should "remain preferably within sight of their units." In real "bosky" one can see about three feet. The Field Artillery Field Manual (Tactics and Technique—1940) states that employment of field artillery in mountain and jungle warfare corresponds to that in other types of operations, "with the necessary modifications incident to the terrain." The tactics and technique of jungle fighting is a study of itself. Some suggestions are given here.

## GENERAL

Movement is the key to success in conventional warfare, but this key rusts extremely fast in tropical rains. Troops can move in the jungle if they are trained and equipped to do so, but they can not move readily. This is the biggest limiting factor in jungle fighting, and should never be



ignored. Tactics which are not simple will not work in fighting of this kind.

## MOVEMENT AND COMMUNICATIONS

Rainfall is far heavier in the tropics than in temperate climates, and the rainy season on the equator is a good nine months long. Low land is usually swamp, that remains wholly or nearly impassable the year 'round. Trees and vegetation grow in a dense, intertwined mass in these swamps. High ground is dryer; the trees are generally taller and the undergrowth less dense. Available high or dry ground offers the best routes and positions.

Rates of march when trails exist rarely reach two miles an hour, and when passage must be cut by bolo or machete, point two miles an hour is a more usual figure. Because it is extremely laborious and time-consuming to move personnel, weapons and supplies in the jungle, organization commanders cannot count on reinforcing their units quickly in battle. Furthermore, it is extremely difficult to communicate with the rear. When mahoganies, cuipas and banyans tower hundreds of feet overhead, and when rain falls in sheets, present radio equipment is unreliable. A recent experience of the 2d Field Artillery, on a march across the Isthmus of Panama, is typical: "The present S.C.R. 194 is unreliable in jungle, covered mountains. It was almost impossible to communicate from the head to the tail of the column, a distance of from four to seven miles, by this means, even with the interposition of a third set at the mid-column for relay purposes, a measure which reduced the range requirements by one-half." (Major C. R. Gildart. FA. FIELD ARTILLERY JOURNAL, September-October, 1940.) Runners are slow. Carrier pigeons have a tendency to go native in the tropics, and take exasperatingly long to do their stuff. It is so exhausting to use wire that the attempt is not usually made in fast-moving situations. Communications are a knotty problem in all fighting; in the jungle they frequently will not exist.

## SIMPLICITY

In heavy going, knowledge of the enemy will be meager. Hostile forces grope blindly for one another, and can reach point-blank range before they know it. Overhead, tree boughs form an unbroken camouflage net for miles on end, baffling air and terrestrial observers. There can be no excuse for failing to reconnoiter as thoroughly as possible, of course, but complete knowledge of enemy dispositions must not be expected. This makes fancy maneuvering dangerous.

It is very hard to maintain direction in the jungle. In a land where trails grow over in a matter of months, and the watershed resembles a kitten's ball of wool, advance by bounds is not easy. There are rarely any lines on which to pause and get coordinated. It is necessary to march by compass.\* This procedure may seem cumbersome, but Col. Jenkins of the 14th Infantry tells of one of his most experienced company commanders attempting to make a flanking movement from some hills through a low river valley. He ran into streams not shown on his map and after losing several hours came out of the lowland just where he had started.

In jungle operations, an elaborate scheme of maneuver simply invites trouble. That commonly offering the best results is attack in depth on a narrow front. Jungle fighting is primitive. Lack of fields of fire cuts down the fire power of all units; the number of rifles, the weight of man power, is far more important here than it is in conventional operations. Since the superb cover offered permits small bodies to stalk an enemy on the offensive or ambush him on the defensive, there is a great temptation to resort to guerrilla tactics. If the enemy is effective, this policy is the boyish one of prodding hornets' nests.

## OFFENSIVE

As always when the going is hard, there is a premium on aggressiveness. Even if it takes one third of total effectiveness, it is vital to press reconnaissance ahead and push out plenty of flank patrols. "Fighting blind" is too great a handicap for any troops.

Since dispositions cannot be changed easily in battle, an engagement must be planned ahead of time; reserves must be brought up in advance.

Since communication in battle will be almost entirely by runner and very slow, commanders must be far forward when action is expected.

\*Here is the method of following an azimuth prescribed for the 14th Infantry—Panama's well-known "Jungleers": "The company or platoon commander determines the magnetic azimuth from his map, from the starting point to the destination. An advance detail equipped with a compass with a flagman and two or three bolo men precedes as a unit. The leader of the advance detail moves out to a point on the designated azimuth and halts. The unit commander checks the direction by compass on the flag and signals to the advance detail to move on. The unit is then led forward to the first station, the leading element opening the trail. This operation is repeated until the unit reaches its destination."—Col. J. L. Jenkins, "Notes from Jungle Experience."

Supply and evacuation during an action cannot be counted upon. Ammunition, pioneer equipment and other needed supplies must be in readiness initially. Medical facilities will generally have to go to the patients, as the attempt to evacuate casualties to medical facilities is too little likely to succeed.

The writer cannot help mentioning the fear of the 3d Battalion of the 33d Infantry in Chepo, Republic of Panama, recently. The regiment had the mission of reaching the Canal and "destroying" Pedro Miguel Locks, starting from a port some forty miles down the Pacific coast. The defenders rested their right flank upon some supposedly impassable coastal swamps. There were no trails in these swamps and mangrove growth made it necessary to chop a way through. Defending patrols did not enter the swamp. The battalion took off at three in the afternoon, marched in virgin jungle all night without lights, and wound up thirty miles later, looking more dead than alive, well in the rear of the defending forces, with the maneuvers won. In the rainy season no one could have made that march at all. A downpour in the middle of it would have proved embarrassing. As it was, one can only wish all our army were as aggressive as that portion.

## DEFENSIVE

Since the effectiveness of fire power is reduced by the jungle, and mass is important, stands should, where possible, be made where swamps or rivers canalize the enemy's advance. Numerically inferior Paraguayans were able to slaughter a number of Bolivians greater than the strength of their own army in the Gran Chaco War by permitting semi-stabilized warfare to develop.

Where positions cannot be flanked easily they can be made much more formidable by constructing fire lanes. The principle to remember in this connection is that only underbrush and low boughs and trees should be cut down. In the jungle this will leave adequate overhead cover to protect the position from airplane observation. It also lightens the work so that in one hour a conditioned man with a machete can cut fifty square yards of fire lane, from five to fifteen feet in width. This is about twice the area he can clear when cutting trail. When withdrawals must be made, then, they should be effected by large bounds. Rallying points behind defensive lines are much further forward than in conventional warfare.

As on the offensive, the difficulty of obtaining information of the enemy makes it necessary to seek it all the more, and to have numerous patrols extending well out.

## ARTILLERY SUPPORT

Jungle warfare calls for the use of pack howitzers, and even the use of these versatile little weapons is restricted by lack of observation, difficulty in regard to fields of fire, the problem of ammunition supply, and last but by

no means least, the difficulty of communication. An infantry battalion normally expects supporting fires to be delivered with artillery observation, on call, or by time schedule. When the artillery is unable to see just where the friendly lines extend, it is unwilling to fire closer than say 500 yards ahead of the line where they presume their own infantry to be. With communications as difficult as they are in the jungle, the infantry might as well make up its mind that resistance to the immediate front will commonly be reduced by infantry means. Direct fire by the artillery, used by the Germans in the present campaigns in exactly the manner of our Civil War, will not be used in the jungle because fields of fire for artillery do not ordinarily exist.\* Even if they did, the task of packing out and going back into action with six mules per piece is too cumbersome an operation. In the Panama Canal Department some officers advocate utilizing an existing motorized artillery battalion as a heavy weapons company in case of battle in the jungle, making use of its .30 caliber machine guns and automatic rifles only, leaving its 75-mm. howitzers and .50 caliber machine guns at home. "Fifties" are not ordinarily taken into the back country, as they are considered too hard to transport, and not adapted to bushwhacking at point-blank range.

#### AIR COORDINATION

Stukas can not blast what they can not see. No flying force could stem the tide of an invasion made under a green blanket of tree tops extending as far as the eye can see. The writer has flown over the Chepo Area in eastern Panama during extensive maneuvers. He can add personal testimony upon the hopelessness of air attack or air observation in jungle warfare, and discounts schemes he has heard whereby ground troops would indicate their own positions and call for air bombardment with smoke signals or flares. Fronts in such combat are too fluid for that.

#### EQUIPMENT AND TRAINING

Jungle troops must be specialists, with equipment and training designed for the job at hand. Their transportation must be specialized; there must be mules, with cargo saddles and arapahos, and there must be plenty of them. There are times when boats can greatly simplify the transportation problem, making quick and easy trips which otherwise would mean a long and exhausting struggle for men and beasts. There must be provided pith helmets and headnets, machetes and bolos, tropical medicines, and other specialized equipment. In time of unlimited emergency, with production plans in flux and transport schedules in chaos, it is not always easy to supply foreign-service units with their more unusual necessities. Much

\*This is contrary to a statement made to the editor by the military attache of Bolivia. He said that in their jungle war in the Gran Chaco, they ran their pieces up to the front line and fired point blank at the opposing infantry. Ordinary aerial and terrestrial observation were both impossible. Portee artillery was used.

forethought is required.

Training men to fight in the jungle is a full-time job. They must be made tough enough to stand a lot of exertion in steaming tropical heat with fifteen grains of quinine a day inside of them. They must handle their rifles and bayonets well. Many of them must learn to pack a mule and to cooperate with said animal. It is still worth remembering the holocaust made by unskilled British troops among fine American mules sent to South Africa in the Boer War. The mules were ill-harnessed, ill-handled and ill-fed. Incredible though it sounds, the records show that in consequence the ox-trains of the Boers had better mobility. In the jungle, badly-packed loads keep falling off, with resultant loss of time in repacking and straggling of the column. Animals with unbalanced loads develop chafes and sores, which attract screw worms at the halts. Well-handled mule trains can make marches that would cause ten to twenty per cent losses among the animals of a badly trained outfit.

Besides mastering their arms and transportation, jungle troops must learn the jungle. They must recognize poisonous snakes and avoid poisonous fruit, fire-ant bushes, black palm and tania. They should recognize edible fruit, and know how pure water can be sucked from the stalk of the bejuca vine. They must learn to cut their way quietly through dense going, and must learn by long practice how to wade through swamps shoulder-deep in mud. The survival of any man, on the march as well as in action, may depend on the skill of a buddy in life-saving or first aid. An article as long as this could easily be written just on jungle bivouac alone. Raw troops do not belong on any battlefield, but it would be especially short-sighted to send men to fight in the tropics without acclimatization and proper training.

#### ORGANIZATION

The need for fighting with self-contained forces in this type of operation has already been mentioned, and the difficulty of coordination in battle has been brought out. It is suggested that a battalion is the largest unit which could be handled in the jungle. It is further suggested that battalions be independent, and directly responsible to divisional headquarters. This has worked well in the case of other specialized troops such as field artillery and engineers. Regimental commanders and their staffs do not have the big picture in the jungle, and often can not get the little picture. It seems best to give battalion commanders full freedom of action.

#### CONCLUSION

The problem of getting a large number of battalions of men able to fight in the jungle will be difficult if we ever need those men in a hurry. The men should have been equipped and trained for jungle fighting over a long period of time. The officers, however, can have received official indoctrination in advance.

# Campaign of Flanders, 1940

## VI—Dunkirk

By  
Capt. Leo Framery,  
French Army

Illustrations by Andre Jandot

*West of Dunkirk, May 30; 75's of the 68th I. D. firing point blank in an attempt to prevent the German tanks from breaking the lines in the marshes.*



MAY 30TH

We selected a place in the sand where a few pine trees and thorny shrubs afforded some cover. We passed the time in attacking the iron rations we had brought along—corned beef and hard tack. The question of food for the personnel was one of our grave worries, as regular issues had been out of question since the 22d.

We also had the opportunity to observe the fire of a German battery of what appeared to be 105-millimeter cannon. We were located between two small forts built in the sand, 800 yards apart, one close to the beach, the other inland, directly south of it and close to the railroad track. The Germans were shelling them alternately. From the sound of the projectiles in the air, the emplacement of the guns must have been somewhere beyond Bergues, some 12,000 yards away.

At 7 PM we resumed our march and entered Malo Terminus, a small seaside resort composed mainly of a cement walk three quarters of a mile in length, built along the sea, and a wide avenue connecting it to the railroad depot, 800 yards inland, both bordered by scattered bungalows. The place was very heavily congested with troops; survivors of the 2d, 3d and 4th L. M. D., infantry outfits from North African Divisions and British units.

The crossroad by the station had just been shelled when we passed by. Doctors and stretcher bearers were taking care of the casualties; the serious cases had to be transported on board the hospital ship at Dunkirk.

Walking single file, we repaired to the emplacement assigned to our battalion in the dunes. Hundreds of thousands of men were there, waiting for the ships to take them away. To avoid disorder every unit was allotted a

certain space of ground in the sand two or three hundred yards from the shore and supposedly in front of what would be the respective embarking station on the beach.

Formation in 50-man sections was carefully maintained as we were led to believe that we might be called to embark at any time. However, at 9 PM instructions reached us stating that we could not embark before dawn the next day at the earliest. Consequently, dispositions were taken to spend the night where we were.

Around 9:30 PM a German battery began a harassing fire on the dunes with 105-millimeter HE shells. A salvo every five minutes during four hours. With the density of troops stationed there, the shelling, though erratic, was bound to cause damage. In the 2d LMD, a single shell killed 9 men of the 29th Dragoons located on our right. On the left, our friends of the 329th R.F.A. (Cavalry Corps) fared badly also. As for us, our usual luck held good and the men did not even wake up.

Embarkation of the B.E.F. units proceeded unhampered during the whole night; one could hear the orders called through megaphones, directing the men to the small craft which were to take them to the ships at anchor, invisible in the darkness.

Towards the south and southeast, the rumble of cannonade and the flashes of guns indicated that the line of defense was vigorously defended.

MAY 31ST

The gray light of dawn and a chilly wind woke me and I went to the beach walk for first-hand information on the happenings. This is what I saw: On the sea, barring the horizon at 1,500 or 2,000 yards from the shore, a line of destroyers. British and French, some of





*Malo Terminus at dawn, May 31: Embarkation of B.E.F.*

them moving, others at anchor. Half way between them and the beach were the ships loading troops; probably a dozen of them at all times, vessels of every description, most of them undoubtedly small freighters.

Still nearer to shore one could see eight or ten wrecked steamers. Some of them were sunk deep, their decks awash, only the funnels and masts showing at crazy angles above the water. Others, still floating, showing unmistakable signs of having been set afire, the plates of their hulls turned grey blue by the heat, vapor rising from the searing hot decks.

No more than 200 feet from the water's edge (the tide was out) was a huge British sea-going barge, grounded, probably after having been cut off from the ship which had towed her across the channel (this ship may have been one of the wrecks foundered nearby). Surprisingly enough, this barge looked new, the hull under the water line showing bright red.

The troops were ferried between shore and ships by a number of small craft, launches most of them, but also a few landing-party boats with flat sterns built so as to swing down and make landing ramps.

As I have said, the tide was out. On these sandy shores the ground slopes down so imperceptibly that a two-foot-draft launch had to be 100 yards out at low tide to keep

floating when empty, and probably 150 when loaded. To embark, the men had therefore to wade a long way out in the water and wait for boats to pick them up. With the chill of early dawn and the rather heavy surf running on that day, standing still with water up to the armpits, and holding one's rifle, helmet, and equipment, was a trying experience. A few men were so numbed by the cold by the time a boat came, that their fingers could not grasp the gunwales; trying to raise themselves with the weight of their soaked clothes pulling them down, some would slip back and fall under. Rescue in such cases was often impossible.

Embarking operations were proceeding in a very orderly manner, but slowly. So far, it seemed that no French units had been embarked. My conclusion was that many hours would elapse before we could expect to go.

Troops could be seen in regular formations on the beaches and the vast expanse of hard sand uncovered by the low tide. Some were standing still in front of their respective embarking station, their first sections already in the water; some were on the march. Small British command cars were running to and fro.

Far on my left, i.e., westward, huge columns of black smoke mushrooming high in the sky marked the position of Dunkirk.

On the cement walk, British A.A. pompom guns were

in position every two hundred yards, each with a two-man crew constantly on the watch.

When the observation Henschels came, as early as 4 AM, flying low over the dunes, they were met by such an intense AA fire, the pompoms pounding away at them and hundreds of machine guns rattling, that they flew back south.

At battalion headquarters a very unofficial report had been received stating that a few British ships not having their full load of troops could take on board limited French complements. To obtain confirmation, I started in search of the B.E.F. officer in charge of the embarking operations. As luck would have it, I found him, a Canadian lieutenant colonel, just as he was stepping in his car to go to Dunkirk. There was no truth whatever in the report we had—just an unfounded rumor, he said. He still had 18,000 men to embark and just enough space for them, no more. As for the French, Admiral Abrial, stationed in Dunkirk, was in charge of their evacuation.

I consequently went back to our camp where it seemed we might have to wait a long time.

