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JULY - AUGUST, 1940

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IN THIS ISSUE

GEN. SNOW'S *Can We Arm?* in the May-June issue was widely quoted in the press. The current installment of his memoirs treats of an equally important phase of national rearmament; namely, training.

MAJ. O. L. MARSTON describes a practical moving target which he developed recently at Fort Sill. The author's article, *The Rains Might Not Come*, in the Jan.-Feb. issue, stimulated training in firing at moving targets, and was also noted by radio commentators and journalists.

MAJOR DOUGLAS V. JOHNSON, on ROTC duty at Ohio State, presents an excellent method of giving gun squads preliminary practice in firing at moving targets.

MAJOR G. B. BARTH, an instructor with the New York National Guard, contributes some timely and important conclusions provoked by a study of the European War.

COL., LANZA'S historical study of the causes of the war continues with an account of the Czechoslovakian crisis.

THE IMPORTANCE of Gen. Scott's serial dealing with jungle and mountain warfare in the Philippines in 1899 should be evident to all thinkers who visualize the possibility of similar future service in the western hemisphere.

CAPT. G. C. DUEHRING'S analysis of the life insurance problem was prepared while the author was on duty with the Dept. of Economics, Government, and History at West Point; it will be helpful to all officers concerned in providing proper protection for dependents.

CAPT. S. E. VAUGHN, a battery commander in the California National Guard, brings to out attention a matter which will concern every artillery unit as soon as it campaigns away from its home reserve. You will not find this important instruction in our training manuals—better save it! (Extra copies of this issue are available at 50 cents.)

CAPT. M. L. CURRY, a graduate of the U. S. Field Artillery School and of the French Artillery School, is an instructor at the Marine Corps School at Quantico, Va.

OTHER CONTRIBUTORS include Maj. Watrous, a member of the FA Board; Capt. J. M. Burdge, 11th FA; and Capt. R. A. Ellsworth, on duty with the ROTC unit at Oregon State.

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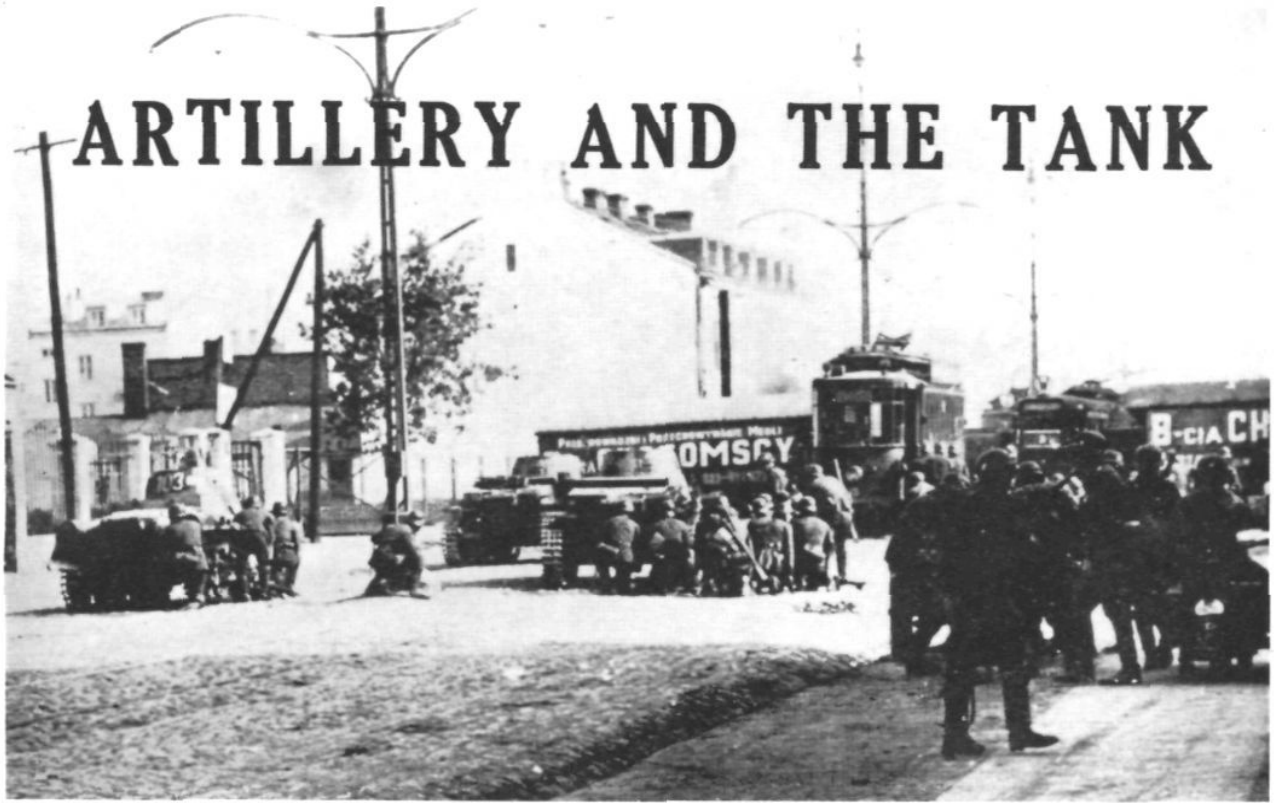
155-mm. howitzer section during maneuvers near Fort Benning

ARTILLERY AND THE TANK



Infantry supporting Panzer unit during street fighting in Warsaw.

An analysis of portions of the German Artillery Regulations

FOREWORD

Seven years ago the German General von Eimannsberger wrote a book titled *Mechanized Warfare*, in which he accurately envisioned the war of 1940 in France, even down to the smallest details of armament, organization, and methods of operation. Further than that he described an illustrative problem which he actually staged on the Amiens front. Reread in the light of what has now occurred, von Eimannsberger stands out as a man of great analytic imagination, one whose proposals, possibly, have been acted upon by the German government. Von Eimannsberger's remarkable work has been available to military students here and abroad, and if they chose to disregard the handwriting on the wall—well, that is history. It is also history that after the Polish campaign the German General Staff stated that one of the great lessons learned by them was that their training regulations were adequate and correct. These regulations can (or could) also be purchased on the open market in Berlin. The wisdom of according them some attention should be obvious.

How did the Germans break through the French fortified positions? Before attempting to answer that question, it may be worthwhile to examine briefly the nature of these French defenses. General descriptions of the Maginot Line and its extension have been given in the press both here and abroad, and a recent study in a Yugoslav service magazine went into considerable detail concerning this and other defensive works abroad. It is unnecessary to review these matters, which are of general knowledge. It is needful, however, to point out one thing which has been overlooked, and that is that the French defensive system was based on a new (and, as subsequently proved, faulty) concept. In 1938 military thinkers in this country became aware that the French had abandoned the old classical idea of basing a defensive position on a good field of fire, in favor of a position behind an obstacle. Accordingly, their fortified lines were built behind rivers and thick woods. Massive and powerful in a purely passive way, these works nevertheless mounted only cannon of comparatively small caliber and short range, and not many of these in each unit. Because of the general plan of the fortifications, supporting heavy artillery and antiaircraft artillery had to be emplaced in the open, where, being more or less "tied" to the fortress, these weapons were very vulnerable to air attack.

When the armored gun turrets were neutralized or destroyed each fort became only a deep mine gallery protecting solely its immediate garrison. Extensive barriers of concrete studs, steel rails, and patented flexible tank traps made of angle iron were placed out in front. Presumably mine fields were employed. But in general

it was the obstacle, not defensive fire, which formed the sinew of the defense. Where the natural obstacles were very strong, as along the Meuse, the fire defense, the artificial barriers, and perhaps even the defending forces were considerably weaker than elsewhere. It is known now that great masses of German heavy artillery could be brought up behind the wooded "barriers" in front of the French defenses, secure from observation, yet out of range of the 75's with which the French fortresses were mostly armed; so the woods, instead of being a protection to the French, actually sheltered the attackers. Presumably the French expected these wooded areas to hinder the passage of great mechanized forces.

It is quite plain today that the Germans were aware of all these things. It is equally plain that they more correctly evaluated these defenses than anyone abroad *or here*. The methods they evolved for penetrating the French fortresses were not based on magic, nor on death rays, nor on secret super-weapons. True, the Germans built* 70-ton tanks; but this was known to the French—they had monster tanks also (though in insufficient quantity, as always). These tanks went through the woods as if the trees were so much bamboo. The Germans built many amphibious tanks—nothing new in that—and with them crossed the water obstacles. They also made extensive use of bridging materials, employed combat engineers to clear mine fields and barriers, and to execute demolitions within the works. They fired powerful artillery concentrations. They used numerous bombing planes. They employed smoke screens to blind the French cupolas. They fired at the turrets with high velocity weapons—antitank guns, antiaircraft artillery, and with heavy machine guns—all brought up close so that their fire impinged accurately on the portholes. They used infantry armed with minethrowers, grenades, and mortars. In brief, they employed different methods and devices, or combinations, depending on the nature of the terrain and the defensive works. Above all, they had great *coordination*.

Let us not forget that in each case where the Germans attacked a French fortified line, quite a number of hours, sometimes three days, elapsed before the position was ruptured and the mechanized forces launched through the opening. The situation was much the same as that in Poland between September 1 and 3. In other words, the Panzer units did not by themselves create the breakthrough, even though they exploited it so spectacularly. But, as ever, it is the halfback who gets the headlines, not the guards and tackles who open the hole.

The German artillery regulations available to us do not cover the subject of artillery support of units which are exploiting a breakthrough. Doubtless their methods are the same as for artillery support of cavalry or other fast-moving units, and it is believed that only the organic artillery, in general, accompanies the Panzer units in their wide and deep movements. The German regulations, brief and to the point, give only the broad principles of artillery support of armored units which are assisting in a breakthrough, and these, together with brief antitank regulations, are set forth below.

*Possibly captured from the Czechs.

ARTILLERY SUPPORT OF ARMORED FORCES

The German artillery regulations open this subject by saying that, where the armored units are to be employed in conjunction with an infantry division, the artillery will best help the attack by promoting the success of the *infantry*. The artillery activity must adapt itself to the special way in which each attack is made, and can never be made according to rigid model. Where armored forces are to be employed with infantry divisions, the latter will be reinforced with additional artillery as well as with mechanized groups.

Two general situations are considered: First where an enemy is attacked who has not had time to prepare properly for defense, and second where he *is* prepared. In the first case, time is the vital element, and the armored units do not wait to coordinate the attack with artillery fires, nor for an artillery preparation. Surprise is gained by speed of attack. The artillery support then consists mainly in holding back such hostile forces as cannot be attacked by the mechanized units, mainly because of local limitations. It renders early support to the farthest advanced infantry; and assists this infantry to hold ground won by the armored forces. "The ability of the artillery to give further direct support to the armored attack depends also on the number of batteries in readiness to fire, and on the observation conditions; at the very least, efforts should be made to give armored units protection with a portion of the available fire or to lay down a smoke screen against enemy antitank weapons, lest the movements of the armored units be impeded."

In attacking an enemy prepared for defense, the first mission of the artillery is to render support to infantry which has no organic armored units or is insufficiently supplied with them. The missions of the artillery always include:

a) Counterbattery. This is most important when armored units are engaged in the zone of the enemy infantry.

b) Early neutralization of hostile antitank weapons. These will first appear after the tank attack has started; speedy blinding of the locality with smoke will often be more effective than using HE.

c) Neutralization of enemy heavy infantry weapons which are firing against our infantry, especially when these targets have not yet been, or cannot be attacked by our tanks.

No priority can be laid down for these tasks; it will depend on the immediate situation. If insufficient artillery is available, chemical troops (with smoke mortars) can take over some of the work. Where ground observation is difficult, aerial observation must be provided.

German medium male tank, mounting 75-mm. gun, following breakthrough of Polish defenses in the Corridor.

Before the armored attack, the mission of the artillery—according to the situation—may consist in:

a) Protecting the assembly of the armored units from hostile artillery fire.

b) Concealing the noise of the tanks, especially at night.

c) Deceiving the enemy as to where the attack is to take place, either by diverting fires or by projecting smoke.

d) Placing fires on hostile OP's, artillery positions, and discovered minefields and antitank weapons; the latter, however, should not be attacked until shortly before the assault, lest they change positions.

Effort should be made to avoid disclosing the imminence of the tank attack by the type of artillery preparation fired.

* * * * *

During the attack the nature of the artillery action is adjusted in accordance with the time of entry of the mechanized forces into combat.

If the armored units break into the hostile position jointly with the infantry, the artillery smothers the point of penetration up to the last possible moment, until the armored units are able to take over this mission at short range. Just before the armored units arrive at the enemy position the artillery fire lifts, and boxes off the area of penetration at rear and sides. Hostile infantry and antitank weapons on the flanks are engaged heavily. All this requires good observation and absolutely reliable communication and liaison.

When the object of the armored attack is only the hostile infantry, artillery neutralizes the enemy artillery during the entire period of the attack. However, if the armored units enter the enemy artillery area, our fire must lift in time.

The principal difficulty will be for the artillery to determine the farthest advance limit of the armored wave. "This may compel the regulation of speedy transfer of artillery fire from the start until after the anticipated duration of the armored attack. However, the disadvantage of the known inflexibility of fire is less than the danger of hindering the armored attack by own artillery fire. Armored troops must take into consideration timely coordination with the artillery firing plan."

* * * * *

The artillery must utilize the penetration of the armored attack into the enemy lines, by timely change of position, and after the conclusion of the armored attack give new support to the front of the infantry attack and keep the same moving forward. In this way the armored attack supplements or bridges the intermittent artillery action; in the same way the artillery from its new positions must render instantaneous help to the infantry whenever and wherever the latter lose the assistance of the armored units. It is only in this way, whereby the infantry receives support alternately from the tanks and the artillery, that its progress is maintained. "It is wrong for the displacement of artillery to coincide with the assembly of the armored units."

The artillery furnishes a liaison officer to the commander of the armored unit. This liaison officer "accompanies the armored attack in an armored vehicle equipped with radio, or if possible, with a telephone"(!) The artillery liaison officer also acts for the chemical troops.

* * * * *

Besides the usual artillery support, the mechanized forces also need *special* fire protection against hostile antitank weapons. If there are insufficient heavy or medium male tanks present for this purpose, then a special artillery unit must be assigned. This unit also furnishes a liaison officer. The batteries assigned for this duty are emplaced far forward, usually during the night before the attack. They execute no general fires. If it can be foreseen that infantry, advancing before the tank attack, will secure better OP's for this special artillery support unit, then the batteries should be held limbered, ready to hurry forward into position as soon as the advanced positions are secured. The idea is to render the very closest support; but this artillery, being unarmored, does not accompany the tanks except by observation and fire. It is highly important that this artillery be given the best OP's, and, if available, an artillery plane. Forward observers, used liberally and in accordance with prepared plans, keep pace with the most advanced infantry.

"Between the commander of the armored protective artillery, and that of the armored units which it is to join, as well as in the posting of artillery observation during the progress of the attack, there may be accomplished the necessary uniform and strict information to the artillery as to targets and lines attained by the armored attack. It may be desirable to establish, before the attack, phase lines for the advance, and check points—particularly near where nests of antitank weapons may be encountered.

"This cooperation makes it possible, by extensive fire direction and other technical means, to assure a heavy effective fire preparation against anticipated targets.

"The artillery commander transmits in proper time to the commander of the armored forces the results of reconnaissance to locate hostile artillery."

Comment: A word should be added here with regard to comparing organization and equipment of German artillery units organically assigned to armored units and similar U. S. artillery units. In both cases mobility is, of course, a prime consideration. The Germans appear to obtain mobility by adding to their personnel and materiel whereas we strip down to the ground to obtain it. What is the result? The Germans outgun us heavily, they having 105-mm. gun-howitzers drawn by specially-built fast tracklaying vehicles. We have only the small 75-mm. howitzers. The Germans have 162 men per battery,* thus providing relief gun crews and drivers and putting their batteries on a 24-hour day operating basis, whereas we are limited to 99 men per battery, barely enough to operate on a peacetime basis.

ARTILLERY SUPPORTING THE DEFENSE AGAINST ARMORED FORCES

The German regulations give the following rules for the employment of artillery support in the case where the main force is attacked by armored units:

The best support is to disperse, or at least to weaken, the armored forces by firing on them before they launch their attack. Assembly areas and jump-off positions are subjected to concentrated, shock-like, massed fire, using

*Of this number 35 constitute the 2d echelon of the battery combat train, but the remainder of the battery proper is still substantially stronger in personnel than the corresponding U. S. unit.

German half-track vehicles used with ammunition train of heavy artillery regiment.

HE. Since map firing involves a great waste of ammunition, aerial observation should be provided if possible.

When the armored vehicles appear, the artillery, on the basis of previous fire (registration), lays down a barrage on the terrain through which the tanks must pass, paying particular attention to defiles.

As the tanks approach our front line the artillery shifts its fire to hostile weapons which support or accompany the tank attack, and fires on the infantry which follows the tanks or moves with them.

If the tanks penetrate our position, then the artillery must, if necessary, defend itself against them, employing the methods of direct fire as described in the following paragraphs.

Close Defense of Artillery Against Mechanized Attack

German artillery protects itself against mechanized attack (as well as against air attack) first of all by a carefully organized scouting and warning service. This operates continuously—while the artillery is on the march, in bivouac, at halts, in position, during engagements, and even in rest areas. Unceasing vigilance is the watchword, and the Germans do not trifle with these matters. Furthermore, this scouting and warning service operates, not to the front and flanks alone, but through a full 360-degree sector, regardless of what other friendly troops may be present.

"The task of the air observers and close-range patrol is the watching with eyes and ears over the air and land area on all sides, especially in the direction that would favor enemy rear attacks and tank attacks because of the location, and in the sun, in order to warn the troop leader. The warning is made through a call, visual or auditory. The leader orders the necessary measures for protection according to the special circumstances of each event. Only the leader of the unit can judge the nature of the threat of the moment and the measures for protection required at the time. The protection measures must be governed by the needs of each situation."

The personnel making up this scouting and warning service are not the greenest recruits or the battery misfits. They are specially selected for their self-reliance and courage, their excellent powers of sight and hearing, their ability to analyze quickly and make swift sure decisions. They are specially trained in their tasks. They are made acquainted with the shape and appearance of hostile machines and the methods which they employ in attack. They are equipped with sun glasses, field glasses, and trumpets or whistles; and they wear no steel helmets.

"Scouting and warning service is very strenous and requires frequent relief. No break in the service, however, may be permitted while reliefs are being changed."

Light tanks of Panzer division halted in wood along Braha River.

During the march, each subordinate unit issues its own special orders for scouting and warning, unless this has been prescribed by higher authority.

During selection of battery positions consideration is given to the requirements for close defense. The Germans mention the desirability of having adequate "wheeling terrain," by which they mean an ability to shift the pieces short distances by manpower. The battery defense is prepared under the direction of the battery commander in person, or he may delegate it to the executive at the firing battery, the RO at the OP, and the senior leader at the limber position or vehicle park.

"Batteries in firing position, from which the near front terrain can be shelled, protect themselves in front through the fire of their own guns (using direct fire and armor-piercing projectiles). They establish close OP's. The machine guns of the battery are installed in such a manner that they can be used in surprise attacks, especially from the flank and rear.

"Also when the guns are shot out or are out of ammunition, the firing position is defended with machine guns, rifles, and hand grenades. In such instances strong points are established from which, with the help of the infantry, resistance can be maintained against the enemy until reserve units have time and opportunity to make a counterattack.

"Guns should never be permitted to fall into enemy hands in useful condition. If they must be left, the firing pins, ejectors, and panoramic sights are dismounted and removed."

The following are, in brief, the points which the artillery commander must check in providing for close defense of his command:

a) On the march:

Upon attack by tanks, the battery scatters and takes cover. If this is not possible, it blocks the road toward the enemy, with vehicles or other materials, and defends the blockade; all not so engaged remain dismounted by the horses (or prime movers) and the vehicles.

b) In the firing position:

The firing position is to be so chosen that—

1. There is a good field of fire to the front.
2. There are natural terrain obstacles (swamps, deep waterways, thick forests, rocks, etc.) which can serve as protection against surprise tank attacks.

The following should be checked:

1. From which direction are tank attacks possible?
2. Which of our own weapons may be used immediately in the defense?
3. What changes in front may be undertaken to follow the principal attack directions?
4. Can the guns be placed in echelon so that at least a portion of the battery can be fired without moving the individual guns?

The following preparations should be made at the firing battery:

1. The abutment of each trail must be reinforced in sandy ground.
2. The guns must be capable of being turned easily in the principal attack directions.
3. Camouflage screens must be placed aside.
4. Cover (fox holes) for personnel must be dug for the eventuality that the supply of ammunition becomes exhausted, the guns jammed, or hostile tanks get into the position.
5. Chiefs of section and gunners must know, and if necessary mark on their shields, the ranges, from 600 yards to 1,000 yards, of points in the directions from which attacks may come.
6. An NCO must be detailed to watch, *at the battery position,* for the appearance of tanks.

c) General:

Fire is not necessarily opened as soon as tanks appear. If it is believed that they have not discovered the battery, it may be better to hold the fire until they reach a favorable range.

The BC directs and distributes the fire. The platoon commanders assist him in this; and hasten to him when tanks appear. The actual firing is by section; each chief of section supervises the fire of his piece. The gunner gives the signal to fire. He does this by springing backwards.

A change of position or change of front for the battery may be considered only in special circumstances, if sufficient time is available and the formation of the ground permits.

CONCLUSION

A study of the foregoing discloses nothing that smacks of the mysterious or unorthodox. The striking thing about German methods (and results) is that they actually *do* what others are inclined only to talk about, and they have a wonderful degree of coordination between arms, services, and organizations.

It is commonly said that modern war is the most recondite of things, requiring experts. War, so long as man risks his skin in it, will always be a matter of instinct.

—DU PICQ.

Training for War

By Major General William J. Snow, USA-Ret.

Editor's note: Gen. Snow has described previously how his office formulated, in 1918, a General Training Scheme for handling the cadres of officers and enlisted men who were to form part of the new National Army. Herein he tells how that plan operated in the great field artillery replacement depots and firing centers.

CAMP JACKSON, SOUTH CAROLINA, REPLACEMENT DEPOT

Of the permanent activities provided for in the General Training Scheme, approved by the Chief of Staff, the one which I was especially anxious to get started without a day's delay was the Replacement Depot. Even while the Scheme was being formulated, and in anticipation of its approval, I had assigned this establishment to Colonel Robert M. Danford, telling him he would have command of the Depot and directing him to work up tables of organization, courses of instruction, and other details as completely as he could. This he did, the work occupying several days. Each day he would bring in to me the results of his work, which we would then discuss. I left him all the freedom I could, simply keeping him coordinated with the other activities so as to prevent duplication and overlapping.

The need for haste was urgent. The April replacements for overseas were 1006 and these could be obtained, in the absence of a Replacement Depot, only by resorting to the old practice of robbing existing brigades in the United States; and these very brigades were short of men, even before I robbed them. Many of the brigades in this country were reduced below one-fifth of their authorized strength. Of course, under such conditions, training in them had practically ceased. A check-up made in March showed that there were nine brigades having an average of four-fifths of their authorized strength and not included in the first three corps. These nine brigades would therefore have to furnish overseas replacements for March, April, May, and June and also furnish the men to fill up brigades scheduled for overseas sailing during that period. The nine brigades would then be reduced to about one-half authorized strength. After spending nearly a week in unsuccessful verbal efforts to get men, I submitted a requisition, on April 9th, for 54,000 men to fill up existing brigades. Two days later, I asked in writing that, if necessary, a special draft for 60,000 men be made. The principal obstacle lay in an inadequate supply of clothing and in certain objections made by the Medical Department.

While I had set July as the date for the Depot to furnish its first replacements, yet I hoped that it could furnish the June ones. But it could not do this, and due to not having gotten the 50,000 or 60,000 men asked for in April, it became necessary to almost strip four brigades in June for replacements and men to fill up the sailing brigades. I then notified the commander of the Depot that he would have to furnish the July replacements, even if only one month's training could be given them. Accordingly on July 15th, the first contingent consisting of 44 officers and 5,500 men left the Depot for the Port of Embarkation. The length of time these men had been under training varied, though none had completed the full course. We simply took the best trained men at the Depot. It is interesting to note that the commanding general of the Port of Embarkation wrote me that the records accompanying these men were the most complete of any that had passed through the port up to that time.

The Field Artillery Replacement Depot at Camp Jackson, South Carolina, organized early in May, was the first replacement depot established in this country for any arm during the war, and its success was so pronounced that similar depots for the other arms were

Extracts from the World War memoirs of the first Chief of Field Artillery furnish a blueprint for meeting a similar emergency in these tumultuous days.

soon ordered by the Chief of Staff. It seems a severe reflection on the War Plans Division of the General Staff (or whoever originally prescribed the organization of our army during the war) that apparently it was not thought there would be any field artillery casualties, and so no provision was made for replacing them. Yet a slight knowledge of history would have shown that casualties begin the day following mobilization, and last throughout the war.[1] The only attempt to provide field artillery replacements was the organization, in the summer of 1917, of three battalions, one for each of the 5th, 6th, and 7th Regiments of Field Artillery, and these battalions were shipped overseas in the fall of 1917. It is true there were six divisions in a corps in France and two of these divisions were to be Training and Replacement Divisions, thus apparently giving six regiments of field artillery for this purpose. But three of these six were to be utilized in forming corps and army artillery. That left only three regiments to provide replacements for division, corps, and army artillery; *and, in addition, to act independently as fighting units*. There was a depot brigade of infantry in each division (wholly inadequate), but it contained no field artillery recruits.

Brigadier General Robert M. Danford, commanding the replacement depot at Camp Jackson, S. C.

Hence the necessity arose of getting field artillery replacements by robbing the brigades here, and the practice necessarily had to continue until the Replacement Depot could take over this burden.

In the brigade which I had just left at Camp Jackson, we were so short of men we had practically ceased drilling. The brigade had been repeatedly bled for men. In January, we had only about one-half as many men as we had the previous October when I joined the brigade. At about the time I left, an Engineer officer appeared at Jackson with carte blanche permission of the War Department to select men as nucleus for two new regiments of Engineers. This of course took away the few key men that organization commanders had successfully concealed up to that time, and necessitated a new beginning in specialist training with only the poorer men to work on. The practice was ruinous, and no sooner would we get specialists of any kind partially trained than they would be taken away from us. Yet this brigade had been no more unfortunate in this respect than many others.

I may give a story of an incident wholly unconnected with the Replacement Depot, yet showing the necessity for such a depot for each arm. One day, prior to the establishment of these depots, I learned of the existence somewhere (not in the Field Artillery) of a body of about 1500 motor men. As at this time General Pershing was considering the early motorization of certain horsed field artillery regiments, I immediately set out to see the General Staff, locate these men, and try to secure them for the field artillery. After some search I finally found out that they had, only a few days before, been shipped overseas as machine-gun unit replacements. All I could do was to cable the facts to General Hinds, Chief of Artillery, A.E.F., so that he possibly might get hold of them at the port of debarkation. My recollection is that he was too late.

Colonel George R. Allin, Executive, OCFA

Colonel Danford was fully as alive as I was to the urgent need of replacements, and I cannot speak too highly of the executive ability he displayed in pushing the work. In less than a week after he arrived at Camp Jackson I had sent him nearly 400 officers. Two or three days later I gave him over 2,000 more, and in the meantime I poured enlisted men in by the thousands. My original idea was to free him from camp administration, leaving him free to run the Depot, while General French, camp commander, promised me to run the entire camp just as Danford desired, and this he did as far as he could. But by the latter part of August it became evident that a better plan would be to place Danford in actual command of the entire camp, hence he was made a Brigadier General and General French was removed to another camp. General Danford was thus promoted over the heads of a number of excellent officers, but I simply *had* to have that Depot function 100%; and I determined to promote these officers, who had been jumped, just as soon as I could. They were promoted about a month later when new brigades were organized.

By referring to the various General Staff memoranda commenting on my General Scheme for Training, it will be noted that the General Staff seemed to think that all the cantonment space at Camp Jackson would not be needed for the Field Artillery, and that, consequently, by

[1] In reality, this fact was well known to the War Department, and accordingly the establishment of replacement depots for training all arms was considered in formulating the original set-up of our American Army for the war. The question was decided in the negative on psychological grounds. Doubt existed as to the temper of the American people at that time, and it was thought that the presence in replacement depots of large numbers of men would immediately bring forth the cry: "A hundred thousand men are already being trained to step into the places of dead men." So the Depot Brigade idea was evolved as a substitute. This amounted to scattering the replacement depot among all the divisional camps; and, like most substitutes and compromises, it proved unsatisfactory and inadequate when a heavy strain was placed upon it.

turning over the whole camp to this arm, space would be wasted. Yet, actually within three months after we took it over, Camp Jackson was too small, and a second Field Artillery Replacement Depot had to be established at Camp Zachary Taylor, Kentucky, under Brigadier General F. T. Austin; and I may further add that during the period indicated we put up many additional buildings at Jackson, and finally, while its capacity at the time we took it over was about 40,000 to 45,000, yet subsequently, at the peak of the load, General Danford had 53,000 men under him there, and early in 1919 would have had 84,000. The work at Jackson was a monument to General Danford's ability, and I have never ceased being grateful to him for making such a complete success of one of the most worrying problems that beset me during the war; that is, replacements. At the two Depots, Jackson and Taylor, and aggregate of 8,125 officers and 73,235 enlisted men received training. Jackson alone supplied 4,831 officers and 29,104 enlisted men for schools and nuclei of new brigades in this country, and for overseas replacement; of the latter, Jackson's aggregate was 460 officers and 21,230 enlisted men. General Danford organized specialist schools there of every sort, kind, nature, and description needed by the field artillery, both for officers and enlisted men, such as for drivers, cannoneers, supply sergeants, stable sergeants, mechanics, cooks, horseshoers, saddlers, wagoners, buglers, bandsmen, bakers, tailors, shoemakers, clerks, machine gunners, automatic riflemen, trench mortar men, draftsmen, painters, telephonists, radio men, motorcycle drivers, motor mechanics, carpenters, chauffeurs, truck drivers, etc. The importance of these schools, which would enable us to supply replacements in the proportions that trained specialists of each kind were desired by the A.E.F., is apparent. It is even more so when we consider that the instructions I received on April 12, as to the supply of June replacements for the A.E.F., simply called for 8,160 men of whom eight-tenths of 1% were to be cooks, mechanics, and buglers; four-tenths of 1% were to be bakers, tailors, shoemakers, and clerks; one-tenth of 1% were to be saddlers and horseshoers. There was no mention of the many other specialists needed by the Field Artillery.

The tables of organization we had prepared in the office prior to his (General Danford's) going to Jackson proved to be not entirely satisfactory. This is not at all to be wondered at, as they were pulled out of the air, with nothing to guide us. However, as experience showed what was needed, Danford made out new tables and sent them to me and I got them approved.