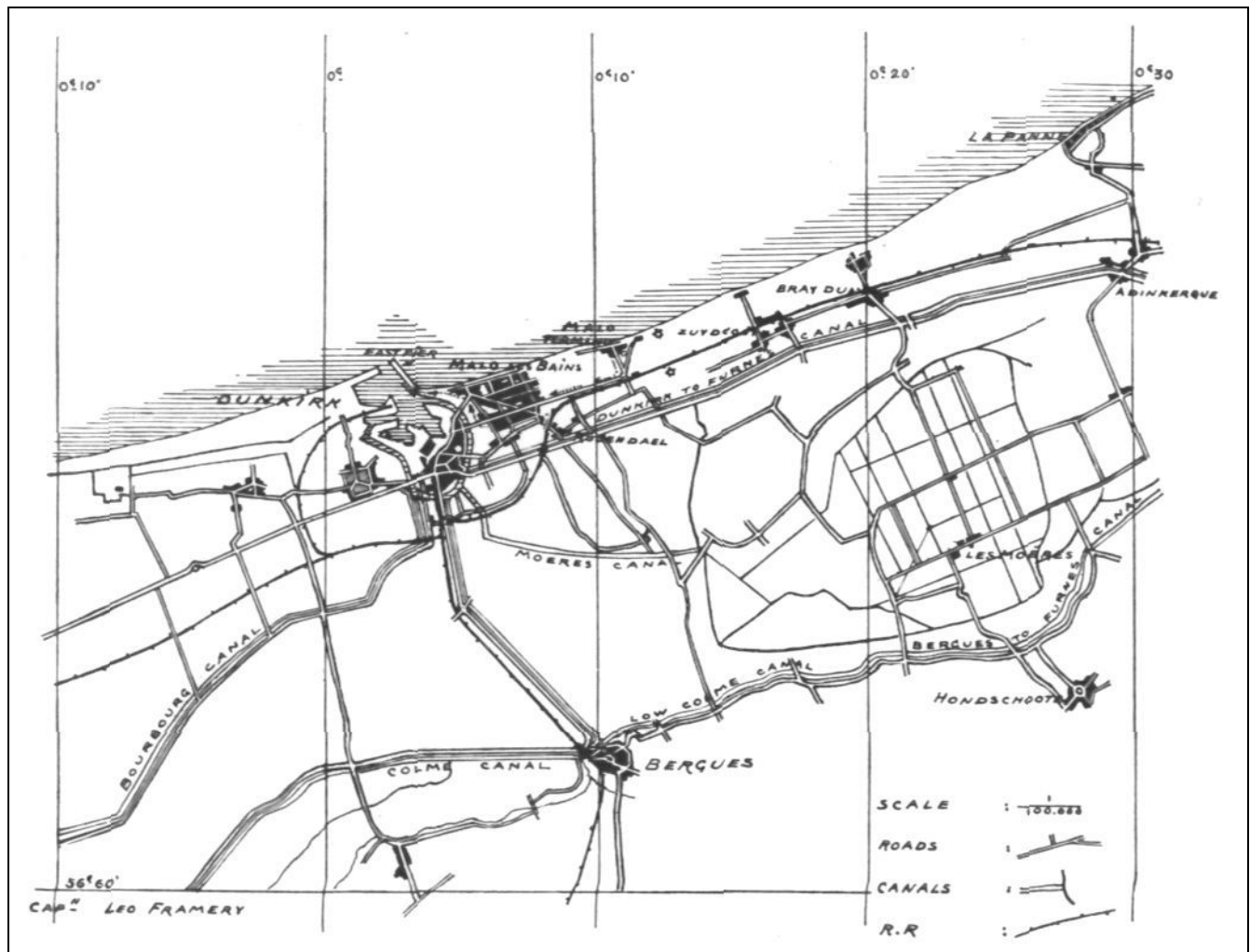
To solve the problem of feeding the personnel, the fattest looking horse among the numerous roaming animals

had been killed and quartered, providing fresh meat. One of our men had managed to board the British barge aground close to the beach; prying open a hatch, he discovered that she was loaded with supplies; thus we had plenty of bread, jams, and corned beef.

Towards 9 AM the Luftwaffe made its appearance in force over the sector. Squadron after squadron of bombers arrived in orderly formation guarded on all sides by Messerschmidt interceptors. Before they had time to let go their bombs, they were received by such heavy AA fire that they were compelled to scatter and climb up to higher altitudes where the Spitfires of the RAF gave them a hot chase.

The Ack Ack guns of the destroyers anchored off our shore kept sending up such barrages that the skies were dotted with thousands of bursts. Many of these, 88 or 90 millimeter HEs, bursting in the air with a tearing crash similar to a clap of thunder, visibly shook all the planes which happened to be within a 200-yard distance, so they scurried away as well as they could.

At the same time the RAF, though outnumbered perhaps 1 to 5 or 7, seemed to have such a moral supremacy



over the enemy, that we had the impression that even the Messerschmidts were evading fights.

It did not of course prevent the Heinkels from unloading their bombs, but their aiming was uncertain. During the several hours the action lasted, I did not observe a single direct hit on the ships. The bombs used were heavy ones which shook the ground 500 yards away and threw up tall geysers of water.

The Luftwaffe losses were high. During a particularly active period shortly after noon. I saw six Germans falling in flames at the same time, while a Spitfire, the fuselage severed just behind the wings, managed to fly back over dry ground, as the tail dropped into the sea. The pilot bailed out over Rosendael and apparently landed safely.

The Luftwaffe, in addition to its bombs, carried propaganda leaflets which were showered on the troops. On each was printed a rough map showing the zone (occupied by the allies around Dunkirk) as it was on the 25th, and in dotted line the greatly reduced area on the 30th. The caption written in both English and French, said:

Comrades!

This is the situation today!  
In any case, the war is over for you!  
Your leaders have already escaped by plane,  
Put down your arms!

The effect on our men was slight and if it aroused their curiosity, it was only as to our whereabouts. However, the impressive map on the leaflet was correct; there was no doubt that the Wehrmacht kept pounding, with ever-increasing forces, at the lines of resistance hastily organized around the Dunkirk area.

The zone which had to be held was small and was shrinking every day. Thus we were in direct contact with elements of the units to whom was entrusted the difficult mission of defending the embarking operations. Our friends of the 12th M.I.D., with whom we had been at Isnes on the KW Line, on May 14th, were holding the eastern part of the zone, a marshy region called "Les Moeres." West of the 12th M.I.D., the line of resistance (Low Colme and Colme Canals, with the City of Bergues a strong point) was manned by units of the "Fortified Sector of Flanders" including elements of the 21st Division and a few battalions of pioneers. The western end of the position, west of Dunkirk between the sea and the Colme Canal, was occupied by the 68th I.D. Incidentally, this unit, with the 60th I.D., had been attached until May 27th on the left wing of the Belgian Army. Here it had fought east and northeast of Bruges. It was conveyed to the Yser in Belgian trucks during the afternoon, before the King signed the armistice. Afterwards, when the Yser line was abandoned on the 29th, the 68th I.D. had been transported west of Dunkirk. A short respite allowed the men to dig in and prepare the

AT defenses. When on the 30th the enemy attacked with tanks and infantry, all his attempts were stopped short by the 75s firing point blank.

On the 31st the Germans renewed their thrusts with violent artillery preparations. This accounted for the heavy cannonade we had heard south of us. Bergues, the main center of resistance in the south sector, was thoroughly wrecked in a few hours by fire, bombs and shells.

We were, of course, keenly interested in the scant reports we could secure concerning the developments of the furious battle being fought but few miles from us. We only knew then that the task assigned to the defenders was to hold the position at any cost so the embarkations could proceed. Today we can appreciate the terrible price they paid to fulfill this desperate mission. When the defense finally broke down, in the evening of June 3d, the 137th I.R., the Regiment of the "Bayonet Trench" (Verdun 1916), had only a handful of men left, grouped around their CO, Colonel Menou; the 12th M.I.D. was reduced to a few hundred; its CO, General Janssen, had been killed by a bomb in their midst, at Bray Dunes. At dawn, on June 4th, these last survivors of the Dunkirk bridgehead, were discovered by the enemy, exhausted, prostrate in the sand dunes. They deserve the unrestricted gratitude of us all who, through their sacrifice, were able to embark and remained free for further fighting.

It is not irrelevant to mention that while relentless battles were waged in the Dunkirk sector, other actions equally desperate occurred in the region of Lille, 20 miles southeast of us, by a few remnants of divisions which had been part of the 7th Army. Since May 19th they had taken part in all the operations, first in the Cambrai sector, on the Escaut River, then around Arras, on the Scarpe River. They retreated slowly to the north, fighting constantly. On the 28th and 29th, two converging German thrusts in the direction of Armentieres—one issuing from Robaix westward, the other led from Bethune directed eastward—had sealed their fate. They were severed from the other units which like the 2d LMD (my own), were retreating on Dunkirk. Surrounded in Lille, they fought until June first when, reduced then to a few hundreds, without ammunition, they were overpowered.

After this digression, which should give the reader some idea of the general situation, let us go back to the sand dunes of Malo Terminus where we patiently awaited facilities for embarkation. At last, around noon, an officer of our regimental staff brought us the expected instructions for embarking. We were to proceed to Dunkirk and embark from the east pier at night. This was good news. Although my companions had not made any comments concerning the embarking operations carried out from the open beach in front of us, I knew that no one relished the idea of having to wade or swim out. To step direct from a pier into a waiting boat suited us.

We departed at 3 PM. The distance to cover was only 4 miles, but difficulties caused by the incessant bombing and shelling along our route were to be expected, so ample time was allowed for stops. Actually, it took us nearly six hours to reach the pier.

The itinerary went back to the crossroad marking the entrance of Malo Terminus, by the station. Thence it followed the wide paved way running parallel to the railroad track up to and through Malo-les-Baines; before reaching the canal which circles Dunkirk, it swung north to reach the base of the East Pier.

Our column was divided into two files walking on both sides of the road, the men at three yards interval. In the fields north and south of the route were scattered the men and vehicles of supply trains belonging to the divisions fighting at Bergues, taking advantage of every bit of cover the country afforded.

When we left the dunes, aerial activity was at its peak. Bombs were falling in great number on the beaches and in the sea, but none landed on our path.

At the first crossroad we had to halt more than one hour until the units walking ahead of us had cleared the way.

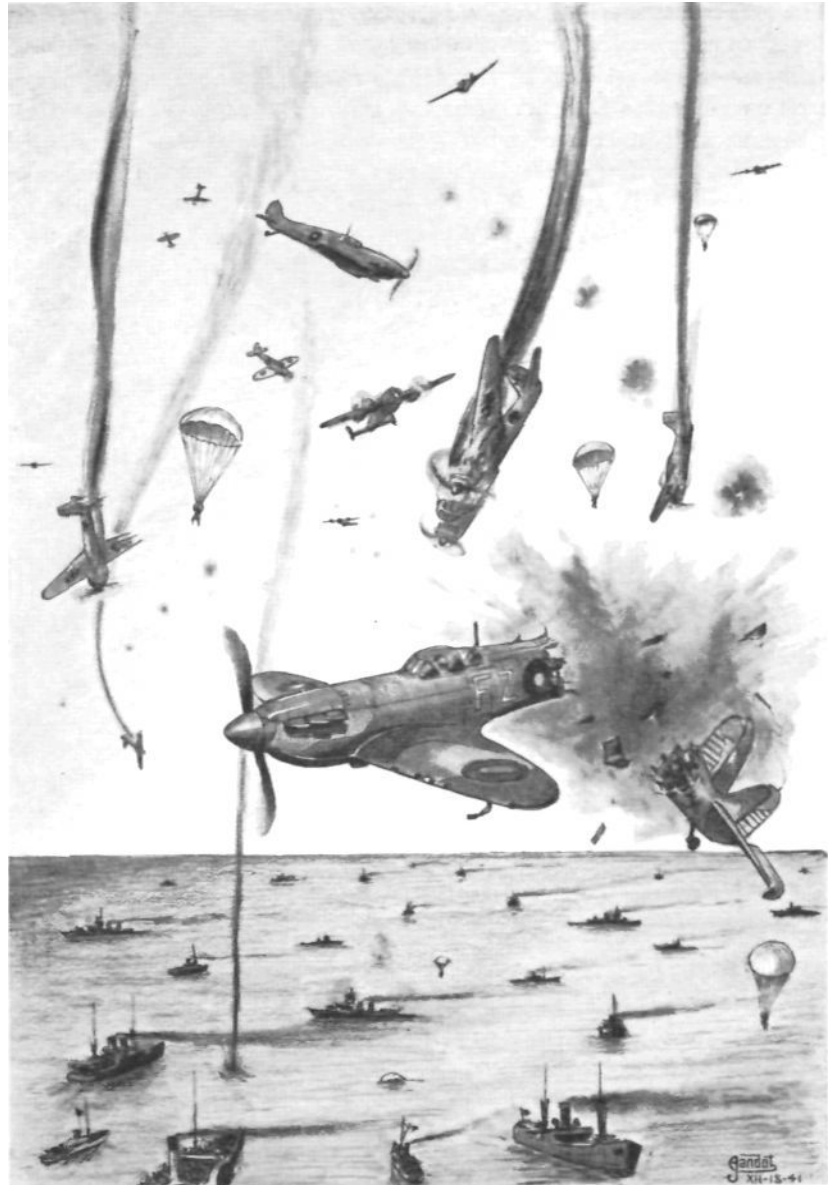
We crossed Malo-les-Bains under a lively shelling which straddled the street but, sheltered by the houses, we avoided mishap in spite of another halt which stopped us for nearly an hour and a half. Reaching the approaches of the pier, the long files of men were guided by General Lacroix, CO of our brigade, who, disregarding the shower of hot shell splinters ricocheting on the paving stones, directed the movements.

We arrived at the pier at nightfall; the scene was eerily illuminated by the vivid glare of burning oil tanks located a little way to our left across the harbor. I could see, a short distance back of us, the white hull of a British hospital ship, still moored at the quay, but preparing to sail as shells were falling dangerously close.

The ground was strewn with cases of supplies, ammunition and materiel, over which we had to pick our way.

We had gone only a short distance along the pier when we were halted. There was as yet no sign of any ship coming to take us. We used this respite to call the roll in each section. Another unit had come up in the meanwhile and halted on our side: a British outfit, the men wrapped in their slickers.

Salvos of German 105 HE were falling at regular intervals, right and left of the pier.



*Malo Terminus, May 31: The Luftwaffe gets a warm reception from anti-aircraft and the R.A.F.*

We had hardly finished calling the roll when out of the night, a dark silhouette against the red background, came the slim hull of a destroyer. In a few minutes two hawsers made her fast to the pier, exactly where we stood. From the bridge came the sharp command, hailed through a megaphone: "Climb on board!" Within ten minutes the load of men, 500 French artillerymen, 500 British, had embarked. Five minutes more and the destroyer, *HMS Havant*, was on her way to England.

The human cargo was soon stowed below deck, while above, the gunners of the crew were at their battle stations, everything cleared for action.

We left Dunkirk at 10 PM and arrived safely at Dover at 3 AM, June 1st. There were five alerts on the way.

The French destroyer *Sirocco* was sunk during this same night, a few miles from us.

Shortly after we landed, the *HMS Havant* turned back once more to Dunkirk. She was sunk on the way at 9 AM, six hours after we had left her.

#### JUNE 1ST

The first battalion of the regiment which was head of us in our march from Malo to Dunkirk had embarked at 8:15 PM on an ancient sidewheeler, the *SS Golden Eagle*. This unit arrived at Margate at 8 AM the next day, and entrained at once to go to Plymouth whence it sailed back to Cherbourg in France, on the *SS Ville d'Alger*. They landed at 5 AM on June 2d. Their voyage, Dunkirk-Cherbourg, via England, had required 33 hours.

As for my battalion, after a much appreciated snack of sandwiches and tea, we left Dover by train at 5 AM and

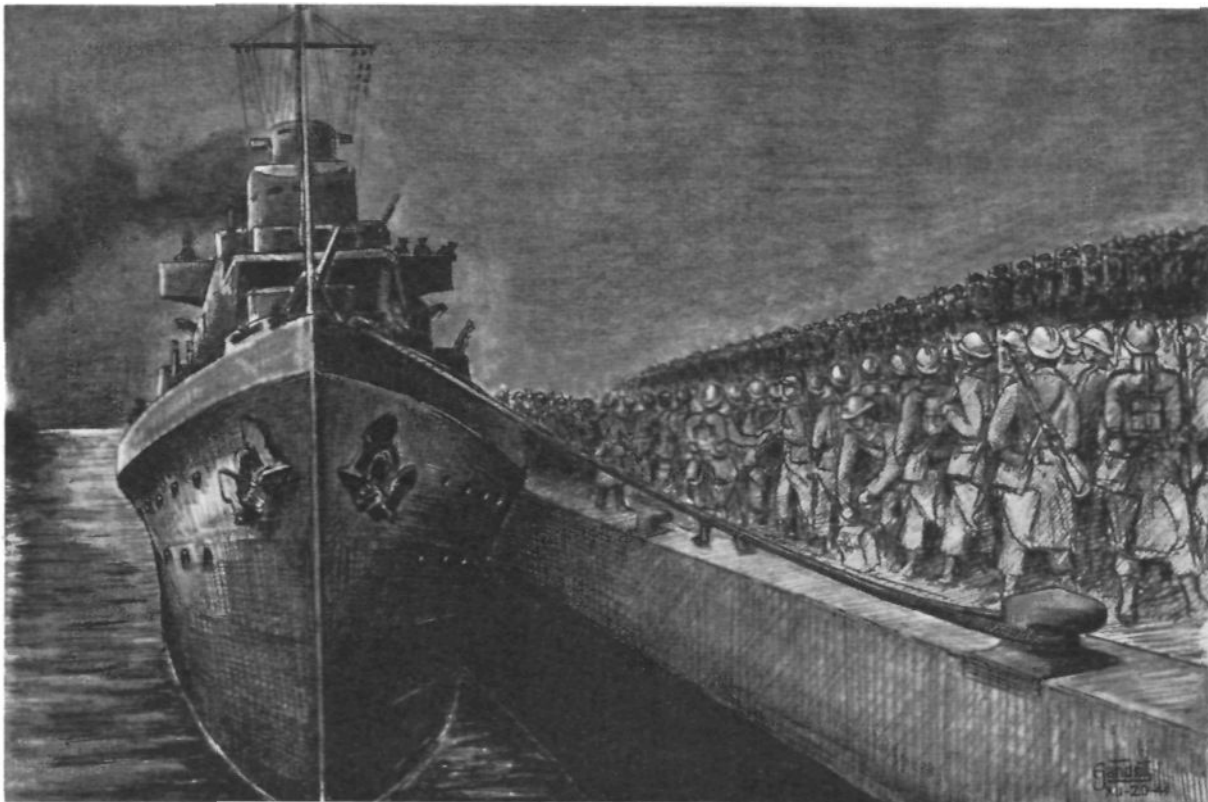
arrived at Bournemouth at noon. The British people, normally undemonstrative, welcomed us with such a display of feeling that the progress of our train through the stations of Kent and Surrey was more like the homecoming of a victorious regiment than the transfer of troops from one battlefield to another. The hospitality bestowed upon us in Bournemouth is beyond description. My companions, hardy Breton peasants for the most part, were literally overwhelmed by the attention they received. We shall certainly never forget it.