From General Hinds, Chief of Artillery, A.E.F., I learned monthly what specialists he wanted and how many of each, and by dividing these between the two Depots, Jackson and Taylor, I was by summer enabled

Mounted review at Camp Jackson

to give him exactly what he wanted, except horseshoers. With these, we could never catch up to his needs. On the other hand, in motors our capacity was too great, as the A.E.F. did not move as fast in this direction as we had anticipated. When, later in the summer of 1918, the Motor Transport Corps was created in the United States, its organization provided that it would train drivers and chauffeurs for the field artillery. I said I would continue to train my own until this Corps got going and, until such time, would help them out by giving them our surplus drivers. The Corps never did get going, with the result that when the Armistice was signed the Field Artillery was still training drivers for the Motor Transport Corps, instead of the reverse as originally contemplated.

By the middle of October, 1918, a total of six training brigades, each composed of three training regiments, had been organized in the Replacement Depot at Camp Jackson. Four brigades were composed of two light and one heavy regiment, corresponding to the divisional field artillery brigade. One brigade, however, was composed exclusively of specialists attending the various schools and one was organized to receive the colored draft. All training was divided into 6 twelve-day periods, each of which culminated in a competitive "Progress Inspection." At these inspections a keen watch was kept for outstanding individuals. Such men were, thereafter, given special instruction and tests with a view to sending them to take the course at the Central Officers' Training School at Camp Zachary Taylor, Kentucky. The object of the Depot training was to produce a disciplined soldier who would be in general a field artilleryman and a specialist in one subject. There was an Inspector for each regiment, and these inspectors were out all day on the job, seeing that schedules were carried out, that instruction was thorough, and to observe where improvements could be introduced.

"The best man goes"

In addition to training enlisted men at this Depot, such officers as could be spared, upon their graduation from the Central Officers' Training School, described later, were sent to Jackson for experience in actually handling enlisted men and in learning, by actual practice, the interior economy of an organization.

The whole Camp Jackson Replacement Depot was a wonderful plant, ably organized and run by General Danford, under such discouraging conditions as would have taken the heart out of an ordinary man. Due to General March's continually speeding up the organization of new units and their shipment overseas, no sooner would Danford get a draft of men partly trained than I had to take them away from him. He never made a complaint, however, but, on the contrary, always sent the best men he had. It must have been a temptation to "cover up" and retain some men who were especially useful to him, but this was never done. On the contrary, the Camp slogan, "The Best Man Goes," was honestly lived up to. *This slogan, so lived up to, proved to be a powerful stimulant for both officers and men*. The result of all this going faster and faster in our shipments overseas and in organizing new brigades (for the organization of which new brigades elsewhere he had to furnish a nucleus) was that no enlisted man ever completed the full 6 periods of twelve days as planned. In fact, the average time a recruit was at the Depot, including Sundays, was between 45 and 46 days, and included fewer than half of the 6 periods of training. There was another mitigating factor to his training plan, which must have disturbed him, but it disturbed me much more. It was my inability to feed drafted men into his Depot as fast as he could handle them with the plant he had in the late summer and early fall. This failure was due to two causes. First, uniforms gave out. I pleaded with the Operations Section of the General Staff to draft men anyhow and give them to me, stating that these men all had some clothes which they could bring with them and wear until we could uniform them, and in the meantime I would put an outer denim suit on them to show that they were soldiers. I explained that every day's delay in getting these men counted with me. But Operations were adamant. I think they rather stood in awe of the Medical Department, who opposed my plan. I offered to take full responsibility for the health of such uniformed men, but to no avail.

The second thing that slowed down the Depot was the exhaustion of the draft. Under the law, as it then stood, only men between 21 and 30 years of age could be drafted. As it became apparent that we were approaching the exhaustion of men within these limiting ages, the

Secretary of War asked Congress for a new law extending the age limit in both directions, 18 to 45.[2] But Congress took about 6 weeks in deliberation before finally passing the law sometime in September. There never was a period in the war when such delay was less justified. It was just when Pershing was getting his Army ready for its first battle as an American Army under American officers, and no one could foresee the outcome. But Congress delayed until it could hear from "the people back home" in the Congressional districts.

Of the hundreds of officers who were on duty at this Replacement Depot, and who contributed of their best to the undertaking, the following are a few who were reported as having occupied the most important key positions in its organization, who remained with the Depot through its entire life, and who were important factors in making it a success: Major Houston L. Whiteside, Camp Executive Officer; Colonel Philip W. Booker, Senior Instructor; Lieut. Col. Edwin R. Van Deusen, Senior Inspector and Coordinator of Instruction; Colonel Oliver A. Dickinson, Commanding 1st Brigade; Lieut. Col. Edwin P. Parker, Jr., Commanding 2d Brigade; Colonel Robert C. F. Goetz, Commanding 3d Brigade; Lieut. Col. Jack A. Rainier, Commanding 4th (Schools) Brigade; Lieut. Col. Lloyd E. Jones, Commanding 5th Brigade; Lieut. Col. Thomas J. J. Christian, Commanding 6th (colored) Brigade.

Regimental Commanders: Majors Paul V. McNutt, Theodore D. Drury, Isaac Spaulding, Otto W. Mull, Jube R. Parton, Howard Eager, John A. Robenson, Frank Harrison, Leslie L. Anderson, Louis E. Ballenbach, Malcom Green, George O. Huey, Donald L. McCuen, Onorio Moretti, Paul Muller, L. Nash, Samuel G. Rea, and John A. Stephens. The first three of these regimental commanders were especially commended.

The Depot was inspected by an officer of the Inspector General's Department November 9-12, 1918, and the following are his conclusions:

"(a) Training and instruction of this depot is intensive and efficient. Work is coordinated in such a manner as to insure absolutely uniformity and the spirit shown by officers and enlisted men is excellent.

"(b) The policy in force at the depot is one which has as its idea to thoroughly ground the individual soldier in the fundamentals. This fact is never lost sight of during the training of first making a thoroughly soldierly recruit and then immediately training him for an intensive period in some specialty. After the first twelve-day period, a man becomes a driver, a cannoneer, or one of the various specialists and receives instruction in his own specialty with an object in view of producing at the end of the course a thoroughly trained individual soldier in his particular line.

"(c) The compilation of training regulations and outline of programs of instruction for a complete six-day period course, which has just been finished, is a model that could well be followed, in principle, by any other training center of any branch of the service. The program of instruction is completely outlined, each day's work specifically laid out, the object of instruction and result to be obtained plainly presented, and a very numerous and valuable number of hints are given instructors to aid them in efficiently presenting their instruction to the men under training.

"(d) At the present time, if given sufficient number of men to train, this depot is reaching its full capacity and very soon, were not automatic replacement drafts for overseas increased in number, the complete schedule of instruction could be placed in effect. Training cadres are now about to be filled and, at the present when apparently hostilities have ceased, this plant is about to function at its greatest efficiency. It is unfortunate that so far it has been impossible to put through at least one draft of thoroughly trained men, for it is believed that the results obtained would be worthy of consideration in any future policy for organizing and training a proper military force for this country.

"(e) The discipline and soldierly bearing of men under instruction is excellent. Men are very smart in their appearance and snappy at their work. The 'click' system school is rigidly adhered to."

THE FIELD ARTILLERY REPLACEMENT DEPOT AT CAMP ZACHARY TAYLOR, KENTUCKY

I have already referred to the fact that the Field Artillery Replacement Depot at Camp Jackson, South Carolina, had barely been established when it became apparent that the load was greater than a single Depot could bear, and another one had to be created at Camp Zachary Taylor, Kentucky. Another and very impelling reason for the organization of a second Replacement Depot was the fact that the recruits received at Camp Jackson came largely from the agricultural and mountainous southern states and did not have the basic education and experience desirable in field artillery recruits. A great deal of thought was given to the question of a suitable location for a second replacement depot in which we could give the necessary training throughout the year and still obtain drafted men who had the basic characteristics desired. Camp Zachary Taylor came as near to meeting these requirements as any place considered, for there we would receive the men drawn from the industrial and agricultural areas of Indiana, Michigan, western Pennsylvania, and West Virginia.

To command this new Depot, I selected Brigadier General Fred T. Austin, who had served under my command when I was a colonel. I sent him to the Jackson Depot to familiarize himself with its operation. The Zachary Taylor Depot, accordingly, became a replica of Jackson, though on a smaller scale. The Jackson tables of organization, drill schedules, and so on, were furnished General Austin, who thus fortunately could escape all pioneering, although, of course, numerous minor changes were made from time to time to meet the different conditions surrounding this depot. Although the object of the two depots was a common one, viz., to produce a disciplined soldier who was to be in general a field artilleryman and a specialist in one subject, yet these results were to be arrived at by different procedures at the two depots. At Jackson, the training first given to the recruit

[2]Under the draft Acts, the following registrations were made: The first one, June 5, 1917, covered the ages of 21 to 31; the second, June 5, 1918, and August 24, 1918, included those who had attained the age of 21 since the first registration; and the third registration, September 12, 1918, extended the age limit to include 18 to 45.

was purely disciplinary in its nature, followed by his field artillery training; at Taylor, on the other hand, both classes of training were carried on concurrently. Colonel H. D. Higley, who formulated the Taylor schedules, had very firm convictions as to the time to take up the field artillery training, and I rather agreed with him. However, I decided to allow each depot to work out its own detailed methods and I simply insisted that the scope and total amount of the training should be the same at both depots. I expected that time would show which plan was the better one, but unfortunately the depots were not in existence long enough prior to the armistice to enable definite conclusions to be drawn. The Depot started July 1st, and during the next three weeks Camp Jackson sent to it some 500 officers; its enlisted strength, as I remember, ultimately reached about 15,000 men.

The same specialist schools that I have mentioned as being at Jackson were established at Taylor. The receipt here of the Jackson schedules, hints to instructors, and all other training memoranda enabled Taylor to progress rapidly and in addition it kept the two depots co-ordinated. But here again the continual speeding up in the organization of brigades, overseas shipments, and other causes prevented any replacements from ever completing the full 6-period course. The average length of time the men were at the depot was less than thirty-six days. Parenthetically, it may be remarked that it was this failure of replacements to ever complete the full schedule of training at either depot that rendered it impossible to make any decision as to which depot had the better system of training.

Colonel Harvey D. Higley, in charge of replacement depot at Camp Zachary Taylor, Ky.

In addition to training enlisted replacements, both depots had to institute schools for officers. Omitting all questions of technical training, it was necessary to establish officers' schools to teach officers who were graduates of Training Camps or Divisional Camp Schools, the handling of government property by a battery commander, the council book, operation of the battery mess, battery paper work, returns, reports, and the like. These schools were generally held at night. This part of training was covered in the Central Officers' Training School when it replaced the Divisional Training Camp Schools.

In each Depot there was maintained an excellent Personnel Office, with qualification cards and locator cards of all men in the Depot; also, a Classification and Assignment Office to classify incoming men and assign them to the training for which their civilian experience had best fitted them; also, a Transportation Office to meet all incoming detachments, make all necessary railroad arrangements for outgoing detachments, and see that each man's Service Record was correct and complete. In addition, confidential records were kept of each officer as to his value as an instructor, as a disciplinarian, and other qualifications, these cards being particularly useful in selecting good officers to be sent as replacements.

Although this Depot was nominally commanded by Brigadier General Fred T. Austin, yet its success is due directly to Colonel Harvey D. Higley. And, in this statement, I do no injustice to General Austin, as he was camp commander, having under him this Replacement Depot, The Field Artillery Central Officers' Training School, The Depot Brigade (left behind by the 84th Division), The Remount Depot, a large hospital, and other activities. No human being could have commanded all these enterprises and devoted any time to the details of the Replacement Depot. General Austin had a big task, and he did it well.

Unfortunately, Colonel Higley was carried on the papers as Senior Instructor, I think, instead of in Command of the Depot, and due to this slight error he has never been given the credit he deserves. He actually organized and commanded the Depot in fact if not in name. And he did it well, too, displaying excellent judgment and much initiative in meeting complex problems daily. I am deeply indebted to him, and have several times tried to have his services recognized by the award of the D.S.M., but each time I have been unsuccessful on account of the way he was carried on the records. If I had to organize that Depot again I would put Colonel Higley in the same position he held, but I would see that he was carried as being in Command of the Depot. As it was, the only reward I could give him was a good command after the war; and this I did by sending him to Germany, as soon as the opportunity offered, to command the Field Artillery in our Army of Occupation.

FIRING CENTERS

The original plan of the War Plans Division of the General Staff, under date of September 11, 1917, stated: "The Plan is to have in Europe 1 army of 5 corps, 30 divisions, in time for an offensive in 1918"; and, in pursuance of this plan, General Pershing had secured certain firing centers from the French, at which the brigade training of the American Field Artillery could be completed.

These centers had a total capacity of 18 brigades. Yet we had fallen so far behind in shipment of troops that at the time I became Chief of Field Artillery there was not a single brigade in any of these centers. However, the fact that the centers did exist and consequently could be used, if we could get the troops to France, naturally subordinated the establishment of such centers in the United States to the establishment of the Replacement Depots here, which at that time did not exist in either country. I had neither equipment nor trained officers for instructors to carry on both activities at 100% nor anything like it.

However, with the shortage of shipping to furnish supplies it was uneconomical and most undesirable to maintain brigades for months in France merely learning such things as they could have learned equally well in this country. The nearer we could get field artillery brigades to combat efficiency before shipping them overseas, the closer we approached real practical efficiency, hence the inclusion of such Brigade Firing Centers in the United States in my Training Scheme.

Colonel E. L. Gruber, organizer of the Firing Centers.

In working out the details of these Centers, I followed the same general plan as with the Replacement Depot; that is, I designated an officer, Colonel E. L. Gruber, in general charge of filling in details of the Training Center organization, course of instruction, and so forth, and he held a daily discussion with me to harmonize the Centers with other activities so as to prevent duplication and overlapping. I selected Colonel Gruber to head the Centers and work out the complicated problems involved because I regarded him as without a superior in knowledge of field artillery technique and tactics — thorough in everything, and a hard and tireless worker. The results he accomplished proved my opinion to be correct. In looking back now, twenty-two years later, and considering all the difficulties under which he labored, I still marvel at the results he accomplished. No man without a complete knowledge of the tactics and technique of field artillery in all its minutae could have laid out the work as well as he did and no man without unlimited physical and mental energy and force of character could subsequently have succeeded in putting his plans into execution.

Of course we got the idea of the Firing Centers from France, where General Pershing, as I have stated, had instituted them for his field artillery. In addition, General Vignal, the French Military Attache, had several times suggested their establishment to me. I agreed with him as to their desirability, but I told him frankly that I did not have the guns and other equipment. Finally, I said I would establish them if he could get a few guns sent here from France. On March 6th, he agreed to take up the gun procurement through his Ambassador and the President, and then cable for the guns. He estimated that they would be here in about a month.

At the time we were planning the organization of Firing Centers and their course of instruction in this country, our problem was complicated by the insistence of our allies that we send overseas only infantry and machine gunners. There was backing and filling over this question for weeks. I did not know how many brigades there would be in this country, nor how much time we had to get them in shape. But it looked as though there would be at least twenty-five of them, and that to their inefficient state of training there was now to be added a low state of morale, caused by seeing themselves left behind when the infantry of their divisions sailed for France. On the other hand, if these brigades were to be left behind, our problem would be partially simplified by giving us more time to whip them into shape. The crux of the matter lay in the uncertainty, and this uncertainty rendered it almost impossible to lay out a course of training, either as to length of time or scope of instruction. However, we had to plan a definite course of some sort before we could begin training, so we blocked one out. Our idea was that the course, while being almost entirely practical, including firing and tactical problems, would in general be one of coordination and advanced work. It would be a sort of Finishing School. In order to provide facilities, therefore, we placed at each center a far more complete equipment for the brigades undergoing training there than they had ever before possessed. Even so, the equipment at the Centers was far from complete.

In addition, we concentrated as many skilled instructors at each center as we could. Some of these men we brought back from France for this purpose. In carrying out our Finishing School conception, our idea was that, immediately upon the arrival of a brigade, a week or two would be devoted to checking up its state of training, and another week or two might be necessary to correct the weaknesses and deficiencies developed by this inspection, either in individuals or smaller units; and then we would go ahead with our advanced work. This we intended to begin by carrying forward each individual battery, then each battalion, then each regiment, and finally putting all three regiments, the trench mortar battery, and the ammunition train, together as a complete brigade. The brigade training would include the advance to and complete occupation and organization of a sector, including organization of the echelons, supply of ammunition, materiel, rations, forage, and the like, preparation for an attack and advance, preparation for retirement to a scondary position, for relief, complete organization of liaison, programs of

fire, both day and night, including barrages, counter-offensive preparation, harassing fire, interdiction fire, use of aerial observation, and many other features characteristic of actual battle.

But upon the arrival of the first brigades it was discovered that their training had not progressed to the point where they could undertake our proposed course with advantage. In reality, we had to start with the most elementary instruction, lay a sound foundation, and lead up to the point where they could profitably undertake the work we had planned for them. In order to correct for previous lack of progress, we had to establish at the Firing Centers many of the schools I have previously stated were organized at the Replacement Depots. It became apparent that much of the training, which both officers and enlisted men had gotten in division camps, was superficial. The standard of knowledge I had set for officers had been too high for them to reach by their own efforts, and with the lack of facilities at division camps. Anyhow, they were far below that standard. So we had to establish schools for officers and for men.

We had to teach the officers drill regulations, blackboard firing, indoor terrain board, use of range tables, methods of fire, corrections of the moment, probabilities, orientation and reconnaissance, use of maps, sketching, telephone upkeep and signalling, radio, machine gunnery, materiel, ammunition, and gas defense.

Similarly for the enlisted men, we had to train them in equitation, saddling, harnessing, driving, road marches, battery drill, occupation of positions, camping, field kits, first aid, and gas defense.

Colonel Thomas D. Osborne, commanding the Firing Center at Camp Jackson.

And, while as a result of this unexpected delay, the brigades did not advance as far as we had anticipated during the three months' course, yet they attained a degree of efficiency far beyond that of the brigades we had sent to France prior to establishing these Centers. I have in my possession a letter from an Inspector in France in which he comments most favorably upon the condition of a field artillery brigade which had reached that country after completing a Firing Center course in the United States. He said that it was by far the best brigade as concerns training that had landed in France; and he even went so far as to say that this brigade subsequently went backwards in its further training in that country.

So much for our Finishing School idea. As the above quoted letter shows, it was working out satisfactorily. And now, while we were striving to complete the training of these brigades, which had been in existence for a year, roughly, new burdens were added to the Firing Centers. In July, as will be seen later, several new brigades had to be organized, and authority was given me to organize them at Firing Centers. This meant enlargement of the schools we already had and the addition of others at these Centers. As the subject is more fully discussed later, nothing further will be stated here, except to say that it meant more work for the already hard-pressed Firing-Center personnel.

Colonel Gruber started his center at Fort Sill, Oklahoma, early in May. He was the pioneer. He not only carried on the work of his own center, but in addition he largely guided the others also. These other centers were Camp McClellan, at Anniston, Alabama, under Colonel John S. Hammond; West Point, Kentucky, under Colonel Charles S. Blakely; and Camp Jackson, Columbia, South Carolina, under Colonel Thomas D. Osborne. Colonel Gruber alone escaped the burden of organizing new brigades at his center. He carried on the Finishing School idea to the Armistice.

It might here be interjected that Colonel Blakely, in starting the Firing Center at West Point, Kentucky, proceeded to that place in an automobile borrowed from Camp Zachary Taylor. He was accompanied by Colonel Lee and Captain Robinson. When Camp Taylor was abandoned some years later, the authorities at that place were still waiting for the return of the borrowed car!

The work done at these centers was hard and discouraging for the commanders. There was a shortage of every sort of equipment; competent instructors were few and far between in spite of all my efforts to get them from France; and the commanders had to feel their way from day to day. They were junior in rank to brigade and many regimental commanders, whose commands were under instruction. Of course, my office got out a memorandum establishing the relations between the Training Center authorities and the brigade undergoing instruction, and General March approved the memorandum. This, however, merely helped, for no paper could entirely remove the difficulties inherent in such relationship. This called for tact as well as a superior degree of professional knowledge. The fact that in all the brigades that passed through these Centers but little friction actually developed, not only speaks well for the spirit dominating the whole field artillery but is also a monument to the tact, wisdom, and great ability of the Firing Center commanders. I now record with the deepest pleasure my appreciation of the fine work done by these Firing Center commanders.

Up to the signing of the Armistice, seven brigades had passed through these centers: Three through Fort Sill, two through Camp Jackson, and one each through West Point, Kentucky, and Camp McClellan, Alabama. In addition, there were eight brigades in the Centers in training.

As to the Camp McClellan Center, it early became apparent that the reservation was inadequate in size, did not lend itself to expansion, and was otherwise ill suited to the work. I visited it personally to see what could be done to improve the situation, but found it to be a bowl in the mountains, containing only 16,000 acres, and with most of the buildings located in the middle of the bowl. Surrounding land, which could be used only at great inconvenience, was high in price. I therefore determined to give up this center as soon as I could locate a new and suitable place, there being no existing camp or cantonment available. Upon presenting the situation to the proper authorities of the War Department, I was given authority to secure a new and suitable reservation if I could find one, and to turn McClellan over to the General Staff for assignment to some other purpose as soon as the Field Artillery could vacate it.

Colonel E. P. King, Jr., head of Camps, Ranges, and Real Estate Section, OCFA.

Ultimately, I located the area which is now Fort Bragg, North Carolina, and thereupon completed the plan of maintaining Centers as follows:

Fort Sill, Oklahoma	capacity 2 brigades
Camp Jackson, South Carolina	capacity 4 brigades
Camp Knox, Kentucky	capacity 6 brigades
Camp Bragg, North Carolina.....	capacity 6 brigades
Total.....	18 brigades

This is the number we contemplated maintaining in the United States under the 80-Division Plan that was in effect when the Armistice was signed.

After we secured possession of the Camp Bragg reservation and construction had progressed to the point where it could furnish a nucleus of accommodation for the Training Center, I ordered Colonel Hammond to proceed there from Camp McClellan, and to command the new center. He had been there only a few days when I received disquieting news as to his health. I sent Colonel Edward P. King, Jr., to investigate, while I went to West Point, Kentucky. Colonel King promptly followed me there. As he walked into the tent where I was discussing affairs with certain officers, I knew that there was trouble. Whenever he promptly followed me to some place during the war, it always meant a situation that admitted of no delay. He informed me that Colonel Hammond was in such a state of health as to necessitate his immediate relief. This sounds like a very simple matter; it looks like merely sending another colonel to replace him; but, actually, colonels of Field Artillery for important work in the United States were few and far between, and each one was in a position from which he could ill be spared and in which he could not be satisfactorily replaced. The whole structure was pretty much like a house of cards—pull one out and the whole structure falls. As there were a number of officers present in the tent, I stepped outside to avoid the noise and confusion while thinking out the problem of Colonel Hammond's successor. It was a dark night and while I was walking back and forth, a light rain began to fall; if the officer who came out of the tent and threw a raincoat over my shoulders ever reads this paragraph, I hope he will accept my belated thanks for the performance of a kindly and thoughtful act. After spending over an hour in considering different men and the work they were on, I finally determined to move Colonel Maxwell M. Murray from command of the Knox Center and to have him organize and command the Bragg Center. I then selected Colonel Waldo C. Potter to command the Knox Center, and this in turn involved a delay in replacing Colonel Gruber in command of the Fort Sill Center for which Colonel Potter had been slated.

I had previously promised Colonel Gruber that as a reward for his fine work, I would send him to France just as soon as I could find a successor to take over his Firing Center. Ultimately I selected Colonel John G. Tyndall for this duty. But the various changes I have mentioned caused such a delay that it was not until late in October that Colonel Gruber was freed. I then met him at Camp Zachary Taylor, when he again asked me to hasten his orders. I told him that his name was on the next list of colonels to be made brigadier generals and that I thought his chances for his promotion would be lessened if he went overseas at once as a colonel. He replied that he still wanted to go at once irrespective of rank, and accordingly I agreed to send him. When we arrived in Washington, however, early in November, there was so much armistice talk in the air that I could not immediately carry out my promise, so, at my request, he was detailed on the War Plans Branch of the General Staff to handle the problems of demobilization and reorganization of the field artillery.

I sent Colonel Hammond to Walter Reed Hospital. This was late in September, 1918, and, as the Armistice came in November, no brigades completed their training at the new Camp Bragg Center. Colonel Murray, I am certain, would have developed a Center there fully the equal of the others. As it was, he remained at Camp Bragg and did excellent work in handling many post-war difficulties at that place.

The reader will have noted that Bragg and Knox were each to have been Centers of a capacity of six brigades, the greatest number contemplated at any one Center. The Knox reservation would have had an area of about 80,000 acres, while Bragg would have had about 140,000, and in addition it offered many more possibilities as a

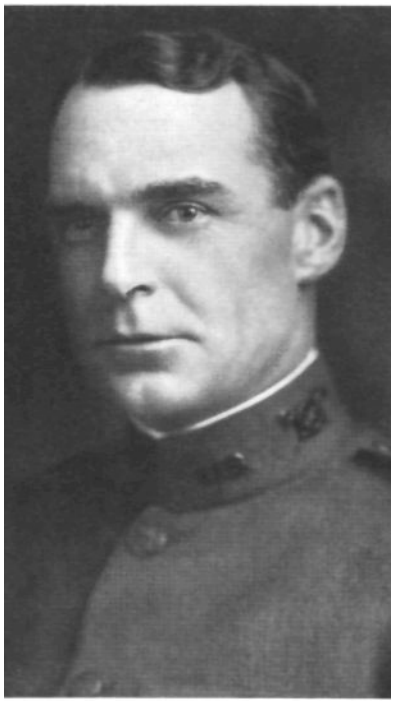
field artillery range. Thus the Bragg Center would in every respect have been our most important Center.

I have discussed the four Firing Centers as though they were all alike and the problems of one characteristic of all, and as though the solution of the problems at one Center was the solution of those at all. This was not the case. Each had its own peculiar trouble and difficulties. In reality, the only factor that was absolutely common to them all was the hard, gruelling work. Nor do I want to leave the impression that all the Firing Center commanders, other than Colonel Gruber, had merely to follow his schedules, training memoranda, and pamphlets. Some of his instruction matter could be, and was, used as written; much of it had to be revamped to fit it to the particular Center where it was used, and in addition it had to be modified to fit the state of training of the particular brigades under instruction, for no two brigades were ever duplicates of one another in their state of training when they arrived at a Firing Center.

Then there were many other local problems to be solved at each Center. Each Center had some advantages and some disadvantages over the others. In the most vague and general terms, I would say that Colonel Gruber, at Fort Sill, being the pioneer, did the spade work (and it was hard) of working out schedules, preparing problems, and writing and publishing an enormous number of printed and mimeographed pamphlets of instruction, all of which were furnished to the other Centers; on the other hand, he had the facilities of the School of Fire, located on the same reservation, to assist him to such an extent as it could spare. Colonel Osborne, at Camp Jackson, South Carolina, had the advantage of the instruction matter gotten out by Colonel Gruber, and had an excellent firing range, though it was not well equipped; but he suffered from having his activity subordinated to the Replacement Depot, at the same place.

I was compelled to so subordinate it, as only the early success of this Depot could relieve the draining of all other existing brigades, whether in Firing Centers or not, to supply replacements for the field artillery in France. These replacements had to go forward on schedule time even though so doing wrecked every existing brigade in continental United States.

General Blakely, at West Point, Kentucky, had the advantage of Colonel Gruber's instruction matter; but his firing range, at the time, was far inferior to either Sill or Jackson, and he had, in addition and to some extent, to divide facilities with the Central Officers' Training School at Camp Zachary Taylor, some 30 miles away; he did not have a free hand; and, in addition to this, he was in general charge of constructing a many-million-dollar cantonment, where he was harassed by labor troubles.



Major Kenneth S. Perkins, Inspector-General.

Colonel Hammond, at Camp McClellan, Alabama, had the advantage of Colonel Gruber's instruction matter, but he had the poorest firing range of any of the Centers, so poor in fact that we were planning to abandon it as soon as we could get Bragg ready to take over the work; and as a consequence he had the least amount of equipment available for instruction purposes. And, finally, I want to add that the different conditions existing at these four Firing Centers, so widely scattered physically, involved no small amount of work in the Office of Chief of Field Artillery to keep them all "on an even keel." For we were, of course, trying to produce a standardized product, a reasonably well-trained field artillery brigade.

There were several factors upon which I counted to produce this result. One was Colonel Gruber's literature furnished to all Center commanders. Another was encouraging personal correspondence directly among Center commanders with one another. A third was frequent visits by an Inspector from my office. In this last case, I followed a rather unique plan of having the Inspector point out verbally on the spot any errors he might find instead of writing back long letters after he returned to the office. If he had noticed any particularly good feature of training or administration at one Center, he discussed this with the other Center commanders, leaving to them the adoption or rejection of the idea. The Inspector brought back to my office lists of the needs, generally personnel or supplies, of the Center commanders and we then helped to remove the deficiency to the best of our ability.

This idea of the Chief letting the Center commanders know of his desires as to results, and then permitting them to work out their mission without interference, while the Chief assisted in supplying their needs, worked miracles. No order from the Chief's office and no cut-and-dried program furnished by him could possibly have produced the wonderful results actually obtained. These results were a monument to the zeal, ability and loyalty of the Center commanders.

There was also a change of commanders at the other Centers. At Jackson, Colonel Osborne was succeeded

by Colonel Erlenkotter and he, in turn, was succeeded by Colonel Paine shortly before the Armistice. And while these changes were taking place, Colonel Charles S. Blakely, commanding the Knox Center, and who was the only remaining one of the four Center organizers, was promoted to a brigadier generalcy in September and given command of a field artillery brigade at his Center. When he was so promoted, it was necessary to relieve him as Firing Center commander so that he could devote more time to his brigade; that in itself was a big enough task for one man. He was succeeded by Colonel Murray as Center commander; and Colonel Murray in turn had to be relievd, as I have previously stated, to take over the more important Bragg Center. Colonel Murray was succeeded at Knox by Colonel Waldo C. Potter. So, during the course of four to six months, while the Centers were struggling to get going, under every sort of handicap, half of them had two different commanders and the other half had three. Of course, so many changes were bad. They tended to prevent continuity of methods and of policies. But the changes could not be avoided. As I have stated, our whole structure depended upon a few key men, and, when one of them was removed, other changes inevitably had to follow.

Brig. Gen. Charles S. Blakely, commanding Firing Center at Camp Knox.

It will be noted that Colonel Blakely was the only one of the four original Center commanders to become a general officer. But he was also the senior of the four commanders. Thus, both by seniority and his work, he was entitled to this promotion. This last sentence may be unfortunate, for I do not want to give the impression that he or anybody else was promoted during the war as a reward. It was not so. General Blakely was promoted to this grade because his whole record showed him to be well fitted for this work, and that he was well qualified to fill it. He was a field artilleryman of outstanding ability, of much versatility, and to a pleasing and disarming personality he added an exceptionally alert mind; he also possessed a capacity for getting things done, and this qualification was put to a severe test in handling the construction of a many-million-dollar cantonment we were building at Camp Knox under the most trying conditions. The more troubles that accumulated around him and the greater the number of trying problems that he had to solve the more his philosophical nature shone forth and the less he showed his troubles to the world.

Omitting the subject of organizing new field artillery brigades at the Firing Centers, which will be considered later, and confining our remarks merely to the brigades which had been in existence nearly a year at the time the Centers were established, the work of the Center commanders in putting the first semblance of efficiency into these brigades was marvelous. It was all the more so when consideration is given to the many handicaps under which the Centers labored. Nothing but the greatest spirit of zeal and devotion to duty, coupled with much ability on the part of all who labored in this field, could have produced the results that were obtained. Under these conditions and considering that there were several hundred officers of junior rank on duty at the Centers and that changes of commanders were continually occurring, it became an extremely difficult task later to select a limited number of such officers for special commendation without inadvertently doing an injustice to others equally worthy of mention. But, notwithstanding this difficulty, the following named officers who were on duty at different times at the Field Artillery Brigade Firing Centers were reported as having materially contributed to the success of these Centers. In listing these few names, the question is not so much whether each of the officers named should be included in the list, as whether many more should not also be so included:

In addition to Colonel E. L. Gruber, who organized the Brigade Firing Center at Fort Sill, Oklahoma, the following officers, by reason of their efficiency, energy, and devotion to duty contributed materially to the success of this Firing Center: Colonel C. P. George, Director of Instruction; Lt. Col. Ivens S. Jones, Assistant Director; Lt. Col. H. L. C. Jones, Assistant Director; Lt. Col. J. B. Anderson, Assistant Director; Major H. R. Corbin, Assistant Director; Major R. D. McDonald, Assistant Director; Captain A. Y. Wier, Commanding Enlisted Detachment; Captain Wayne Johnson, Assistant Adjutant; Captain John B. Grimball, Munitions Officer; 1st Lieut. L. H. Dean, Range Officer; 1st Lieut. R. J. Turner, Transportation Officer; Captain Bennet (French Army).

Instructors—Captains D. R. Sigourney, Luckett Cochran, T. K. Fisher, T. P. Speer, K. T. Tenner, David C. Spooner, William Horstkotte, Signal Corps; C. C. Ellzey, and E. K. Ruth of the Chemical Warfare Service.

In addition to Colonel C. S. Blakely, who organized the Brigade Firing Center at Camp Knox, Kentucky, the following officers, by reason of their efficiency, energy, and devotion to duty, contributed materially to the success of this Firing Center: Colonel R. E. Lee, Camp Adjutant and Executive; Colonel Maxwell Murray, Commandant (relieving Col. Blakely); Colonel Waldo C. Potter, Commandant (relieving Col. Murray); Major Howard M. Randall, Camp Adjutant; Major Craigie Krayenbuhl, Camp Adjutant and Senior Instructor; Captain W. Meade Robinson, Camp Quartermaster; Captain Arthur O. Walsh, Personnel Adjutant; Captain Charles H. Reckfus. Assistant Camp Adjutant and Assistant

Instructor in Gunnery.

Instructors—Major Edwin M. Smith, Captains William P. Clancy, Stacy L. Norman, Lawrence K. Mansfield, Robert P. Newton, Norman F. Claussen; 1st Lieuts. James H. Irwin, Leonce J. Blanchard, Richard B. Hand, H. O. Moore, William A. Galbraith, and 2nd Lieut. Quinnell.

In addition to Colonel John S. Hammond, who organized the Brigade Firing Center at Camp McClellan, Alabama, the following officers, by reason of their efficiency, energy, and devotion to duty, contributed materially to the success of this Firing Center: Lt. Col. Clift Andrus, in charge of Service Practice, and "in great measure responsible for the success of the Firing Center"; Major Wm. R. Woodward, in charge Specialists' Schools; Major W. D. Geary, Senior Instructor in Tactics; Major T. J. J. Christian, Instructor in Field Gunnery, Camouflage, and Field Fortification; Major James Imbrie, Director N.C.O. School, Machine Gun School, and School of French 75-millimeter Gun; Captain W. E. Boughton, Adjutant and Statistical Officer; Captain J. D. Thomas, Range Officer; Captain H. W. Larsen, Supply Officer; Captain A. H. Ortman, in charge School for Bakers and Cooks.

Instructors—Major Martin Rice, Captains George W. Murfitt (British Army), J. D. Thomas, J. P. Kelly, J. F. Robohm, Jr., F. M. Fuecker, Wm. S. Covell, L. K. Lydecker, 1st Lieuts. C. D. Tuska, J. Achelis, 2nd Lieut. C. C. Ottosen, and Field Clerk Eugene McAdams.

In addition to Colonel Thomas D. Osborne, who organized the Brigade Firing Center at Camp Jackson, South Carolina, the following officers, by reason of their efficiency, energy, and devotion to duty, contributed materially to the success of this Firing Center: Colonel George H. Paine, Director of Instruction; Lt. Col. Herman Erlenkotter, Adjutant, and Director of Instruction; Major Basil H. Perry, Adjutant; Captain Paul W. Johnson, Supply Officer; 1st Lieut. Frederick W. Franke, Personnel Adjutant.

Instructors—Captains Lauren Arnold, R. E. Beck, W. H. Dubard, W. McB. Garrison, E. E. Loupret, and 1st Lieut. C. B. Giles.

THE FIELD ARTILLERY ASSOCIATION extends heartiest congratulations to one of the members of its Executive Council, Brigadier General C. C. Haffner, on his promotion from a colonelcy. In spite of General Haffner's repeated requests for "no publicity," we cannot refrain from testifying to the fact that during his tenure of office on the Council he has continuously and vigorously advanced the interests of the Association. Gen. Haffner, formerly of the 124 FA, now becomes commander of the 58 FA Brigade (Illinois National Guard).

Members of the Military Order of Santa Barbara who are present at Fort Knox held an interesting meeting at Doe Run on July 15. There were no speeches, but considerable lusty singing. Maj. F. H. Boucher, FA, and Capt. Roy A. Horn, FA-Res., were initiated into the order.

Colonel Louis L. Roberts sends in 31 new memberships to the U. S. Field Artillery Association from his regiment, the 139th FA (ING), which makes it a 100% organization. So far as this office is aware, three National Guard regiments (111th, 124th, and 139th), and no others, *belong to this distinguished group*.

SUBSCRIBERS! Please note statement in italics at bottom of Contents *page, with reference to changes of address and rank. Also please remember to put your name on your change-of-address cards; we have received a number unsigned, and even a few which were completely blank!*

Let Them Practice First

How to conduct moving-target drill in the gun park

By MAJOR DOUGLAS V. JOHNSON, FA

The failure of any weapon smaller than a seventy-five to stop German heavy tanks makes it vital that our batteries be able to fire effectively with direct laying on moving targets. Few, if any, of our batteries do as much of this firing as they need, or would like to do. A recent article in the JOURNAL* states that the great majority of our batteries are not able to deliver this fire satisfactorily; and there are few who will contest this statement.

One of the reasons for this unsatisfactory condition is the lack of opportunity to shoot a sufficient number of moving-target problems. Another and more cogent reason is that we rarely drill our batteries in this type of problem. Stated another way, we seldom drill on the most difficult problem we have. It is true that to some extent we teach direct laying to our gun crews, and the conduct of that fire to our officers; but both officers and gun crews show their need of something further before they go on the range and blaze away ammunition using the "guess and prayer" method of hitting that moving target.

A drill to fill this need must be one which can be done with equipment already in the battery; one which will be interesting; will to some extent duplicate the apparently disordered condition existing when such fire is delivered; and, most important, one that can be done primarily in the gun park. This latter necessity is added because, if it is necessary to move out away from the park to do it, the opportunities for giving the drill are reduced. Particularly is this true in horse-drawn batteries. The restriction of doing at least part of this training in a gun park means that the moving target must be near the guns, perhaps only across a road.

The following is submitted as a system of training which will satisfy these requirements in a great measure, and which will improve a battery's performance in this type of fire. I have tried it in my own battery and found that a great improvement in our range firing resulted.

Suppose, for example, that the clear ground in front of our gun park is only 50 yards. We wish to drill against a target 2,000 yards away, moving at 20 MPH directly across our front. If we put our target at 50 yards' range and let it move at 50 2,000 of 20 MPH, we will have the same apparent speed so far as our gunners are concerned. Thus we would wish to move our target at 1 MPH. The cadence of quick time is about 4 MPH. If we put a soldier 50 yards from our guns, let him count cadence to himself and take a step each time he counts "one," we will then have a target apparently moving at the desired speed. In a similar manner any other range or speed may be simulated. For the initial problem, a target made up of two men keeping step and separated by a fixed distance, such as the length of a rammer staff or an aiming stake, will be found sufficiently elusive. This gives a very wide target which can progressively be reduced later.

In addition to the one or two men needed to simulate a target, the only personnel required for these drills besides the firing battery are two men per gun; one, a spotter, equipped with field glasses and stationed far enough behind the trail to be out of the way of the gun crew, in a position where he can sight directly over the line of metal; the other, equipped with a stop watch and standing beside the spotter. The latter, called the timer, must be informed as to the time of flight for the projectile and approximate range to be used.

The battery being prepared for action and ready, the drill starts by signaling the target to start moving. Commands are given to commence simulated firing. As each gun fires, the timer on that gun starts his stop watch. At the conclusion of the time of flight he says "Now" to the spotter. The spotter sights over the line of metal at the time the gun fires, and notes the direction at which it is then pointed. At the moment when the timer calls "Now," the spotter, using his field glasses, measures the deviation of the above noted direction from the front edge of the target, calling out this deviation as "50 Right," or "40 Left," or "Target." This gives the deflection sensings to the officer conducting the fire, who may thus seek to correct his lead of the target until he is getting target sensings on all guns. The gun crews continue their drill until the target passes out of view.

**The Rains Might Not Come*—Maj. O. F. Marston, FIELD ARTILLERY JOURNAL. Jan.-Feb., 1940.

(Should the deviation be greater than the field of view of the field glasses the spotter calls out "Right" or "Left" only.)

Greater accuracy and more intricacy in drill conditions may be obtained by the addition of a chief timer, who will continuously give to timers the exact time of flight for the varying ranges being used.

Progress in this drill is gained by continuously reducing the size and increasing the speed of the target. Mixed in with the more normal drills in service of the piece with indirect laying, it will be found to add variety and interest to the work of the gun crews. When proficiency in this drill is attained, it is then time to move the battery into more open country and conduct the same type of drill, using limbers or trucks at greater ranges for targets. Many drill plains are within sight of roads used by vehicular traffic which can replace or supplement the truck or limber targets. From this stage, the same drill should be used against the actual moving target on which the battery is to fire, and this is followed by actual fire on that target. Not until a battery is reasonably proficient at firing on a moving target under the most favorable conditions possible, is it prepared to fire on such a target under the more normal service conditions.

Any battery which goes through this routine will make a much better showing when called on to fire on a moving target when the chips are down.

Antidote for Blitzkrieg

By MAJOR G. B. BARTH, FA

Out of the fog of war, as the Nazi forces roll over Holland, Belgium, and France, comes the realization that it is time to sit down and take stock of our tactical concepts. In the present war we see exemplified again all our old familiar "Principles of War," but modern Blitzkrieg certainly adds new problems in applying them on the battlefield. Everything the German army is doing today (with the exception of the extensive use of parachute troops and dive bombers) was forecast by the Spanish Civil War. The reduction of Bilbao was brought about by the same air-ground cooperation methods that are being used today. In the early stages in Spain, tank action was unimpressive, due to lack of strength to follow the principle of mass employment so necessary to mechanized success. The Nationalists' breakthrough tactics, however, leading to the capture of Barcelona, foreshadowed those on the Meuse and the Somme. General Mola was the originator of the term, "Fifth Column"!

While the Spanish laboratory of war paid rich dividends to the interested powers, its results seemed inconclusive to us at a distance. Were the forces large enough and evenly enough matched to make the conclusions sound? Was enough modern equipment used? Did geography and the racial characteristics of the peoples involved make the results only of local interest? Now we see the same tactics applied by powers of the first magnitude with electrifying results. After the happenings of the last few days we can no longer remain complacent about the adequacy of our present tactical doctrines to meet all battle conditions. I don't mean that our present doctrines should be changed but rather that we should begin discussing basic changes in our organization, equipment, and training dictated by the necessity for isolated, unsupported combat by small units of any combat branch during a mechanized breakthrough operation.

Of all the combat branches, the one most seriously affected by the fact that a successfully mechanized attack reduces the combat area to a form of "melee" is the Field Artillery. All our tactics are based on the supposition that we are well behind the organized infantry area, and support the infantry by fire while their presence normally gives us security from attack of our battery positions by enemy ground forces. If organized positions are apt to be overrun we must add a corollary to our basic doctrine, "The only reason for the existence of the field artillery is to support the infantry by fire."

"There ain't no holt what can't be broke"

The corollary might read, "In order to remain in existence and be of future service to the infantry, the field artillery must be able to defend itself against direct attack of its gun positions by enemy fast-moving ground forces." In order to make this corollary something more than mere words, the following thoughts on artillery reorganization and training are submitted. The writer is an unknown "junior" and lays no claim to brilliance of mind or wide experience, but if, by the succeeding statements, he is able to provoke discussion, including disagreement, his purpose will have been attained. We can't afford to bury our heads in the sand.

1. *Arm and train all field artillerymen with the rifle*. The German artillery is so armed. Now we are beginning to see why. With mechanization firmly established, close defense of the position may now be more often the rule than the exception. Who will do it? Not the infantry, because in the fluid condition accompanying a successful attack, organized control will probably disappear and the fighting will degenerate into many small "dog fights" between isolated units. Only the men who are serving the guns will be left to protect them.

2. *Re-issue caissons to the field artillery*. With the possibility always present of being cut off we must have more ammunition at the gun positions. For motorized artillery the caisson might be adapted for high-speed travel and doubled in capacity by increasing its depth and having two ammunition compartments with doors front and rear. For carrying ammunition the caisson has several advantages over a trailer. Boxed ammunition weighs more and takes time to prepare for use at gun positions. The caisson would furnish protection for the gun crews in close defense. The two caisson doors could be so constructed that they could be detached from the caisson and serve as armor-plate shield placed parallel and in rear of the wheels in case of attack from a direction other than the front.

3. *Reform ammunition sections in batteries instead of concentrating all ammunition vehicles in the battalion combat train*. These battery sections could still be grouped by battalion when conditions were normal but if the front became "fluid," sections could report to their own batteries in order to find protection and assist the battery in further re-supply of ammunition. Drivers and assistant drivers could be equipped with submachine guns for close defense in case the section is attacked while enroute to or from the distributing point. Each truck could have one machine gun on a pedestal-type mount outside the right door.

4. *Replace a number of station wagons or command cars by armored command cars*. The loss of important headquarters personnel through a surprise penetration of a position would disrupt the system of command. Armored cars would give some protection and power of resistance to such personnel and allow it to make its way to the protection of the nearest artillery unit. Artillery headquarters (battalion and regimental) could be located close to some other arm, in the interest of protection.

5. *Limbers or motor park should be located close to the flank of the battery*. With mechanized threat likely, it will probably not be safe to send the transportation of the battery away from the position. By so doing vital mobility is sacrificed and the transport would be relatively unprotected in case of attack. Of course the air threat to such a compact position would be greater but it would probably be the lesser of two evils.

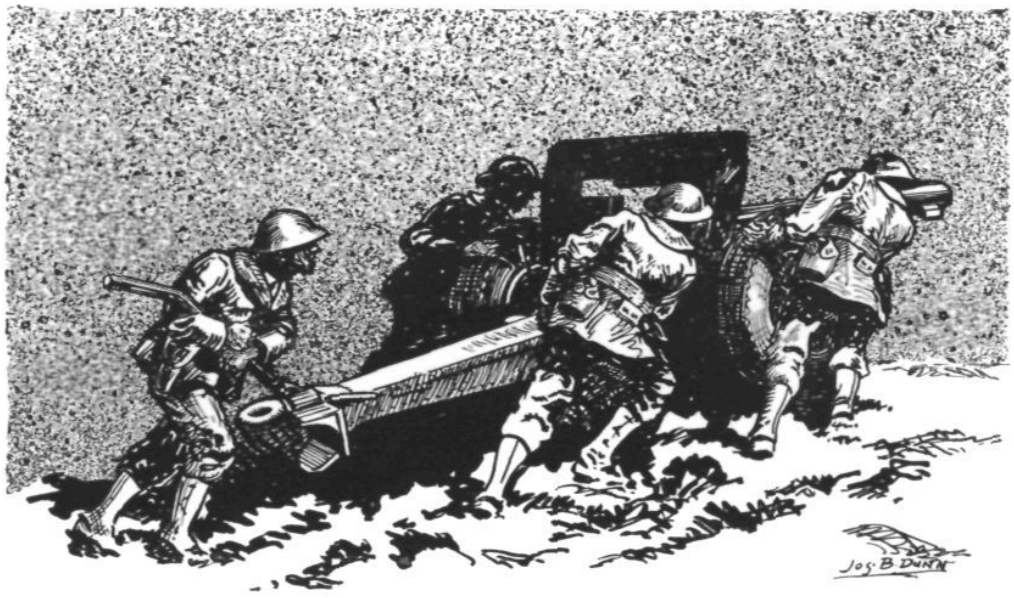
6. *Issue motorcycles and bicycles to battery to augment means of signal communications*. A mechanized attack while in progress would completely disrupt normal channels of signal communications. Immediately following such a raid, prompt action might be decisive but at this very time communications are almost sure to be out. Motorcycle or bicycle messengers could be used to reestablish control in the vital minutes following such an attack. I am discounting radio owing to the ease of enemy interruption, and the confusion and the possibility of damage to sets during an attack.

7. *Stress direct laying*. This is obvious. Of course this training must be decentralized to the individual gun sections. Training should point towards having all cannoneers able to act in key positions in direct laying. Moving targets must be used. In selecting gun positions it will now be necessary to consider an additional factor—field of fire at the gun position to facilitate close defense of the guns against mechanized attack from any direction.

8. *Teach use of natural obstacles*. In addition to the above, all artillery battery commanders and junior officers must be well instructed in the utilization of natural obstacles (such as woods, swampy ground, etc.) in connection with the selection of positions and their defense. There must be a definite plan of defense worked out to handle ground attack similar to that now contemplated in case of attack by low-flying planes. Hasty defense measures taken when a mechanized attack is approaching will not be enough.

A well known wrestling coach I once knew, had a quaint saying, "There ain't no holt what can't be broke." This seems to cover the present Blitzkrieg very well. Through hundreds of years of warfare there has been a constant grapple between offensive power and defensive measures. At the moment the former, in the form of mechanized fire power, seems in the ascendancy. It's up to modern ingenuity to prove that the wrestling coach was right.

Field Artillery School is testing panoramic cameras to determine suitability for field artillery survey work.



Fast Moving Targets

By
Major O. F.
Marston, F.A.

Disaster awaits those who are unable to protect themselves against tank attack.

This subject is by no means new but, as the present wars continue, the subject assumes greater importance. For our initial protective forces the ability to defend against mechanized forces is as essential as gas defense. All combat arms should be vitally interested in being prepared to successfully defend themselves against attacks by mechanized forces, tanks, and cavalry.

How many of us have been on maneuvers in the last few years where tanks and mechanized forces were encountered and where the umpires' rulings enabled tanks to overrun our positions? In your situation, perhaps your fixed antitank defenses and the fire power of your weapons could have broken up the attack, but in ninety-nine per cent of the situations, the umpire's ruling was correct, even though he may have been stampeded into his decision by his overestimation of the capability of tanks. On your side of the ledger, what reasons had you for assuming that his decision was in error? Have you or any of your gun crews ever seen a modern tank, not in action, but even in motion? Have any of your organizations seen a modern mechanized force? Assuming that your answers to the foregoing questions are in the affirmative, to satisfy your professional ego, have your organizations ever fired on fast moving targets? But enough of these irritating questions! Let us get away from generalities about subjects which few have more than a conversational knowledge! Let's get back to moving targets, back about thirty years or so (the subject is not new) and rapidly trace the development of the moving targets suitable for service practice against the most modern tanks and mechanized forces!

Figure A

Target, Figure A. consists of a half-tun vat or other cask rolling between two pieces of timber or shafts about 20 feet long, carrying a flag eight feet high and a rectangular target in front about four by five feet in size. British, 1898, towed by horses using 2-inch rocket line.[1]

Figure B

Target, Figure B, consists of a two-wheeled truck, six-foot axle, wheels three feet six inches in diameter (board), tongue ten or eleven feet long, to which a tow line is attached. The framework carries a triangular target five feet high and five feet base. This target is recommended for smooth sandy ground. British, prior to 1898, towed by horses using 2-inch rocket line.

Figure C

Target, Figure C, is similar to target B, except that it is mounted on two board runners eight feet long and one foot high. The line for these targets A. B. and C. is a 2-inch rocket or coir line.

Figure D

Target, Figure D, consists of two parallel wooden runners on which screens are mounted representing infantry, cavalry, etc. These screens are hinged at the bottom and lie horizontally when target is at rest, being pulled into the vertical position when a strain is put on the cable. The screen can be placed on the runners at any angle to the line of march of the target and thus be kept normal to the line of fire. Italian, 1883; tow line used is rope.

Figure E

Target, Figure E, is a light frame eight feet high by fifteen feet long covered with white cloth on which was pasted two mounted figures and three standing infantry silhouettes. The frame described was set up vertically on the bed and from front to rear (shown in sketch). U. S. 1897, target towed by No. 9 galvanized wire, using horses at trot and gallop—range 1100-1600 yards.

[1] Journal of the U. S. Artillery, May-June, 1898.

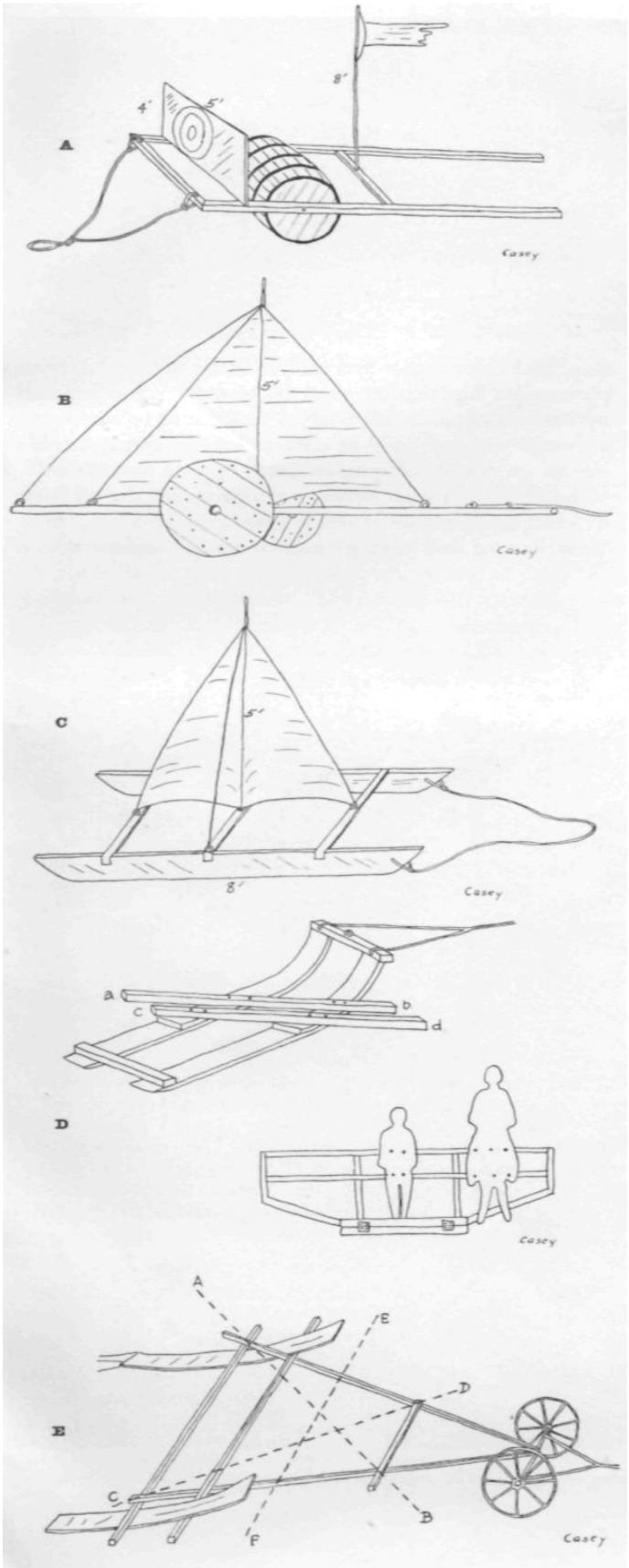


Figure F

Target, Photograph F, is steel frame, flat runners, metal uprights to which are fastened, with wire, wooden panels covered with target cloth. A very rugged practical target. The most practical and serviceable moving target designed and used at the Field Artillery School. Excessive weight and flat runners reduce practical speed and maneuverability on rough terrain. Direct hits destroy wooden panels. Silhouette is too small, compared to light tank, for gunners; however, this target is still used when higher speed and maneuverability are not essential in early training. U. S. 1932, design perfected by Lt. Col. (now Maj. Gen.) Leslie J. McNair, assisted by Range Detail, F.A.S. Towed by truck on steel cable.

Another type of moving target not shown, but one which a large number of officers have seen, is now in use at the Cavalry School. (Also used by some units of the French Army.) It consists of a narrow gauge railroad track laid on a slope; a target is mounted on a set of trucks (small railroad car) which in turn rides the track. This type depends upon gravity for its acceleration. This target has the disadvantages that it travels a fixed path, construction is costly, repairs costly, suitable location for track is difficult to find. By having fixed limits of travel, there is a tendency to reduce the initiative and resourcefulness of the gun squads.

In 1909, Capt. D. T. Moore, FA, was sent to Germany for a study of the moving targets in use by the German Army. Capt. Moore submitted a very complete report, together with photographs, sketches and descriptions of practically all targets then used. Copies of his reports are on file in the Library, Field Artillery School. Their principal interest to us now is in showing than even in 1909, a first-class power had spent large sums of money in perfecting moving targets.

The moving targets developed by the Field Artillery Board in 1931, shown in detail in FIELD ARTILLERY JOURNAL, July-August, 1931, were not practical.

The moving targets shown in the photographs "G" and "H" are the result of an attempt to design a target which would have the following characteristics:

1. Capable of speed equal to light fast tank, and maneuverable while in motion.
2. Approximate silhouette of tank.
3. Simple construction and ease of maintenance.
4. Suitable for use by all combat arms.
5. Low initial cost of manufacture, the idea being to have the targets manufactured, and issued by the Ordnance Department to the using combat arms.

The design also embodies the following: All parts used

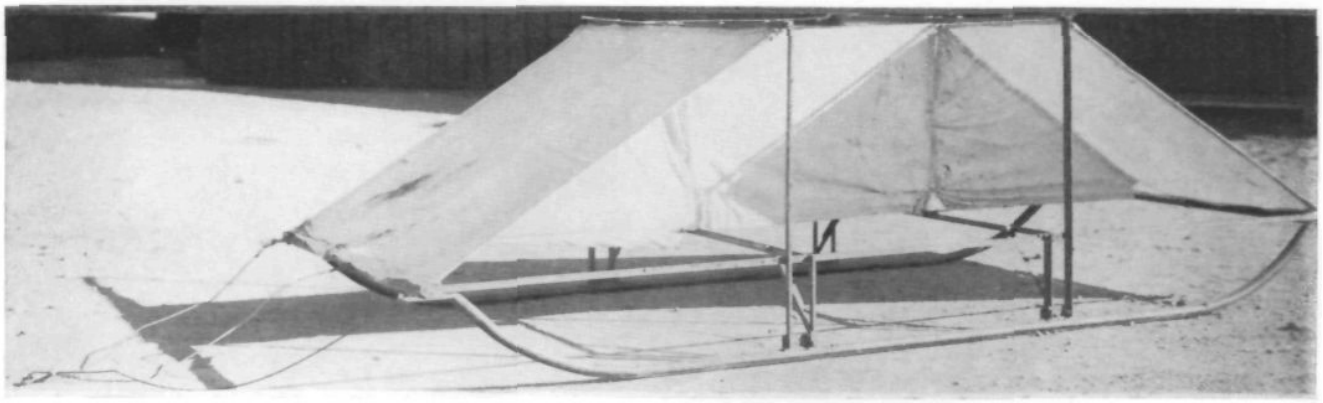


Figure G
New fast-moving target—speed up to 50 miles per hour, U. S. 1939.

may be purchased in any incorporated town; construction and repair may be made with tools available in any army post; the bridle is so designed that no ball or other tipping devices are needed in making a change of direction, and three direct hits on the bridle are necessary to prevent its functioning; may be towed from either end by reversing bridle, this enables practice to be completed although one end may be shot away; the spring tension design on the superstructure enables that part to withstand shock of rough terrain and concussion due to burst of H.E. shell; a type of truck now in use in all organizations is used for towing; panels on the superstructure

British divisional field piece. Note circular platform for use in firing at moving targets.

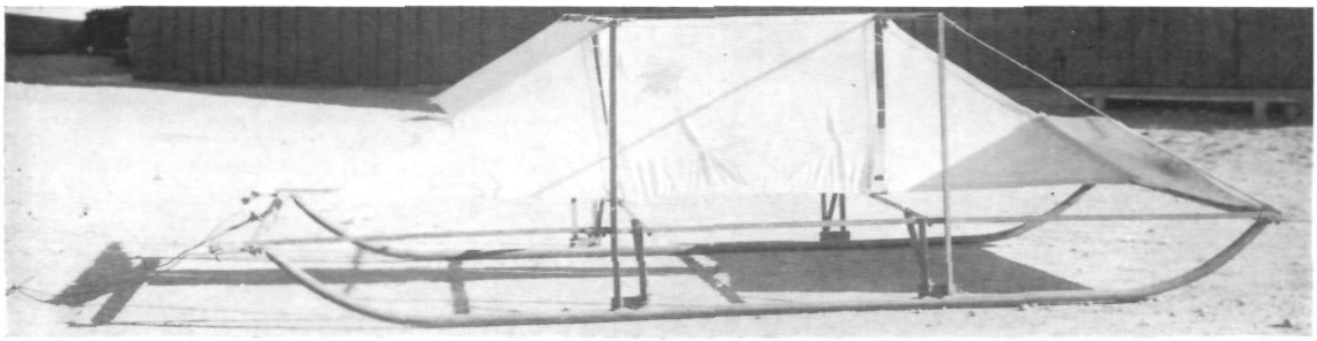


Figure H
New fast-moving target—speed up to 50 miles per hour. U. S. 1939. Same as G with different panel arrangement.

are made of target cloth and may be rearranged to suit the using arm.

While not perfect, this target has withstood a tremendous amount of use in actual practice. The design is a continuation of the efforts of those who have devoted time and thought to the art, and to them the designer gratefully acknowledges his indebtedness.