We left that beautiful city five days afterward for Plymouth, where, on June 7th, we embarked on a French troop transport, the *SS El Kantara*. At noon the next day we landed at Brest.

Thus ended for the 2d L.M.D. the first part of the war.

*(To be concluded)*

*Dunkirk, night of May 31: HMS Destroyer "Havant" taking on board 500 French artillerymen and 500 British, the British being lined up on the pier's parapet.*



In line with Journal policy of providing the latest technical information for use in basic training; similar to the widely acclaimed "How to Build an Efficient Firing Battery," we present here a new professional study of solid worth to all units.

# SURVEY PLANS AND PROCEDURE

By Lt. Colonel E. B. Gjelsteen, FA.

## FOREWORD



GOOD field artillerymen know that:

- (1) All artillery fires should be observed whenever possible. But—
- (2) For unobserved fires, survey is necessary.
- (3) The preparation of data for observed fires and the

massing of fires is best accomplished on a chart based on survey.

Survey is started as soon as the artillery positions are known. If the situation moves too rapidly, survey may not be completed; but it should always be started.

The most effective form of artillery fires are massed fires. For this it is necessary that batteries within the battalion be tied by firing or by survey, to a common control. This principle is applicable also to battalions within the division artillery and the corps artillery brigade.

When time is not available for establishing common control for massing fires, artillery supports the infantry by battery observed fires. Common control is established as soon as practicable.

Note: This article covers only Survey Plans and Procedure. It is not a survey text. Detailed methods of performing survey operations are contained in Technical Manual 6-200 and Field Artillery Book 161 (Gunnery).

## BATTALION SURVEY

### GENERAL

All survey operations within the battalion are performed by the battalion survey party. Any battery personnel so employed act as part of the battalion survey party. The battalion survey in any position is a single battalion survey, not a group of battery surveys. It is performed for the use of the battalion fire-direction center; and unobserved fires are prepared in this center. For unobserved missions the fire-direction center needs a chart based on survey. The massing of observed fires also is best accomplished on a surveyed chart. Batteries functioning as part of a battalion do not prepare unobserved fires and therefore do not need

survey. The battery commander in this case is concerned principally with observed fire; hence he can get along without survey. The battalion survey is made available to him, however, for his use in calculation of data for observed fires and as a measure of dispersion. When a battery is acting alone it must perform its own survey, using the methods discussed below for battalion survey.

In this part are discussed survey plans and procedure for battalions of division artillery; they are applicable also to battalions of corps artillery.

### DIVISION OF LABOR

Survey tests list the survey operations and methods of doing each operation. The list, as extracted from Technical Manual 6-200, is as follows:

- (1) Horizontal locations of batteries and targets.
- (2) Determination of direction.
- (3) Provision for transmission of direction to batteries.
- (4) Provision for vertical control.
- (5) Determination of scale.
- (6) Extension of common control.
- (7) Location of observation posts.
- (8) Uniform declination of instruments.

The foregoing does not indicate any logical division of duties. For instance: It would be impracticable to have one detail locate horizontally the batteries and the targets, and have another detail make the provision for vertical control. The horizontal control is necessary before the vertical control can be started. Furthermore when horizontal angles are read, vertical angles can also be read. A better division would be to have one detail locate *targets* horizontally and vertically and another detail locate the *batteries* horizontally and vertically. A third detail can provide for the transmission of a direction to the batteries. Therefore the logical division of survey operations into duties would be the target area survey, the position area survey, and the connection between the two. The latter involves the determination of the direction and provision for its transmission to batteries.

Before considering these three survey tasks, let us mention the survey operations which have not been covered: (1) Determination of scale, which is a function of the division artillery topographic platoon. (2) Extension of common control, which is another name for survey. (3) Location of observation posts—a part of the

target area survey. (4) Uniform declination of instruments, which is performed before the survey is started; and is much like the checking of the guns in the position, rendezvous, or park.

During the following discussion reference will occasionally be made to Points A and B. These are control points established by division artillery to coordinate and facilitate the battalion surveys. Point A is a known accessible point in the position area, to be used by the battalions as the origin of their surveys. Point B is a known point, preferably in the target area, which with Point A establishes direction. A member of the division artillery topographic platoon gives each battalion the coordinates and altitude of each point and identifies them on the ground. Only those battalions using a common Point B have their surveys coordinated. When possible a single Point A is used for all battalions. If the battalion position areas are too far apart it is not convenient for all battalions to use the same Point A; in this case division artillery survey personnel establish as many Points A as are necessary. The best survey control exists among batteries using common Points A and B. When division artillery survey personnel are not present, a battalion establishes its own control points, using the methods prescribed in Part II.

#### TARGET AREA SURVEY

Target area survey includes the horizontal and vertical locations of the base point, check points, key terrain features, targets, and observation posts. The survey is started from Point A; direction is taken from the line A B.

Horizontal location by inspection is usually not possible; therefore location must be determined by either long or short base intersection.

Long base intersection is a graphical method. For accuracy the angles of intersection must be between 500 mils and 2,700 mils. The advantage of long base is that no computations are necessary. The disadvantages are the difficulty of communication between the two ends of the base, target identification is difficult, and both ends of the base must be located on the chart.

In short base intersection the direction is determined graphically but the distance is determined by computation, based on the solution of the right or oblique triangle. For this method, the angle of intersection must be at least 100 mils when angles are measured with the transit, and 150 mils when angles are measured with the aiming circle. The advantages are that communication is relatively easy, identification of targets from the ends of the base is easy, and only one end of the base need be located on the chart. The disadvantage is the computation involved. This disadvantage, however, may be minimized by training. Trained survey officers and men prefer to compute rather than to plot. They state that the only individuals who plot are those who are unable to compute.

When the angle of intersection is such that long base intersection methods may be used, short base intersection methods may also be used, with greater accuracy.

With a contoured map, vertical control already exists. If the contour interval is large (50 feet or more), the existing vertical control must be supplemented for check points. With an uncounted chart (air photo or grid sheet) vertical control must be established by computation. The vertical angles are measured at the same time the horizontal angles are measured. Having the horizontal locations and the vertical angles, compute differences in altitude from the vertical angles and distances, using the mil relationship. The altitude of a control point is assigned by division artillery headquarters. Other altitudes are computed with respect to this value. The best method for establishing vertical control is to determine and enter on the chart the altitudes of key terrain features (points where the ground slope changes). When the firing chart is an air photo the location of key terrain features may be accomplished on the chart by inspection. For this, a range finder is useful for determining the approximate distance. Knowing the direction and the approximate distance, a terrain feature can readily be located on the photo. By interpolation between key altitudes the altitude of any point in the target area may be determined. The VCO (Vertical Control Operator) of the fire-direction center, who uses the chart, should previously study the target area from an observation post and inform the target-area survey group of the altitudes he needs. On uncounted charts all altitudes are entered in yards.

In target area survey, priority is given to the location of base and check points, and to the determination of key altitudes required by the VCO. Target area survey is never completed; it continues as long as the position is occupied.

#### POSITION AREA SURVEY

Position area survey includes establishment of the orienting line, and the horizontal and vertical locations of the base pieces of the batteries.

The orienting line is for the purpose of laying the batteries for direction. By means of this line and computed base angles (see *connection survey*) batteries are laid on their base lines. The orienting line is selected so that the distance from the executive's instrument (on the line) to any gun is not less than 50 yards. The ideal is about 100 yards. A greater distance would give greater accuracy, but the executive's instrument should be close enough so that the executive is within voice distance of the battery. If absolutely necessary a relay can be established. Batteries have been laid at night from an orienting line over 400 yards away from the battery. The executive established a messenger service between himself and the battery. Of course this takes time, but generally plenty of time is available in a night occupation of position. The orienting line must be selected



from the position area. Never attempt to select an orienting line while you are at a distance from the position area. In selecting the orienting line consider only the primary purpose of the line, which is to enable the executives to lay their batteries on the base lines. Do not try to tie the orienting line to a distant point. Experience shows that a great deal of time is wasted and orienting lines are placed in poor positions if you endeavor to make one end of the orienting line a distant point. Place the orienting line in the best place with respect to the three batteries, and let the ends fall where they may. An orienting line is merely a direction which is staked out on the ground. It is not located on the firing chart, therefore no attempt should be made to select an orienting line with this in view. The ends (and intermediate points when necessary) of the orienting line are best marked by stakes about 6 feet long. On the line are also placed small stakes conveniently so the battery executives can set their instruments on the orienting line. Figure 1 shows several examples of orienting lines.

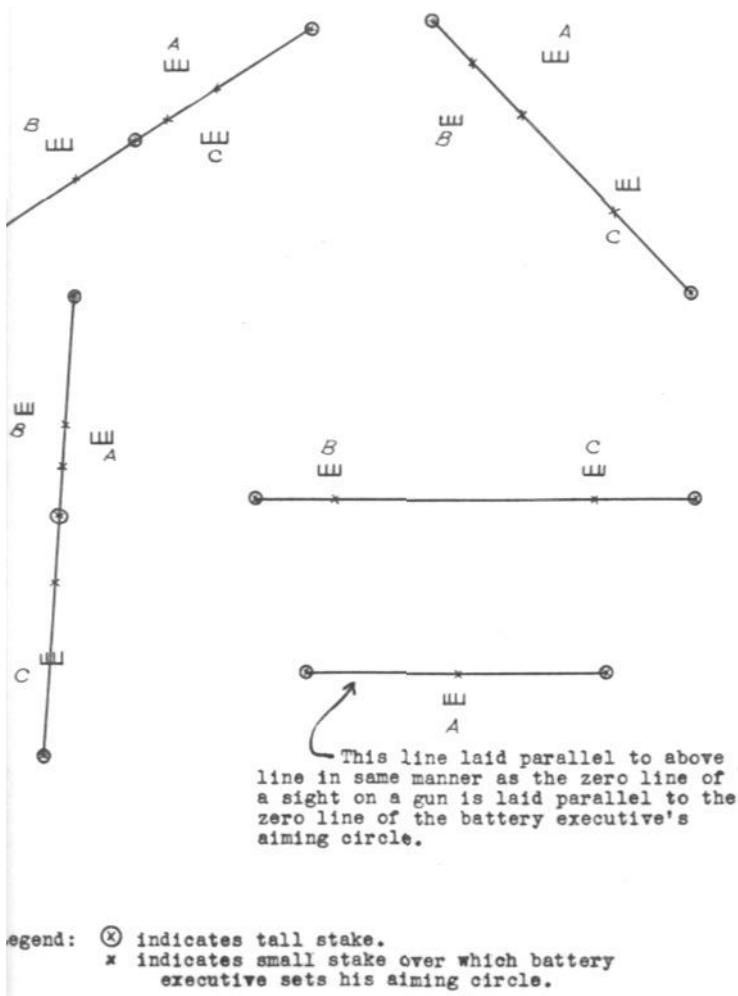


Figure 1.—Several examples of orienting lines.

The horizontal locations of the batteries are determined with reference to the nearest accurate point or points which can be identified both on the chart and on the ground. In some cases, particularly with an air photo, the base pieces may be located by inspection, but usually a short traverse is necessary. Since distances are usually less than 1,000 yards it is sufficiently accurate to determine the direction of the traverse with reference to a road or the edge of a field. The base pieces may be located with reference to one point or with reference to more than one point. The first method is preferable and should be used when time permits. Likewise closed traverses should be used when time permits. The foregoing discussion applies when a battle map or air photo is available. When a grid sheet must be used the base pieces are located with reference to a point (hereafter termed the chosen point) and a line in the position area. The angles and distances of the traverse are noted on a sketch. When the chosen point and line are located by the connection survey group (see connection survey, below), the position area survey is plotted on the end of the connection survey.

Vertical locations of the batteries are determined with reference to the altitude of a control point or an altitude determined by inspection of contours on a contoured map and with reference to the chosen point or uncountured charts (air photos or grid sheets). In the latter case the altitude of each battery is determined as so much higher or lower than the chosen point. When the altitude of this chosen point is determined by the connection survey group the altitudes of the batteries may then be determined and entered on the chart.

For the computation of the base angles at least one angle is measured on the chart, therefore the position area chart (connection survey chart in case of grid sheet survey) should have plotted on it the line AB, the base point, the locations of the base pieces, and the base lines. The computation of the base angles is discussed under *Connection Survey*, below.

#### CONNECTION SURVEY

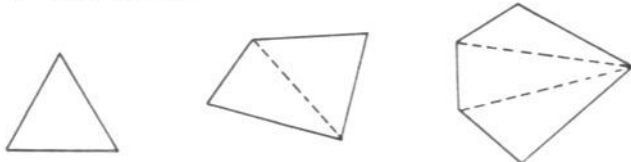
The position and target area surveys determine the horizontal and vertical locations of batteries, base points, check points, targets, and observation posts. The range can be measured and the site computed. One further step is necessary; provision must be made for laying the batteries for direction. It is always best to transmit this direction from the target area to the position area, since this removes the distortion of the map from the calculations. The connection between the target area survey and the position area survey is termed the connection survey. It consists of:

- (1) Transmitting direction from the line AB to the orienting line; applicable for all types of charts.
- (2) Computation of base angles; applicable for all types of charts.

(3) Transmitting vertical control from Point A to the chosen point in the position area; applicable only for uncountoured charts.

(4) Transmitting horizontal control from Point A to the chosen point in the position area; applicable only for a grid sheet survey. The connection survey leaves the target area survey at Point A, takes its direction from the line AB, and connects to the position area survey.

Basic formula for the computation of base angle: The sum of the interior angles of a polygon is equal to (the number of sides minus two) times 3200 mils.



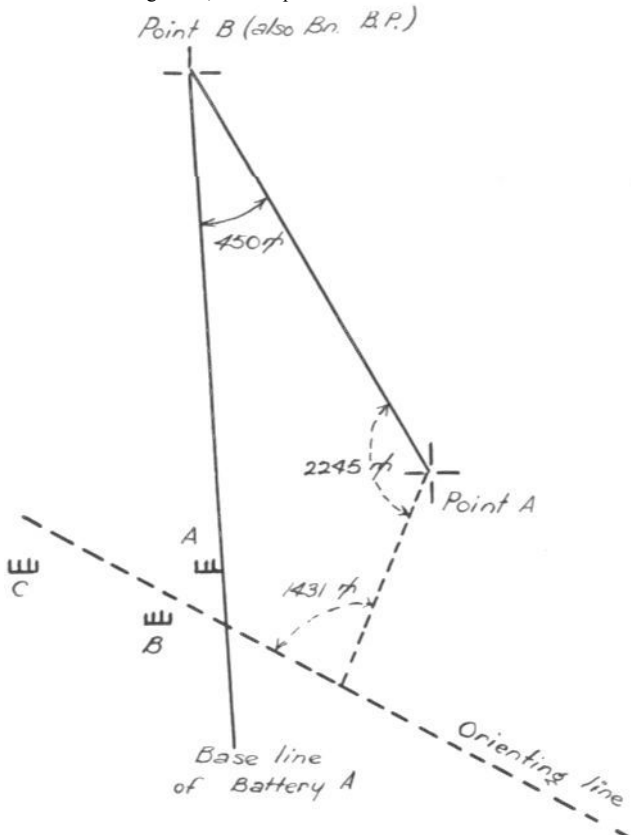
The sum of the interior angles of a triangle equals 3200 mils.

In a four-sided polygon the sum of the interior angles equals the interior angles of 2 triangles or  $(4-2) \times 3200$  mils = 6400 mils.

In a five-sided polygon the sum of the interior angles equals the interior angles of 3 triangles, or  $(5-2) \times 3200$  mils = 9600 mils.

Figure 2.—Methods of computing the base angle.