The following tables show the results of actual firing[2] on these targets by gun crews[3] which are at least the equal of any in the army. They bring out the fact that practice firing on fast-moving targets, with the materiel with which we are equipped, is an *immediate necessity*.

Perhaps the main reasons for our inability to score direct hits on fast-moving targets are: (1) Unfamiliarity with the problem. (2) Interest in other activities. (3) Lack of practice where the facilities are available. (4) No suitable target has been available.

For those more interested in other activities, a more explicit and definite compliance with the War Department Training Directive on the subject could get results. A beginning creates more interest until presently, a military necessity creates more enthusiasm and rivalry than trying to make a birdie on the ninth green. As for the gun crews, no service practice has so aroused the enthusiasm of the men as their efforts to score direct hits on fast-moving targets.

As for lack of practice, now if you don't practice you should know the answer.

It is proposed to have the Ordnance Department manufacture a target of the same, or a similar design, for issue, but such proposals are not always acted upon favorably. The working drawing is complete, and with initiative it is oftentimes surprising what can be done with salvaged material available in your post. Why wait any longer?

A working drawing of the fast-moving target shown in the photographs accompanying this article (Figures G and H) may be secured by the commanding officer of your organization by applying to the Secretary, The Field Artillery School, Fort Sill, Oklahoma.

[2]Targets towed from seven different positions. Gun crews did not know from which direction the target would appear.

[3]For obvious reasons the numerical designations of the organizations are omitted.

TABLES SHOWING RESULT OF SERVICE PRACTICE, FIRING ON TARGETS SHOWN IN FIGURES G AND H

Date 1939	No. of guns firing	Speed of target (mph)	Rounds per min.	Rounds fired	Hits	Time from identification to 1st round
MOVING TARGETS. 37-MM. SHELL. 37-MM. MOUNTED ON 75-MM. M-2 TUBE.						
10/25	1	20	15	25	0	16″
10/25	1	20	20	34	0	16″
10/25[1]	1	20	3	6	0	16″
10/28	1	28	5	4	0	18″
	1	25	9	8	0	12″
	1	28	12	12	0	8″
	1	25	12	12	0	5″
	1	28	15	15	0	8″
	1	25	15	4	1	5″
	1	28	12	11	0	5″
	1	25	12	4	0	4″
	1	28	14	13	1	4″
	1	28	17	16	0	5″
	1	25	19	16	1	5″
11/1	1	20-30[2]	8	7	0	5″
	1	20-30	10	8	0	6″
	1	20-30	15	12	0	10″
	1	20-30	17	15	0	3″
	1	20-30	12	10	0	5″
	1	20-30	13	11	0	4″
MOVING TARGETS. 37-MM. MOUNTED ON 75-MM. PACK HOWITZER[3]						
10/9	1	20-30		17	0	
10/13	2	20-33		82	2	
11/2	2	20-33		200	10	
75-MM. PACK—NEW ELBOW SIGHT						
10/9	2	20-30		7	0	
37-MM. MODEL 16. ANTITANK GUN CREW						
11/15	1	23-35[4]		10	3	
75-MM. MODEL M-2						
11/17	1	30		5	0	
11/17	2	33		9	0	
75-MM. SHRAPNEL, MODEL M-2. EXPERIMENTAL FIRING[5]						
11/1	1	20	4.2	2	0	43″
	1	20	8	4	1	45″
	1	29	3.2	2	0	29″
	1	30		1	0	38″

[1]After first two runs, targets were towed back to original positions and rerun. No hits were obtained until targets had repeated the run five times. Targets were visible for ¾ mile.

[2]Target started at 20 mph and increased speed during run to 30 mph.

[3]Two targets appeared simultaneously. Both guns firing.

[4]Two runs. No hits on first run of target.

[5]Note 1.—Problem No. 1. Gun coupled to truck. Time from identification to first round is time from command "Action left to first round." Trails not spread. Problem No. 2. Same as for No. 1 except trails spread and gun fired with 4-point suspension. Problem No. 3. Same as for No. 1. Problem No. 4. Same as for No. 2. Note 2.—To check time to go into action from coupled to firing with and without trails spread and with and without jack.

STANDARD CONTRACT PROVISIONS

COMPANY	NON AIR CORPS FLYING PROVISIONS (Occasional Flights in Military Aircraft)	"DUE PROOF OF DEATH" Accept Notification from Adjutant General as sufficient	LICENSED TO DO BUSINESS	DO BUSINESS ON FEDERAL RESERVATIONS IN STATES OR TERRITORIES WHERE NOT LICENSED	EMERGENCY PROVISIONS War Clause Status as of March 15, 1940
Aetna Life Insurance Co.	Aviation exclusion rider for Cadets and Young Officers Regular non-flying premium rate for occasional flights as passenger Individual consideration where hazard is more than average	No definite rule	All states except Nevada; licensed in Hawaii	Can, but no agencies	No war clause for armed services; $5,000 maximum amount issued
Bankers Life Co. (Iowa)	Standard rates for occasional flights. Individual consideration where hazard is more than average	Circumstances would govern	Most states, including Texas, but not in Me., N. H., Vt., Mass., Conn., nor R. I.	No	War clause included in new policies sold to members of the armed services
Conn. General Life Insurance Co.	Standard rates for occasional flights	Yes	Most states, including Texas, N. Y. and New England states.	——	No war clause. $10,000 maximum amount issued, including old insurance with Co.
Conn. Mutual Insurance Co.	Officer under 30 and Cadets accepted subject to aviation exclusion clause, others at non-flying rates	Prefers regular form, but in case of war or disaster would accept notification from Adjutant General	Except Ala., Ariz., Ark., N. D., S. D., Idaho, Miss., Mont., Nev., N. M., S. C., Utah, Wyo., territories and possessions	No	No war clause. Company is limiting its risk by the amount which it sells to military personnel
Equitable Life Assurance Society (New York)	Will consider about 30 flights per year as "occasional flights." Standard rates	Yes — no unusual circumstances. Otherwise may investigate	All states, D. C. and Alaska	——	No war clauses for U. S. military personnel, except aviators. New insurance limit is $5,000
Guardian Life Insurance Co.	Accept at regular rates 5 years after graduation provided applicant has not been assigned to aviation duties and signifies that he has no intention of going into aviation	Non-committal	33 states and D. C. (withdrew from Texas because of Robertson Law). Not licensed in Me., N. H., R. I., nor Vt.	Possible where jurisdiction is exclusively Federal; if jurisdiction is qualified it might not be possible	In general no war clause for armed services
John Hancock Mutual Insurance Co.	Under 35: Aviation exclusion rider	Yes; as a general rule	38 states, including Texas, N. Y. and New England, D. C., Hawaii	No	——
Lincoln National Life Insurance Co.	Accept at Standard Rates	Accepted as partial proof	Except Alabama, Fla., Ga., Ky., Nev., N. Y., Vt., S. C., Wyo. and Alaska	Believes it is legal	War clause applied only to the amount over the limit on which the company is willing to take the risk
Mass. Mutual Life Insurance Co.	Accept at regular rates where not more than 3 or 4 flights are made each year. Aviation exclusion clause applied to those of less than 5 years service unless disqualified for aviation	Non-committal	37 states including N. Y. and New England, and D. C. Not licensed in Texas	Does not know, but is not desirous of doing such business	No war clause for U. S. military personnel. Maximum limit $10,000
Metropolitan Life Insurance Co.	Occasional flights standard rates: otherwise an additional charge	Yes	Licensed in all states, but not in territories or possessions. Does not operate in Texas	Will not sell on Federal Reservation in Texas	War clause depends on marital status, age, and number of dependents.*
Mutual Benefit Life Insurance Co.	Officers over 31 accepted at regular rates. Those under 31 and Cadets accepted with aviation exclusion clause Maximum $10,000	If body is lost usually accept notification of A. G.—Settlement always has been prompt and satisfactory	All states except Ark., Ariz., La., N. M., and Texas. Does not do business in territories or possessions	Prefers not to	No war clause
New England Mutual Life Insurance Co.	Regular rates for those who fly as passengers very occasionally — Otherwise only with exclusion clause	Prefers regular form. Have made exceptions	38 states, including N. Y., New England and Texas; and Hawaii	Not sure. Has done it but prefers not to	No war clause. $5,000 maximum limit issued Officers and Cadets. No term insurance
New York Life Insurance Co.	Up to Age 28—aviation exclusion clause	Generally, yes	All except Texas; sells in Hawaii and Alaska	Yes	No war clause up to $5,000. Over that amount company will not cover death in war time outside continental limits (except Panama)
Penn Mutual Life Insurance Co.	Accepted at regular rate	Depends on circumstances	All except Texas	No	No war clause. Maximum limit $10,000
Phoenix Mutual Life Insurance Co.	Regular rates if flying as passenger occasionally	No: each claim considered on its own merits	Except Ariz., Colo., Fla., La., Miss., Nev., N. M., N. D., S. C., Texas, Utah, Wyo.	No	No war clause for U. S. military personnel
Provident Mutual Life Insurance Co.	Usually at regular rates	Yes, when bodies are lost	33 states, including N. Y. and New England; and D. C. Not licensed in Texas	No	No war clause
Prudential Insurance Co.	Regular rates usually. Certain officers granted insurance with a clause which covers them when flying in military plane when it is not connected with their duties	Pays ½ cash on notification; remainder on receipt of "Due Proof"—If some optional plan of settlement is used then on Due Proof	Does not operate in Nevada, N. D., Texas—Will do business by mail with residents of Federal Reservations in Texas	Yes	No war clause, for maximum of $5,000, including old insurance with the company
State Mutual Life Assurance Co.	Regular rates for those flying as passengers occasionally	Requires substantiating affidavits	Licensed in 38 states, including N. Y., Texas, and New England; D. C.	Yes, by mail	No war clause
Travelers Insurance Co.	Regular rates	If desired, ½ cash on notification; remainder on receipt of "Due Proof"	No restrictions	——	No war clause. Not selling term insurance to Officers. Maximum limit $5,000.

Information contained hereon should serve only as a guide. Companies change their practices from time to time. The War Clause situation is particularly dynamic and should be carefully checked.
*Limits without war clause: Single officers and cadets, $5,000; married officers under 35 years (with dependents), $10,000; married officers (with dependents) over 35 years, $25,000.

Can They Live Without You?

By Capt. George C. Duehring, FA.

What is our Insurance mission?

In these days of international stress, and increased activity in preparation for the nation's defense, it seems a fitting time to check over our plans for our families' security—just in case.

It is with the life insurance phase of our families' security that this article will deal, and it will present just one viewpoint—that of the army officer.

Many of us are in need of at least a partial reorientation on the entire subject of life insurance and most of us need a spur to engage in a check to see if our insurance will do for our dependents the job we want it to do. With those two points in mind let us state the mission.

It is agreed that life insurance provides the only method whereby an officer positively can provide an immediate estate, and nearly all officers are insurance minded. However, some of us have strayed from the mission which is *to provide for our dependents an adequate amount of protection, in terms of a safe income, as rapidly as possible, getting the maximum amount of protection for our insurance dollar*. The amount which one considers adequate is, of course, an individual problem, as is the rapidity with which it is provided. Procuring the maximum amount of protection for the insurance dollar, however, will come in for considerable discussion.

The accomplishment of the mission as stated involves (1) the proper selection of the type of policy, including the contract provisions pertaining to the activities of the military profession; (2) the following of an adequate purchasing schedule; (3) consideration of the method of premium payment; (4) the arrangement for the payment of the benefit under one or more of the settlement options provided in the contract; and last, but by no means least (5) the *careful* selection of the company from which to purchase. The officer who solves his insurance problem on the basis of those five points will never leave dependents who will be an object of pity—or charity—because of lack of thoughtfulness in providing for them.

Whole Life

Life insurance can be divided into three general categories: (1) whole life, (2) term, and (3) endowment insurance. Whole life is the type which matures upon death (or at age 96) but which can be paid for in a number of ways. One uncommon method of payment is by one single payment. However, the usual methods of payment are (1) for the lifetime of the insured, which is generally classified as Ordinary Life Insurance; or (2) for a limited number of years; for example, 20 Payment or 30 Payment Life. Ordinary Life Insurance (premiums payable for life) is the cheapest *permanent* protection available and should form the major portion of the officer's insurance portfolio. The limited payment plans are luxury insurance in which an officer can ill afford to indulge, for such plans provide for a future privilege which he may never live to realize. An officer who buys limited payment insurance is looking forward to his own retirement, and the cessation of premium payments rather than the protection which he is providing his dependents *now*. In brief, he is violating part of his mission inasmuch as he is not getting the *maximum amount of protection for his insurance dollar*. The objection which naturally is raised to paying premiums for life will be met in the discussion of methods of premium payment, and use of the dividends.

Term Insurance

Term insurance, as the name implies, insures against the risk of death for a specific length of time. It is the cheapest type of protection, but it is *temporary*. However, term insurance may have a very real place in an officer's insurance program. An officer who needs a large amount of protection but can not afford to buy it on a permanent basis should buy term insurance as a stop-gap measure. Unfortunately, there seems to be a psychological abhorrence of purchasing insurance which has no "cash surrender" value. This point is fallacious, for in buying term insurance one is buying life insurance on the same basis that he buys his fire or automobile insurance—as he uses it. It is not feasible for permanent protection, for in later years the premium payments are so high as to be burdensome. However, for the young officer with a relatively large family term insurance is an ideal hedge against premature death, and offers a means of providing his wife with an adequate income to raise the children. A large number of officers are gaining an appreciation of this point of view. Of course, hindsight will prove that most officers needed no hedge against premature death, but the more thoughtful of us do not care to gamble with our *dependents'* security. Incidentally, the best term policies are those which permit the insured at the end of the term, to convert to a permanent type *or* to renew the term contract without another physical examination.

Endowment Insurance

Endowment insurance is the most luxurious type and therefore the most expensive. It guarantees the payment of a certain sum at a definite future date. To accomplish this the contract is merely the combination of a steadily mounting savings fund and a decreasing amount of term insurance, the sum of the two always equalling the face of the policy. If the insured lives to the terminal date of the contract he has, with the aid of compound interest, accumulated the amount which he desired to save. If, on the other hand, the policy is matured by the death of the insured prior to the terminal date of the contract the beneficiary receives the face value of the contract, which is made available by the amount of the savings fund plus the term insurance feature. Re-examination of the mission will disclose that this type of insurance has no place in the officer's insurance portfolio.

Combination Policies

There are on the market various complicated and fancy types which are merely combinations of at least two of the three basic types. Life insurance men admit that these various fancy types are designed to be attractive to the buying public. Three of these, the "Family Protection Policy," the "Educational Policy" and the "Retirement Income Policy" will be discussed briefly inasmuch as officers are placed under considerable pressure to buy them.

The "Family Protection Policy" is a combination, usually, of ordinary life and decreasing term insurance. It is designed to provide a sizable income for a family until the children are grown and self supporting, and thereafter a lesser income for the widow. Specifically, the plan works in this manner: The period of "Family Protection" usually starts with the *date of issue* of the policy and continues for a definite period of time, say twenty years, although shorter periods may be used. Should the insured die during the period of "Protection" his family would receive a monthly income for the *remainder* of the "Protective Period." This income would be provided by the proceeds of the term insurance, and the interest from the ordinary. At the end of the "Protective Period" there is available the proceeds from the ordinary insurance. Should the insured live through the period of "Family Protection" that part of the contract is terminated and the premiums are reduced to the amount required by the ordinary insurance. The insured has paid for his term protection and has received the protection offered thereby. This type of policy has its good points, for it sugar-coats term insurance for those who need it, but who might not buy it unadorned. However, the plan lacks flexibility, for the insured is committing himself to a lengthy span of time which changing conditions may prove to be too long. The same purpose can be achieved by buying term and ordinary life insurance separately, and can be reviewed and readjusted from time to time in light of changing conditions. However, this flexibility will be obtained at the expense of a slightly higher cost than for the combination policy.

No such good word can be said for the "Educational Policy," for too frequently it is unwisely purchased. This policy is normally a combination of an endowment and decreasing term insurance, written upon the life of the wage earning parent. The term insurance serves the same purpose as it does in the "Family Protection Plan" and the endowment matures to provide funds for the child's education.

The appeal of this policy is emotional. The new parent in his initial glow of fatherhood wishes to make provisions for his offspring's higher education so he rushes forth to buy an "Educational Policy"—or perhaps an agent drops around and suggests that such a policy be purchased. However, a bit of reflection should determine that "Educational Policies," being basically endowments, are very expensive, and further that a young officer cannot afford to buy an "Educational Policy" for each youngster in order of appearance. The solution is pointed out in the mission previously stated—*adequate protection first*, then make provisions for higher education. "Educational Policies" are successful only if the insured lives. Premature death probably would necessitate using the proceeds from "Educational Policies" for the more important need—nourishment and clothing for the family. So, whereas the motive is laudable, one should defer purchasing "Educational Policies"—if at all—until the *entire* insurance program has been completed.

"Retirement Income" is a phrase which also has a strong appeal, but one which the Army officer should resist. The "Retirement Income Policy" is in effect an endowment, which upon maturity is made payable as an annuity—paying a lifetime income. No doubt such a contract has its place in the portfolio of the individual who must provide for his own retirement, but inasmuch as the Government provides a retirement income for its military personnel it is unnecessary for the officer to do so. One should always remember, however, that the Government does not assume the responsibility for adequately caring for an officer's widow and children. Therefore, before embarking on any plan designed to increase the retirement income an officer should satisfy himself that his family is properly protected.

To summarize, an officer's program should consist of two types of insurance, (1) ordinary life insurance for the bulk of the portfolio, and (2) term insurance, if there is a need for more protection than can be provided on a permanent basis. Such selection gives the maximum protection for the insurance dollar—a most important point.

Flying Hazard

Investigation has shown that far too many officers have purchased insurance which restricts their activities—particularly with respect to flying as passengers in military aircraft. Most men fly as passengers or on temporary flight duty. Obviously, no officer should accept

a policy which fails to give him full coverage, for no one can afford to have part or all of his life insurance program vitiated by his accidental death which may not be covered under the terms of his policies. Perusal of the table "Standard Contract Provisions" page 268) reveals the current practices of the listed companies. The practices vary widely among the companies. However, enough of them grant favorable provisions so that there is a wide range of selection.

War Clauses

The outbreak of the European War caused some companies to attach War Clauses of varying severity to policies now being offered. Other companies have chosen to limit their risk by limiting the amount (and sometimes the types) which they will sell to individuals who might be exposed to wartime risks. Needless to say, no officer should accept a policy which will release the company from liability in the event he dies in time of war. If all reliable companies adopt a war clause it seems reasonable to expect that the government will take cognizance of the seriousness of the situation and provide aid to those who have not completed their insurance programs. At any rate, one should not buy a policy which contains any type of war clause or which restricts aeronautical activity.

Officers should set up sound schedules

Quite a number of officers fail to set up for themselves an insurance buying schedule, in spite of the fact that pay increases are predictable. As a consequence, insurance buying lags; this sometimes has disastrous results. The reasons for buying insurance as rapidly as possible are numerous. The most obvious, of course, is that protection is gained sooner, which is a boon to the family in the event of premature death. Then, too, the rates are lower at the earlier ages of issue, which lightens the premium paying load throughout the later years. A considerable number of officers for one reason or another did not buy insurance while they were younger and as a result now find it necessary to pay a larger percentage of their pay for *adequate* protection. Another and perhaps more serious possible consequence of delay is the possibility of slight physical impairments which creep into the human frame with increasing rapidity after the age of forty. Often slight impairments do not cause an applicant to be rejected, but the alternative to rejection is "rating up"—the charging of a higher premium than is charged a good risk.

An insurance buying program cannot be settled categorically, for the conditions in each family vary. However, an excellent rule to follow is to complete the program by the time twelve years' commissioned service have been completed—for the average-aged officer that is about thirty-five years of age.

Of course, an integral part of the buying program is the amount to be purchased. It depends upon the amount of income an officer wishes to provide his dependents—and the amount he can afford. Most officers arrive at a figure between $25,000 and $33,000, which is none too much. The best plan seems to be to purchase insurance with the pay increases, before becoming accustomed to spending the additional money, and it is important to work toward an established goal rather than make purchases in a haphazard manner.

Methods of premium payment

The *method* of premium payment ordinarily is given no consideration by the officer. He makes out a monthly allotment in favor of the insurance company and the matter is permanently disposed of. Unquestionably this is convenient, but quite often it is unduly expensive. Insurance companies compute the premium on an annual basis, payable in advance. For the privilege of paying in installments an increment usually is added to the annual premium. Examination of the "Net Cost Chart" will reveal the practice followed by the companies which were considered in working up the table. Several companies make no additional charge to army officers for the privilege of paying by monthly allotment. However, it will be noted that the competitive position of those companies based on the past twenty years is not particularly favorable.

An arithmetical example will serve to illustrate the savings potentialities offered by annual premium payment as opposed to monthly payment.

Assume an annual premium of $100 for a $5,000 Ordinary Life Policy purchased from a mutual company by an individual about 25 years old. This particular company adds 8% to the annual premium for the privilege of monthly payment. Thus, over a period of forty years the additional charge for the privilege of paying monthly is $320. Consider further that the army officer buys $15,000 to $20,000 worth of insurance from commercial companies which may mean that the method of premium payment involves a differential of a thousand dollars or more over a lifetime. Viewed from that angle the matter may be worth some consideration.

According to a report of officers' allotments to commercial insurance companies, about $10,000 of the $300,000 paid each month is the increment charged for the privilege of making payments monthly.

Excellent methods

Some companies have a system of permitting the insured, if he will pay one annual premium, to deposit one twelfth of the annual premium starting the next month. Thus, by the time the second annual premium is due the amount has been collected in advance by the company. This saves, for the insured, the increment, but still gains for him the convenience of paying monthly.

A number of officers have set up separate savings accounts for the sole purpose of accumulating insurance

premiums. Another workable method is to have the anniversary dates of the various policies spaced around the calendar, so that a premium falls due every three or four months. This tremendously simplifies the accumulation of premium money.

The idea of citing the possibilities of saving money by annual premium payment is not for the purpose of endoctrination, but merely for education. Some individuals are so constituted that they are unable to save *systematically* the money for annual payment. Those individuals would be foolish to attempt it. However, for those who are a bit thrifty the matter is surely worth considering.

How to use dividends

A planned use of the dividends returned by the mutual companies adds to the success of a long range insurance program. In passing, it should be noted that dividends from insurance differ from the dividends earned on the stock of corporate enterprises. Insurance dividends reflect favorable mortality experience, interest on the company's investments, and managerial efficiency. Therefore, they represent excess savings which are returned to the policyholder each year. A sensible use of the dividends is for premium reduction. If this plan is followed until the insurance program is completed it enables an officer to get the maximum amount of coverage for his insurance dollar—a point in the mission. *After* the program is completed, if the dividends are not needed for every day living expenses—and they should not be—it is well to leave the dividends with the company *on deposit*. If this is done, it will be found that by retirement time there will be accumulated an amount more than sufficient to pay up the policy so that no further premium payments will be necessary; or there will be enough to continue the premium payments for another ten years or so. This serves to illustrate the advantage of Ordinary Life over Limited Payment Life, for in the latter type the higher premiums merely serve to increase the reserve *within* the policy, whereas by saving the dividends from an Ordinary Life policy *without* the policy they may be used at the policy holder's option to accomplish the same end—eventual cessation of premium payment. In the meantime, however, should the insured die, the beneficiary would receive in the case of the Ordinary Life policy both the face of the policy and the dividend savings; in the case of the Limited Payment policy just the face of the policy. This should clinch the case for Ordinary Life as well as offer a plan for use of dividends.

Preferred methods of settlement

To this point, policy selection, method of premium payment, and use of dividends have been discussed. This leads us naturally to a consideration of the disposition of the proceeds of the insurance estate. In passing it should be mentioned that insurance *should not*, in the normal case, be made payable to the estate. It should be made payable to the wife with the children named as contingent beneficiaries. Provision should also be made to protect the rights of children who might be born at a later date, because sometimes the naming of specific contingent beneficiaries falls behind the rate of production. Let us return to the disposition of the proceeds, which is a matter which seems to be neglected more often than not. In order to get the maximum benefit from this discussion one should get out an insurance policy and use it to follow through. Most authorities agree that only a relatively small amount should be left in cash—just enough to pay the expenses incident to the death of the insured and to permit the family to reorient itself. Aside from a cash settlement (option 1 of most policies) there are usually three other options offered:

(a) Payment of a fixed amount for a certain number of years (option 2).

(b) Payment of a fixed amount for a certain number of years (usually ten or twenty) or for the *life* of the beneficiary, *whichever is longer* (option 3).

(c) Payment of interest (option 4).

Option 4 preserves the principal, whereas under options 2 and 3 the principal is consumed. However, an officer can hardly afford to own enough insurance so that his dependents can live on the interest. He should arrange for the bulk of the proceeds to be paid under option 3, and some to be paid under option 2, if there are minor children to be raised and educated, for option 2 offers a greater monthly income than does option 3. Payments under option 2 should terminate about the time the children become self supporting. Following this procedure gives a *peak* income while the children are being raised, and *guarantees* a life income for the wife. In order to be assured that the insurance will serve its best purpose it is absolutely essential that *the settlement arrangements be reviewed every few years*. Right now is a good time to make a periodic check. There are many sad cases on record where adequate insurance was carried but improper settlements were provided for, resulting in destitution for the widow in her later years. Under few circumstances, if ever, should insurance be left as a single payment to the officer's wife, for then her lifetime support must depend upon her investment sagacity.

How to select your company

Undoubtedly the most important thing in this matter of providing security is the selection of the company from which to purchase. An insurance contract is a long term proposition, lasting the lifetime of the insured and sometimes thirty years or more after his death. Therefore, financial strength is a paramount consideration, but this

strength is difficult for the layman to determine. In this country, insurance companies are state regulated, and they must comply with the regulations of every state in which they wish to do business (*except in conducting business on a Federal reservation*, for usually a Federal reservation is not subject to any control of the state in which it is located). The quality of state regulation varies greatly. Because of the stringency of regulation in New York and the New England states any company which is licensed to do business in *all* of them is meeting very severe standards of supervision.

However, the most stringent state regulation cannot assure soundness of management. Many companies do fail. Therefore, one should buy insurance from old, well-seasoned organizations which are large in size. Fifty years of age and a half billion dollars of insurance in force are good minimum standards. Such companies have their risks well spread geographically, through all age groups, and through all occupations and professions. They have many decades of proven successful experience behind them. Furthermore, they are in a position to employ the most expert men in the various fields necessary to safeguard and manage the policyholders' funds. To the average army officer the record of a company's experience is the safest assurance he can obtain. And this assurance of safety is all-important. Buying insurance is in no sense a speculation. No officer can take a chance in this matter which vitally affects the welfare and happiness of his dependents—but some do.

Among the group of companies which meet the test of strength an officer should determine which companies will sell him a policy containing the provisions which he desires. He should then purchase the policy from the company which has the lowest net cost record for *that type of policy* for the past *twenty* years. This procedure is a time consuming process through which most insurance purchasers are not willing to go. Therefore, to make policy selection simpler for those of us in the military profession the accompanying charts were compiled. Most of the companies listed cooperated, and the well known standard statistical references were consulted freely. The charts will be discussed briefly later.

Net cost comparison

Comparison of companies on a net cost basis has never been given much publicity—and as a matter of fact it is not entirely conclusive. Net cost records should be studied in conjunction with the various contract provisions, including settlement options. However, contracts do not vary much, whereas there is a wide difference in costs.

This numerical example will serve to demonstrate the point:

ORDINARY LIFE POLICIES ISSUED 1919

Age of insured 25. Amount of insurance: $10,000.

	Co. A	*Co. B*
Annual Premiums (20 years) ...	$3,074.00	$3,246.00
Dividends (actual)	.....	845.16
Cash outlay	$3,074.00	$2,400.84

The difference in the cost of the insurance to date is $673.16 in favor of Co. B. The insured in each case is now age 45, and has an even chance of living to be 71.

Although one should not predict that the differential in cash outlay will be maintained at the same rate—particularly in this period of falling interest rates—nevertheless it is unlikely that the position will be reversed.

The cash surrender value of each policy at the end of 20 years is $2,130.00. However, Co. B is currently paying a settlement and mortuary dividend of 6% of the cash value for 20-year-old policies which are matured by death or are surrendered for cash. In this case it amounts to $127.80. This company appears to be the only one which follows this practice. Thus, if the two policies under consideration were surrendered the situation would be:

	Co. A	*Co. B*
Cash outlay (carried down from above)	$3,074.00	$2,400.84
Cash value	2,130.00	2,257.80
	$944.00	$143.04

Therefore $10,000 protection for 20 years in one company has cost $143.04; in the other $944.00. In each case, however, the insured kept his cash outlay to a minimum for his particular company by paying premiums annually.

It should be reemphasized that as important as is the net cost of the chosen type of policy, it is *secondary in importance to the financial strength of the company and provisions contained in the policy*.

Perhaps a word should be added to distinguish between stock companies and mutual companies. The former are owned and controlled by their *stockholders*, whereas the latter are owned by their *policyholders* but controlled by the management. Stock companies sell what they classify as guaranteed cost or nonparticipating insurance, the cost of which is the premium paid the company, there being no dividends returned. Mutual companies charge a higher premium, but after two or three years a dividend, which is not guaranteed in amount, is returned to the policyholder. History shows that for the first five or six years the stock company premium is less than the mutual company premium minus the dividend. Thereafter the mutual company has the advantage. Carrying the analysis further, the ten year net cost record is in favor of the mutual company and continues to be thereafter. The choice between the two forms, non-participating or participating, rests in the desire for *initial* or *eventual* lower cost. It is

a decision which each individual must make for himself.

Those individuals who discover that they are carrying the wrong types of insurance can often make arrangements with the company to change the existing condition. This procedure usually necessitates offering evidence of insurability, for such changes invariably involve exchanging the existing policy for one calling for a lower premium. In such cases it is better to communicate directly with the home office, rather than deal with the agent. Shifts should always be made on the anniversary of the policy in order to receive the advantage of the increment of the reserve which accrues to the credit of the policy at that time.

Those who are convinced that they are carrying insurance in low grade companies should consider dropping the insurance in order to place it with a stronger company, but first consult with a qualified unbiased individual—if one can be found.

Dropping insurance always involves a loss to the policyholder, but the loss thus occasioned may be small compared to the possible loss involved in continuing to carry insurance in a high cost, weak company.

Be your own agent

In this country there are 64 million policyholders owning about 120 billion dollars' worth of life insurance. That means that 7% of the world's population owns 75% of the life insurance in force. Now, the human being is by no means provident enough to provide that amount of security without persuasion. This persuasion has been provided by the persistence of the agents plus the tremendous educational impetus furnished by the sale of War Risk Insurance to the members of the armed services during the World War. Unquestionably, life insurance agents have done a real social service in inducing people to provide for their dependents' security. However, much insurance has been mis-sold. The life insurance profession is endeavoring to raise the standard of its agents, and that is a worthwhile project. Nevertheless, it is obvious that a life insurance agent is a salesman who is primarily interested in the sale of his *own* product. Therefore, he can not be expected to disclose to the prospective buyer the competitive weaknesses of the company which he represents. Enough information has been furnished in the preceding pages to enable the prospective purchaser to make a wise choice rather than to have insurance *sold* to him. Do not be stampeded into buying insurance. Take the necessary time to figure out the merits of respective propositions—the agent will not mind coming back another time.