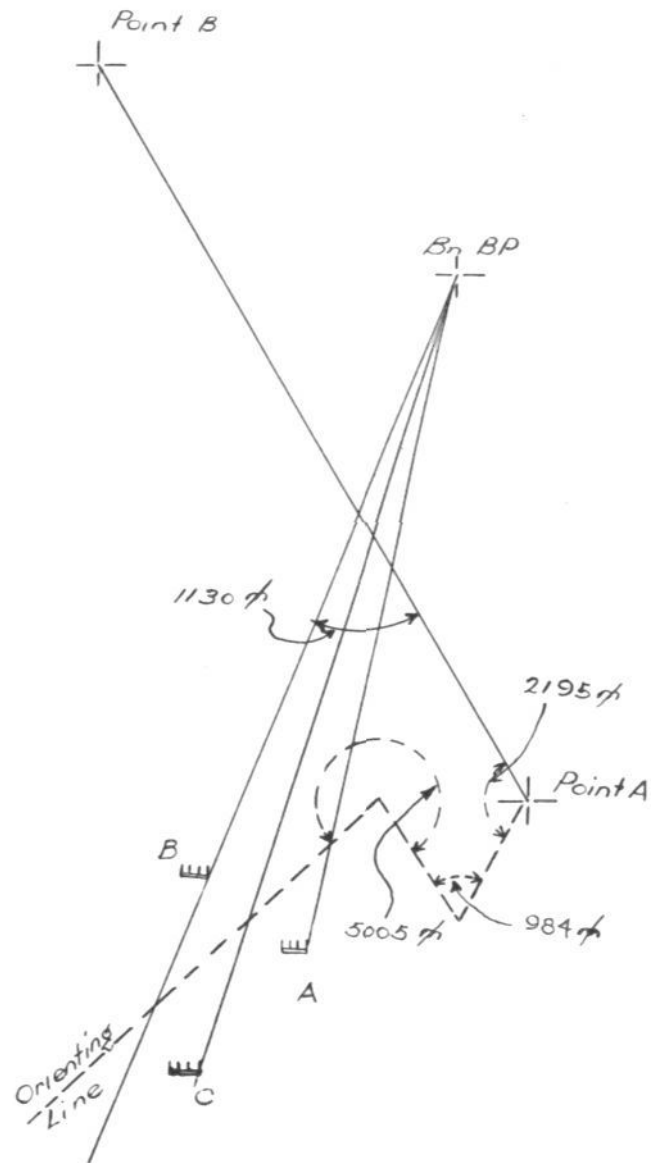
The base angle of one of the batteries is determined by solving a polygon, as shown in figures below. Full lines represent lines which are plotted on the chart; dotted lines represent lines on the ground and angles measured on the ground, but not plotted on the chart.



Four-sided polygon; therefore interior angles equal  $(4-2) \times 3200$  mils, or 6400 mils. Base angle of Battery A equals  $6400 - (450 + 2245 + 1431) = 2274$  mils.

Figure 2(a)

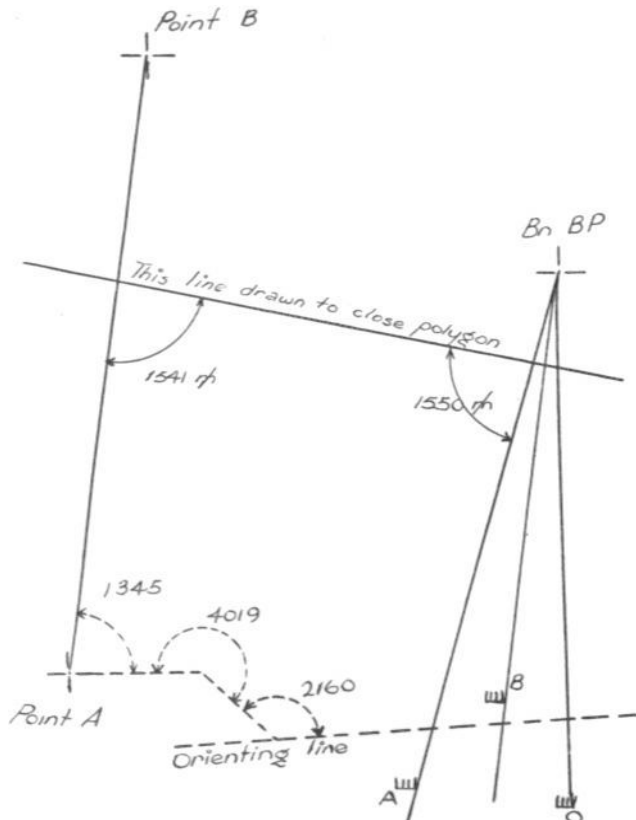
Direction is transmitted from the line AB to the orienting line by a directional traverse, recording the interior angles. On arrival in the position area the base angles are computed, using the interior angles of the directional traverse and one or two angles measured on the chart. Methods of computing base angles are shown in Figures 2 (a-f). As a check on the computation of the base angles the directional traverse can be plotted and the base angles measured with a protractor. As a check for the battery executives they can be furnished the azimuths of the base lines. After laying the battery by means of the base angle the executive can check his laying by measuring the adjusted compass. These two checks are approximations, but they will eliminate gross errors.



Five sided polygon, therefore interior angles equal  $(5-2) \times 3200$  mils, or 9600 mils.

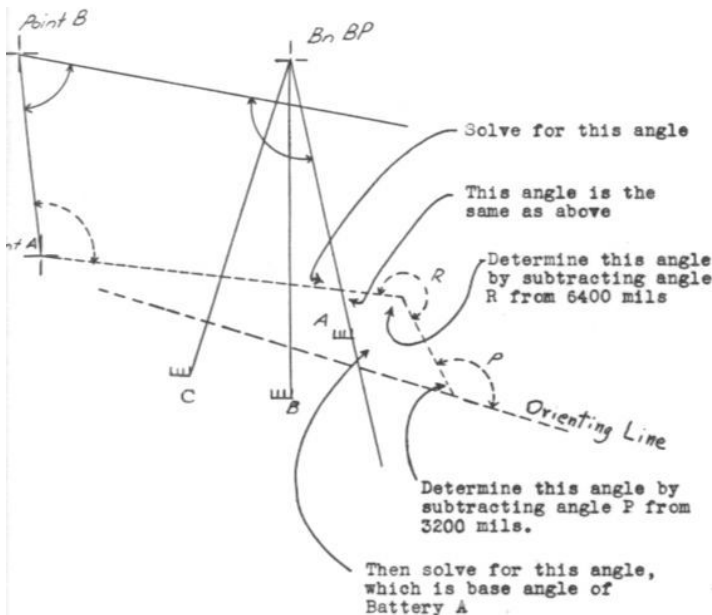
Base angle of Battery B =  $9600 - (1130 + 2195 + 984 + 5005) = 286$  mils.

Figure 2(b)



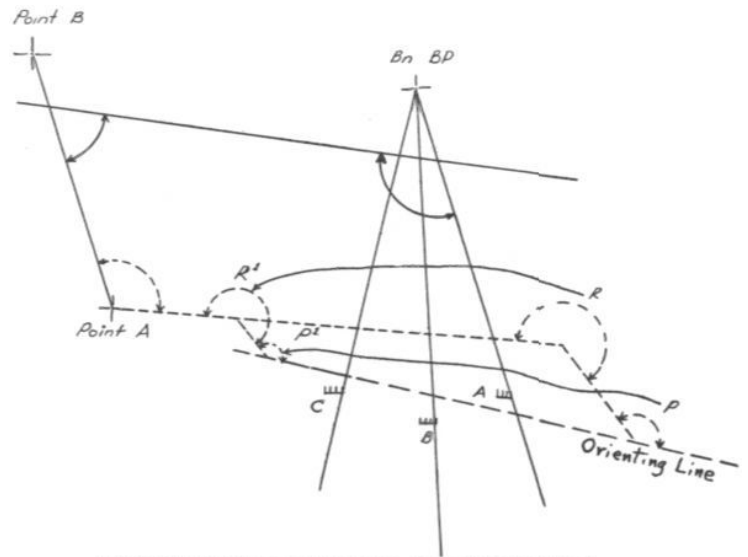
In this case it is necessary to draw on the chart a line across the base line and the A-B line to close the polygon, forming a six sided polygon. Interior angles equal (6-2) times 3200 mils, or 12800 mils. The supplement of Battery A base angle equals  $12800 - (2160 + 4019 + 1345 + 1541 + 1550) = 2185$  mils. Base angle A equals  $3200 - 2135 = 1015$  mils.

Figure 2(c)



Note: An alternate solution to this problem is shown below.

Figure 2(d)

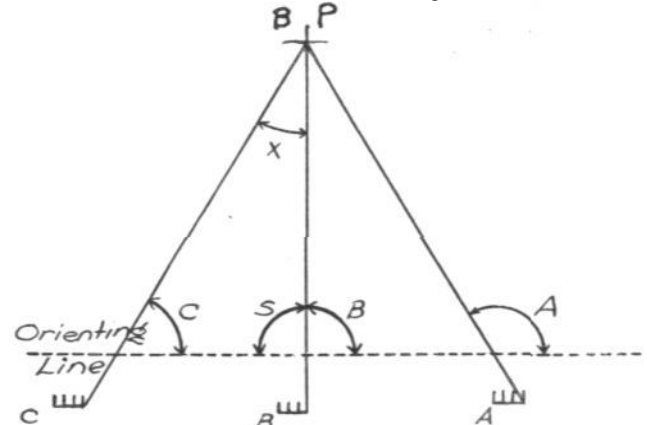


ALTERNATE SOLUTION TO ABOVE PROBLEM

Draw parallel lines in sketch so as to form a polygon. Thus angle R equals angle R', and angle P equals P'. Then solve polygon for supplement of base angle A and subtract supplement from 3200 mils to determine base angle A.

Figure 2(e)

Having determined one base angle apply to it the angles of intersection between base lines to determine the other base angles.



$$C + X + S = 3200 \text{ miles.}$$

$$S + B = 3200 \text{ miles.}$$

$$\text{Therefore } C + X + S = S + B, \text{ and } C + X = B.$$

Thus base angle B equals base angle C plus angle of intersection between lines of B and C. Similarly base angle A equals base angle B plus angle of intersection between base lines of A and B, or base angle C plus angle of intersection between base lines of A and C.

Base angles of batteries differ by the angle of intersection between their base lines. A battery to the right has a larger base angle than a battery to the left.

Figure 2(f)

When the chart is not contoured the connection survey includes carrying vertical control from point A to the position area. During the directional traverse, vertical angles as well as horizontal angles are measured. The stations occupied during the directional traverse are determined by inspection. The distance necessary in the distance and angle-of-site computations are measured on the chart. On arrival in the position area the position

area survey group is furnished the altitude of its chosen point.

When the firing chart is a grid sheet the connection survey includes not only the transmission of direction and vertical control but also the transmission of horizontal control to the position area. The distances between stations occupied in the traverse must be determined by taping, short base computations, or stadia. The survey is plotted on the chart. Horizontal and vertical control is carried to the chosen point and line used as the origin of the position area survey; direction is carried to the orienting line. Often the chosen point will be on the orienting line. The position area survey is plotted on the end of the connection survey, altitudes of batteries are determined and entered, and base angles computed.

#### ORGANIZATION FOR SURVEY

As previously discussed, a battalion survey is divided into three tasks: the target area survey, the position area survey, and the connection survey. The battalion survey personnel (which includes any battery personnel available) should be divided into three groups, one for each survey job, so that the three tasks can be performed simultaneously.

The Field Artillery School has recommended that the following battalion survey personnel be included in Tables of Organization:

- 1—Survey officer
- 1—Chief of party
- 1—Transitman
- 2—Recorders and computers
- 4—Tape and rodmen
- 1—Axeman
- 3—Drivers (also tape and rodmen)

The transportation recommended includes 1 truck, ½-ton weapons carrier; and 2 trucks, ¼-ton.

The above personnel are sufficient for the simultaneous performance of two of the survey jobs. They should be employed in the target area survey and the connection survey. The chief of party, the transitman, one computer and recorder, and two tape and rodmen should be used in the target area survey. After the survey officer has issued orders to his chief of party for the target area survey he performs the connection survey with the assistance of one computer and recorder and two tape and rodmen. This division of personnel is an average one. The assignment of computers and recorders, tape and rodmen, and axeman is dependent upon the relative difficulties of the two tasks. The survey officer should use the minimum personnel necessary for the connection survey, leaving the rest for the target area survey.

The position area survey must be performed by battery personnel made available to the survey officer by the battalion commander. The survey officer designates a battery reconnaissance officer to be in charge of the position area survey. If no battery personnel are available

the connection survey group performs also the position area survey; in this case the three survey jobs are not performed simultaneously.

In the performance of their duties the three survey groups are working in different places. The survey officer must designate a place where survey data are to be sent, in order that the data of the three groups may be consolidated. Usually the position area is the best place. The position area survey group is already there. The connection survey group usually starts at Point A and ends in the position area. As the target area survey group determine the coordinates and altitudes of points they are reported piecemeal to the personnel in the position area.

The survey officer checks the plotting of survey data and the computation of base angles.

When the chart is a map or air photo the chart used by the position area survey group becomes the chart used by the HCO (horizontal control operator) of the fire-direction center. As a minimum the chart must have plotted on it the base point and the battery positions. A duplicate chart is prepared for the VCO. Survey personnel prepare the charts for the fire-direction center if time permits. If time does not permit, survey data are reported piecemeal to the fire-direction center for plotting by personnel at that place. After the charts are in the fire-direction center, further data are reported directly to the center.

When the position area survey and the connection survey have been completed, the battalion survey personnel of these two groups assist the target-area survey group, returning the battery survey personnel to the batteries.

#### CHECK LIST OF SURVEY OPERATIONS

1. The following survey operations are applicable when a battle map (scale 1/20,000, contour interval 50 feet) is available as the firing chart:

*a. Control furnished by the division artillery survey officer.*—The horizontal and vertical locations of Points A and B.

*b. Target-area survey group.*—Locate, horizontally, the base point, check points, and targets by long or short base intersection. Occasionally these points can be located by inspection. Locate observation posts horizontally by inspection (and short traverse when necessary) or long or short base intersection. Supplement the existing vertical control by determining the altitudes of check points and observation posts, using the mil relationship.

*c. Connection survey group.*—Carry direction from the AB line to the orienting line, and compute the base angles.

*d. Position-area survey group.*—Stake-in the orienting line. Locate batteries horizontally by inspection (and short traverse when necessary). Determine altitudes of batteries, starting from the altitude of a control point, or an altitude determined from inspection of contours; use

same point as starting point in determining all altitudes. The chart of the position survey group becomes the HCO chart.

2. The following survey operations are applicable when a wide-angle photo (single vertical covering an area approximately 10,000 yards square, approximate scale 1/20,000) or a mosaic assembled from wide-angle photos is available:

*a. Control furnished by the division artillery survey officer.*—The scale of the photo; the horizontal locations of Points A and B, corrected to the datum plane; the altitudes of Points A and B; the datum plane; and the azimuth of a line.

*b. Target-area survey group.*—Locate horizontally the base point, check points, and targets by long or short base intersection. Occasionally these points can be located by inspection. Locate observation posts horizontally by inspection (and short traverse when necessary) or long or short base intersection. Determine altitudes of above points and key terrain features (whose horizontal locations are determined by inspection) by the mil relationship, and enter same on the chart. Correct points for distortion due to relief.

*c. Connection survey group.*—Carry direction from the AB line to the orienting line, and compute the base angles. Carry vertical control from Point A to the chosen point in the position area.

*d. Position-area survey group.*—Stake-in the orienting line. Locate batteries horizontally by inspection (and short traverse when necessary). Determine altitudes of batteries with respect to the chosen point; when connection survey group has carried vertical control to this point, determine and enter the altitudes of the batteries. Correct battery locations to the datum plane. The chart of the position-area survey group becomes the HCO chart.

3. The following survey operations are applicable when no maps or photos are available, and the grid sheet is used as the firing chart:

*a. Control furnished by the division artillery survey officer.*—The horizontal and vertical locations of Points A and B.

*b. Target-area survey group.*—Locate horizontally the base point, check points, targets, and key terrain features by long or short base intersection. Locate observation posts horizontally by traverse or long or short base intersection. Determine altitudes of above points by the mil relationship.

*c. Connection survey group.*—Carry direction from the AB line to the orienting line, and compute the base angles. Carry horizontal and vertical control from Point A to the chosen point and line used by the position-area survey group as the origin of their survey. The chart of the connection survey group becomes the HCO chart.

*d. Position-area survey group.*—Stake-in the orienting line. Locate batteries horizontally and vertically with respect to the chosen point and line (chosen by position-

area survey group), measuring angles with an aiming circle and determining distances by taping or stadia. When connection survey group completes and plots its survey, plot the position area survey on the end of the connection survey. Determine and enter the altitudes of the batteries.

4. In all cases, regardless of type of chart, the survey officer designates a place (usually the position area) where survey data are to be sent. As survey data are reported, they are plotted on the chart. The survey officer always checks the computation of the base angles.

#### SURVEY ON TWO CHARTS

A battalion may have two different charts. Corps artillery battalions always perform surveys on grid sheets, using control established by the corps field artillery observation battalion. This ties the battalion into the flash and sound system. In addition a battalion of corps artillery may have the mission of reinforcing the fires of a division. If the division artillery is using a photo as the firing chart, the reinforcing battalion must perform a survey on the same chart used by the division artillery, using the control established by the division artillery. The two surveys are independent of each other, although both must have the same base point, and most of the survey data are applicable to both charts. From the source of the mission, and the nature of the coordinates, the fire-direction center knows which chart to use when a mission is received.

#### TRANSFER FROM ONE CHART TO ANOTHER

Survey units above the battalion should always endeavor to furnish battalions with survey control before the battalions begin their surveys. When a battalion or the division artillery has started from an assumed control it may be necessary to transfer to another control brought forward later by a higher unit. Another case requiring transfer from one chart to another is one in which a map or photo is received after a grid sheet survey has been completed. In both cases the transfer can be effected by restitution or by replotting the survey data (the survey notes should be saved). If the scales of the two charts are the same, the old chart can be placed correctly over the new chart and the points on the old chart pricked through to the new chart.