Inasmuch as insurance selling is a highly competitive occupation, it is perhaps unavoidable, though unfortunate, that numerous unimportant, misleading and sometimes even fallacious arguments are used. Agents of higher cost companies will sometimes claim that their companies give a more personalized service than the lower cost companies. That may be true but it is not particularly important. Another cost argument which is advanced sometimes is the so-called *future* net cost argument, whereby it is claimed that a company is going to improve its competitive position. The future, of course, is difficult to predict and the best gauge of the future is the record of the past. Another stunt is the comparison of policies of *different* types instead of the same type. For example, a comparison of the cost of one company's 25 Payment Life Policy with another company's Ordinary Life Policy with the dividends left in to mature the policy in an estimated 27 years. Insist on comparisons of like types. Some agents try to convince the prospective buyer of the mildness of the "air hazard exclusion rider" or the "war clause." Perhaps they are mild, but since some companies sell policies without these restrictions it is foolish to buy a policy so encumbered. A fallacious method of figuring the cost of a policy is to demonstrate that the company which returns the largest dividend is selling the cheapest policy. Investigation may show that the same company is also charging the highest premium and therefore has more of the policyholder's money to return than does some company which does not collect so high a premium.

The foregoing tricks of the trade, although not particularly laudable, are not too vicious. However, one should beware of the agent who endeavors to induce him to give up insurance in a company known to be reliable in order to buy insurance in a company which has *not* demonstrated its soundness. There are agents operating today who have persuaded officers to drop their Government insurance in order to buy the particular brand that that agent was selling. Business methods of this type are thoroughly reprehensible. Now, any reputable insurance man—and some who are not so reputable—freely admit that the Government policy, considering its contract provisions, can not be touched competitively.

In dealing with the agent it is best for one to know what he wants and to *buy* it rather than be *sold* something which may turn out to be the wrong type. Agents who are making legitimate propositions have no objection to making them in writing over their signatures. Thus armed, the prospective buyer can check the statements at his leisure and act accordingly, upon his own best judgment.

The charts which are published with this article were compiled from information furnished for this purpose, in all except one or two cases, by the respective companies. One or two companies did not desire to furnish cost information because of its possible misuse. In order to guard against misuse of such information a statement specifically explaining its value appears as a note on the chart.

The better known companies were selected for inclusion in the study. However, the fact that a company is not included does not necessarily reflect on its standing—nor are those which are included necessarily recommended. Nevertheless, the charts offer a wide enough

NET COST CHART, PER $1000 OF INSURANCE, FOR PREFERRED RISK, ENDOWMENT AT 85, AND ORDINARY LIFE POLICIES ISSUED IN 1919, WITH THE CURRENT INCREMENT FOR MONTHLY PREMIUM PAYMENT INSURED AGE 35

Table of Settlement Options Contained in Currently Issued Policies.

NON - AIR CORPS

NAME OF COMPANY	Annual Premiums: 1919 Annual Premium	Annual Premiums: 20-yr. net cost. Premiums minus Dividends minus Cash Value	Annual Premiums: Percentage addition to annual premium for monthly premium payment.	Monthly Premiums: 20-yr. increment for monthly premium payment—col. 3 times col. 1 times 20	Monthly Premiums: 20-yr. net cost—col. 2 plus col. 4
Aetna (Participating)[1]	24.89	96.32	5%	24.89	121.21
Aetna (Non-participating)	20.59	100.80	5%	20.59	121.39
Bankers Life (Iowa) (Special Ordinary Life, minimum $5000)[2]	26.28	29.86	4.4%	23.13	52.99
Connecticut General (Participating)	23.64	93.03	none	none	93.03
Connecticut General (Non-participating).	20.36	96.20	none	none	96.20
Connecticut Mutual	26.35	77.46	5%	26.35	103.81
Equitable (NY)	28.11	69.12	6.5%	36.54	105.66
Guardian Life	26.35	82.58	5%	26.35	108.93
Lincoln National (Non-participating)	20.65	111.00	none	none	111.00
Massachusetts Mutual	26.35	64.87	3%	15.81	80.68
Metropolitan (Whole Life, $5000 minimum)	21.40	20.45 1.81[3]	can not pay monthly		
Metropolitan (Endowment 85)	24.00	56.15 37.31[4]	6%	28.80	66.11
Mutual Benefit	26.35	60.52	4%	21.08	81.60
New England Mutual[5]	27.00	60.00	2.25%	12.15	72.15
New York Life	28.11	46.83	6.5%	36.54	83.37
Penn Mutual	26.35	56.48	4.4%	23.19	79.67
Phoenix Mutual	27.54	78.93	6%	33.05	111.98
Provident Mutual[6]	24.89	61.79	can not pay monthly		
Prudential (Modified "3")	18.35[7]	26.79[7]	8%	33.93	60.72
Prudential (Endowment at 85)	23.54[8]	64.90[8]	8%	37.66	102.56
State Mutual Life Assurance Co.	26.35	71.21	6%	31.62	102.83
Travelers	20.11	91.45	none	none	91.45

FEMALE BENEFICIARY, AGE 35
(Insurance program will be completed, normally, by the time the beneficiary is 35.)

Equal monthly payments for a Fixed Period. This column shows interest rate on which payments are	Monthly payments for Life or Ten Years, whichever is longer. Payment per $1,000.	Monthly payments for Life or Twenty Years, whichever is longer, Payment per $1,000.	Rate of Interest when proceeds of Policy are left with Company at Interest only.
1	2	3	4
2½%	3.56	3.51	2½%
2½%	3.56	3.51	2½%
3%	3.56	3.51	2½%
3%	3.56	3.51	2½%
3%	3.56	3.51	2½%
3%	3.64	3.58	2½%
3%	3.56	3.51	3%
3%	3.56	3.52	2%[1]
2½%	3.60	3.54	2½%
2½%	3.54	3.49	2½%
3%	3.56	3.46[2]	3%
3%	3.99	3.82	3%
2½%	3.56	3.51	2½%
2½%	3.26	3.22	2%[2]
2½%	3.56	3.51	2½%
2½%	3.56	3.51	2½%
2½%	3.56	3.51	2½%
3%	3.56	3.51	2½%
3%	3.56	3.51	2½%
2½%	3.56	3.51	2½%
3½%		3.50[4]	3%[3]

[1]This policy was not issued in 1919. Ten year record adjusted by a policy in its own class (Conn. Gen.) to give a twenty year estimate. The premium shown is the 1929 premium.

[2]Policy issued in 1927. Ten year record adjusted by a policy in its own class (Metropolitan Whole Life) to give a twenty year estimate. The premium shown is the 1927 premium.

[3]Includes 20 year settlement dividend of $18.64 (6% of cash value) which is paid if policy is surrendered. (This group had exceptionally good experience.)

[4]Includes 20 year settlement dividend of $18.84 which is paid if policy is surrendered. This policy has been replaced by Whole Life Paid Up at 85.

[5]Additional increment for monthly premium is equal to 6% rate on unpaid balance of annual premium.

[6]Premiums may be paid only annually, semi-annually or quarterly.

[7]Annual premium $18.35 first three years, $21.71 thereafter. Policy first issued in 1928. Ten year record adjusted by a policy in its own class (Metropolitan Whole Life) to give twenty year estimate. Premiums stripped of waiver of premium charge, which is an integral part of policy.

[8]See note above. This policy was compared with record of Metropolitan Endowment at 85.

The amounts shown in columns 2 and 3 are greater for older beneficiaries. They do not increase, of course, after they are put in force by virtue of the policy becoming a claim.

[1]Withdrawable. Funds left with the company and not withdrawable for lifetime of primary beneficiary or 30 years, whichever is longer, draw 3%.

[2]For deposit not over five years. For deposit for payees lifetime, funds draw 2½%.

[3]No withdrawals. Withdrawable funds draw 2½%.

[4]For lifetime of beneficiary. If beneficiary dies before receiving payments equal to amount retained the excess of amount retained over payments made will be paid in one sum.

A standard method of determining the net cost of insurance is to subtract the sum of the cash value and the total dividends returned from the total premiums paid during the period under consideration. This method is open to the objection that as long as the insured retains his insurance the cash value is in the hands of the company and therefore constitutes part of the cash outlay necessary to maintain the policy in force. However, the cash value is an asset which may be realized by surrendering the policy, or may be borrowed by using the policy as security.

This chart does *not* forecast future insurance costs. It does show the actual twenty year history (policies which have not been issued that long have been adjusted), with *present day* increments added. A study of this chart does show the competitive *relationship* among these companies for the past twenty years, and for annual and monthly premium payments. Charts drawn for other age groups would show a slight variation in the relative position of some companies. This chart does not take into account the interest which could be earned on the premiums if the money were invested otherwise instead of in insurance. Such a chart would vary the relative standings somewhat. However, the companies which attain the most favorable positions on this chart seem to attain them for various age groups and various methods of comparison. The information contained hereon is not guaranteed, but it is believed to be accurate.

Connecticut General and Travelers have reduced premiums for Army officers 5%.

range of selection to enable the buyer to make decisions intelligently.

Companies which do not offer favorable contract provisions, except "War Clauses," were not included in the Net Cost Chart, for regardless of cost the policies of such companies should not be purchased by military personnel. Companies whose only disqualifying feature was the inclusion of a "War Clause" were not excluded from the "Net Cost Chart" because it was felt that the "War Clause" situation is a temporary one. However, it should be repeated that *no officer* should buy a policy which includes *any* form of "War Clause."

It should be noted that quite a number of companies do not operate in Texas, which is of interest because of the large number of officers stationed in that state. The reason is that a number of years ago the Texas legislature passed legislation requiring the investment in Texas securities of a certain percentage of the reserve on the policies of Texas policyholders. Rather than comply with the restrictions some companies withdrew from the state, and have never returned.

Perhaps it would be proper to explain that the writer of this article has no connection with any life insurance company—nor has any member of his family. Every effort has been made to present accurate information in an unbiased fashion. Regardless of the success of that attempt only one point of view served as motivation—that of the army officer in his endeavor to carve out for his dependents a measure of security after he has taken his "last ride."

Without fear of over emphasis let us restate our mission:

To provide adequate protection for our dependents in terms of a safe income, as rapidly as possible, getting the maximum protection for the insurance dollar.

The man who follows that plan will never leave behind him a widow and children who harbor resentment because of a shirked duty on his part.

BATTERY D 25TH FAIN PUERTO RICO

"Our target was the edge of an island near San Juan and the battery is situated about ten yards from the shore. We had a tough time keeping the guns from sliding in the sand. Even heavy trail logs and mats of palm fronds failed to stop it completely, the guns sliding back a few inches at a time until we ran into palm tree roots or else pushed the gun back into its original position."

Engineer and Field Artillery Survey

BY "GIRAFFE"

In the new tables of organization of the Corps there appears a new unit of especial interest to the Field Artillery; namely, the Engineer Topographic Company. The peace strength of this organization is 3 officers and about 65 enlisted; the war strength is 5 officers and about 100 enlisted.

The relations of this company with the Field Artillery are likely to become quite intimate since it helps to bridge the gap between the map-making activities of the Engineer Topographical Battalion (Army) and the survey work of the Field Artillery.

No texts seem to have been issued to acquaint the service with the cooperative functioning of the Field Artillery and this Topographic Company. On the other hand, rumor has it that the Company is to make its debut in the Third Army maneuvers. Sooner or later it will be necessary to establish doctrines governing their joint activities. There being no approved solution, the following is submitted as a possible working arrangement:

1. *a. GHQ and Army Topographical Engineers* make or complete maps pertaining to the theater of operations as a whole; they also produce large-scale battle maps for field artillery fire-control and other combat purposes. They establish or extend such primary control as is necessary for mapping purposes, and recover existing control points. The degree of accuracy with which the positions of these points are determined depends upon the specific purpose of each. It is likely that they will be too widely separated to meet the needs of the Field Artillery.

b. The Army Engineers take advantage of every opportunity to extend this control forward of the lines held by our troops; they push the control forward as our troops advance.

c. GHQ and Army Engineers publish descriptions and coordinates of all control points with which they are concerned and which may be of use to the other Arms.

d. On occasion field artillery personnel, particularly that of heavy artillery and of observation battalions, may find it necessary to obtain data on control points directly from Army Topographical Engineers.

2. *a. The Corps Topographic Engineer Company*.—Corps Topographical Engineers are responsible for more hasty maping and map-reproduction work in the area of immediate interest to their own corps. Starting with the most suitable control points of the army net, they establish a denser net in the area which interests the combat troops. This net includes points in the vicinity of the artillery position areas and, as far as conditions permit, points in the target area. They install a marker at each accessible point thus established. They record the Y-azimuth from each accessible point to permanent prominent objects around it so as to enable other surveyors to orient their instruments with facility. They compute the coordinates (including elevation) of all control points which they establish, and publish them, together with their descriptions and Y-azimuths to prominent objects. Where practicable the descriptions will enable the points to be identified on aerial photographs. Behind our lines such points will be located not more than about 3 miles apart.

b. It is essential that the topographic information be furnished to the Field Artillery in time for it to perform its own survey work without delaying fire which is dependent upon the results. Accordingly, close liaison between the Corps Topographic Engineer Company and the appropriate Field Artillery echelons (observation battalion or brigade survey sections*) must be maintained at all times. Upon receipt of a warning order concerning operations—even before that time if available information justifies anticipatory planning—the commanding officers of these interested units should immediately confer and prepare plans for the performance of the necessary survey work. Among the items to be considered are: Artillery position areas to be occupied; target zone; future position areas; general location and density of the Engineer Control net; night signals; time schedule; location of limit between artillery and engineer survey systems.

c. In certain situations due to the speed of the movement of the troops the Topographical Engineers, by their own means, may not be able to bring control within reach of the artillery position areas as rapidly as is desirable. In such cases field artillery survey personnel must lend active cooperation. In such cases it may also be necessary for the Field Artillery to set up its own local survey systems, basing them upon assumed grid systems. At the earliest opportunity the Topographical Engineers cooperate with the Field Artillery in the computations necessary to convert these to the standard grid system.

3. *a. Field artillery survey* is planned with the object of furnishing to the pieces the information necessary to enable them to fire on their scheduled targets at the proper time. Team-work is essential; the information and cooperation necessary to enable each successive echelon to perform its task are borne in mind and furnished as promptly as possible. Duplication of effort is avoided.

b. Speed, as well as suitable accuracy, in the performance of field artillery survey work is essential. Night

*Or survey section of triangular division artillery section.

surveying is a normal procedure. The observation battalion and brigade survey sections keep in constant touch with the Engineers, profiting by such work as the latter perform; the initiative in obtaining survey information must be taken by the Field Artillery since the Engineer Topographic troops have other important missions.

c. Field artillery survey normally extends over areas which are not sufficiently large to require that the effect of the curvature of the earth be considered. It therefore follows the procedures of plane-surveying and determines positions with respect to the rectangular grid system instead of latitude and longitude.

d. Field artillery survey is normally based upon the control furnished by the Corps Topographic Engineers. Wherever possible the control established by the Engineers in their mapping work should be used by the Artillery; on occasion it may be practicable for the Engineers to establish a point at a location more convenient for Field Artillery survey purposes if its desirability be explained.

e. Survey work of the Engineers and Field Artillery is coordinated when necessary by the corps commander through his G-2 section.

4. *The observation battalion* has a dual function with respect to survey work:

a. It establishes its own microphone stations, observation posts, and other control.

b. It plans, coordinates, assists in and supervises where necessary the survey work performed by the other field artillery units in the corps zone or sector. As indicated in paragraph 2, it maintains liaison with the Corps Topographical Engineers; it also maintains liaison with the Army Topographical Battalion as the situation requires. It advises the Field Artillery with the corps as to the plans and progress of the Engineers insofar as these relate to artillery survey, reporting the availability of control and relevant data, or, when such control does not exist, the likelihood of its being established. It coordinates demands for Engineer assistance with a view to reducing this to the minimum necessary, having regard to the other missions with which the Topographical Engineers are charged.

Basing its work on the positions established by the Corps Topographic Engineers (in special cases by the Army Engineers) the observation battalion establishes additional control points and determines azimuths for the guidance of the survey personnel of the artillery with the corps.

6. *The field artillery brigade survey section* (or survey section of triangular division artillery section) obtains from the observation battalion, or from the Engineers if necessary, the requisite information to enable the survey work of the brigade to be performed.

It views the survey work within the brigade as a whole, and, with the authority of the brigade commander, allots the tasks of subordinate units. It cooperates in computing corrections to apply to assumed grids for the purpose of coordinating them with the standard grid. It establishes additional control points (as well as means for determining azimuth from them) and declinating stations within its sector, thus providing data for the tasks of subordinate organizations; such tasks are so planned as to contribute to the survey work and fire control of the brigade as a whole.

The artillery brigade survey section coordinates requests for original aerial photographs, mosaics, and for reproduction, submitted by its subordinate echelon, passing these requests through the observation battalion when appropriate.

It is responsible for the prompt distribution of these documents when received.

FIFTY MILLION FRENCHMEN CAN BE WRONG

Today the French pendulum has reached the other extremity of its are. The headlong offensive of 1914 has given way to extreme caution. Infantry moves at a snail's pace. Divisions crawl from crest to crest with sometimes as much as two-thirds of their strength in a practically deployed advance guard. We wonder how this conception will fare against the swift-moving tank attack or against motorized infantry? We wonder about its flanks and rear. The French say the day of surprise is over, and still we wonder. When this new dogma or theory clashes with flesh and bone and iron and steel and lead we shall know.

—CAPT. C. T. LANHAM, *in* FIELD ARTILLERY JOURNAL, *1935*.

Battle is the cash transaction in which the strategic mistakes and errors of judgment, lack of training, and poor generalship pay their debts to the force which is well trained, and ably led, by a courageous, steadfast, and sound commander.

ON TYING ONESELF to the GROUND

By Captain S. E. Vaughn, 144th FA.

One of the bits of knowledge impressed upon every class at the Field Artillery School is that sad piece of negative information—there are no Fire Control maps of these United States. Work at the School is predicated on this fact, and we students were wont to fare forth to the fray with clean white grid sheets; sometimes on gala occasions we were even allowed Fire Control Data Sheets. Survey operations, we decided in the end, were not so tough. Tower 2 and the beacon on Mount Hinds, the markers on Welch Hill and Jocelyn Ridge served us faithfully and accurately; we ran traverses and triangulated from Elgin to South Arbuckle and from Potato Hill to Signal Mountain, if not with the greatest of ease at least with very little difficulty. Declinate your aiming circle? Just set up over spot 58 on Artillery Ridge and pick the azimuths off the nicely mimeographed data sheet. Only take care that you don't use the figures for spot 56! It was the life of Riley.

Back home at the Armory the youngsters gathered round with eager upturned faces, like a brood of hungry robins. I spoke wisely of coordinated battalion survey.

"Show us how!" they chirped. "Give us the dope! You've been to Sill, so say us some big words!"

"It's easy," I said; "all you have to do is set up the plane table with your known points plotted on the grid, cut yourself a resection to find out where you stand and take off from there."

Then I looked at the board the sergeant had just set up; it was virgin white, unsoiled, unspotted—not a point, not even a flyspeck. I looked out into the landscape, but nowhere could I see the white marker on Caddo Hill or the Blockhouse on Signal Mountain. I rubbed my eyes—still they weren't there.

Since that embarrassing moment some midnight oil has been consumed and many a sheet of scratch paper has drifted into the waste basket, but in the files of each of our batteries is a small red book containing the Military Grid Coordinates of some forty well defined points in the vicinities of their stations. Some of these points can be occupied and some are for reference only, but all are located with sufficient accuracy for all military uses. This is how it was accomplished:

From the Superintendent of Documents in Washington were obtained two publications, one entitled "Grid System for Progressive Maps in the United States" (Spec. Pub. # 59) and the other "First and Second Order Triangulation in California" (Spec. Publication # 202). Special Publication No. 59 contains the methods and tables for the transference of geographic positions given in latitude and longitude to positions defined by Military Grid coordinates. Special Publication No. 202 gives the geographic positions of numerous points in the State of California.

What are you gonna do when you get off that nicely mapped reservation?

It was immediately found that these two books were not in themselves sufficient to constitute the basis for the work in hand. A letter to the San Francisco office of the U. S. Coast and Geodetic Survey resulted in a set of about 700 geographic positions covering in detail the coast from Monterey on the north to Los Angeles on the south. From the Office of the Chief of Engineers were obtained on request the "Grid Coordinate Tables for One Minute Intersections" which were necessary for the calculations. These tables are not published as yet but sections of the manuscript may be had in photostat sheets.

The Grid Coordinate Tables mentioned are nothing more nor less than the military coordinates of the point of intersection of each parallel of latitude with each meridian of longitude at one minute intervals over the entire United States. The tables are not so voluminous as might at first be supposed, for the area is divided into seven parts and the tables for one part serve equally well for the other six.

Transposition from geographic to grid coordinates is merely a process of interpolation and once the idea is grasped no trouble should be experienced. It may be helpful to run through a problem to demonstrate the procedure. First, however, a short review of the relation between the geographic grid system and the military grid system may serve to clarify some of the steps in the interpolation.

We are all familiar with the geographic grid system, which consists of one set of lines encircling the earth parallel to the equator and a second set crossing the equator at right angles and converging at the north and south poles. A small portion of the grid, one minute on a side, may be considered as bounded by two parallel straight lines of latitude and two slightly converging straight lines of longitude (Fig. 1). These assumptions cannot be made for larger areas, and the inquisitive are referred to TM 2160-25 for a fuller explanation.

The military grid is composed of straight parallel lines so placed as to form squares. The north and south lines corresponding to the meridians of longitude are called Y lines, and the east and west lines corresponding to parallels of latitude are called X lines. If the military grid is superimposed on the geographic grid it will be seen that the Y lines and the meridians of longitude can coincide along only one line, and that as one moves east or west from that line of coincidence, the angle of divergence (gisement) between the meridians or true north and the Y lines or grid north will become greater the farther one moves. It is obvious that if one is to the east of the coincidental or central meridian, grid north will be to the east of true north and, vice versa, if one is to the west of the central meridian Y or grid north will be to the west of true north; if one moves true north along a meridian of longitude one's military coordinates will increase in both the X and the Y values. If one is to the east of the central meridian and moves true north, one's Y coordinate will increase but one's X coordinate will decrease. If, now, one moves in either an east or west direction from the central meridian along a parallel of latitude, one's X coordinate will increase or decrease correspondingly, but also one's Y coordinate will increase because of the slight curvature of the lines of latitude in relation to the straight lines of the military grid.

We are now ready to proceed with the practical problem. The geographic coordinates of the U. S. Coast and Geodetic Survey Triangulation Point called Santa Barbara are:

Lat. 34° 24′ 16.722″
Long. 119° 42′ 51.740″

Plotted in its one minute quadrangle of the geographic grid it appears as in Fig. 1. Superimpose the military grid and the plot appears as in Fig. 2. The central meridian for this part of the country is the 121st meridian of longitude. The point, Santa Barbara, therefore lies to the east of the central meridian and the lines of longitude will have a westerly cant in relation to the military grid lines. The parallels of latitude will tilt in the same sense as the meridians of longitude.

In making the numerical solution of the problem let us use the following symbols:

C = The point, the coordinates of which are desired.

A = Point on the first full minute meridian to the west of C and of the same latitude as C.

B = Point on the first full minute meridian to the east of C and of the same latitude as C.

Cy = Seconds of latitude of C divided by 60.

Cx = Seconds of longitude of C divided by 60. (Cy and Cx are the seconds written as decimal parts of a minute.)

x_1 & y_1 = Grid coordinates to the south west of C.

x_2 & y_2 = Grid coordinates to the north west of C.

x_3 & y_3 = Grid coordinates to the north east of C.

x_4 & y_4 = Grid coordinates to the south east of C.

We may now write the following series of equations for the grid coordinates of the points A, B, and C:

$$x \text{ of } A = x_a = Cy(x_2 — x_1) + x_1$$
$$x \text{ of } B = x_b = Cy(x_3 — x_4) + x_4$$
$$x \text{ of } C = x_c = Cx(x_a — x_b) + x_b$$
$$y \text{ of } A = y_a = Cy(y_2 — y_1) + y_1$$
$$y \text{ of } B = y_b = Cy(y_3 — y_4) + y_4$$
$$y \text{ of } C = y_c = Cx(y_a — y_b) + y_b$$

Substituting in the above equations known values and the significant values taken from the Grid Coordinate Tables, we have:

Lat. = 34° 24′ 16.722″
Long. = 119° 42′ 51.740″
Cy = .2797
Cx = .8623

$x_2 = 29022.0$ $x_3 = 30697.6$
$x_1 = 29047.6$ $x_4 = 30723.5$
$(x_2—x_1) = —25.6$ $(x_3—x_4) = —25.9$ (1)

$x_a = .2797\ (—25.6) + 29047.6 = 29040.4$
$x_b = .2797\ (—25.9) + 30723.5 = 30716.3$
$x_c = .8623\ (—1675.9) + 30716.3 = 29271.3$

$y_2 = 62463.0$ $y_3 = 62484.3$
$y_1 = 60441.0$ $y_4 = 60462.3$
$(y_2—y_1) = 2022.0$ $(y_3—y_4) = 2022.0$ (2)

$y_a = .2797(2022) + 60441.0 = 61006.6$
$y_b = .2797(2022) + 60462.3 = 61027.9$
$y_c = .8623\ (—21.3) + 61027.9 = 61009.5$

The military grid coordinates of the station Santa Barbara are therefore:

x = 1129271.3
y = 1261009.5

In practice one will develop one's own general layout for these computations, depending upon whether one uses longhand, logarithms or some sort of computing machine. The ordinary slide rule, even the 20-inch variety, is not satisfactory, since the calculations must be carried out to the nearest tenth of a yard, which means reading to the fifth place.

A few facts may be pointed out which should help in visualizing the process of transposition. Note that longitude increases from east to west while the value of X increases from west to east. Due to the convergence of the meridians on the central meridian, the values of the quantities $(x_2—x_1)$ and $(x_3—x_4)$ will be negative for all points east of the central meridian and positive for all points to the west of that line. Values of $(x_a—x_b)$ will always be negative. Values of $(y_2—y_1)$ and $(y_3—y_4)$ will always be positive while the value of $(y_a—y_b)$ will be positive for points to the west of the central meridian and negative for all points to the east.

Sources of information concerning geographic points are not confined to the Coast and Geodetic Survey. There is also the U. S. Geological Survey, and the local county and city authorities can often lend invaluable assistance. In our own district enthusiastic cooperation has marked our contacts with these civilian aids and a large fund of knowledge built upon years of detailed study of the local terrain has been cheerfully placed at our disposal.

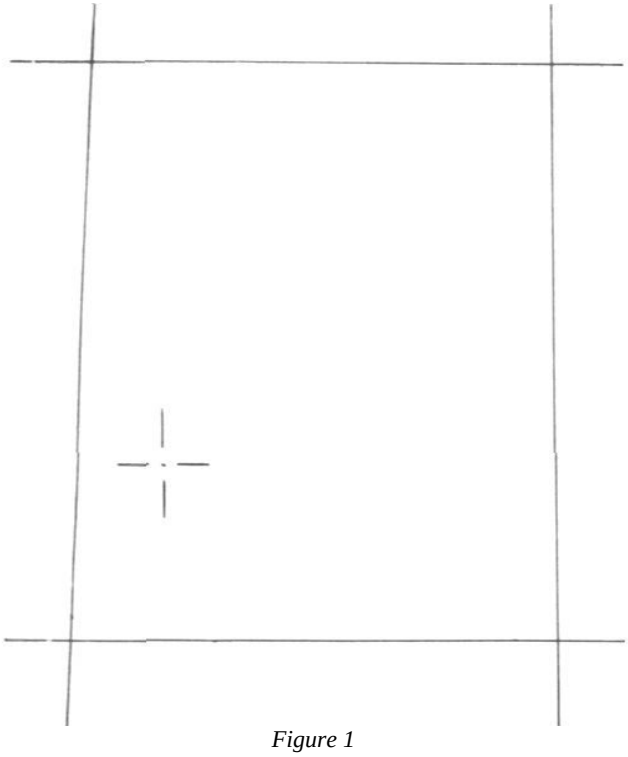


Figure 1

Figure 3

Excerpt from "Grid Coordinate Tables for One Minute Intersections"

	34° 24′		34° 25′	
	X	Y	X	Y
119° 00′	1201105.5	1261607.3	1201065.6	1263629.7
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
42′	1130723.5	1260462.3	1130697.5	1262484.3
43′	1129047.6	1160440.9	1129022.0	1262463.0
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....