#### TRAINING OF SURVEY PERSONNEL

Survey personnel must be trained as thoroughly as are the members of the firing battery. Consider the training methods used in the firing batteries: Each member of the gun squad is so thoroughly trained in his duties that their performance is automatic. When each member of the squad has been trained the squad is put together for squad training and this is followed by the training of the firing battery as a whole. The same procedure must be followed in training survey personnel. For example, the transitman must be as expert in handling his transit

as the gunner is his sight. The tape and rodman must be taught to tape distances rapidly and accurately, and to use the aiming circle. The recorders and computers must be trained in recording, in trigonometric calculations, the use of logarithms, computation of base angles, and the use of plotting equipment. The survey officer and chief of party must know the duties of all individuals of the survey party. When each individual has been trained in his job he is given instruction in the duties of other members of the survey party. When the survey party has been trained it must continue working survey problems, to gain speed and for the men to "keep their hand in." The proper drill for a survey party is *surveying*, solving the many types of survey problems which may arise in combat. The training and drill methods used for the firing battery must be applied to the survey party. We all recognize the need to keep the firing battery intact and to drill it every day; if we are to have proper survey we must follow the same plan for survey personnel.

#### STANDING OPERATING PROCEDURE

Although every survey problem is different, and each of the three tasks of the battalion survey will differ in each situation as to relative difficulty of performance, survey operations must be standardized as far as possible. The division of the battalion survey into the three tasks of target area survey, position area survey, and connection survey; and the division of the survey personnel to perform these three jobs simultaneously, are the principal parts of the standing operating procedure. In addition, within each of the three groups there must be a standing operating procedure. For example, when the survey officer designates to the target-area survey group the points to be located and the base to use, each member of the target-area survey group knows what he is to do. The survey officer's designation of points to be located and the base to use are comparable to the commands announced by a battery executive to a gun squad.

#### SUPERVISION OF SURVEY

The survey officer is responsible that his survey data are applied by the battalion. The best survey data are of no value if mistakes are made in applying them.

The survey officer must insure that each battery executive has the correct base angle, and that he understands where he is to place his aiming circle and the location of the orienting line. The base angle given a battery executive should be written on a piece of paper and given to him in this form. The location of the executive's aiming circle must be marked by a stake, and the battery gun marker must be instructed as to its location. The stakes on the orienting line must not be confused with other marking stakes. A good plan is to have orienting lines stakes painted a distinctive color, and to use these stakes for no other purpose.

On the charts furnished the fire-direction center the base point and check points and the battery positions must be

plainly marked. If survey data are reported to the fire-direction center, the survey officer should check the fire-direction center charts at the earliest opportunity.

#### BATTALION COMMANDER'S ORDER

In his order to his survey officer the battalion commander should include the following:

- (1) Chart to be used.
- (2) Battery survey personnel available for survey.
- (3) Situation.
  - Normal and contingent zones.
  - Time available for survey.
  - Registration.
- (4) Division artillery survey control.
- (5) Base point and check points.
- (6) Location of the batteries.

The above is a check list, not an arrangement of the sequence of the battalion commander's order for survey. The battalion commander's order will usually be in fragmentary form, each item being given his survey officer as soon as known. Below is discussed each element of the battalion commander's order to his survey officer.

The battalion commander prescribes the chart to be used only when the area to be surveyed falls on more than one chart. This will often be the case when overlapping wide-angle photos are available. Often it will not be necessary to mention the chart, since this is understood. When the observed-fire chart is to be used initially, the battalion commander so states.

Some battery survey personnel is necessary if the three survey tasks are to be performed simultaneously. When the battalion commander decides to occupy position or to displace he can determine what battery survey personnel can be made available to his survey officer. This should be decided as early as possible in order that the battery personnel designated may be on hand for the survey. The extremes as to battery survey personnel available are a rapid and a deliberate occupation of position. In a rapid occupation of position, when battery commanders must conduct observed fires and the battalion fire-direction center will use initially the observed-fire chart, the battery commanders need all their personnel and none should be made available to the survey officer. On the other hand, in a deliberate occupation of position the survey personnel of all batteries can and should be made available to the survey officer. In between these two extremes, either one or two battery survey parties can be given to the battalion survey officer.

The designation of the normal and contingent zones indicate to the survey officer the target area to be surveyed. Priority of course is given to the survey of the normal zone. Since the contingent zone will often be the normal zone of another battalion the battalion survey officers can often exchange survey data.

When the battalion commander specifies the time available for the survey, the survey officer plans the

amount of survey he can perform before the charts must be delivered to the fire-direction center. As a minimum the charts must have plotted on them the horizontal and vertical locations of the batteries and the battalion base point. (If the base point is not identifiable on the ground then the chart must include at least one check point. In case the observed-fire chart is to be used initially, the base point must be identifiable on the ground). In addition the orienting line must be staked in and base angles computed, unless the batteries are to register. (See registration status, below.) If the battalion must start shooting before the minimum survey can be completed, the observed-fire chart should be used initially. Based on the time available and his survey officer's estimate as to how much survey can be accomplished, the battalion commander decides whether or not to use the observed-fire chart. When the survey initially is incomplete or the observed-fire chart is used, a complete survey is performed and the surveyed chart replaces the chart based on hasty survey or the observed-fire chart.

The orders concerning registration should be made known to the survey officer since this affects the amount of survey to be performed. When there is no restriction on registration and the battalion commander decides to have all batteries register, the computation of base angles is unnecessary. By registration the batteries are laid for direction more accurately than is possible by survey. Thus registration by all batteries reduces the amount of survey necessary. When one battery only is to register (and thus be laid for direction), the non-registering batteries are laid for direction by base angles determined from the adjusted base angle of the registering battery, adding (for batteries to the right) or subtracting (for batteries to the left) the angle of intersection between base lines. When one or more batteries are to be laid for direction by registration, the base point must be identifiable on the ground and located on the

chart. The orienting line is always staked in. When registration is prohibited, survey must be complete.

Such division artillery survey control as may be known to the battalion commander is passed on to his survey officer. Often the division survey control will be information as to where contact can be made with the division artillery topographic platoon. Lacking division artillery survey control, the battalion commander (or his survey officer) selects Points A and B; and the survey officer establishes his own survey control, using the methods discussed in Part II.

The battalion commander selects the battalion base point and check points as soon as he arrives at an OP. In case the survey officer precedes the battalion commander to the area to be surveyed, the survey officer selects the battalion base point and check points in order that the survey may be started. Later the battalion commander secures a report from his survey officer as to the points he has selected. The battalion commander indicates any additional points to be located.

On his reconnaissance of the position area the battalion commander should take with him the officer or noncommissioned officers in charge of the position area survey. As soon as the battalion commander has designated the positions of the batteries, the position area survey can be started.

With trained survey personnel the battalion commander's orders to his survey personnel will be few. By standing operating procedure the battalion commander and survey officer understand each other. It is important that the survey officer get early information of the battalion commander's plan.

*[In the next issue Lt. Col. Gjelsteen will discuss "Division Artillery Survey Control."]*



*"No! You can beg all you want—I still won't eat any breakfast!"*



# COMMENTS ON THE WAR

## LORD GORT

The recent publication of Lord Gort's *Despatches*<sup>1</sup> gave to the world one of the very few official documents to come out of the war so far, and it is believed that they are deserving of more attention than they have received in this country. In England they aroused considerable comment, which varied widely in tone. To Field Marshal Lord Birdwood, for instance, the *Despatches* demonstrated that Lord Gort was "a fine commander." But to H. G. Wells, on the other hand, they were "shocking" and "dismaying," and showed "some of the very worst qualities of a seasoned military character." It may be doubted if the document furnishes sufficient material to support either of these views, for it comprises only thirty-five pages, and gives but one side of the picture. Nevertheless, in it can be found much which will be invaluable when the final evaluation is made of Lord Gort's command of the British Expeditionary Force in France.

John Standish Surtees Prendergast Vereker, sixth Vixcount Gort and Baron Kiltarton, was born July 10, 1886. While at Harrow he succeeded to his title (1902), and in 1904 he entered the Royal Military College, Sandhurst. The next year he passed into the Army, and, as is customary for peers, was gazetted to a Guards regiment, in this case the Grenadiers. At the outbreak of the Great War he was aide to the general officer commanding the London District. He was at once promoted captain and sent to France, where he was to make a record of great distinction with his regiment. Four times wounded, the Armistice found him a brevet lieutenant colonel. He received nine mentions in the despatches, the Military Cross, the Distinguished Service Order with two bars, and the Victoria Cross. The highly coveted V. C. was awarded to him for an action near Flesquieres, on the Canal du Nord, in September, 1918. He was wounded early in the action while leading his men across the Canal under heavy fire. In spite of the wound, he crossed open ground and boarded a tank from which point he directed enfilading fire upon the enemy. He was again wounded, but when his men began to fall back he took charge of the operations from his stretcher, and they succeeded in taking their objective.

After the war Lord Gort was successively an instructor at the Staff College, Camberley, first general staff officer of the Shanghai Defense Force and later of the 4th

Division, and commanding officer of the Grenadier Guards. In November, 1932 he was assigned as Director of Military Training in India with the rank of brigadier, and three years later was made a major general. In March, 1936 Gort became the commandant of the Staff College. It was in the next year, however, that he first attracted wide attention, for it was then that Leslie Hore-Belisha, the reforming Secretary of State for War, chose Gort to be his military secretary. A few months afterwards, on December 4, 1937, Lord Gort succeeded Field Marshal Sir Cyril Deverell as Chief of the Imperial General Staff.

There were many noteworthy aspects to this appointment, but chief among them was the fact that Lord Gort was, at the time he succeeded to supreme command, only 51 years of age. Great enthusiasm was aroused by the promotion of the new C. I. G. S. The foreign correspondent of the *New York Times* cabled, "Already the old seniority rule is doomed and the democratization of the British Army has become a live public issue at last. It (Lord Gort's appointment) is the most revolutionary thing that has happened in this tradition-ridden kingdom in many a year"; and although Gort was both a peer and a Guards officer, Mr. Kuhn nevertheless felt that "the 'feudal character' of army leadership has been swept away." In England, General Sir Ian Hamilton briefly commented, "Thank God we are under the command of a proper soldier and shall not be shot sitting." For our purposes perhaps the most important thing to note is that Lord Gort as C. I. G. S. was able to exert a powerful influence on the formation of the command he was later to take to France.

At the outbreak of the war, on September 3, 1939, General Lord Gort took command of the British Expeditionary Force, and was succeeded as C. I. G. S. by General Sir William (now Field Marshal Baron) Ironside. Although advance parties began landing in France as early as September 4, the B. E. F. as a whole did not begin to cross until the 10th. Because of the possibility of air attack, the Channel ports were not used, as they had been in 1914, and instead the B. E. F. was landed at the western ports of France. The troops disembarked at Cherbourg, while their stores and vehicles were sent to Nantes, St. Nazaire, and Brest. On the 13th Gort moved his headquarters from the War Office to Camberley, where General Headquarters was forming. The next day he left for France in H. M. S. *Skate*, accompanied

<sup>1</sup>Supplement to *The London Gazette* of Friday, the 10th of October, 1941.

by Lieutenant General Sir John Dill (later Field Marshal and C. I. G. S.), commander of the I Corps. They landed at Cherbourg, from which point they went by automobile to the Chateau de la Blanchardiere at Le Mans, which the French government had placed at Gort's disposal.

By the 21st of September the concentration of the GHQ staff was complete, and the next day the advance elements of the I Corps arrived. An assembly area had been chosen between Le Mans and Laval, two towns about fifty miles apart. The distance between the base ports and the assembly area averaged about 150 miles. Although its reorganization was not complete, the I Corps was compelled to move forward out of the assembly area when, on September 26, the leading units of the II Corps (Lieutenant General Sir A. F. Brooke, now C. I. G. S.) began to arrive.

The problem of the frontage to be occupied by the B. E. F. now came to the fore, and General Gamelin was then in London discussing this question with the British government. On September 22 Gort received from General Georges a telegram outlining the extent of this frontage. On the 24th and 25th Gort made a reconnaissance of the proposed sector. The next day, in company with his chief of staff Lieutenant General H. R. Pownall (who recently took over the Far East command from Air Chief Marshal Sir Robert Brooke-Popham), Gort visited General Georges at Grand Quartier General, and agreed to accept this position. "This sector was from Maulde exclusive to Halluin inclusive, and thence a defensive flank along river Lys Armentieres." Georges put the French 51st Division under Gort's command, and the latter placed it on his left between the towns of Roubaix and Tourcoing.

The original plan called for the units of the B. E. F. to move from their assembly area to a concentration area in the north of France, from which point they would move up to the front beginning October 5. Georges, however, desired to hasten this process, and the I Corps correspondingly began to move on the 250 mile trip from the assembly area to the front on September 26. On October 3 the I Corps took over the right section between Maulde and Brusson, with the 2d Division (Major General H. C. Lloyd) in the right, and the 1st Division (Major General Hon. H. R. L. G. Alexander) on the left. GHQ was installed at Habarcq on the 2d of October.

It will thus be noted that a full month elapsed between the outbreak of the war and the arrival of the first British corps at the front. It is plain that the Allies contemplated no such lightning attack as the Germans eventually delivered in May of the next year. Had the Germans delivered such an assault in September, 1939, the campaign might well have been decided before the B. E. F. could have arrived in sufficient strength to affect the issue.

On October 12, the 3d Division (Major General B. L. Montgomery) of the II Corps, moved into the line between

Bouvines and Lannoy. The 4th Division (Major General D. G. Johnson) of the II Corps, was held in GHQ reserve. The initial movement of the B. E. F. to the front was therefore complete.

During October the November reinforcements arrived, and on December 1, the 4th Division was thus able to take its place at the front to the left of the 3d Division. In so doing the 51st French Division was relieved, withdrawn from Gort's command, and returned to the French. The 5th Division (Major General H. E. Franklyn), was organized and took its place in the line on the left of the 4th Division on December 30. In January the 48th Division (Major General A. F. A. N. Thorne) arrived in France and was assigned to the I Corps, but held in GHQ reserve.

At the end of January, 1940, therefore, the B. E. F. consisted of two corps of three divisions each. The right sector was held by the I Corps with the 2d Division on the right, the 1st Division on the left, and the 48th Division in reserve. The left sector was held by the II Corps, with the 3d Division on the right, the 4th Division in the center, and the 5th Division on the left. At the same time the air component consisted of eight wings under the command of Air Vice-Marshal C. A. B. Blount.

The B. E. F. was holding a section of the Franco-Belgian frontier, and thus was not in contact with the enemy. It was considered desirable that opportunities for combat experience be presented, and therefore an arrangement was made with the French whereby a small sector on the Saar front would be allotted to the British. This front was to be occupied by a British brigade, and it was planned that each brigade in the B. E. F. would have a short tour of duty in the Saar sector. The first brigade took over its sector on the Saar front on December 4, and the several brigades successively relieved each other thereafter until the outbreak of active operations. The terrain of the British front along the Belgian frontier was flat, wooded sections alternating with rolling farm land, the whole being intersected by many small streams. At the time the British arrived they found that the French had almost completed a tank obstacle in the form of a continuous ditch covered by concrete block-houses mounting antitank guns. This work was taken over by the British, who immediately commenced to improve their position by building defensive works of all types on an extensive scale, using the best equipment and machinery available.

Under the original plan two more corps were to join the B. E. F., to be made into a second army. The III Corps (Lieutenant General Sir Ronald Adam, Bt.), was to arrive in February, 1940, and the 51st Division (Major General V. M. Fortune), was duly disembarked at that time. At the same time the 50th Division (motorized; Major General G. le Q. Martel), arrived and was assigned to the II Corps. However, the departure of the

rest of the III Corps was delayed by the British Government, and the 42d Division (Major General W. G. Holmes), and the 44th Division (Major General E. A. Osborne), did not arrive until the end of March. At that time the 51st Division took over a sector from the French, and extended the British line on the left from Armentieres to Croix de Poperinghe. The 44th and 42d Divisions were held in reserve.

Circumstances were to rob Lord Gort of two divisions. When the Germans invaded Denmark and Norway (April 9), the 5th Division was withdrawn from him. One brigade (the 15th) was sent to England en route for Norway, and the other, although left in France, was placed under War Office control. At about the same time it was decided to increase the Saar detachment from a brigade to a division. The 51st Division was chosen, and on May 7, it moved into line on the Saar front. The 51st Division, therefore, was not under Gort's command during any of the operations which commenced three days later. The III Corps front west of Armentieres was taken over by the 42d Division.

At the outbreak of active operations on May 10, the British front was as follows: I Corps on the right (2d, 1st and 48th Divisions); II Corps in the center (3d, 4th and 50th Divisions); and III Corps on the left (42d and 44th Divisions). The position had been strengthened by the construction of over 400 concrete pillboxes and more than 40 miles of revetted antitank ditch.<sup>2</sup> There was, however, a shortage of ammunition, and of guns in the antitank units in the Royal Artillery. There was no armor-piercing ammunition for field guns. As to planes and tanks, the British Air Force in France was placed under the control of Air Marshal A. S. Barratt (January 15, 1940), although the original air component of the B. E. F. was left under the "operational control" of Lord Gort. Divisional cavalry regiments had been grouped into armored reconnaissance brigades. The only armored division available remained in England, despite Lord Gort's request for it. Motor vehicles completely supplanted horses in the B. E. F.

Soon after the arrival of the B. E. F. in France, Lord Gort was invited to consider what should be the part of his command in the event of an Allied advance into the Low Countries. Gort's reaction to this suggestion is significant: "The question of such an advance was one of high policy with a political as well as a military aspect; it was therefore not for me to comment on it." In a consequence the plans were made by the French High Command, and they were three in number.

These plans were drawn up during October and November, 1939, and may be briefly summed up as follows. The first plan called for the holding of the frontier defenses in force, and for advanced elements to be pushed

out to the line of the Escaut river. However, the French High Command became convinced of the ability of the Belgians to hold their lines along their eastern frontier and the Albert Canal, and much confidence was placed in the tank obstacle the Belgians were building between Wavre and Namur. Therefore the French soon abandoned this first plan.

The second plan called for an Allied advance in force to the Escaut river: this was known as the E plan. The third plan outlined an advance still farther to the east, to the line of the Dyle river; this was known as the D plan. Gort and Georges discussed these two plans on October 13 and on November 16, and at the latter meeting the role of the B. E. F. in the D plan was determined.

The Allied armies were to advance to the line Namur-Wavre-Louvain-Antwerp. On the left of the B. E. F. was the French 7th Army (General Giraud), which was to march north and occupy the Antwerp-Ghent area, and then, if conditions were favorable, push forward to the Turnhout-Breda line. This movement would extend the Allied line north into Holland and would leave a space between the French 7th Army and the B. E. F., which was to be filled by the Belgian Army as it fell back from the frontier. The Belgians were to hold the line between Louvain and Antwerp. The B. E. F. was to make a sixty-mile march to the line between Louvain and Wavre, covering Brussels. Next to the south was the French First Army (General Blanchard), which was to hold the line between Namur and Wavre. The principal mission of this army was to block the so-called Gembloux gap, which contained no natural antitank obstacle. The Cavalry Corps (mechanized; General Prioux), was attached to the French First Army, and was to push forward to the line Eghezee-Tirlemont. The hinge that connected this group of field armies with the fortress troops in the Maginot Line was the French Ninth Army (General Corap), which held the area around Sedan.

At 4:30 on the morning of May 10 German planes appeared over Gort's headquarters near Arras and bombed airfields in the neighborhood. An hour later a pre-arranged signal denoting readiness to advance into Belgium was received from Georges. Gort immediately applied to the War Office for the release of the 5th Division, which was granted. At 6:15 Gort was instructed to put plan D into effect.

The 12th Lancers (armored cars), which were to lead the advance, could not move out until 1 PM, and this time correspondingly was set as zero hour. At the same time Gort opened his command post at Wahagnies, between Douai and Lille. German aircraft offered almost no opposition, and the 12th Lancers reached the Dyle at 10:30 PM.

On the afternoon of May 11, the leading British brigades had reached the Dyle, and by the next day had completed the occupation of the new position. To the right was the I Corps (in command of which Lieutenant

<sup>2</sup>Three divisions used primarily as labor units were sent over in April; the 12th (Major General R. L. Petre), the 23d (Major General W. N. Herbert), and the 46th (Major General H. O. Curtis).

General M. G. H. Barker had succeeded Sir John Dill), with the 2d Division on the right and 1st Division on the left. To the left of the I Corps was the 3d Division of the II Corps, extending the line to Louvain.

In the afternoon of May 13, a conference was held at Chateau Casteau, which was attended by King Leopold of the Belgians, his military advisor General Van Overstraeten, Daladier, Georges, Pownall, and General Billotte. The latter commanded a French army group consisting of the Seventh and First Armies. Between them were the Belgian and British armies. The object of the conference was therefore to inquire whether King Leopold and Gort would accept coordination from Billotte. The King assented, and Pownall agreed for Gort. The same day Gort moved his command post forward to Renaix. On the 14th Gort went to Brussels, to confer with his corps commanders, who informed him that the retreat of the Belgian I Corps was congesting the II Corps area. Gort arranged with King Leopold for the readjustment of the Belgian line.

May 15th, the Dutch army surrendered, causing the French Seventh Army to withdraw. The II Corps position was penetrated northwest of Louvain, but the line was restored by counterattack. On the right the French First Army was forced back. In order to keep contact with the French it became necessary for the I Corps likewise to withdraw its right. But the most serious news came from the south, where the Germans had crossed the Meuse and broken into the French Ninth Army front between Sedan and Mezieres.

With Allies on both flanks giving away it was plain that the British front could not be much longer maintained on the Dyle, and on the 16th Gort sent a messenger to Billotte for instructions. The reply called for a withdrawal to the Escaut in three steps: to the Senne on the night of May 16-17; to the Dendre on the night of May 17-18; and to the Escaut on the night of May 18-19. This movement was duly carried out, with little interference from the enemy. On May 18, Gort transferred his command post from Renoir back to Wahagnies.

Meanwhile, the German breakthrough to the south was endangering the rear GHQ near Arras. The three labor divisions—the 12th, 23rd, and 46th—were ordered from the Line of Communications to take up a position on the Canal du Nord covering Arras. Since they were without artillery, guns had to be supplied from the ordnance reserve. On the 19th, GHQ left for Boulogne. At the same time Billotte issued an order placing Arras in the area of the French First Army, which relieved Gort of responsibility for it, although the defense was still carried on by British troops. By May 18 the Germans had effectively severed the communications of the B. E. F. in Belgium with its bases to the south. The next day, in Gort's words, "The picture was now no longer that of a line bent or temporarily broken, but of a besieged fortress."

An obvious solution was to break out to the south, and join hands with the Allied forces there. The morning of May 20, Ironside arrived from London with such a plan, calling for Gort to launch an attack with seven divisions south towards Amiens. Gort argued that such a move was impossible with the Germans pushing him on the east and north, and suggested instead that two divisions be used. Ironside agreed,<sup>3</sup> and the 5th and 50th Divisions under General Franklyn were given the task. On the 21st, this force together with the French Cavalry Corps attacked near Arras, but by the 23rd they were forced to give up the attack and fall back. The same day the War Office sent Lieutenant General Sir Henry Karslake to take charge of the British troops cut off to the south by the German thrust to the Channel.

The project for an attack south was not dead. Weygand (who had taken over supreme command from Gamelin on May 19) had a new plan for a concentric attack on the German corridor from both the north and south, which was vigorously endorsed by Reynaud and Churchill. Gort appointed Sir Ronald Adam to consult with General Blanchard<sup>4</sup> regarding arrangements for the attack, and for this three French and two British divisions were to be employed. The attack never came off because the crumbling of the Belgian line to the north seriously menaced the British left. Gort also decided to fall back behind the Lys, and in these decisions he was supported by Sir John Dill, the new C. I. G. S. then at Gort's headquarters.

The organization of the Dunkirk bridgehead was the next problem and this also was assigned to Sir Ronald Adam, who was relieved of the command of the 3d Corps by Major General S. R. Wason (evening of May 26). The Dunkirk perimeter, as it was called, followed canals from Dunkirk to Bergues, and thence across the Belgian frontier to Furnes and Nieuport. The perimeter was divided into three corps areas, and on the 27th the troops began to occupy it. Progress was almost hopelessly complicated by great crowds of refugees and savage German air attacks. At midnight, May 27, the King of the Belgians surrendered.

By May 29, the occupation of the perimeter was completed, and the embarkation of the II and III Corps begun. The evacuation was made even more difficult by the presence of great numbers of French and other Allied troops, for whom no boats had been provided. Gort was under orders to the effect that when his command had been reduced to the size of a corps he should relinquish it and return to England. This became the situation on the evening of May 31, and accordingly at 6 PM he turned over the command to General Alexander of the I Corps. Gort embarked on H. M. S. *Hebe*, and arrived in England at 2 AM on the morning of June 1. Alexander completed the evacuation by midnight of June 2.

<sup>3</sup>Ironside likewise consented to Gort's request to withdraw from the Escaut to the Lys.

<sup>4</sup>Blanchard had succeeded Billotte when the latter was fatally injured in an automobile accident on the night of May 21.

Altogether, 211,532 fit men and 13,053 casualties of the B. E. F. were evacuated, in addition to 112,546 men of the Allied armies.

Gort summed up the campaign in these words: "The series of situations which the B. E. F. had to face was not brought about by failure on their part to withstand enemy attacks when holding a position of their own choosing: it was caused by the enemy breaking through completely on a front many miles away from that held by the B. E. F." It would be hard to refute this statement. The B. E. F. was simply the central unit of a group of five armies, with the French Ninth and First Armies on its right, and the Belgian army and the French Seventh Army on its left. The movements of the B. E. F. were governed by the actions of its Allies on the flanks: it certainly could not be said that the British were forced to retire because of enemy action on their own front. It is therefore difficult to see how Lord Gort could have acted in any other way than he did, and in consequence strong criticism of him as an army commander seems unjustified.

The essence of the Allied defeat was Plan D—the advance to the Dyle. In leaving their fortified lines to march into Belgium, the Allies were merely making the German task easier by walking into their trap. Once the Allied field armies were safely committed in Belgium, the Germans had merely to break through the weakened hinge at Sedan and the trap was closed. The first plan—which the French High Command apparently abandoned after the briefest consideration—would seem to have been far better: namely, to hold in force the frontier defenses upon which they had extended so many months of labor and push out advanced units to the line of the Escaut. A straight front, on a prepared position, would thus have confronted the Germans, and while they might have defeated the Allies in any case, the opportunity for the diversion of the Allied armies, and the encirclement which ended at Dunkirk at least would not have been presented.

Gort nowhere says whether or not he approved of Plan D, but it is apparently in reference to it that he makes the following statement: "It would not be appropriate in this *Despatch* to discuss questions affecting the higher command of the Allied forces: on these matters I received orders from H. M. Government and through the French commanders under whom I was placed." Here, it may be argued, Lord Gort is most open to criticism, in spite of the fact that his attitude was correct from a military standpoint. If he disapproved of Plan D, Gort should have made the strongest representations to his government. It will be remembered that Haig did not hesitate to do so when in a similar position during the Great War. Although only one of several army commanders among the Allied forces, Gort was the representative of France's most powerful ally, and as such his protest would certainly have been given the most serious consideration. To repeat, if in fact Gort did disapprove of Plan D, he cannot be exonerated from a share of the responsibility for its failure simply on the grounds of obedience to orders.

After Dunkirk, Gort was made Inspector General for Training in England, and then sent out to Gibraltar as commander in chief. Charged with the defense of Britain's last foothold in Europe, Lord Gort has once more been given the difficult task of maintaining the keenness and morale of a force during the wearisome period before the delivery of an expected attack. In his New Year's message for 1942, Lord Gort remarked: "Our daily lot is to combat the irksome routine imposed upon us by life inside a fortress, but we must stand constantly on guard, ever alert, ever vigilant, and should the war reach Gibraltar we shall defend the fortress with the determination worthy of its long and glorious past." And it is not beyond the bounds of possibility that Lord Gort will once again face the enemy in his new post.

—H. S. F.

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## Organizations and Individuals Please Note:

The FIELD ARTILLERY JOURNAL is not a branch of the War Department. It has no pipe line to the AGO's office nor to the Operations Section of the GHQ. Addresses of subscribers will be changed—and cheerfully—as often as desired. *But only on notification* sent in by the subscriber. Please cooperate.

# ANNUAL MEETING, UNITED STATES FIELD ARTILLERY ASSOCIATION

## MINUTES OF MEETING

In accordance with the call of the Executive Council, the thirty-second annual meeting of the United States Field Artillery Association was held at the Army and Navy Club in Washington, D. C., at 5:30 PM. December 15, 1941. The President, Major General Robert M. Danford, presided.

A quorum was present in person or by written proxy for the transaction of business.

It was moved, seconded, and carried that the reading of the minutes of last year's annual meeting be dispensed with, these having previously been printed in the JOURNAL.

The Secretary-Treasurer presented and read his annual report and financial statement, which are appended hereto and made a part of the minutes.

The President had previously appointed Lieutenant Colonel J. V. Phelps and Major S. L. Cowles to audit the financial statement. At the direction of the chair, the Secretary read the report of the auditors, which stated that the auditing had been performed and the financial statement had been found to be correct. A motion was made, seconded, and carried, to approve the annual report and financial statement.

The President stated that the annual report was gratifying and indicated considerable progress in the affairs of the Association.

The President stated that there were six vacancies in the Executive Council, caused by the expiration of terms of office of Brigadier Generals F. C. Wallace, J. A. Crane, W. H. Sands, C. C. Haffner, Lieutenant Colonels E. S. Ott and R. C. Bishop. A nominating committee consisting of Lieutenant Colonels J. A. Stewart and Thomas North had been appointed. The chairman of this committee read his report, in which the committee submitted the names of Brig. Generals W. H. Sands and C. C. Haffner, Colonel R. W. Beasley, and Lieutenant Colonels R. C. Bishop, A. L. Campbell, and M. W. Daniel, to fill the vacancies. After opportunity had been given for further nominations, a vote was taken which resulted in the unanimous election of the choices of the nominating committee.

The President stated that, as has been announced in the JOURNAL for the required period of time, several amendments to the Constitution had been proposed. These proposed amendments are as follows:

Article V. Combine sections 3 and 4 to read: Active and associate members shall be entitled to receive the JOURNAL without payment other than the annual dues.

Article VI, Section 1: The Executive Council shall be composed of nine active members, five of whom shall be officers of the regular army, two officers of the National Guard, and two officers of the Field Artillery section of the Officers' Reserve Corps, to be elected biennially for a term of two years by a majority vote; such majority vote to consist of a majority of active members present or represented by written proxies at a meeting of the Association. The Council shall hold its meetings at the

headquarters of the Association, which shall be in the city of Washington.

Article VII, Section 1: The regular meetings of the Association shall be held annually at Washington, D. C., or at such other place as may be designated by the Executive Council, who shall also prescribe the time of meeting and give at least thirty days' notice of same, by publication in THE FIELD ARTILLERY JOURNAL or by such other means as the Council may prescribe.

Article VII, Section 3: Special meetings may be called by the Executive Council, upon written request therefor signed by twenty members. At least thirty days' notice thereof shall be given in THE FIELD ARTILLERY JOURNAL, or by mail, to active members. The object of the meeting shall be stated in the request and in the notice.

Article VII, Section 4: The number of active members at a meeting or represented thereat by written proxies, shall constitute a quorum, except as provided in Article IX.

It was moved, seconded, and carried, three-fifths of the active members concurring, that the foregoing amendments to the Constitution be made.

The meeting adjourned.

ROBERT M. DANFORD,  
Major General, U. S. Army,  
President

W. S. NYE,  
Major, Field Artillery,  
Secretary-Treasurer

### ANNUAL REPORT OF THE SECRETARY-TREASURER FOR YEAR ENDING NOVEMBER 30, 1941

<i>Assets November 30, 1940</i>			
Gov't. bonds, value 11/30/40 .....	\$ 9,510.00		
Securities, cash value .....	10,018.92	\$19,528.92	
Balance checking acct. 11/30/40 .....		3,166.26	
Net worth, Nov. 30, 1940 .....			\$22,695.18
<i>Assets November 30, 1941</i>			
Gov't. bonds, value 11/30/41 .....	\$13,458.00		
Securities, cash value .....	8,972.50	\$22,430.50	
Balance in checking account 11/30/41 .....		3,176.96	
Net worth Nov. 30, 1941 .....			\$25,607.46
Net gain for year ending November 30, 1941 .....			\$2,912.28
<i>Total assets, November 30, 1941</i>			
Securities .....		\$22,430.50	
Cash .....		3,176.96	
*Inventory (furniture, fixtures, and supplies) .....		2,588.35	
Total .....			\$28,195.81
Cash value of securities 11/30/40 .....	\$19,528.92		
Cash value of securities 11/30/41 .....	22,430.50		
Net gain in value of securities .....	\$2,901.58	\$2,901.58	
Excess of receipts over expenditures for fiscal year 1941 .....		10.70	
Net gain for fiscal year 1941 .....			\$2,912.28

\*Not previously carried as assets.

The following is a detailed statement of receipts and expenditures for the fiscal year 1941, as compared with fiscal year 1940:

RECEIPTS		
	1940	1941
Membership dues .....	\$13,083.85	\$29,090.77
Books and Magazines .....	1,619.25	6,700.40
Visiting Cards .....	86.78	457.80
Interest on securities .....	554.63	506.42
Miscellaneous .....	49.19	9,238.80
Total receipts .....	\$15,393.70	\$45,994.19
Balance in checking account November 30, 1940 .....		3,166.26
		\$49,160.45
EXPENDITURES		
Printing and mailing THE FIELD ARTILLERY JOURNAL .....	\$ 6,157.85	\$19,020.18
Authors, engravers, artists, photographers .....	2,333.25	6,694.27
Job printing .....	1,169.14	1,629.11
Office equipment .....	261.60	1,504.16
Office supplies .....	124.86	333.09
Postage .....	710.34	1,535.78
Books and magazines .....	927.27	4,584.63
Services .....	2,352.48	3,981.60
Insurance and Tax .....	71.02	98.80
Donations .....	27.00	32.00
Government bonds .....		3,700.00
Visiting cards .....	91.39	356.91
Rent .....	*510.43	495.00
Telephone .....		106.03
Petty cash .....		249.49
Temporary services .....		245.21
Refunds .....		135.20
Unpaid checks returned by bank .....		160.58
Miscellaneous .....	647.78	1,121.45
Total expenditures .....	\$15,384.41	\$45,983.49
Balance in checking account November 30, 1941 .....		3,176.96
		\$49,160.45

Receipts for year ending November 30, 1941	\$45,994.19
Expenditures for year ending November 30, 1941 .....	45,983.49
Excess of receipts over expenditures for fiscal year 1941 .....	\$10.70

\*Telephone service included in this amount.

It should be noted that an inventory of furniture, fixtures and office supplies is now included in the annual report, as a part of the assets of the Association.

There are now about 11,400 paid subscribers, which is an increase of 260% over last year. However, there is still room for vast improvement in this field, and the assistance of all members is solicited in bringing the JOURNAL to the favorable attention of nonsubscribers. This is our principal means of promoting its growth; and in a mutual organization it is greatly to the advantage of each of us to do so.

It is hoped that in the near future a copy of the Constitution, together with a brief history of the Association, may be printed and distributed to all members.