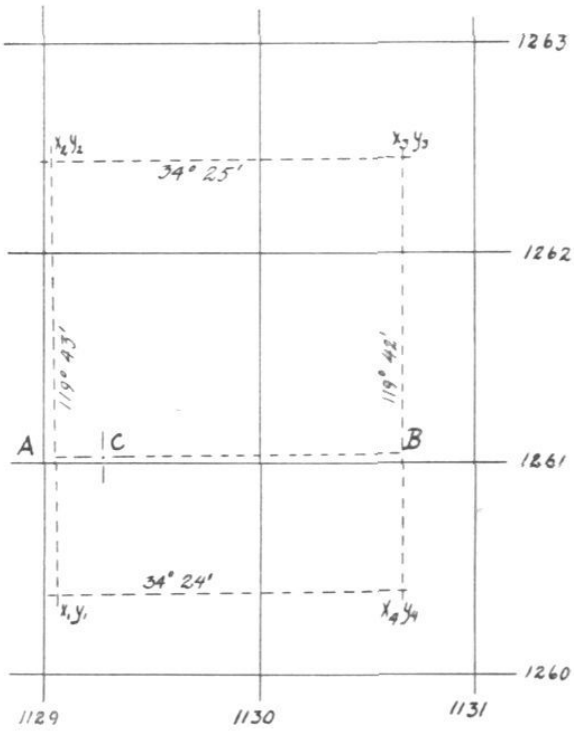


Figure 2

BASIC SURVEY OPERATIONS

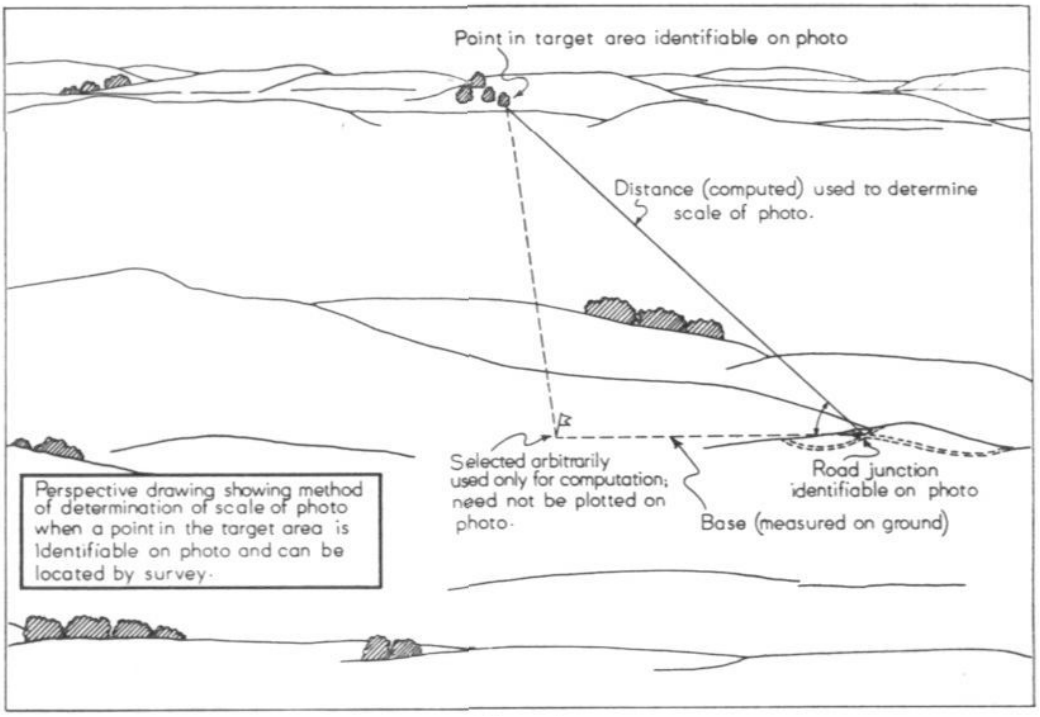


Figure 1

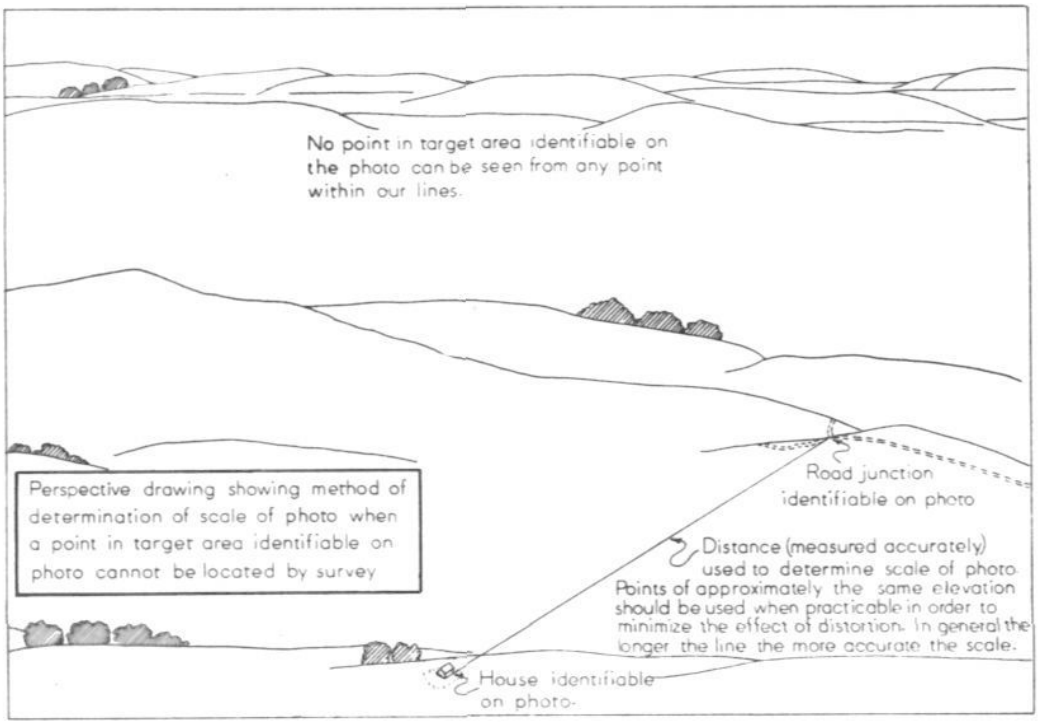


Figure 2

In each perspective drawing, the area shown represents the area included in a wide-angle photo. The position areas are on the photo and the base pieces have been located by inspection or short traverse. The photo itself is used as the firing chart; distances and angular measurements are taken from the photo. The two initial survey operations are (1) the determination of the scale of the photo and (2) the determination of a direction. When points in the target area identifiable on the photo may be seen from within our own lines, more accurate results in determining scale and direction usually are obtained by using these points

USING WIDE-ANGLE PHOTO

(10,000 yards on a side)

(see Figures 1 and 3). When such points are not available, a scale and direction of satisfactory accuracy usually may be determined from points within our own lines (see Figures 2 and 4). When the division is present, the Division Artillery Section normally should determine the scale of the photo and transmit it to all battalions concerned. In the future, with expected improvements in photographic and reproduction technique, the photos may be printed with an accurate 1:20,000 scale, which will obviate the necessity of determining the scale by survey. At present the scale must be determined.

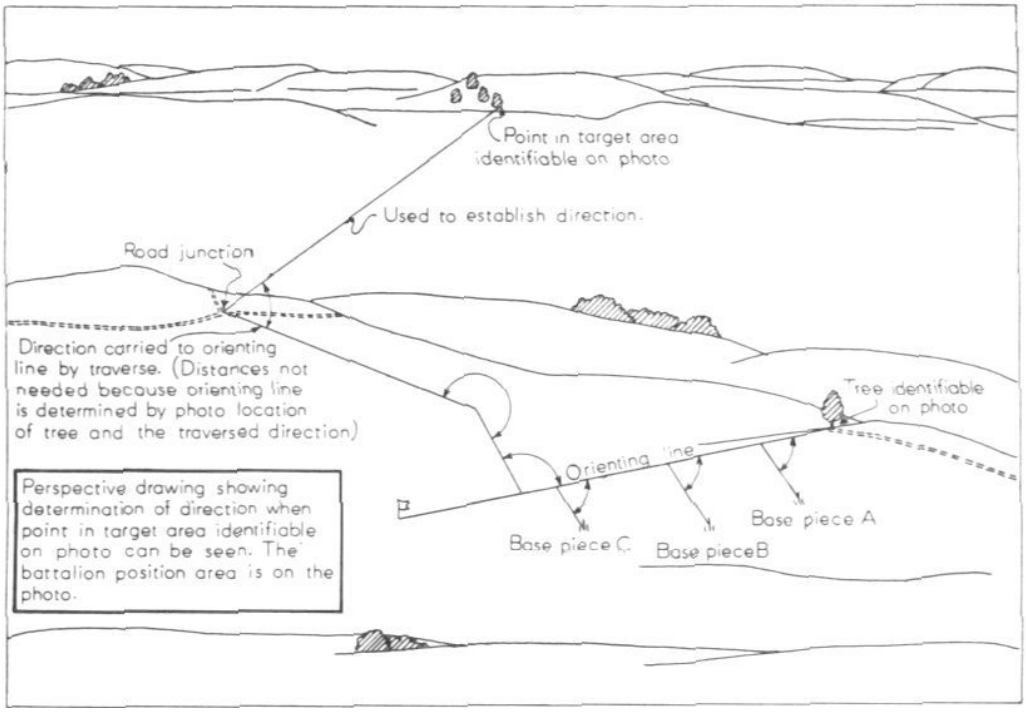


Figure 3

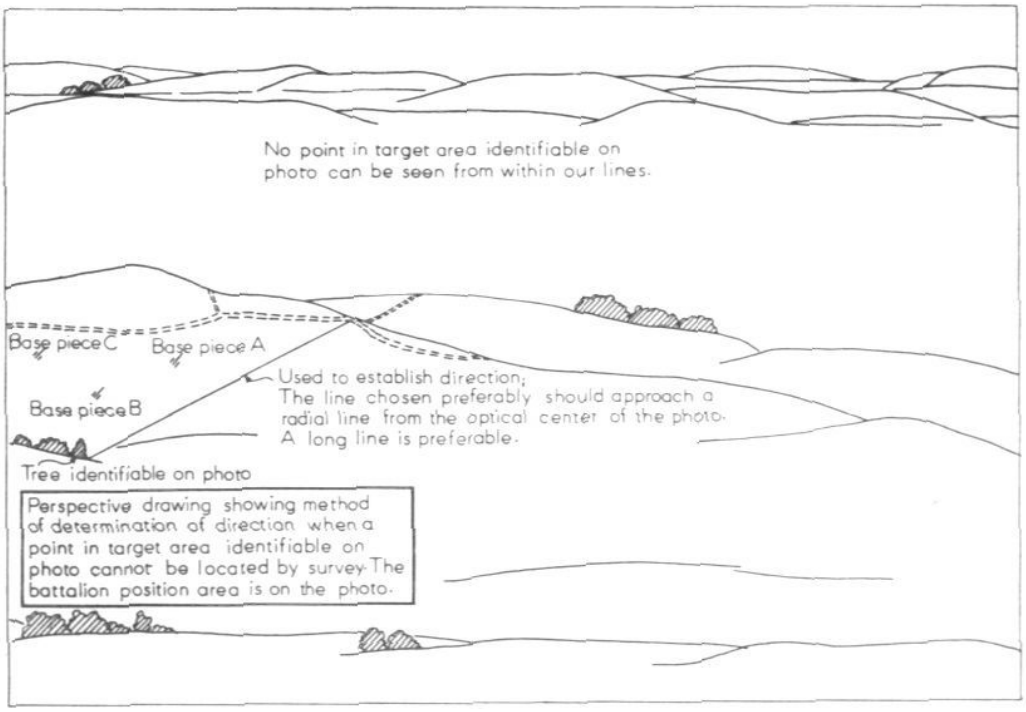


Figure 4

Captain W. J. Aylworth, plate courtesy "The Military Engineer"

ORIGINS
of a
MAJOR WAR

By Colonel Conrad H. Lanza, FA.

Editor's note: In the May-June issue Col. Lanza pointed out that the acquisition of Austria by Germany was one of the steps leading to the European War. He now continues his discussion by showing how the surrender at Munich was another link in this ominous chain of events. The opinions expressed herein and the conclusions drawn are solely those of the author.

FIFTH-COLUMN ACTIVITIES

The German press lost no time in continuing agitation against Czechoslovakia over alleged iniquities in the Sudeten. Increasing disorders occurred in this territory, which formed a belt along the German-Czechoslovakian frontier. That the disorders were probably secretly instigated by the German government did not make them the less dangerous.

Czechoslovakia had no illusions. She understood that the Germans would seek to absorb the Sudeten, might attempt to take over her entire territory. The President of Czechoslovakia, Edward Benes, was a scholar and statesman. He had long realized the German mentality and ideals. In a speech made before the French *Academie des Sciences Morales,* on 18 October, 1932, he had stated: "With the Germans, this sentiment appears to be a belief in the material and intellectual superiority of a great people; a belief which involves an ardent desire for expansion nationally, politically, and economically; a belief which leads to the idea of the superman, and of the conception of a German nation which shall be the guardian of the aspirations, needs, and rights of humanity. This sentiment appears to carry with it the idea that the German people have rights which are more extensive than those of other nations."

On 11 April, 1938, Professor Grimm, Hitler's legal

adviser, in an interview with M. Georges Oudenard, French correspondent, declared: "No one has the right to suspect the clearly expressed word of the Führer, who clearly defined certain frontiers—provisional towards Poland; definite towards France and Italy. Obviously in case German peoples of states should later plainly express their wish to rejoin the Reich, it would no longer be within our power, or in that of anyone, to prevent them, in view of the principle, now universally acknowledged, that peoples may freely dispose of themselves. The Führer has only agreed to, and this he will loyally do, never to seek to assimilate German peoples by conquest." The inference is that Germany felt free to liberate German peoples, such as the Sudetens, on "request."

Czechoslovakia started to fortify her Austrian, now German, border. While helping herself, she looked around for friends. Warning had been received from Italy that she would not help. Now Yugoslavia intimated she could not be counted upon for aid.

Czechoslovakia, feeling sure as to her alliances with France and Russia, thought that the British also would come to her assistance. In April, the Prague *Lider* published an article which reflected the government view as to France and Great Britain. "They will not desert us, whatever we do, even if we make mistakes and our policy is bad." This belief led to a no-concession attitude toward Germany.

The Sudeten was a fringe of territory along the German border. The inhabitants were about 85% German. Their territory, which included a strongly fortified line of hills protecting Czechoslovakia, had much mineral wealth and contained large textile, glass, and other industries. The loss of the Sudeten would affect the economic stability of the parent state. It seemed that it would be impossible for Czechoslovakia to exist as an independent nation if the 3,500,000 Sudetens out of a total of 14,500,000 seceded. And if the Sudeten departed, other minorities, Slovakians, Ruthenians, Poles, Hungarians, might claim the same right. If all these left, there would be nothing remaining except Czech elements, with a population of around 6,500,000. It would be national suicide. The sacrifice was too great.

Czechoslovakia decided to resist. There had been no oppression of the Sudetens, but it was admitted that the latter had grievances. There had been discrimination in political appointments and in awarding government contracts. These had generally gone to Czech citizens; few to German residents. Prior to the World War, the Sudeten had been united to Bohemia within the Austro-Hungarian Empire, as a German-Czech state, with the German element predominating. In the reorganization of 1918, the new state of Czechoslovakia remained a German-Czech state, with the Czech element in control. It had seemed that now that the shoe was on the other foot, political preferences ought to be given to the Czechs. However, the Czechs were willing to drop discriminations and, in order to preserve their country, to afford full political rights to all minorities.

Czechoslovakia made real and repeated efforts to satisfy these minorities. She proposed that as vacancies occurred, political appointments would be distributed among her various races in proportion to their numbers. She was willing to grant local self-government wherever wanted. Only the integrity of the state as a whole, with one central authority for foreign affairs, national defense, post office, and so on, was to be accepted by all elements. If this principle was kept, minorities could use any language and have any schools they wished; and in general would be free to do as they pleased. Elections were held to provide for a more liberal system of local government.

ATTITUDE OF FRANCE AND BRITAIN

The Prime Ministers of Great Britain and France met at London on 28 April, 1938. The danger of an explosion over the Sudeten was recognized. But it was necessary to look further. The increase in the German military strength had become sufficiently great as to warrant an assumption that it might be used to attack some neighbor. Italy, an ally, appeared to be in no danger. Czechoslovakia, Poland, and France might be. If colonies were considered, the British Empire might also, although this danger seemed remote.

Czechoslovakia appeared to be most likely the next victim. This did not directly affect other countries, but if Germany succeeded in annexing the Sudeten, she would thereby receive a decided increase in reserves and resources, and be a correspondingly more formidable antagonist thereafter. It was suspected that Germany had a plan to seize territory through a step-by-step advance. The sensible thing was to stop Germany by banding together to resist further encroachments. Otherwise it would only be a question of time before France might be attacked to recover Alsace-Lorraine, and by that time she might have lost many or all of her present allies.

Public opinion supported their governments. In England there was a strong feeling that collective security ought to be, and could be made to rule. Nations should have the right to retain what they possessed unless arrangements were made peacefully for voluntary transfers of lands. Anyone attempting to violate this rule through use of force was an aggressor, a disturber of the international peace.

To the people, it seemed that the aggressors could be restrained through the use of moral and economic pressure. Perhaps they forgot that this method had been tried unsuccessfully against Japan in 1932, when she seized Manchukuo. When the next aggressor appeared—Italy—a more powerful weapon had been tried, that of sanctions. This also had failed, but there were differences of opinion as to whether it was the method, or the application of the method, which had been at fault. Many believed that the united economic pressure of the

three great democratic states would stop any war. As there was some doubt as to this, it seemed clear that a threat of force might be required, and the possibility that the democracies might have to go to war to support their views had better be provided for.

It had been hoped at one time that the League of Nations would supply the necessary force against aggressors; but the League had not, and was not going to. The democracies would have to do it themselves.

France and Great Britain felt that the danger was near them. They would have liked to have the United States associate itself actively with them. The American press was sympathetic; polls of the people showed an overwhelming majority strongly opposed to the aggressor nations.

Unsatisfactory Military Situation of the Democracies

The French and British military situation was not at this time quite satisfactory. The geographical position of the Axis states separated the western democracies from Poland and Czechoslovakia. The Axis countries had superior land and air forces, which gave them a tremendous advantage. On the sea the British and French had decisive superiority, even allowing for Japan joining the Axis, which was possible. Supremacy on the sea was counted upon to stop essential resources from reaching the Axis states. If the land and air forces could simply hold, and it was thought they could, economic pressure, after exhaustion of stocks on hand, would force the aggressor nations to yield.

Great Britain and France took immediate measures to increase their military strengths. The Prime Ministers agreed to coordinate the British and French air, sea and ground forces, by appropriate conferences between their general staffs. It was decided at their conference to provide ultimately for a unified command, and policy as to reserves and resources jointly for the two empires. A crisis with Germany was to be postponed if possible, but further aggressions were to be opposed. Czechoslovakia would be supported, but it was that nation's duty to avoid risks by satisfying legitimate demands of the Sudeten within the framework of the Czechoslovakian constitution.

On 7 May, 1938, the British and French ministers at Prague urged M. Hodza, the Prime Minister, to settle the Sudeten question peacefully. They suggested no special method. M. Hodza agreed to make a serious effort. He had on the preceding day announced that Czechoslovakia was ready to make every concession, except any which would impair the sovereignty or endanger the security of the state or alter its existing frontiers.

M. Hodza had to deal with Conrad Henlein, who was the leader of the Sudeten Germans. Henlein kept close liaison with the Nazi party in Germany, made frequent trips to visit them, and reported directly to Hitler. Presumably Hitler gave him advice, possibly orders. From time to time Henlein went to London. It is not exactly known what he did in that city, which contained influential ladies and gentlemen who sympathized with German desires for annexation of other German peoples, and who thought that war might not be a good thing for British business.

British Favor Appeasement

Henlein was in London from 12 to 14 May, 1938. On 13 May, Lady Astor gave a luncheon party, her guests including distinguished statesmen and outstanding journalists. They discussed the European situation. According to Augur, of the New York *Times,* "Mr. Chamberlain . . . certainly favors a more drastic measure—namely, separation of the German districts from the body of the Czechoslovak Republic, and the annexation of them to Germany."

Joseph Driscoll, in his dispatch to the Montreal *Star,* wrote, "Nothing seems clearer than that the British do not expect to fight for Czechoslovakia . . . the Czechs must accede to the German demands, if reasonable. . . . Frontier revision might be advisable. This would entail moving the frontier back for some miles to divorce this outer fringe from Prague, and marry it to Berlin. A smaller but sounder Czechoslovakia would be the result . . . Czechoslovakia can not survive in its present form, the British are convinced . . . The Czechs should be practical and make the best terms with Hitler, without any war at all."

This appeasement policy would avoid war—at least for some time, and it was hoped that if Germany was given the Sudeten, she would have no further demands for territorial aggrandizement, and the world could settle down in peace. This view does not agree with that indicated by the Prime Ministers at their meeting on 28 April, just fifteen days earlier. What is known of that meeting is limited to the official pronouncements, worded so as to respond as far as possible to public demand for condemnation of aggressors. Aware of the military situation, they may have agreed on other measures which have not been made public. A large part of the people were convinced that the dictators were bluffing, that they had no chance to win a war against the wealthy democracies, and never would try it. They were satisfied that if the language of force was used, the only language the dictators were thought capable of understanding, neither aggression nor war would come. The people and press wanted forceful action, but not war.

Prudent statesmen of Great Britain and France were not sure that the dictators were bluffing, nor that war could be avoided if Germany's demands were not granted. Temporarily, until their armaments had been increased, it might be necessary to yield. In the instant case of the Sudeten, Germany presented, as an excuse, the desire of the Sudetens to join themselves to Germany, and the right of peoples to freely dispose of their political destiny. In the World War, the democracies

had made the principle of self-determination of peoples one of their objectives, and could not now deny it. This could be used as a convenient reason for acceding to Germany this time.

The opinions expressed at Lady Astor's luncheon appear to have been the initial step to prepare the public not to insist, yet, on war with the totalitarian states, and if necessary to yield the Sudeten to Germany on the ground that its inhabitants were German, who wished to secede peacefully from Czechoslovakia.

Germany took careful note of Henlein's report of his trip to London.

The First Crisis Ends Quickly

A week later a crisis threatened. Commencing on 19 May, reports came in that Germany intended to invade Czechoslovakia forthwith. Troops were concentrating near Chemnitz. Czechoslovakia prepared to resist; mobilization was ordered. France announced that she would support her ally. The British ambassador at Berlin notified the German government that his country might enter any war over Czechoslovakia. For a few days the situation was tense. But nothing more happened; the crisis passed.

Different interpretations have been made on the events of this week. The peoples of the democratic states were convinced that Germany had really intended to invade and seize the Sudeten, and refrained from doing so because of the veto by Great Britain and France. The popular view was that the dictators understood the language of force, and could not and would not fight the wealthy and powerful democracies. Let the policy of keeping the totalitarian states in their proper place continue!

The reported positions of the German troops were opposite the strongest part of the Czechoslovakian defenses, whereas none, or few, were reported in Silesia and Austria, from where an advance would not have met important fortifications. An explanation may have been that Silesia is a narrow province extending between Poland and Czechoslovakia. Unless Poland was friendly, an invasion by Germany of Czechoslovakia from Silesia ran the risk of being taken in reverse by Poland. The same reason would apply to an invasion from Austria, should Yugoslavia attack from the south. Also the road net in Austria had not yet been reconstructed so as to permit large forces to move in a northerly direction from the valley of the Danube.

It may be that, encouraged by Henlein's report, Germany believed that Great Britain and France favored the German demands, and that under this circumstance, there would be no opposition. The troop positions in this case would be unimportant. When resistance presented itself it was impossible to proceed with what may have been hasty action. Germany, however, denied that she had any intention of "invading" Czechoslovakia at this time. She explained the troop concentrations as having been for training purposes.

Satisfied that the Sudeten could not be taken by a minor demonstration. Chancellor Hitler on 28 May, 1938, gave instructions secretly to have everything ready to seize the Sudeten, by force if necessary, on 2 October. He ordered the construction of strong defenses, subsequently known as the West Wall, along the French frontier, to make impossible an invasion from that direction. The Army was to be nearly doubled in strength by increasing the number of divisions to 96. This would provide a sufficient force to stop the French, while leaving enough to overrun Czechoslovakia. These measures were started immediately.

War of Propaganda

German agitation concerning the Sudetens was active. Emphasis was placed on the alleged iniquity of requiring 3,500,000 Germans to live against their will under foreign domination. Poland was reminded of the understanding as to eventual dismemberment of Czechoslovakia; Hungary was given to expect that she might receive large Hungarian sections of the many-nationed state for her cooperation. Italy was friendly, kept Yugoslavia from interfering. This country, by August, definitely announced that should war come she would be neutral. From certain revelations made in the *Telegrafo* of Livorno, Italy, it appears that the destiny of Czechoslovakia had been settled in October, 1936, when Count Ciano, the Italian Foreign Minister, signed the treaty establishing the Rome-Berlin axis. This may have been covered in one of the protocols.

Czechoslovakia found herself surrounded by threatening states. None of her neighbors were friendly. The Germans were rapidly erecting their West Wall to prevent the French from marching to her assistance. Czechoslovakia sought a peaceful solution, provided the Sudeten did not secede.

Germany expertly disseminated appropriate propaganda. At home the propaganda showed the justice of the mission of liberating oppressed brethren. It was represented that there probably would be no war; but if there were, the German land and air forces were unbeatable.

In France propaganda sought to prove that war between the two countries would be idiotic, as there were no important differences. Alsace-Lorraine was not an issue; it was not worth fighting for anyway; it was always dissatisfied whichever country it belonged to. Germany did want colonies, but would not fight for this. The German army was too strong to overcome. On the principle of self-determination, the Sudetens should be allowed to join Germany, if they so desired, and they did. Czechoslovakia, and especially her President, Benes, could not be trusted; the Czechs had promised a long time ago to grant autonomy to the Sudetens, and had

done little or nothing. The Franco-Czech alliance did not really apply to the current issue. Finally, Hitler's unfavorable remarks regarding France appearing in his book, *Mein Kampf,* were written in his young days, and should not now be taken too seriously.

In the British Empire, propaganda represented that it would be very difficult for France to aid Czechoslovakia; quite impossible for the British. Besides, the latter nation had no interest whatever in the matter. A war would only be a trap for Great Britain. Much better to suggest to the French that a peaceful settlement of the dispute would be a sensible thing to do.

In the United States the propaganda explained that once before the Americans had gone to war for the British and French Empires. The United States had received absolutely nothing for its really extraordinary efforts. The Allies had even refused to pay their just debts. After such an experience, it would be ridiculous to enter another European war.

Slovakia started agitation for autonomy in June. Her situation was not dissimilar to that of the Sudetens. She had been promised self-government; the promise had not been kept. Few political appointments went to Slovaks. They furnished their prorata share of the enlisted strength of the army, but the officers were Czechs. The Czechs stated that the Slovaks were too inferior culturally to furnish government officials and army officers; pointed out that to correct this defect they had established many new schools in Slovakia, and that it was reasonable to believe that in due course of time there would be sufficient educated persons in Slovakia to permit making appointments from that section of the state.

On 12 July, the French President du Conseil, M. Daladier, announced that France positively would support Czechoslovakia if necessary. The press of the three democratic countries urged firmness against Germany, no more yielding. Judging from the experiences the previous May, as interpreted popularly, this was what was required, make the dictators understand that the world would not allow aggression. The British government was confronted with her people solidly opposed to Germany as against the knowledge that war ought to be avoided.

Another German agent was in London at this time—Captain Wiedeman. Wiedeman was Hitler's confidential aide. A solution to the difficulty of avoiding war by yielding to the secession of the Sudeten, while appeasing the popular clamor for no further surrender to Germany, appeared while he was in England.

On 18 July, an offer was made to Prague by the British government to send an impartial investigator to Czechoslovakia to report upon the facts. Prague accepted. Lord Runciman, selected as the leader of the fact-finding party, arrived in Prague on 3 August. He was cordially welcomed. Later that day, at a meeting at the Aleron Hotel, he met Czechoslovakian and Sudeten representatives. In spite of a gloomy nature—he seldom smiled—Runciman made a good impression. In off-the-record talks, Czechoslovakian officials made it plain that their country would make many concessions, but would prefer war rather than grant full territorial autonomy to the minorities.

Information at Paris and London indicated that Germany was indeed preparing for war. Four hundred thousand men were rushing work on the West Wall. The reserves had been called out. There had been mobilization of trucks, and of much materiel. It was estimated that by the end of the month Germany would have 1,500,000 men under arms. Her press in no way abated its hostile tone toward Czechoslovakia. It was not certain that the dictators were bluffing.

Italy appeared ready to intervene in favor of her ally; it seemed possible that Japan might do so also. Russia advised that if France went to war for Czechoslovakia she would comply with the terms of her treaty, and enter the war on the side of France; she did not say how or when. Poland was tending towards Germany, and the Balkan states seemed to be overawed by the Axis strength, and unwilling to commit themselves.

FRANCE AND BRITAIN UNABLE TO SAVE CZECHS

If war should arise, France and Great Britain did not see how, with inferior land and air forces, they could save Czechoslovakia. In view of their superior wealth, resources, and sea power, they might win a war in the long run, and probably would if they had a little more time to complete their armament programs.

According to the French press, the American ambassadors at London and Paris, on 27 or 28 August, advised the governments to which they were accredited that the United States could not openly join Great Britain and France in case of war, but that American opinion was such that the two Allies could count on material aid from the United States. On the same dates, the American ambassadors at Berlin and Rome advised the German and Italian governments to the same effect. According to the French press, the ambassador to Italy added in substance: "Remember 1917; the United States may enter the war." The French ambassador at Washington reported that he had been advised verbally as stated by the ambassadors. On 2 September, the American ambassador to France in a speech at Bordeaux said that France and the United States were united both in war and in peace. This remark was interpreted locally as meaning that the United States would support Great Britain and France should war develop.

What resulted from these warnings? Germany and Italy had, a few days earlier, made a military estimate of the situation. They had classified the United States as doubtful, with a possibility of her joining the Allies. The diplomatic representations confirmed this view. The Allies were naturally pleased, but as military aid from the United States was to be withheld, it did not alter the fact that Czechoslovakia probably could not be

saved, and that they were not quite ready to embark upon a war which would be long, possibly frightful, and of uncertain nature.

U. S. Press Urges Resistance

The American press was supporting the views of the ambassadors. It counselled resistance to the dictators, made it plain that the United States would furnish material aid at once. Public opinion in Great Britain, and to a lesser extent in France, was influenced and bolstered by the Americans. The people were still strongly of the belief that the dictators were bluffing, that it was time to put a stop to constant alarms, which to date had always resulted in an increase of strength of the totalitarian states. Firmness in dealing with such persons was required. It seemed inconceivable that the relatively poor states of Germany and Italy could undertake a major war; they would never dare to challenge the might, power and wealth of the three greatest empires that the World had ever seen.

The people remembered that it had been alleged that, had Germany known in 1914 that Great Britain would enter the war against her, there would have been no war. Let it now be made plain that the three great democracies were united against the dictators, and in particular against Germany. If the dictators were unmistakably told that they would not be permitted to attack Czechoslovakia, without engaging in war with the three mightiest empires of the world, there would be no aggression, and no war. If the dictators had grievances, let them submit them to some impartial tribunal, provided they first disarmed, and agreed to substitute law and order for force.

Czechoslovakian opinion reechoed that of the Allies. On 5 September, the leading newspaper of Prague published an editorial entitled *We Are Ready*, stating "with maximum seriousness, there is not sufficient force in the world to make us accept a settlement which is incompatible with our independence, and the democratic character of our Republic." Czechoslovakia reenforced words with deeds. She mobilized her troops, issued gas masks to her citizens, stored food, stopped increases of prices, provided for refugees from frontier districts, and blacked out towns at night. Thus she openly prepared for war, secure in the belief that she would be rescued by her allies before Germany could overcome her efficient army fighting for their homes from behind as strong a line of forts as existed anywhere. Spurred by Czechoslovakian action, and warlike counter measures taken in Germany, Great Britain and France started to mobilize on 5 September.

The situation was developing into war. The British and French governments were alarmed. Their own people, not perhaps appreciating the danger that there would be a war, were forcing their leaders into a position where peace might no longer be possible. Something had to be done. The Allies were not fully prepared for war.

British Press Again Suggests Appeasement

On 7 September, 1938, the London *Times* in an editorial signed by Colonel Geoffrey Dawson, known to be a close friend of the Prime Minister, suggested that the Sudetens be allowed to join Germany if they so desired and so voted. The views in this article were similar to those expressed by the correspondents who had attended Lady Astor's luncheon in May. The editorial caused a sensation. In the House of Commons, Mr. Chamberlain declined to either affirm or deny responsibility for the articles of 14 and 15 May, although the *Times* editorial was denied officially.