The only "dark spot" on the immediate horizon is that the JOURNAL must move its offices at once to another building, located at 1218 Connecticut Avenue, Washington, D. C. This, no doubt, will cause some initial difficulty in receipt of mail; and the cooperation of all concerned is asked.

W. S. NYE,  
Major, Field Artillery,  
Secretary-Treasurer

## SOLUTIONS TO AMMUNITION SUPPLY PROBLEM (page 115)

### FIRST REQUIREMENT

<i>Battery A</i>			
3:00 PM-6:30 PM, 10 January .....	8 × 4 × 3.5	or	112 rounds
6:30 PM-12:00 M, 10-11 January .....	2 × 4 × 5.5	or	44 rounds
12:00 M-5:30 AM, 11 January .....	2 × 4 × 5.5	or	44 rounds
5:30 AM-6:30 AM, 11 January .....			120 rounds
6:30 AM-8:00 AM, 11 January .....			70 rounds
8:00 AM-9:00 AM, 11 January .....			50 rounds
Total for Battery A .....			440 rounds
<i>Battery B</i>			
3:00 PM-6:30 PM, 10 January .....	6 × 4 × 3.5	or	84 rounds
6:30 PM-12:00 M, 10-11 January .....	2 × 4 × 5.5	or	44 rounds
12:00 M-5:30 AM, 11 January .....	2 × 4 × 5.5	or	44 rounds
5:30 AM-6:30 AM, 11 January .....			110 rounds
6:30 AM-8:00 AM, 11 January .....			100 rounds
8:00 AM-9:00 AM, 11 January .....			60 rounds
Total for Battery B .....			442 rounds
<i>Battery C</i>			
3:00 PM-6:30 PM, 10 January .....	4 × 4 × 3.5	or	56 rounds
6:30 PM-12:00 M, 10-11 January .....	2 × 4 × 5.5	or	44 rounds
12:00 M-5:30 AM, 11 January .....	2 × 4 × 5.5	or	44 rounds
5:30 AM-6:30 AM, 11 January .....			140 rounds
6:30 AM-8:00 AM, 11 January .....			90 rounds
8:00 AM-9:00 AM, 11 January .....			70 rounds
Total for Battery C .....			444 rounds

Battery A .....	440	rounds
Battery B .....	442	rounds
Battery C .....	444	rounds
Total for battalion .....	1,326	rounds

### SECOND REQUIREMENT

<i>Battery A</i>		
1 executive truck at 40 rounds or .....	40	rounds
4 prime movers at 40 rounds each or .....	160	rounds
2 5th section trucks at 60 rounds each or .....	120	rounds
2 5th section trailers at 40 rounds each or .....	80	rounds
Total for Battery A .....	400	rounds
Battery B—same as Battery A or 400 rounds.		
Battery C—same as Battery A or 400 rounds.		
Ammunition Train		
12 Ammunition trucks at 100 rounds each or .....	1,200	rounds
12 Ammunition trailers at 40 rounds each or .....	480	rounds
Total for Ammunition Train .....	1,680	rounds
Battery A .....	400	rounds
Battery B .....	400	rounds
Battery C .....	400	rounds
Ammunition Train .....	1,680	rounds
Total for battalion .....	2,880	rounds

Note—For the above carrying capacities see the Field Artillery School Instruction Memorandum T-1.



## THIRD REQUIREMENT

Predicted ammunition expenditure .....	1,326	rounds
Ammunition for prescribed loads .....	2,880	rounds
<hr/>		
Total .....	4,206	rounds
Minus ammunition on hand .....	491	rounds
<hr/>		
Total ammunition to haul .....	3,715	rounds

## FOURTH REQUIREMENT

The unit of fire for the 105-mm. howitzer is 225 rounds per howitzer.

There are twelve howitzers in the battalion. Therefore the ammunition available is:  $3.2 \times 12 \times 225$  or 8,640 rounds.

## FIFTH REQUIREMENT

Time to load and also unload one ammunition truck with trailer is 20 minutes (see paragraph 101 c, page 180, FM 101-10). At the ASP all vehicles are loaded simultaneously by ASP personnel. For unloading at the howitzer battery positions, battery 5th section personnel and spare cannoners may be used so that all vehicles can be unloaded simultaneously.

At night without lights on secondary or hilly primary roads  $2\frac{1}{2}$ -ton trucks with or without towed loads can travel at the rate of 5-15 miles per hour (see paragraph 31, page 115, FM 6-130). Let us use the average value of 10 miles per hour. Then the time for a one-way trip will be  $18/10$  or 1.8 hours or one hour and forty-eight minutes.

For resupply purposes on good roads each  $2\frac{1}{2}$ -ton truck with trailer can haul 140 rounds of ammunition—100 rounds in the truck and 40 rounds in the trailer. Therefore the total number of trucks with trailers will be  $3715/140$  or 27.

PLAN: Dump now at howitzer battery positions all 5th section vehicles. All 5th section trucks and trailers report empty at 6:20 PM, 10 January, to the Ammunition Train Commander at the Ammunition Train bivouac area. At 6:30 PM (darkness) the ammunition train of 12 trucks and 12 trailers and the 6 5th section trucks with trailers (2 from each howitzer battery) leave the ammunition train bivouac area for the Ammunition Supply Point.

1st Trip: 18 trucks and 18 trailers

Leave Bn Area: 6:30 PM, 10 January

Arrive ASP: 8:18 PM

Leave ASP: 8:38 PM

Arrive Batteries: 10:26 PM

Send the 2 5th section vehicles to their own battery and from each 5th section truck dump at the battery position 40 rounds of ammunition. This will then leave 60 rounds in each 5th section truck and 40 rounds in each 5th section trailer which is the prescribed load for these vehicles. This also reduces to the minimum the labor of handling the ammunition.

Also send to each battery position 3 ammunition train trucks and trailers of 140 rounds each and dump this ammunition ( $3 \times 140$  or 420 rounds) at each battery position. These Ammunition Train vehicles to report back to the Ammunition Train bivouac area when empty. The remaining three Ammunition Train vehicles will report to the train bivouac area and remain loaded.

2nd Trip: 9 Ammunition Train trucks and trailers only.

Leave bn area: 2:30 AM, 11 January

Arrive ASP: 4:18 AM

Leave ASP: 4:38 AM

Arrive Area: 6:26 AM

## Ammunition hauled:

1st trip $18 \times 140$ or .....	2,520	rounds
2d trip $9 \times 140$ or .....	1,260	rounds
<hr/>		
Total .....	3,780	rounds
Predicted haulage .....	3,715	rounds
<hr/>		
Surplus .....	65	rounds

## FIFTH REQUIREMENT

The weight of one round of 105-mm. ammunition packed is 50 pounds (see paragraph 4, page 5, FM 6-130).

## COMMENTS

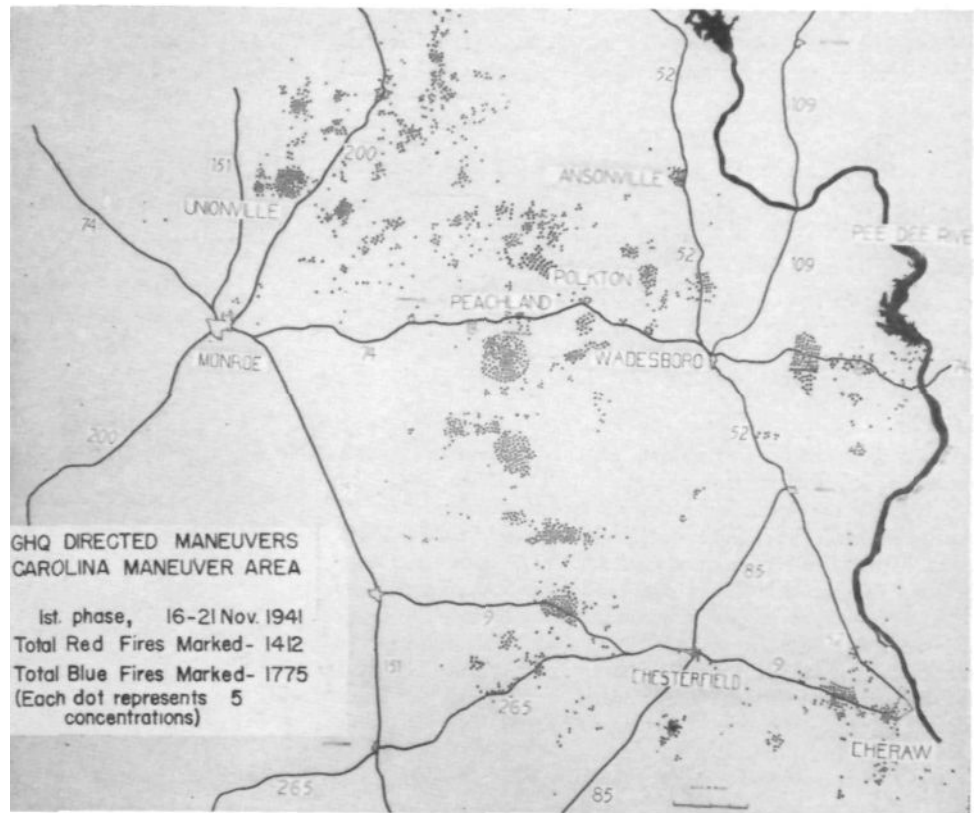
It is to be noted that this is a plan only and may or may not be approved by the battalion commander. In actual practice it is realized that no ammunition train can follow a time schedule to the minute. Each haulage plan will encounter many difficulties. Among these may be mentioned (1) the difficulty of locating the Division Ammunition Office and of getting cleared through that office; (2) the state of the weather—convoys move slowly during inclement weather; (3) the available road net; (4) mechanical failure of trucks; (5) driver fatigue, and (6) enemy air and ground activity. However, devising a sound plan for ammunition resupply taking into consideration and weighing the difficulties to be encountered in its execution is the only way the S-4 together with the Ammunition Train commander can arrive at a logical solution of the problem. S-4 must coordinate his activities with S-3. The impetus of all supply is from rear to front. In this particular problem S-4 hauled 65 rounds of ammunition too much. The blame is neither on the S-4 nor the S-3. The S-3 who can predict ammunition expenditures to the exact round just does not exist. The important point is the staff coordination between the S-3 and the S-4.

An alternate solution would be to use the complete ammunition train (12 vehicles) on each of the two trips and use only 3 5th section vehicles on the first trip. However, by summing up the predicted ammunition expenditures to include midnight it will be noted that about then the ammunition situation will be approaching zero. It therefore seems desirable to haul as much ammunition before midnight as possible.

No mention has been made of fuzes. This is ordinarily handled by the Ammunition Train commander. He requests a sufficient quantity of them by type at the Division Ammunition Office and then draws them at the ASP. The additional weight of a box or two of fuzes on an ammunition vehicle is negligible. Distribution of fuzes is effected in the same manner as other ammunition.

# Artillery Fires

The following statistical analysis of field artillery fires pertaining to the maneuvers of the First Army vs. IV Corps in the Carolinas during the period Nov. 16-30, 1941, has been released by the Artillery Section, GHQ. It merits close attention of all concerned; and shows strikingly the sustained, heavy fire power of artillery as compared to aerial bombing, even in a very fluid situation. While these fires were, of course, all theoretical, they will be called for in actual combat, and must be delivered. Even the very incomplete news of the fighting in Luzon attests again the fact that the *Field Artillery will be heard from on the battlefield.*



DATA ON AMMUNITION

	First Phase	Second Phase	Total
Total Rounds Fired			
Light .....	453,864	280,248	734,112
Medium and Heavy .....	147,192	65,988	213,180
Total .....	601,056	346,236	1,947,292
Average number of rounds fired per Battery			
Light .....	3,152	1,946	5,098
Medium and Heavy .....	1,258	564	1,822
All .....	2,303	1,327	3,629
Average number of rounds per Battery per day			
Light .....	622	572	602
Medium and Heavy .....	248	166	215
All .....	453	390	428
Average rounds per mission			
Light .....	230	208	222
Medium and Heavy .....	116	105	112
All .....	186	170	182
Tons of Ammunition (Projectiles only) Expended			
Light .....	3,313	2,046	5,359
Medium and Heavy .....	6,992	3,134	10,126
Total .....	10,305	5,180	15,485

NOTE: Data on ammunition expended are not taken from ammunition records but are based on the assumption that fires were delivered at prescribed maximum rates for short bursts. These rates should not be decreased for neutralization fires, although the duration of some fires reported indicated that some units were either reducing these rates of fire or were putting an undue amount of ammunition on the targets designated. Weights of ammunition are based on weights of projectiles only.

<sup>1</sup>As compared to: 14,000 bombs theoretically dropped by the two Air Support Commands.

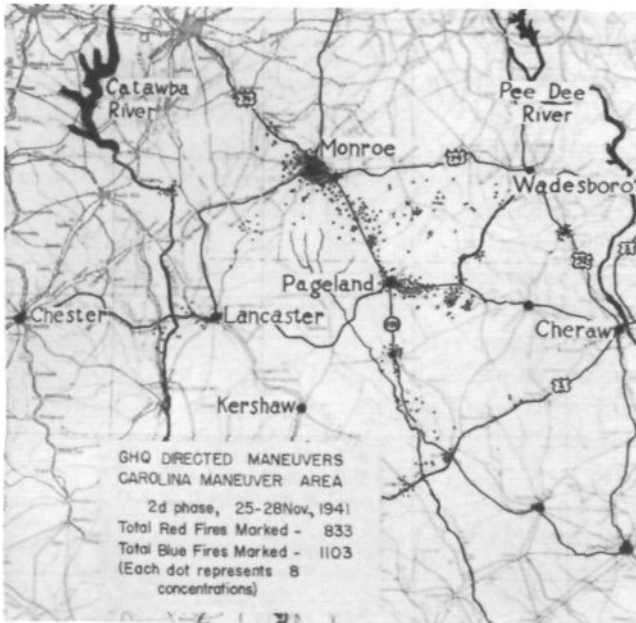
<sup>2</sup>As compared to; 1,402 tons of bombs theoretically dropped by the two Air Support Commands.

DATA ON TIME LENGTH OF FIRES

Number of batteries engaged	Total or		
	First Phase	Second Phase	Average
Light .....	114	144	144
Medium and Heavy .....	117	117	117
Total .....	261	261	261
Total time battery fire in minutes (entire phase)			
Light .....	18,911	11,677	30,588
Medium and Heavy .....	12,266	5,499	17,765
Total .....	31,177	17,176	48,353
Average battery time of fire in minutes (entire phase)			
Light .....	131.3	81.1	212.4
Medium and Heavy .....	104.8	47.0	151.8
All .....	119.4	65.8	185.2
Average minutes per hour batteries fired			
Light .....	1.08	.00	1.04
Medium and Heavy .....	.86	.57	.75
All .....	.98	.8	.91
Average percentage of time batteries fired during phase			
Light .....	1.8%	1.65%	1.73%
Medium and Heavy .....	1.45%	.95%	1.25%
All .....	1.63%	1.3%	1.52%

NOTE: The data on time length of fires indicate that small advantage was taken of the vast potential power of the artillery. Some contributory reasons follow:

1. *Observed Fires.* Forward observation was only partially effective. Some observers also did duty as liaison officers and thereby lost some effectiveness. The bulk of the observers depended upon radio communication. Only in the armored force, whose radio equipment is adequate, was such observation effective. Units equipped with SCR-194 Sets will usually find it necessary to run wire heads well forward to insure constant and prompt communication with forward observers. Observers were handicapped by difficulty in distinguishing between red and blue troops. Sending out an adequate number of observers was occasionally neglected. The location of observers, particularly with relation to supported infantry, was frequently faulty.



2. *Scheduled Fires.* Few targets were obtainable for this type of fire. Infantry could not dig in, organization of the ground was never completed, and intelligence photography neglected. Lack of sound and flash ranging and neglect of intelligence photography resulted in practically no counterbattery. The time element, lack of intelligence, and in many cases lack of leadership prevented planning and coordination of artillery fires.

DATA ON FIRE MARKING

	First Phase	Second Phase	Total
Fires Broadcast .....	3,239	1,974	5,213
Fires Marked .....	3,187	1,936	5,123
Percentage of Fires Marked .....	98.4%	98.1%	98.3%
Fires Marked on Own Troops .....	168	105	273
Percentage of Fires on Own Troops ...	5.2%	5.3%	5.2%
Average time lag from designation of mission to unit umpire to time broadcast by operator, including plotting on map. (Less 36 fires in first phase and 17 fires in second phase considered erratic.) (Minutes) .....	1.9	1.6	1.8
Average time lag on acknowledgment of fires transmitted (minutes) .....	1.5	1.4	1.8
Average time lag from receipt by Fire Marking Umpire until marked. (Less 74 fires in first phase and 18 fires in second phase considered erratic.) (Minutes) .....	4.5	4.3	4.4
Total time lag from receipt by unit umpire until marked (minutes) ...	7.9	7.3	7.6

NOTE: The data on fires on own troops are based on umpire and fire-marker records. The system used creates many opportunities for error. In the case of observed fires, the location of the target, which is some distance from the observer, must be located on the photomap, a difficult operation. Plotting, reading, and transmission of coordinates offer chances of error. The time lag in marking fire could account for some cases of fire on own rapidly moving troops. However, the figures are believed to be a substantial indication of faulty identifications, inadequate intelligence, and poor artillery technique.

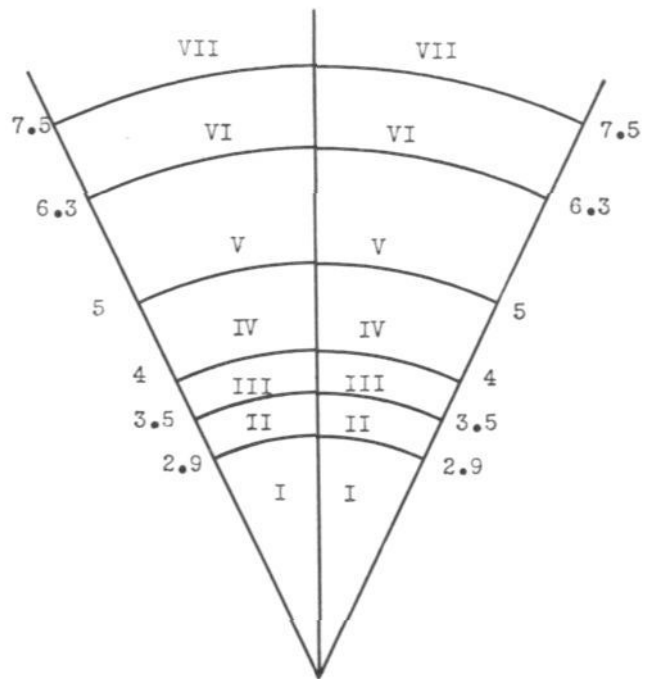
## Correction of Map Data for the 105-mm. Howitzer

By

Lieut. Ulrich G. Gibbons, 29th FA Bn.

EDITOR'S NOTE: *Paragraph 22, IM G-12, and paragraph 418 FA Book 161, 1941 Edition, explain the selection of check points so as to obviate the construction of a complete weather correction diagram. There will be times, however, when the construction of a complete diagram is advantageous, and the author's method will be of value.*

With the 75-mm. gun giving way to the 105-mm. howitzer in our Army, the problem of rapidly correcting map data for weather comes to the fore. This is because we are now dealing with the variable propelling charge characteristic of semi-fixed ammunition. With fixed ammunition we were able to correct map data quickly by computing a weather-correction diagram wide and deep enough to cover the target area, then placing this diagram on the firing chart and interpolating between corners



Weather-correction diagram for 105-mm. howitzer (not drawn to scale)

for range and deflection corrections. With a fixed powder charge, one such diagram was all that was necessary, and when the concentrations to be figured exceeded about six, such a diagram was a considerable time-saver.

With a variable powder charge, however, the weather fan in its present form loses most of its value as a time-saver. Paragraph 24 of the new gunnery publication, G-11, prescribes that in order to avoid excessive erosion of the guns the lowest practicable charge consistent with the mission to be fired should be used. Also, to keep accuracy, a given charge should not be used at a range which exceeds three-quarters of the maximum range for that charge. These limitations will necessitate the using of all different charges in ascending sequence as the range increases. Since each charge has an entirely different set of characteristics with regard to weather effects, it is easy to see that the present weather fan is useless. Figuring a separate fan for each charge would entail seven times the work involved with fixed ammunition, and would require a practical minimum of about forty concentrations before it would save time over computation of individual corrections for each concentration.

However, by slightly modifying the fan, constructing it with a slightly different point of view, we can make it almost as economical of time as when we used it with fixed ammunition. The old fan had corners every 400 *m* in deflection and every 2000 yards in range. Suppose that instead of marking off the range dimension in thousands of yards, we lay it off in charge limits. Charge limits are arrived at as follows: The restrictions of paragraph 24, G-11 have the effect of limiting the range through which a charge may be used—from three-quarters the maximum range of the next lesser charge to three-quarters the maximum range of the charge in question. Thus Charge No. 1, with a maximum range of 3836 yards, may be used from 0 to 2877 or 2900 yards; Charge No. 2 (maximum range 4513 yards) from 2900 to 3384 or 3400 yards. Similarly, the maximum effective ranges of Charges III, IV, V, and VI are 4000, 5000, 6300, and 7500 yards respectively.

These charge limits may now be applied as follows: Lay off the deflection rays of the fan every 400 *m* as usual. But, instead of drawing a range arc every 2000 yards, draw in a range arc to the scale of the firing chart at 2900, 3500, 4000, 5000, 6300, 7500, and 12100 yards. Label these ranges and place between successive range arcs the number of the charge which is usable between those limits. The completed fan is shown on the preceding page.

In figuring corrections for the corners of this fan, two sets of corrections must be computed for a corner which

may be used with either charge which the corner joins. Thus, if there are targets in both zones V and VI, the corners representing the upper limit of V and lower limit of VI must have corrections computed both for charge V and charge VI. Corrections for targets are interpolated between appropriate corner corrections as usual with the old fan.

The necessity for twice computing corrections for any corner where both charges may be used raises the point at which such a fan becomes profitable. But even so, at mid to extreme ranges (5-800 yards) the three corners involved on each side of a 400 *m* sector require the computations of only ten sets of corrections. This means that such a fan becomes a profitable time-saver when there are more than ten concentrations within those limits. At near to mid ranges (0-5000 yards) the zone limits are closer, and fourteen computations would be required for a 400 *m* sector.

For a plan of fires requiring a complete fan, then, a 400 *m* sector would require twenty-four computations for an area 8000-odd yards deep. It seems obvious that for a plan of fires in such depth, far more than twenty-two concentrations would be planned; therefore even a full weather fan as designed would be an economical device to use.

At a battalion fire-direction center, where the plan of fires is far more detailed and the concentrations more numerous than for a battery, such a fan is a real economy. And where battery computers are used, the fan may be rapidly developed by splitting up the computation of the various zone corners among the computers. The resulting corrections can then be consolidated on a master fan placed over the firing chart. A fan so designed is being successfully used by the 29th Field Artillery Battalion, of the 4th Division. The deflection rays and zone limits are etched to 1/20,000 scale on a transparent sheet of plastic. Corrections are added in grease pencil, and the fan is oriented on the firing chart, ready for instant use.

We may conclude, then, that while a fan as outlined above requires more computation than that for fixed ammunition, yet it is far more economical of time than the system of correcting individual concentrations, particularly in a battalion fire-direction center where the number of concentrations is great and where simultaneous computation by three computers speeds the construction of the fan. Moreover, such a fan, based on zone limits rather than ranges, systematizes the use of the zones of the semi-fixed ammunition, saves excessive wear of the guns from excessive charges and simultaneously keeps the charges within requisite limits of accuracy.

# 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.*

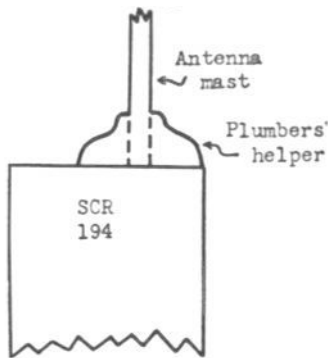
## KEEPING THE RADIO SET DRY



NEVITABLY, when water gets into the antenna socket of an SCR 194, the set goes out of action. As it is exceedingly difficult to remove all moisture from this socket, the easiest way to keep the set working is to prevent the moisture from getting into the socket in the first place. Sketch shows how this may be done. A "plumber's helper," normally used to free stopped-up toilet bowls, is slid over the bottom section of the antenna. Keep the canvas cover on the set and after the antenna is carefully screwed on, the helper is slid down until it makes smooth but positive contact with the top of the case. As long as the cover of the set is kept closed, there need be little

worry about rain shorting out the set. The plumber's helper should always be carried on the antenna; when not needed it is not pushed down around the antenna base. Using this method, 194 sets have been satisfactorily operated in heavy rains without additional protection.

—BY SGT. H. C. MOC.



## EXTENSION CORDS FOR THE SCR 194

Anyone who has had experience with SCR 194 sets knows that they cannot be grouped too closely; it not only is poor tactics, but the sets create mutual interference. On the other hand, spreading out the sets and operators causes unnecessary confusion by shouting and voice-relaying from set to fire-direction center. Extension cords solve the problem, but at present the extension cords issued with the set are too short to be generally satisfactory. Long extension cords can be made by utilizing the plug, socket, and radio-frequency choke, of the issue extension cord. For the cord itself, W-130 wire is used. Four strands are braided or twisted together so as to form a cable about 40 to 50 feet long. Proper connections to plug, socket and RF choke can be made by noting the wiring diagram in the operating manual for the set. If desired, this cord can be connected to an EE-5 or EE-8 headset.

Operation of the transmitting switch on the headset will cause the relay to function in the same manner as depressing the transmitter button on the microphone. Extension cords can be conveniently carried on wire frame spools or wooden drums.

The operator establishes communication as usual, then plugs in his extension cord and takes up a protected position close to, but not interfering with, the fire-direction center. The set should be placed in a hole in the ground deep enough to almost cover the case. A small parapet should be built around the set, but not touching it.

Result achieved by the use of these cords is that communication is improved, since sets can be placed in the most suitable locations, and yet operators are close enough to the fire-direction center to facilitate transmission and receipt of messages, particularly fire missions. In addition, the immediate area of the fire-direction center is not needlessly cluttered up with four or five radio sets with their fishpole antennae outlining the CP.

BY SGT. H. C. MOC.

## CALIBRATION OF THE SCR 194

Probably one of the most frequent causes for poor functioning of SCR 194 sets, other than poor operators, is improper and inaccurate calibration. It should be standard procedure to check calibration at each new position. When several 194's are fairly close together, as around a CP or near a gun position, accurate calibration is difficult and sometimes almost impossible because of mutual interference.

Co-ordination of calibration is necessary. There is one method of securing such co-ordination, which has proven very successful. Radio Sergeant (or Signal Sergeant in the case of gun batteries) indicates location for each 194 set. As soon as operators have set up and are ready to calibrate, they signal the Radio Sergeant by arm or voice. He then designates a set to calibrate. When this operator has finished calibration, he tunes his set to the proper channel and then turns his set off, again signalling to the Radio Sergeant that calibration has been completed. Another set is then directed to calibrate, and so on. When all sets have been calibrated, the Radio Sergeant directs all sets to open station. Often two or three operators will report immediately that communication has been established. The entire operation is normally completed in less than a couple of minutes, and the rapid and sure establishment of communication, free from interference, more than makes up for the time consumed. This method is particularly expedient when nets are operating with only one- or two-channel separation.

BY SGT. H. C. MOC.

## SURVIVAL

Have you ever noticed in a field how quickly a family of baby quail can disappear? One sharp call from the mother and in a split second her infants are concealed, and again, a mother's vigilance has saved their lives. Among all outdoor creatures, the unselfish mothers first teach their young that instant obedience is necessary for survival. And yet, we to whom is given "dominion over all things" have problems of discipline?

Perhaps if we had a few barred owls up in the air picking up those of us who did not heed the warnings, there would be an awakening in ourselves of the proper conditions of mind to want discipline and self control that we might attain success in our pursuits.

—COL. WILLIAM N. DAY.

# BOOK By H.S.F. REVIEWS



*The more our means of waging war are mechanized, the less mechanical must become our thoughts.*

—GENERAL J. F. C. FULLER

*ARMIES ON WHEELS.* By S. L. A. Marshall. With a foreword by Major General J. F. C. Fuller. William Morrow and Company, New York, 1941. \$2.50.

As the author rightly remarks, no one could write a book on mechanization in war without acknowledging the tremendous work of General Fuller, and in some respects the latter's brief foreword is the best part of the book. The first part of the book discusses the developments of the war since the publication of the author's *Blitzkrieg* (1940). The second part is entitled, "The Nature of Mechanized Power."

In an introductory chapter Marshall states his purpose: "The aim here is to inquire further into the military nature of war." His second and third chapters are not altogether satisfactory. In discussing the Libyan campaign of last year, only the British advance is considered. Rommel's counterattack is summed up in a footnote—which is as

illogical as it would be to devote a chapter to Rommel's advance and a footnote to the British counterattack now in progress. Marshall does give it as his opinion, however, that it was the bad disposition of the British troops and not the weakening of the army for the Greek expedition which led to German victory last spring. In describing the Balkan campaign, the author gives seventeen pages to the Greek-Italian struggle in Albania, and only five pages to the Balkan campaign proper, although the latter is certainly far more important from a military standpoint. On the Russian campaign he is much better: "So it is far from certain that operations in this Russian campaign will be stalled by natural conditions. In the end, Russia will be lost or saved according as the Red Army fares with aggressive offensive action from a defensive base."

Using specific campaigns, past and present, merely for purposes of illustration, the author passes to more theoretical material in the book's second half. He is not an advocate of mechanization and motorization to the exclusion of everything else, and instead sees a return of the infantry. But it is a new infantry which contains within itself the elements of all the other arms (including the field artillery). It is in this new infantry, transported by motor vehicle and deployed in depth for a truly elastic defense, that Marshall sees a force with which the tank might be tactically "stopped."

In dealing with the touchy question of the independent air force, the author is at his best. Using the "independence" of the German air force as a model, Marshall shows how well they have interpreted the meaning of the word: "In a word, it is the independence of unification: the independence of morale, esprit, and the creative faculty. It means freedom from a restrictive doctrine, and liberty to explore and to examine each new role objectively and prepare for it fully. But it does not mean the self-determination of military function or discretionary powers over its missions in collaborative action with other forces." With this there should be general agreement.

GEORGE B. McCLELLAN. *THE MAN WHO SAVED THE UNION.* By H. J. Eckenrode and Bryan Conrad. University of North Carolina Press, Chapel Hill, 1941. \$3.50.

When in 1936 the authors published *James Longstreet* it attracted wide attention, for they are both historians of the Virginia Conservation Commission and enjoy an enviable reputation as authorities, particularly with regard to the Civil War. The publication of a new book by them, therefore, is worthy of notice, but it must be confessed that *George B. McClellan* is disappointing.

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Readers of *James Longstreet* will remember that in almost every instance where Lee and Longstreet differed, the authors concluded that Lee was right, despite the fact that in many instances the evidence seemed clearly to favor Longstreet. This lamentable lack of historical objectivity regarding Lee is equally evident in *George B. McClellan*. McClellan is considered as an opponent of Lee rather than as a commander in his own right, and it might almost be said that the authors' fondness for McClellan is based on the fact that Lee defeated him. Although Grant nowhere figures in the story, the authors do not hesitate to introduce wholly uncalled for criticisms of him, which are nearly always completely irrelevant to the narrative. As serious evidence of McClellan's military skill, the authors cite Lee's post-war remark that McClellan was the best of the Union generals. Of course, readers of military history all recognize this familiar phenomenon: a commander always feels that the opponent he defeated was superior to the one who defeated him.

McClellan received command of the Union armies as the result of the battle of Rich Mountain, which secured West Virginia to the Union. Although McClellan was the department commander, the operations were both planned and executed by Rosecrans, and McClellan was not even present at the scene of the fighting, as the Official Records and the Report of the Joint Committee on the Conduct of the War plainly show. Thus, when the authors give McClellan full credit for Rich Mountain, and do not even mention Rosecrans' name, one wonders just how thorough their research has been.

The authors' theme is that McClellan was a failure not because of his military deficiencies, but because the Republicans feared him as a political threat. It is true that politics played a considerable part in his dismissal, but that because McClellan made the mistake of playing politics himself. To escape the blight of politics McClellan had only to emulate Grant, Sherman and the others who made the military conduct of the war their sole consideration. In all, if it was required to pick a single man who might be said to have "saved the Union," one certainly would not choose McClellan.

*THE DELAWARE CONTINENTALS, 1776-1783.* By Christopher L. Ward. *Historical Society of Delaware*, 1941. \$3.75.

While this is a history of a single regiment, it goes much farther and really is a detailed study of the more important portions of the Revolutionary War. The regiment fought in some fourteen major battles, both in the north and in the south. Of special interest is that part dealing with the operations in North and South Carolina. Too many Americans think of the Revolution as having commenced in New England and finished at Yorktown; and are only vaguely aware of Cornwallis' extensive campaigns in the South. Guilford Court House, fought in 1781, was really one of the decisive battles of the war.

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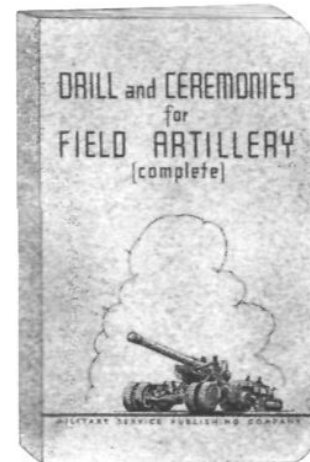
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W. S. N.

*THE ROAD TO DISAPPEARANCE.* By *Angie Debo.*  
*University of Oklahoma Press, Norman, 1941. \$3.50.*

Here for the first time is presented a complete history of the Creek Indians, by an author whose writings and research in Indian history have already reached extensive proportions. The Creeks were a "civilized" nation, which is to say that at a time when there was only a few scattered white settlements on the eastern seaboard the Creeks already had laws, government, social customs, cities and other characteristics

commonly associated with civilization. After describing this early prosperous era, the author moves on to relate the story of the decline of Creek power.

Since the Creeks held some of the richest land in the southeast, a quarrel with the Americans was inevitable, and the fact that they aided the British in the Revolution made this all the more certain. The leadership of the Tory McGillivray likewise did not help relations with the new republic. Spurred on by Tecumseh, they took the final step, and began the Red Stick War with the massacre at Fort Sims. Two years later the campaigns of Andrew Jackson had broken Creek power forever. There followed the Removal Treaty of 1832, the ejection of the Creeks from the southeast, and their disastrous trek to their new lands in Oklahoma. The Civil War came as a final blow to the Creeks. The author carries the story up through the Dawes Act to modern times, and in so doing adds another valuable volume to the University of Oklahoma Press' impressive series on Indian life.

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FM 6-40, Firing, now in process of revision, will cover in a condensed form the subject matter of FAB 161.

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