The day following, some French papers accepted the idea of the *Times,* and suggested that if the inhabitants of the Sudeten by vote showed a wish for annexation to Germany they ought to be allowed to do so.

Germany, immediately accepting this idea as just and reasonable, thereafter played it up.

The *Times* editorial was not well received in England. It was strongly disapproved of in the United States. It was judged to mean that the British government did not wish to fight, notwithstanding the undeniable justice of the Czechoslovakian cause, and in spite of the fact that sentiment in the United States had indicated a willingness to furnish moral and material aid. The tone of the American press was that it was now best not to offer such support, since the Allies appeared to be unable, or unwilling, to take advantage of it.

On 9 September, in his press interview, President Roosevelt announced that whoever believed the United States had entered into any moral connection with the European democracies over the Czechoslovakian situation was completely mistaken.

On 11 September, the British government press release held that attempts to use force, after arrangements had already been made for some peaceful solution, would be universally condemned. The German government could have no illusions that if an aggression were made against Czechoslovakia, France was obliged by treaty to defend her. If a general war threatening the security of France should then arise, Great Britain might be forced to intervene. "Great Britain is in close contact with France, the Dominions, and especially with the United States, whose sympathy is particularly precious for Great Britain at all times, but particularly so at a time like the present. . . ."

The peaceful solution mentioned may have been one being prepared by Lord Runciman, who was still laboring to mediate the differences between Czechs and Sudetens. The facts were not in dispute; however, there was no progress towards a direct settlement between the contending parties. In the meanwhile, agitation, disorders and rioting were frequent throughout the Sudeten.

According to the correspondent of the Paris *Echo de Paris,* Hitler, on 12 September, had an interview with Generals von Fritsch, chief of staff, and von Beck. The generals made energetic representations against an attack

on Czechoslovakia. They were overruled. Hitler ordered that from 25 to 28 divisions should be ready to attack Czechoslovakia by Saturday, 24 September. He knew of the possibility of war with France, but was of the opinion that the new fortified West Wall would immobilize the French. He had been advised by Mussolini that in his opinion England would not go to war.

THE NUREMBERG SPEECH

The same evening, Hitler made his Nuremberg speech. He reproached the democracies for allying themselves with bolshevism; he charged that Czechoslovakia was an artificial state, that the Czechs lacked culture. He showed considerable hatred, alleged martyrdom of the Sudeten Germans. He renounced any idea of recovering Alsace-Lorraine; but said he would not abandon the Sudetens. On the contrary, he proposed to reestablish the ancient Germanic Empire whose insignia still were at Nuremberg; while his good ally—Italy—would similarly reestablish the old Roman Empire. He realized that neither of these two empires might be loved by outside nations; but neither of them could, from now on, be suppressed.

The tone of Hitler's Nuremberg speech, broadcasted, made a bad impression on the democracies. This tone may have been intentional. The mission was to arouse the German people to alleged wrongs in the Sudeten, and to accept the risk of a war to save their brothers.

The reaction to the Nuremberg speech made it increasingly difficult for the British and French governments to avoid war. News arrived that Germany would be supported by Italy. Lord Runciman reported that consideration was being given to a federative form of government, but something more would have to be done, and done immediately, to avert imminent war. More rioting, casualties, martial law, refugees, in the Sudeten. An acute situation.

The French Premier, M. Daladier, on 13 September, personally telephoned to Mr. Chamberlain, According to his own statement, he advised Mr. Chamberlain as to the news about Italy, and recommended that Lord Runciman be instructed to make another effort to have the Czechs and the Sudetens reach an agreement. He further believed that some "exceptional proceeding" should be taken to secure a peaceful solution of the Sudeten problem.

It seems probable that the exceptional proceeding was a suggestion for an interview between Hitler and Chamberlain, for this idea was immediately submitted to the Dominions for remark. Australia and Canada thought it excellent. So, the next day, 14 September, Chamberlain suggested such an interview to Hitler, to take place on 15 September, at such place and hour as he might designate. Diplomatic pressure was exerted on Czechoslovakia to get her to accept a plebiscite as to the future of the Sudetens, and Lord Runciman was told to make one more effort to arrange matters.

THE BERCHTESGADEN CONFERENCE

Hitler accepted the interview, designated Berchtesgaden as the place, and the next afternoon as the hour. Proceeding by air, for the first time in his life Chamberlain met Hitler on the 15th, at the wonderful cottage in the Bavarian Alps, where Hitler is accustomed to brood and meditate on his future actions. The interview was short, and was dominated by Hitler, who was courteous, but stated that it was no longer a question of autonomy for the Sudeten, but of incorporation with Germany, on the principle of the self-determination of peoples. This must be at once. He would delay military action pending efforts by Chamberlain for a peaceful arrangement.

Mussolini on this day decided that in case of war between Germany and Czechoslovakia, Italy would not participate unless a general war arose, in which case Italy would join Germany.

The diplomatic representations (concerning a plebiscite) made to Czechoslovakia caused that state to suspect that her allies were seeking a way to avoid their commitments to her. Mr. Benes sent for the Russian ambassador, M. Alexandrowski, who stated that if war occurred, and France went to the assistance of Czechoslovakia, Russia would honor her treaty with all her strength. If France did not come to the aid of Czechoslovakia, he advised appeal to the League of Nations. If this body then officially designated Germany as an aggressor, Russia would comply with her obligations as a member of the League. Mr. Benes broadcast a speech refusing a plebiscite for the Sudeten, while the Czechoslovakian ambassadors at Paris and London filed notice that their country would not accept French or British decisions to her detriment.

While these events were occurring in Prague, on the same 18 September, M. Daladier, with M. Bonnet, his Foreign Minister, flew to London to consult with the British. It was decided to avoid war by accepting secession of the Sudeten from Czechoslovakia to Germany, provided that the new frontier was guaranteed by Great Britain, France, Italy and Germany. Russia was not taken into account. Negotiations were to be undertaken on a basis of ceding those districts where the last elections showed that a majority of the population were German; where the Germans numbered around 50%, autonomy within Czechoslovakia was to be granted where desired.

At 2:00 PM, 19 September, the British and French ministers at Prague presented formal communications proposing that the Sudeten districts having a majority of Germans be ceded without vote, subject to minor adjustments of frontiers. Provision was to be made for a mutual exchange of minorities. A reply was requested by the 21st; in the meantime it was requested that Czechoslovakia take no military measures which might handicap negotiations. About the same time, Czechoslovakia ascertained that Poland would support Germany,

and was about to claim cession of the Polish districts.

DEMANDS OF POLAND AND HUNGARY

On 20 September, Poland demanded that Teschen be ceded to her. To lend weight to her demand she began to concentrate troops. Hungary announced that she knew her rights, and would insist on return of the Hungarian districts. New disorders were reported from the Sudeten. It was a hard situation, and the cabinet at Prague studied the matter all day. Their decision was made in the afternoon, when they informed the British and French ministers that their proposals of the day before could not be accepted. Mr. Newton, the British minister, announced that in this case Great Britain would drop the Czechoslovakia dispute; the French minister, M. Lacroix, said he was of the opinion that France would do the same. M. Krofta, the minister for Foreign Affairs, then asked M. Lacroix for a definite answer as to whether, if war came, France would support Czechoslovakia. M. Lacroix replied that he would have to consult Paris.

After considerable telephoning, at 2:15 AM, 21 September, M. Lacroix advised that if Czechoslovakia refused to accept the Berchtesgaden agreement, and war thereby resulted, France would not assist. M. Osusky, Czechoslovakian minister at Paris, telephoned to the same effect, but added that the French decision had been made by M. Bonnet, and had not been authorized by the French cabinet.

Lord Runciman, having been prodded to make efforts to arrange a peaceful settlement along lines desired, on the 21st reported: "I have received the impression that the Czechoslovak government during the past 20 years, although it has not engaged in an active opposition, and certainly not in terrorism, has been marked by a want of tact, a lack of understanding, an intolerance and an undesirable discrimination to a degree which has inevitably led to the resentment of the German population towards revolt. The Sudeten Germans have also the feeling that during the past they have received numerous promises from the Czechoslovakian government, but that these promises have seldom been followed by results." He then represented that cession is inevitable; and that a plebiscite "would be a sheer formality"; adding that a large majority of the Sudeten desired annexation to Germany. This report established a desired legal basis for the Allies to agree to surrender the Sudeten on the ground of self-determination of peoples.

CZECHS AGREE TO CESSION OF TERRITORY

The Czechoslovakian government, in a calm and statesmanlike announcement issued at 5:00 PM, 21 September, complied with the requirement to give its answer by this date. As France and England had submitted a project for cession of certain territory, and had refused to aid in case of war should their project be not accepted; that as Russia had advised that her action would be only such as the League of Nations might hereafter indicate; that, as arbitration had been asked and refused, the government felt that the proposed project must be accepted as a basis for discussion. It would present the same to Parliament. "We believe they will approve it, after having noted the fatal reasons which have made this necessary."

Peaceful surrender of the Sudeten had now been agreed upon. The British and French governments were elated. There would be no war, at least not now. If the agreement could be concluded before new complications arose, there might be no further difficulties. Full of hope at the happy turn of events, Mr. Chamberlain arranged to once again meet Herr Hitler the next day. He wished to discuss the procedure for carrying out the transfer of the Sudeten. He anticipated no trouble at all. Hitler designated the Hotel Dreesen, at Godesberg, as the place.

The Hotel Dreesen takes its name from its proprietor, one of the original Nazis. When Hitler was younger, and was to many an undesirable agitator, there were hotels that could find no room for him. It was on such occasions that Herr Dreesen gladly opened his establishment to Hitler, made him his guest of honor, gave him his best room. It was a great room, all green—green chairs, green table. It overlooked the Rhine valley, beautifully green at this season. Since his first visit as a politician, poor and despised, Hitler from time to time returned to this quiet, restful hotel. He liked to reoccupy the great green room. He brooded there, decided important measures in the solitude which he likes. It was here that in January, 1933, he received von Papen and Baron Strauss, the banker, and arranged for Nazi accession to power and rule over Germany. A year and a half later, on 29 June, 1934, Hitler here decided on the fate of Captain Roehm, and on the dissolution of the Brown Shirts. Four years later he now selected this historic room as the place to settle the Czechoslovakian question.

HITLER DEMANDS IMMEDIATE OCCUPATION

The first meeting with Chamberlain was from 4:00 PM to 6:40 PM, 22 September. Hitler received his guest warmly. Chamberlain, through an interpreter, explained the French-British idea as to cession of the Sudeten, with a subsequent guarantee to Czechoslovakia. Hitler had no objection to the guarantee, provided that Italy was included as a guarantor. He did object to the method of cession presented as being slow, and as news to him. On account of the disorders in the Sudeten a rapid solution was desirable. He saw no reason for delay, wished his German troops to march in. No boards, no commissions, no ceremonies.

Chamberlain answered that these ideas were wholly unexpected. He had understood at Berchtesgaden that if the principle of self-determination was accepted, Hitler would discuss details as to the application of the

principle. He came for this purpose.

Hitler replied that never for a moment had he intended that Chamberlain should return to announce that the principle had been agreed upon.

Surprised, with no answer ready, Chamberlain requested until next day to consider the question. It was agreed to adjourn until 11:30 AM next morning.

Long consultations by phone followed, with Chamberlain at one end of the wire at Godesberg, London at the other end. There were other long conversations between London and Paris. Here were two great Powers, who, in spite of their antipathy to yield to Germany, had nevertheless arranged to acquiesce in the surrender of the Sudeten to Germany. They had secured from their agent and inspector, Lord Runciman, a document explaining the reasons and the justice of this. Czechoslovakia had been induced to consent. Although the stage was set for peaceful transfer, Germany was now refusing to wait even a short time for a formal and regular transfer. Further, it now appeared that Germany asked for certain districts which were not entirely German and which contained valuable resources. The situation was worse in that Poland and Hungary had joined in demanding part of the spoils, that the action of Russia was uncertain, that Italy was supporting Germany.

At Chamberlain's request, Hitler on the next day, the 23rd, reduced his terms to writing. They did not differ from his previous verbal statements, but were clearer, in that a map accompanied the paper, showing the areas proposed to be transferred. The leaders met during the afternoon, again after dinner. The final meeting lasted until 1:30 AM of the 24th. Both sides made their positions plain. They did not agree.

As explained later in his speeches, Chamberlain's plan was that some kind of arrangement should be made to present a showing to the world that the Sudetens desired annexation to Germany, that the Allies had carefully investigated the facts, and had found that an annexation was justified, and had been approved of under their own principle of the self-determination of peoples. If, however, Germany insisted that the annexation was on account of a unilateral decision by Germany, how could the public of the democratic states be made to see any justice in this?

Hitler's idea was that cession of the Sudeten was not to be "in virtue of the gracious or benevolent sympathy of other nations," but on account of the decision of the German Reich. Germany was not now willing to admit that the Powers who had forced her to sign the Versailles Treaty, and had for many years insisted on keeping Germany in an unarmed and humiliating position, were any longer to be permitted to assume a right to decide on German action.

These two points of view are the best definitions so far made by national leaders as to the assigned reasons for war.

While the foregoing discussions were under way at Godesberg, other events occurred on the 23rd. At 4:00 AM, the Polish *chargé d'affaires* at Moscow was sent for, and advised in writing that if Polish troops entered Czechoslovakia, Russia would denounce the non-aggression pact. Later that morning Poland replied that she understood her duties under the treaty, and considered herself the sole judge as to what measures were necessary to insure the safety of her own territory, that she was amazed at the Russian note, since not a single move had been made on the east Polish frontier. Yugoslavia and Rumania announced that if Hungarian troops entered Czechoslovakia, they would go to the latter's assistance.

In the afternoon, the British and French ministers notified the Prague government that, in view of the unforeseen German attitude, their request to suspend such military measures as might be construed as hostile to Germany was withdrawn. Czechoslovakia took advantage of this; she ordered general mobilization and prepared to fight.

THE SECOND CRISIS

The 24th saw European countries mobilizing, danger everywhere. The democratic peoples had been determined not to yield. They still felt that way, but were now disagreeably and unexpectedly surprised by the fact that the dictators apparently would fight. The people became frightened. Sandbags and airmasks were issued; trenches were dug; children sent off; great cities were evacuated.

Encouraged by what appeared to be a general determination not to accept Germany's demands, Czechoslovakia rescinded her decision to cede the Sudeten. The new proposals from Godesberg were firmly rejected. "The proposals go far beyond what we agreed to in the so-called Anglo-French plan. They deprive us of every safeguard for our national existence. We are to yield large portions of our carefully prepared defenses, and admit the German armies deep into our country before we can organize it on the new basis, or make any preparations for its defence. Our national and economic independence would automatically disappear. Against these new and cruel demands my government feels bound to make their utmost resistance, and we shall do so, God helping. The nation of St. Wenceslaus, John Huss, and Thomas Masaryk will not be a nation of slaves."

On the morning of 26 September, the Prime Ministers of Great Britain and France, in conference at London, decided to insist on an international commission to supervise transfer of Sudeten districts; and if the present crisis was solved, to guarantee the new frontiers of Czechoslovakia. To avoid precipitate action by Germany, Sir Horace Wilson was directed to proceed at once by plane to Berlin, with a personal letter to Hitler, asking him to agree to a German-Czech conference, at which a British representative should be present.

Sir Horace lost no time. Matters were urgent. He

arrived at Berlin in time to see Hitler at 5:00 PM the same day. According to his report he found Hitler in such an irascible and disagreeable frame of mind that he did not deliver his letter. He understood Hitler to say that "if Czechoslovakia has not yielded by 2:00 PM, 28 September, I will order a general mobilization and advance into her territory."

At 8:00 PM that evening Hitler delivered a speech in which he expressed himself clearly. After solution of the Sudeten question, Germany would have no other cause of complaint in Europe. He had no intention of attacking France. His memorandum to Mr. Chamberlain was a definite, and a last German proposition. It was nothing more than a realization of what Benes had already agreed to. "Two men are face to face: there Mr. Benes, and here I. He has the decision in his hands—peace or war. Either he will finally accept, and give liberty to Germans, or we ourselves will seize this liberty," Positively he would not modify his demands; if Benes does not agree, German troops will enter Czechoslovakia on 1 October.

Following this speech, which was broadcast, the British government at 9:15 PM advised the press that they had sought a peaceful arrangement; that it was not yet too late to arrange for a transfer of the Sudeten; but that if an attack on Czechoslovakia were made, France would be bound to go to her aid, and that this would certainly involve Russia and Great Britain.

The next day at noon Sir Horace Wilson presented his letter at a second interview. The Chancellor promised to reply in writing later. He stated verbally that if Benes did not accept the Godesberg memorandum by 2:00 PM, 28 September, "exceptional measures" would be taken. From conversations with Hitler's assistants, Wilson understood that "exceptional measures" meant that the promise made at Berchtesgaden not to use force was revoked. At 6:00 PM Hitler dispatched by air his formal reply. He was surprised that anyone saw anything in his Godesberg propositions which were not strictly in accord with those previously made at Berchtesgaden. Chamberlain received this letter about 12:30 AM.

During the day war preparations advanced at a great rate. There was great excitement throughout the world. At 8:00 PM, this 27 September, following a day full of alarming news, Mr. Chamberlain made a radio address, delivered in a tone of weariness and hopelessness. He considered it horrible, fantastic, incredible, to be digging trenches, and trying on gas masks, because of a quarrel between people far away. Hitler was insisting on immediate cession of the Sudeten, without time to safeguard new Czechoslovakian boundaries. Chamberlain found this unreasonable; he would, but saw no use, make a third trip to Germany. The time limit of 1 October was an obstacle to negotiation. He would not necessarily involve the whole British Empire in war over Czechoslovakia; if war came, it would be for a better reason, that of preventing German domination of Europe. "Under such domination life of people who believe in liberty would not be worth living." He did not see what more he could do, asked his people to be ready for anything.

United States opinion had largely disinterested itself from the Sudeten problem after the *Times* editorial of 7 September. It now changed into strong support of Great Britain and France, as soon as the reports of the Godesberg conference indicated that Germany was to be opposed. On 26 September, President Roosevelt at 3:00 AM sent appeals to Hitler and to Mussolini asking that there be no war. After listening over the radio to Chamberlain's speech of the 27th, he sent directions to American ambassadors and ministers to support his appeal of the previous day.

At 1:00 AM, 28 September, Chamberlain answered Hitler's letter. He expressed a willingness to go to Berlin to discuss jointly with Czech representatives arrangements for transfer of the Sudeten. He felt convinced that they could arrive at a settlement within a week. The British and French governments would see that promises were fully, fairly, and forthwith carried out. They had publicly made statements to the effect. "I cannot believe that you will take responsibility of starting a world war, which may end civilization, for the sake of a few days' delay in settling this long-standing problem."

The solution of the Suderen crisis came soon afterwards, and at Paris. At 12:30 AM, 28 September, M. Bonnet, minister of Foreign Affairs, sent for Mr. Bullitt, the American ambassador, and asked him to telephone to President Roosevelt, asking him to send a second telegram to Hitler, suggesting an international conference. Mr. Bullitt 'phoned this message to the White House around 1:00 AM. At this same hour, M. Bonnet telephoned his own ambassador at Berlin to see Hitler as soon as possible, and to advise him that, if Germany would agree to occupy the Sudeten *by stages*. France would do everything possible to secure Czechoslovakian consent. Czechoslovakia knew nothing about this; she had not been consulted. At 2:40 AM M. Bonnet had another idea. Whether he thought it out himself, or someone else suggested it to him, is not known. It was to ask Mussolini to mediate, on the ground that he had more influence with Hitler than any other person. As there was no French ambassador at Rome, Bonnet telephoned to M. Corbin, French ambassador at London, directing him to see Lord Halifax, the British minister for Foreign Affairs, at once and ask him to make such a suggestion to Mussolini.

Two lines of appeal to save the peace of the world arose through M. Bonnet's efforts. Both Washington and London accepted his advice. At 10:15 PM, of the 27th, about one hour after the receipt of Mr. Bullitt's phone message, the American State Department sent a message to Mussolini. The contents of this message have not yet been made public. A message was also sent

to Hitler appealing for an international conference of interested nations to be held in a neutral country.

Between 4:00 and 5:00 AM of the 28th, Mr. Chamberlain wired, through Lord Perth, British ambassador at Rome, a letter to Mussolini. "For the last time I have today addressed to Mr. Hitler an appeal not to use force to settle the Sudeten question, which I feel sure can be settled by a short discussion, which will give all essential territory and population, and which will at the same time protect the Czechs during the transfer. I have offered to go myself at once to Berlin to discuss an arrangement with representatives of Germany and Czechoslovakia, and if the Chancellor so desires, with representatives of Italy and France. I feel certain that your Excellency will inform the German Chancellor that you are willing to be represented, and to beg him to accept my proposition. This will save all our peoples from war. I have already guaranteed the carrying out of Czechoslovak promises, and I am sure a complete agreement can be reached within a week."

Lord Perth received this at 8:45 AM. Immediately requesting an interview, he handed the letter to Count Ciano, Italian Minister for Foreign Affairs, around 10:00 AM. Without delay, Ciano submitted it to Mussolini. At 10:40 AM, Mussolini telephoned his ambassador at Berlin to immediately see Hitler, and after assuring him that Italy was ready to fill all her engagements, ask a postponement of military measures for twenty-four hours, pending his examination of the situation.

MUSSOLINI INTERVENES

Around 12:30 PM, nothing having been heard at Rome from the ambassador, Mussolini telephoned directly to Hitler. Hitler at the time was receiving M. François Poncet, the French ambassador, who was submitting his proposition for a conference, and for an agreement to occupy the Sudeten by *stages,* with a neutral zone between Germans and Czechs. The conversation was interrupted in order to enable Hitler to talk with Mussolini. There is no record of this 'phone conversation, but the result was that Hitler accepted the idea of a conference. Shortly afterwards he transmitted an official invitation to the British and French Prime Ministers, to meet with Mussolini and himself at Munich at 2:00 PM next day. The invitations were immediately accepted. There was great enthusiasm and relief in London and Paris. The conference would find a way to avoid war, which no one wanted!

President Roosevelt's letter to Mussolini was delivered to Count Ciano informally during the morning. The American ambassador was not in Rome, but returned and delivered the message officially during the afternoon. Available records do not indicate what it was, nor that it influenced the situation.

THE DEFEAT AT MUNICH

During the afternoon of 29 September, and late into the night, the famous Munich conference was held. Hitler, Mussolini, Chamberlain and Daladier, with their assistants, were present. The problem was to arrange for cession of the Sudeten, already agreed upon as a just development of the principle of the self-determination of peoples, in such manner as to satisfy two points of view:

a) By Germany: that the cession was to be by direct arrangement with Czechoslovakia, peacefully if possible; forcibly otherwise.
b) By Great Britain and France: that the cession was to be by virtue of their approval, and under their supervision.

Great Britain and France were not yet ready for war. Germany and Italy were, but preferred to avoid it, provided their mission as to occupation of the Sudeten by Germany was secured. A compromise was arrived at. It provided for

a) Occupation of the Sudeten by stages, a concession to France. The stages were, however, very short; all to be completed by 10 October.
b) Germany secured the entire area it claimed, less very minor modifications, but agreed to having an international commission charged to supervise the transfer.

There were other provisions which related to procedure, to prohibition of the Czechs removing resources prior to German occupation, to mutual exchanges of minorities, etc.

Munich *postponed* a major war. For a short time it was believed that it had prevented war. Messrs. Chamberlain and Daladier were received with extraordinary demonstrations of joy when they arrived home. They had removed a threatening disaster. There was no longer danger of being mercilessly bombed. The people were deeply grateful.

Second thought rather quickly reversed this early judgment. It was seen that Germany had gained about 3,500,000 population, with valuable resources. She now was potentially a more formidable enemy. Czechoslovakia had lost her frontier, strongly fortified against Germany, and with her reduced size was incapable of seriously opposing Germany in a future war. She was handicapped by the fact that many of her lines of communication, essential to mobilization and war, now ran partly through what had become foreign territory. Economically, too, the country had suffered. Raw materials and the industries using them found themselves in different states. The country now contained only some 10,000,000 people, and of these 3,500,000 were Slovaks and Ruthenians. These nationalities had also been discriminated against by the Czechs, who had refused them their share of political and military appointments, on the ground of alleged inferior education. Sensing the growing power of Germany, and foreseeing the impossibility of Czechoslovakia continuing as an autonomous state, these minorities commenced an active agitation for secession, and with this end in mind, opened direct negotiations with Berlin. For Czechoslovakia, Munich was a mortal blow.

The democratic states soon grasped the idea that the totalitarian states, encouraged by their continued successes, and apparently in accordance with some well-considered

plan, would soon again, somewhere, attempt another advance. They felt that they had been too lax; had too easily acquiesced to German demands. They determined not to be so easily imposed upon hereafter. On the contrary, they would oppose the dictators and all aggressions by them. It seemed probable that they had lost at Munich because from a military point of view they had been too weak. If this had not been the case, perhaps Czechoslovakia would still have been in existence as a powerful democracy and ally. If they were hereafter sufficiently strong, and made it plain that they could and would fight, very probably the dictators would understand their language, and would cease from continually disturbing the international situation by their constant attempts to aggrandize themselves.

As this looked like the best solution for world peace, and maintenance of the *statu quo*. Great Britain, France and the United States undertook the greatest armament programs ever known in times of peace. The necessity for this was explained as required to stop the totalitarian states. If this were not accomplished in time, it would eventually mean, for the British, return of the former German colonies; for France, possible loss of Alsace-Lorraine to Germany, and of Corsica and Tunis to Italy; for the United States, ultimate destruction of the Monroe doctrine, and of the open door in Asia.

On her part, Germany proceeded with her step-by-step advance. The next move was to be towards Poland, with Danzig, the Corridor, and Polish Silesia as primary objectives. At this time, as a major war might result, it was desirable that certain preliminary measures be first provided for. These included:

a) Elimination of what little was left of Czechoslovakia, to remove a possibility of its being made a base for air forces flying from France and Russia.
b) Improving the line of communication to East Prussia, by securing a sea line, for which no suitable port now existed.
c) Arranging to have Russia at least benevolently neutral.
d) Further strengthening the West Wall, to discourage French and British hopes to invade Germany overland from France.

The opening move towards removal of Czechoslovakia as a possible enemy came on 21 January, 1939. The Czech Foreign Minister was advised that his country must discontinue "Benes policies," and comply with German directions. It was pointed out that the union of the Czechs, Slovaks and Ruthenians into one state depended on German good will; that in case of war, Czechoslovakia must come within German lines. Serious disagreements had started between the Czechs and their Slovak and Ruthenian subjects, who were clamoring for secession.

On 30 January, the sixth Nazi anniversary, Hitler made a speech. He considered Germany's east boundary as provisional only; but other boundaries as fixed definitely. He made vigorous demands for colonies for Germany and Italy. Realizing frankly Germany's economic difficulties, he consequently expected a long period of peace.

Great Britain and France placed little faith in German pronouncements for peace, or as to fixation of boundaries. During January, 1939, they agreed among themselves that something had to be done. They looked upon the German statements as camouflage, to conceal the location of the next act of aggression. Remembering Hitler's statements in his book, as to overcoming France, it seemed possible that his next move might be against that country, and that in order to avoid what was believed to be the insuperable Maginot defenses, German armies would go around this obstacle. They undertook to go to war immediately in defense of either Holland or Switzerland, should these countries be endangered. Neither of them was consulted, and both subsequently repudiated the proposed assistance.

Early in March, agitation became acute in Slovakia and Ruthenia. On 10 March rioting occurred, whereupon the Czechoslovakian government took energetic measures to preserve order. All parties appealed to Berlin. They were advised that Germany was neutral, had no interest in the dispute, but that under the well-agreed-to principle that peoples could freely dispose of themselves, Slovakia and Ruthenia appeared to be justified in asking for self-government if they wanted it. On 13 March, Germany mobilized about 14 divisions around Czechoslovakia. Disorders in Slovakia and Ruthenia increased, and on the 14th, these provinces declared their independence. The government at Prague resigned.

Under this emergency, President Hacha of Czechoslovakia left for Berlin at 4:00 PM. A midnight conference with Hitler followed, resulting in a decision announced at 4:15 AM, 15 March. In view of the "serious situation threatened by the events in the previous Czechoslovak territory during the last few weeks," and in order "to assure calm, order and peace in this part of Central Europe," the Czechoslovak President "trustfully laid the fate of the Czech people into the hands of the Führer of the German Reich. The Führer has accepted this declaration, and has expressed his decision to take the Czech people under the protection of the German Reich." Instantly the German divisions, already on the border, moved forward and occupied Czechoslovakia within 24 hours. Slovakia was allowed to secede and become an "independent" state. Ruthenia announced her independence, but was entered by Hungarian troops and annexed to that country. What was left of Czechoslovakia—the states of Bohemia and Moravia—became a German protectorate. The Czechoslovak army was disbanded.

For Germany the occupation of Czechoslovakia was an important success. It removed a possible danger in case of war. New and improved lines of communication between Austria and Silesia were opened; valuable resources and labor reserves became available.

(*In the September-October issue Col. Lanza will conclude his study of the causes of the War by discussing the Polish crisis*.—EDITOR.)

Artillery in the Elastic Defense

EDITOR'S NOTE: *One of the reasons for the speedy obliteration of France is that she relied too much on a rigid form of defense based on concepts of the Middle Ages. Throwing away what she had learned of the efficacy of an elastic defense in the closing months of the World War, she withdrew into a fortress, the lines of which were shallow, fixed, rigid. Weygand saw the error and tried to atone for it on the Somme—but too late. The speed and power of the modern offensive make imperative an elastic defense of much greater depth than anything yet imagined. Depth is no longer based on range of artillery, nor upon the time required for its displacement. Depth and elasticity must be based on the* time *concept, upon the speed and range of air power and armored forces, and upon the necessity for greater dispersion to avoid losses from air attack. It is not inappropriate, then, to reject 1935-39 ideas, and to return to the* principles *(though not the exact 1918 adaptation) of elastic defense. Understanding these unchanging principles, we can with governed imagination adapt them to the modes of defense which must prevail in 1940. In this spirit we may derive benefit from the historical study presented below.*

In July, 1918, the new tactics of the "elastic defense" devised by General Pétain were brilliantly executed by General Gouraud commanding the 4th French Army east of Reims. This article is concerned mainly with the tactical employment of the artillery in this defense, since it was upon the artillery that the success of the scheme largely depended.

Toward the end of June, 1918, it became apparent to the German High Command that if something were not done to relieve the supply situation at the front, it would be necessary to withdraw from the Reims-Soissons salient. Partially to correct this condition, partially to restore the morale of the Germans at home and partially to draw reserves from Flanders preparatory to a new offensive, the fifth German drive was decided upon.

In general, the German plan called for a double envelopment of Reims; the 7th Army to cross the Marne east of Chateau Thierry and advance up the valley of that river to Epernay (south of Reims), and the 1st and 3d Armies to attack east of Reims toward Epernay.

The 4th French Army consisting of the IV, VII and XXI Corps and commanded by General Gouraud held a front east of Reims about 30 miles wide. The XXI Corps, holding the center of the army's sector, had three infantry divisions in line, the 43d, 13th and 170th from right to left and had the 42d U. S. Division in reserve. It is with the 43d French Division that we are here concerned. Of the defense by the 4th Army, Colonel G. L. McEntee in his *Military History of the World War* says: "So dramatically was the attack east of Reims stopped that it obscured the attack west of Reims."

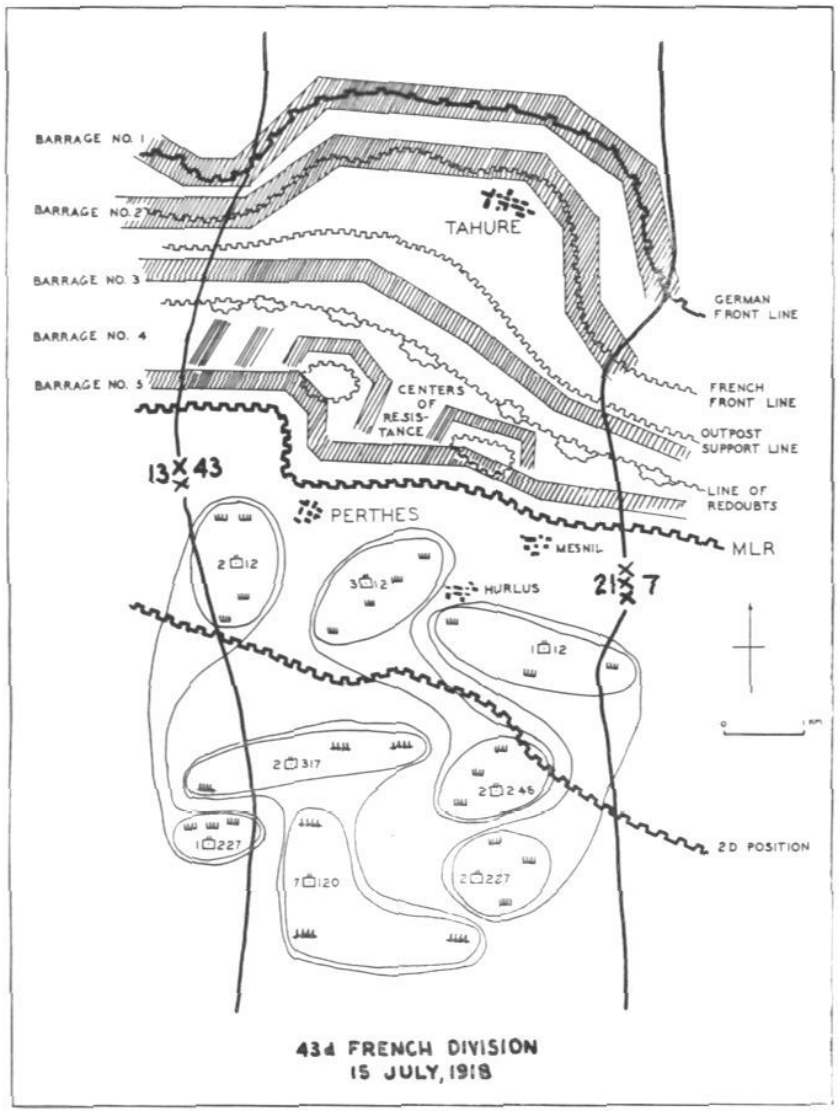
The following account of the employment of the artillery supporting the 43d Division is translated from "*L'Artillerie au Combat*" prepared for L'Ecole d'Application d'Artillerie at Fontainbleau, France. The accompanying sketch is diagrammatic only, made to show the general scheme of defensive

By Captain M. L. Curry, USMC

Signal Corps, courtesy "The Military Engineer"

France, 1918

How properly prepared artillery fire broke up a German attack in July, 1918



barrages in the sector of the 43d Division.

Situation.—The 43d Division formed a part of the 21st Corps which occupied its sector on 21 June on a front of 20 KM between Auberive-sur-Suippes and Tahure.

Certain indications of a possible attack had been noted. It was the general opinion on the 2d of July that the Germans would attack between the 6th and the 9th, probably from the Suippes to the Argonne, perhaps even from Reims to the Argonne. But the S.R.A. (Artillery Intelligence) of the 21st Corps affirmed categorically, after an exhaustive study and a clear interpretation of aerial photographs, that neither the enemy artillery nor ammunition were yet in place. However, on the 12th this same S.R.A. announced that the last preparations had been accomplished and that the attack might take place at any moment.

Organization and Occupation of the Sector.—The sector, well organized and perfected for nearly four years, included three positions: 1st position, intermediate position, and 2d position.

By order of the Commanding General of the Army the defense was to be organized with the main line of resistance on the intermediate position. The first position was to become an outpost line of resistance.

Only small units were to remain in the advanced position and in centers of resistance existing between the two first positions.

The purposes of these elements were:

—to send back information of the enemy advance in order that defensive fires might be delivered at the proper time:

—to disorganize the assault waves, separate them from their rolling barrages by delaying them, and force them into corridors beaten by fire.

Organization of the Artillery—Missions.—Corps Artillery. The Corps kept only its long-range heavy artillery (G.P.F. mainly). This artillery was divided into 3 groupments called divisional groupments (one would say now, groupments adapted to the 3 divisions in line). Each of these groupments was to answer calls directly from its division if necessary. A fourth groupment, called the long-range groupment, was to fire throughout the entire front of the Corps.

Artillery with the 43d Division.—At the beginning this artillery consisted only of the organic artillery: The 12th Regiment (3 battalions of 75's) and one battalion of 155-mm. howitzers (the 2d of the 317th Regiment). In each subsector the infantry regiment was supported by a battalion of 75's. The battalion of 155's was the only general support.

The artillery was echeloned in depth, batteries within battalions, which was the only possible solution in this case.

This framework having been established, a plan for reinforcing artillery was worked out. In each subsector emplacements were reconnoitered, observation posts and command posts organized and data determined for each position.

The reinforcing artillery arrived on the 4th of July. It consisted of:

2 battalions of 75's, horse drawn (the 1st and 2d of the 227th).

1 battalion of 75's, porté (2d of the 246th).

1 battalion of 155 howitzers (7th of the 120th).

This reinforcement brought the divisional artillery to:

6 battalions of 75 guns.

2 battalions of 155 howitzers for a front of 5 kilometers.

Each new battalion of 75's was attached to a battalion already in place, thus forming direct-support groupments.

The two battalions of 155's were also formed into a groupment in general support.

The reinforcing battalions were echeloned behind the organic battalions so as to assure the defense of the second position, and batteries were echeloned within battalions.

Thanks to certain precautions, the reinforcing artillery remained, in general, unknown to the enemy. This artillery opened fire without registration but after a careful survey and with map data corrected for weather. Let us remember that this was made possible by the availability of accurate fire-control maps showing up-to-date information of the enemy installation.

Systems of Artillery Fires.—Before the attack the artillery was used to nullify all enemy preparations which could be discovered:

—*interdiction* was very active at night and in foggy weather. For the whole corps the artillery ammunition expenditure for interdiction was about 3,000 rounds per 24 hours.

—*destruction* of all important organizations located on aerial photographs: batteries, ammunition dumps, etc. These fires resulted in a dozen explosions a day.

—*gassing* of important assembly areas or points of passage.

During all this period silence was imposed on the reinforcing batteries.

For the attack, in view of the numerical inferiority of the defender in artillery (1:4), it was decided to use the artillery mainly against the enemy infantry. Such action was facilitated by the abandonment of the terrain between the old first and second lines, giving a field of fire of about 300 meters over which the enemy had to advance with little cover, forcing him into channels by the advanced centers of resistance.

The counterpreparation was to begin at the same time as the German preparation throughout the zone in which the assault troops had to assemble. This band, originally taken as 700 meters, was increased to 1,000, and to 1,200 at a certain part of the line densely occupied by advanced enemy batteries, which were in fact very exposed.

Having few batteries for the front to be covered, the counterpreparation was to be fired successively in the sector of each infantry regiment, remaining 30 minutes in each. All divisional artillery, reinforced by the corresponding groupment of corps artillery, was to participate in this counterpreparation.

Beginning with the enemy attack, fires were to be delivered by the divisional artillery planned to destroy the enemy formation during and after the advance.

Fires were planned in five phases each including:

—for the 75's: barrages, both time and percussion and 600-700 meters in depth.

—for the 155 howitzers: concentrations.

Barrages 1 and 2 were to be fired before the attack; 3, 4 and 5 afterwards.

Barrage No. 1 had its short limit on the German front line.

After 10 minutes (time necessary for the advanced infantry elements to fall back) this fire automatically shifted to:

Barrage No. 2, planned inside the French position 200-300 meters in front of the line of supports. Falling first on distant objectives, this fire was to become more intense in approaching the support line, notably when the enemy's rolling barrage seemed to be commencing.

Barrage No. 3 had its short limit 200 meters in front of the line of strong points.

Barrage No. 4 covered, by box barrages, the centers of resistance in front of the MLR.

Barrage No. 5 was to cover the MLR with its short limit 200 meters beyond.

These fires were to be delivered on rocket signal, different for each one.

The artillery fires rather than being slow and continuous were to be by concentration, short and violent on a series of target sections (slices). These concentrations classed according to priority were to be repeated as often as necessary, corps artillery assisting if necessary.

Execution of the Attack.—At 8:00 PM on 14 July during one of the frequent raids, the IV Corps captured 27 prisoners, the interrogation of whom indicated that the attack was to take place the 15th at daybreak and that the German artillery preparation was to commence at 12:10 AM.

At 11:00 PM the French artillery opened fire by a series of interdiction fires. At midnight, 10 minutes before their own preparation, the Germans had the surprise of seeing a counterpreparation launched against them "with such violence that an uninformed observer would have wondered which of the two adversaries was going to attack."

Beginning at 1:00 AM, the fires were intensified progressively in the zones nearest our lines.

The enemy attack was launched at 4:00 AM.

The systems of fires acted as planned. The assault waves were disorganized and separated from their rolling barrage.

The attack, obliged to follow communication trenches and exposed to French infantry and artillery fires, was broken.

About 6:00 AM Barrage No. 4 was fired before the centers of resistance. About 6:30 AM Barrage No. 5 was fired before the MLR.

Only a few enemy elements filtered into certain points of the MLR, especially the village of Perthes, where they even reached the batteries for a short while.

These elements were reduced by counterattacks after having been isolated by box barrages.

By noon the MLR was completely reestablished.

COMMENTS

Communications.—During the attack the communications functioned well. Rockets were clearly seen. Telephone lines, *most of which were under ground*, functioned well also. Those which connected the battalions with advanced batteries were cut at first, but were reestablished by 7:00 AM and permitted an effective counterattack support. Finally the centers of resistance in front of the MLR, connected by telegraph with the rear, were able to transmit calls for barrages in good time, the fires being delivered immediately.

Enemy counterbattery.—The activity demanded of the artillery since the first of July had not allowed French batteries to remain silent. A part of them occupied old emplacements, well-made and giving good protection. Others had been either separated or taken to the rear to new emplacements. All were violently bombarded during the preparation. The 12th Regiment lost a fourth of its cannon in 8 hours.

In spite of these losses, which were naturally accompanied by casualties to personnel, and in spite of being hampered by the wearing of gas masks necessitated in certain batteries, the units were able to deliver promptly all fires planned. It should be noted that the gun emplacements gave good protection and the depth of the zone that the enemy was obliged to cover reduced considerably the density of fire. Finally the organization of reduced gun crews permitted the men to take turns resting in gastight shelters where they could breathe freely.

As for the reinforcing batteries, 7 out of 9 were placed in open fields at emplacements simply marked by stakes tagged with survey data. *They did not receive a single artillery shell*. The other two (two porté batteries), tempted by work already done, occupied partially completed emplacements. Although these positions had never been fired upon, these two batteries came under enemy counterbattery fire.

Ammunition expenditures.—The rate of fire during the counterpreparation was 100 rounds an hour for the 75's and 40 to 50 rounds an hour for the 155's. This amounted to about 2 units of fire per piece for this period.

During the attack the expenditure was from 2½ to 3 units of fire per piece.

In particular the pieces of the 12th Regiment fired an average of 1,000 rounds from 11:00 PM, 14 July, to 9:00 AM, 15 July.

Effectiveness of the artillery fires.—Prisoners declared that the enemy losses had been greater during the development of the attack than just before it was launched. During the counterpreparation the enemy had taken advantage of numerous shelters in the assembly areas.

This observation gives little indication of the value of counterpreparation fires. In fact, it would be interesting, if it could be done, to measure the morale effect produced on the Germans by the French counterpreparation brutally destroying their hopes of surprise. However, it is quite evident that counterpreparaton is most effective where the enemy has available little or no cover in his assembly areas.

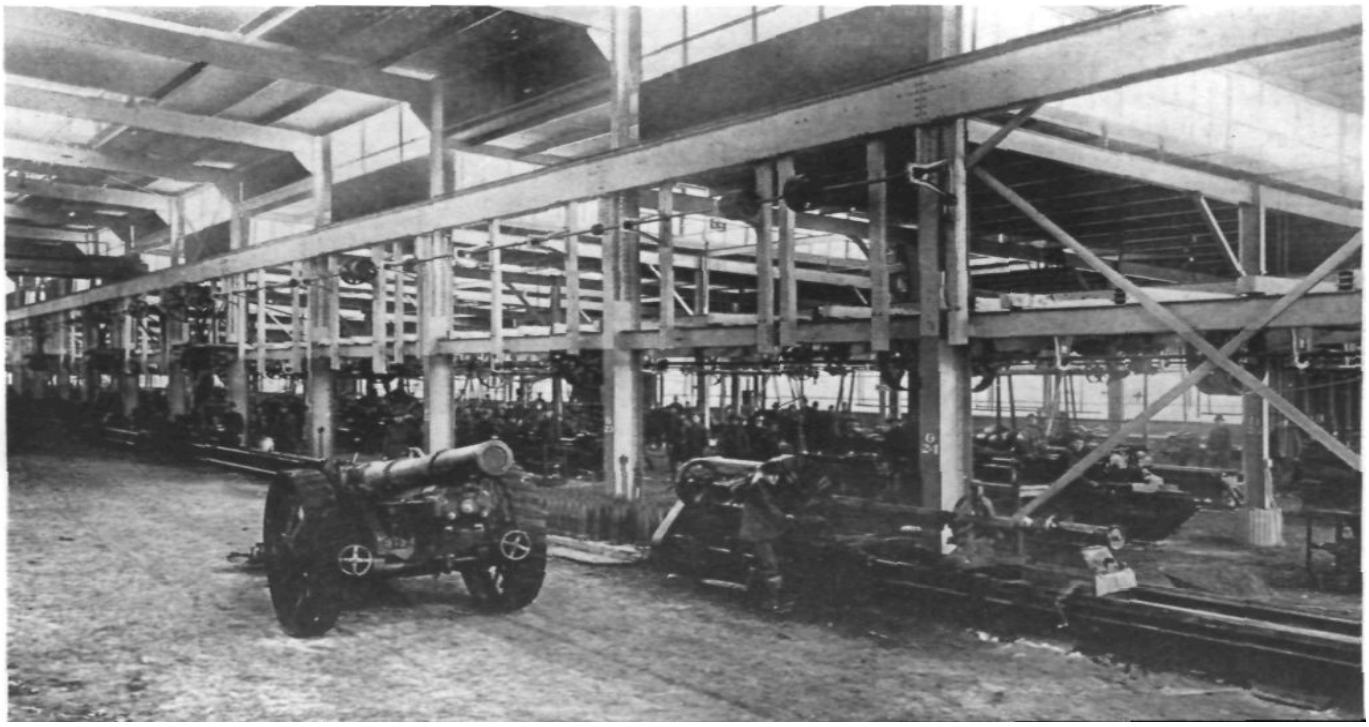
Finally let us recall that the German batteries included in the counterpreparation zone were seriously exposed.

Final results.—The 21st Corps supported by 500 cannon and having 3 divisions in line was able, without help, to stop a mass of 6 divisions of élite troops supported by 3 other divisions and 2,000 cannon.

The 6 first-line divisions suffered about 50% casualties, and the 3 second-line divisions from 20-30%.

Except for the sacrifice of advance elements, the 21st Corps' losses were insignificant.

Interior of Carriage Machine Shop, Ordnance Depot, Mehun, Cher, France, 1918



GUNNER IN LUZON

PART V

Morong Expedition

By Brigadier General Ernest D. Scott, USA-Ret.

The only potable water in the city of Manila was that supplied from "El Deposito," about four miles northeast of the Walled City, and it was supplied by a pumping station at Santolan on the Mariquina River, another three miles further away. Our line in that direction at the time of the outbreak was the San Juan River, half a mile short of the Deposito. The securing of the latter was a prime necessity and there the Americans met fierce resistance. Next day they pushed on to secure the pumping station, meeting with little resistance. Thereafter both Deposito and Pumping Station were strongly held by infantry with artillery support, and a strong infantry post was established between the two. The Deposito was in the new defensive line, the Pumping Station at the end of a three-mile long finger projecting from that line.

The occupation of Pasig in March closed the Pasig River and the lower Mariquina to the enemy but aside from these two points the Mariquina valley and the country to the east remained insurgent territory, so situated as to constitute a sort of stepping-stone from Northern to Southern Luzon. True, our gunboats patrolled the Laguna de Bay, but that is a considerable body of water. More than the usual number had been sent in for the operation about to be described, but a considerable body of the enemy managed to cross the eight miles of water from below Taguig to Angona during the night of June 2.

General Otis had always been much concerned about this region. Even when Lawton was at Baliuag, thirty miles away over very difficult country, Otis had warned him about strong forces at Antipolo. The rainy season was at hand and it was certainly desirable to clean out this nest while operations were still possible. He decided on Pasig and the Pumping Station (Camp Alva) as the jumping-off places.

The Mariquina River is a considerable stream but at that season was fordable in several places. It flows along the western side of its valley from Montalban southerly about 15 miles to the Pasig. West of it the country rises quickly into hills from 100 to 200 feet high. East of it the floor of the valley is flat, nearly two miles wide, largely in rice cultivation, some of which in spite of the season was quite soft. A well built road crossed it, Rosario to Cainta. Otherwise only farm trails, too narrow for our vehicles, crossed it. There were numerous ditches while the small dikes enclosing the rice fields were innumerable and every one of them an obstacle that had to be cut through for vehicle passage.

Beyond the valley floor the country rises into hills that attain heights of 1,000 feet in two or three miles, and are largely covered with jungle and heavy timber. A poor road ran from Taytay to Antipolo, thence through Teresa to Morong. North of this road are only trails and few of them. It is a wilderness such as caused us such grief between Novaliches and Norzagaray.

The plan was for the main force to proceed from the Pumping Station straight across the valley and through the hills to some point east of the line Antipolo-Teresa, capture the garrison of the former place, then advance in line on Taytay and Morong, sweeping the enemy force into the Morong peninsula and there capturing it. Meantime a smaller force was to demonstrate against Cainta from Pasig, after which part of it would be withdrawn to Pasig and sent from there by water to attack Morong.

It may be noted that the roads Antipolo-Morong, and Antipolo-Taytay, diverge at about 100 degrees, that the "line" would be about 6 miles long, and that the peninsula was large enough to furnish refuge to a small army—if it had no trains to worry about.

Whose plan was this? The answer is buried with those who knew. That it was not Lawton's is evidenced by his conduct of the operation, the only example in his career where he emulated "General A" of the schools. He was primarily a "front-line general" and once firing began could usually be found advising or directing some lowly company commander in his combat duties. He literally loved a scrap. At Zapote he led two reconnaissances

to the enemy lines, then ordered everything into the fight and wired Otis, "We are having a beautiful battle." He omitted "Wish you were here." Six months after Morong he was killed at San Mateo while unnecessarily on the firing line. And with the experience of Novaliches-Norzagaray fresh in his mind would he have sent Hall's column into the wilderness north of Antipolo? Not likely. Nor was he under the least illusion as to an enemy unencumbered by artillery and trains waiting supinely to be bagged, nor as to the possibility of cornering such an enemy in a hundred square miles of wilderness.

Lawton spent the day of June 3 at Camp Alva overlooking the Mariquina valley. He could see Hall's advance until it was swallowed up in the hills, and he could watch Wholley's "demonstration" against Cainta. He sent his Adjutant General, Major Clarence Edwards, to Pasig to supervise Wholley and his Inspector, Major Starr, with Hall for the same purpose—and gave both carte blanche to issue orders or instructions in his name. He seemed like a man carrying out orders that he knew would be fruitless.

He sent numerous telegrams to General Otis and seemed to be trying to give that officer a play-by-play picture of the action. He made a few tentative suggestions during the day, approved of Hall sending the ambulances back, and ordered Wholley to change his demonstration to an attack on Cainta. He also started Hall's trains to join him via Rosario and Taytay. His actions were, in fine, what a general's should have been—but wholly at variance with his custom before and after this operation.

The file of telegrams and messages is far from complete, but the 60-odd reveal some interesting sidelights. One directs Captain McKenna, Chief Signal Officer, to lay a line to Cainta; Captain McKenna replies that his orders forbid the laying of any lines "north of the Pasig." General Lawton wires General Otis about it. No reply is of record but a later message from Captain McKenna advises General Lawton that he now has authority to lay any wires desired. Edwards wires Lawton that the captain of a launch that brought some cascos from Manila insists on returning, as the sergeant in charge of such craft had ordered him to do so; Edwards insists that he stay. Edwards wires Lawton that the surgeon in charge of evacuation of the sick refuses to take aboard some 38 men who have no tags; the Division Surgeon wires to put them on board even if the "guard" must be used; the surgeon in charge wires the Division Surgeon to know if he expects him to take aboard anyone who claims to be sick. A wire from E. L. King, Lawton's aide, gives some details of preparations for the shift by water of the Washingtons, but contains the following, "Better not bring ladies as there is still firing here and a few stray bullets." Could that have been code? It is possible—Senator Beveridge of Indiana was Lawton's guest that day.

Bringing in the wounded.

On the night of June 2-3 the main force was assembled

about Camp Alva on the heights west of the Pumping Station. It comprised one troop mounted and three dismounted, 4th Cav., two battalions 4th Inf., one battalion 9th Inf., six companies 1st Col. Inf., the 2nd Oregon Inf., one battalion Wyoming Inf., one platoon Light Battery E 1st Arty., one platoon Hawthorne's Battery, an ambulance company and other small units. The whole mustered 102 officers and 2,474 enlisted men. Companies of regular infantry mustered from 80 to 90 men, those of volunteers 45 to 55. Officers ran about 1 per company in the regulars while the volunteers usually had a full complement.

The artillery was combined under command of Hawthorne. His two guns were 3-inch Hotchkiss mountain guns, those of Lt. Alston Hamilton were 1.65-inch mountain guns. The former were drawn by two ponies in tandem, the latter by one mule each. Ammunition was carried in light pony carts drawn by two or three ponies, as were other supplies, but Hamilton also had an escort wagon with reserve ammunition and most of his supplies.

If one is to take the reports literally all units moved out simultaneously at four o'clock on the morning of June 3. However, units moved a mile and a half down the river and up it to beyond Mariquina to clear out any enemy, before the advance began across the valley. The axis of the advance appears to have been the trail Mariquina-Pantayanin, and it was about noon when the leading elements reached the foot-hills. Wheeled vehicles had hard going and even the light guns fell far behind, but they were near enough to render efficient aid when the advance guard was held up by the enemy on the hills. After entering the hills the going became much worse and the ambulances had to be sent back. But for assistance from the infantry—notably the 9th—the battery could not have gone on and at one point it was suddenly attacked at close range from the left rear, a company of the 9th running the attackers off. Finally sharp fighting on the front and left led to a general deployment and by the time the enemy had been driven off darkness was at hand and the troops bivouacked where they happened to be. Men and animals were pretty well used up, yet the advance had penetrated the hill country only about three miles, and had as much more to go to Antipolo. Casualties had not been severe except in the 4th Cavalry, which had 2 killed and 4 wounded, of whom 3 died later. But a great many men were exhausted and had to be carried along.

At five o'clock on the morning of the 4th the advance was resumed and by ten o'clock Antipolo was occupied with little or no opposition. The place had been deserted by its inhabitants. The march that morning had been a duplicate of that of the afternoon before—jungle, washouts, steep grades, sweltering heat. Hawthorne's men and animals both gave out and at a particularly hard slope he ordered the wagon burned with all its contents except the ammunition. Again with the assistance of doughboys, guns, ammunition, supplies, etc., were practically carried along by hand.

It now appeared the whole command was in a bad way for rations. One regimental commander states that his men had had nothing since their rather scanty breakfast the morning before, another that his men had eaten what they had started with the day before. Actually, all had arrived at Camp Alva with three days' rations in their trains, as ordered. All issued something for the advance next day, but that something varied from a sandwich in some units to two days' rations in the case of the Colorados. That unit, with full stomachs, had gone around Antipolo towards Teresa in accordance with the original plan, but most of the other units were unfit for further exertion until fed. General Hall started the whole command down the road to Taytay to meet the trains. Halfway there he was met by General Lawton, who directed him to return to Antipolo and march on Morong. But the wagons were coming up, a couple of hours were taken out for rest and food, then the command marched through Antipolo to Teresa, where it spent the night, going on to Morong the next day. Only one or two light skirmishes enlivened the march and with food and a dirt road underfoot fewer men had to be helped.

My first information of the proposed operations came in the form of a telegram received at the camp at San Pedro Macati directing me to report with two guns to Colonel Wholley, 1st Washington, in command at Pasig, who would supply details. I then had four guns but all lead mules had been taken away by the QMD. I started at once and arrived in Pasig just after noon. The clatter of hoofs and wheels on the cobble-stones of that town brought out the garrison and our passage was in the nature of a triumphal progress! Men cheered

Troops advancing on Antipolo

and waved, officers shook hands with me as I passed—"Scott's Battery" that had so often made their tasks easy and that they had so often helped when in difficulty, had rejoined them. It was a most gratifying demonstration of good will and appreciation.

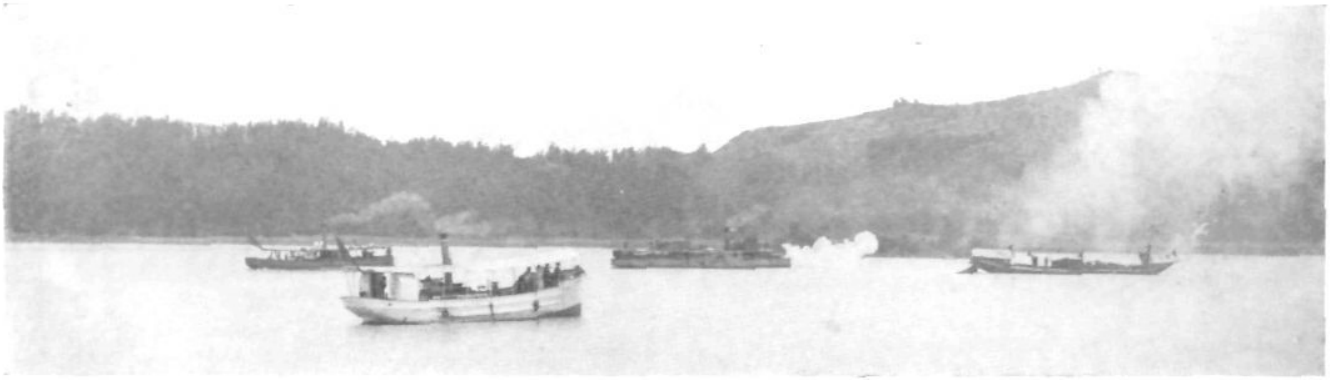
Soon we moved out to march on Cainta. I was required to attach one gun to the North Dakotas, who started directly across country, and to march with the other in the main body, up the road to Rosario. Six companies of the Washingtons, about 300 men, and Haskell's battalion of the 12th Infantry, about 300 men, constituted the main body. The North Dakotas numbered about 400. At Rosario the 12th took the road to Cainta followed by my gun, the Washingtons continued on a few hundred yards, then proceeded across the valley in column of files. Nothing happened until the Washingtons reached the foothills, where they had a short but lively skirmish. The 12th deployed and we waited; I was unable to assist the Washingtons. On our right the North Dakotas could be seen advancing, apparently without opposition. Their gun had been unable to cross a ditch but now was lucky enough to find a position from which the trenches at Cainta were visible, and squarely on their flank. Corporal Ramsey, 14th Infantry, was in charge and he proceeded to rake the trenches from end to end with shrapnel, which probably accounted for our lines sweeping through them without opposition, a little later. I watched this action from within 1,000 yards and an angle of about 60 degrees from Ramsey's line of fire. Only one shrapnel fell harmlessly in front of the trenches. What was an infantry corporal doing in charge of the gun? When the Astor Battery equipment was turned over to D Battery in December, 1898, it meant that our 140 men had to man 12 guns. Requests for details from infantry were at first unheeded, but after hostilities began it was different. This was not my own platoon—I was giving it a rest after the San Isidro expedition. How many doughboys served with the battery I have no idea, but it is a curious fact that of four former members of the battery now resident about Washington, three were doughboys.

The deployed lines marched through and on either side of Cainta but found strong and well manned defenses in front of Taytay. The main work proved to be a five-foot high breastwork astride the road and a couple of hundred yards long. As we found later, it was of earth, about four feet thick, revetted with bamboo matting, had a firing step and was pierced with large bamboo tubes giving complete protection but limited field of fire. The work was extended in either direction by less formidable looking ones. Rifles all along were keeping up a hot fire.

I could find no place from which to attack except on the further side of a stream whose bridge was broken down. But I got the bridge repaired and about six PM got my gun to the rear of a thick clump of bamboo about 600 yards short of the breastwork. There I had it loaded and rolled out into view. That brought a storm of fire on us and for some time things were very interesting. It must be remembered that in those days there were no gun shields, the gun crew had to work standing up, the projectile had to be inserted and rammed home, the powder charge placed, breech closed, primer inserted, the recoil carried the gun ten or twelve feet to the rear and it had to be rolled back. A shot a minute was extremely fast work. Yet the only casualties at the gun position were two doughboys of Hugh Drum's company of the 12th, firing from the prone position, both killed.

After raking the breastwork with shrapnel we changed to shell, and next morning saw their effect. Each had gone nearly through before exploding and torn out portions of the inner revetment. There was plenty of evidence that the enemy had suffered from this fire. Darkness came soon and with it a cessation of all rifle firing. The only distinguishable object in the town was the white wall of the church. Using it as an auxiliary aiming point, I put on a mild sort of harassing fire on the town for a short time. About 8 PM my other gun rejoined and was put in position to resume fire on the trenches at daylight, but before then it was ordered to rejoin the North Dakotas, west of Cainta. It did not get into action.

Meantime the Washingtons had been withdrawn and started back to Pasig, thence to be sent by water to Morong. There were many bitter remarks to be heard



Gunboats firing on Morong

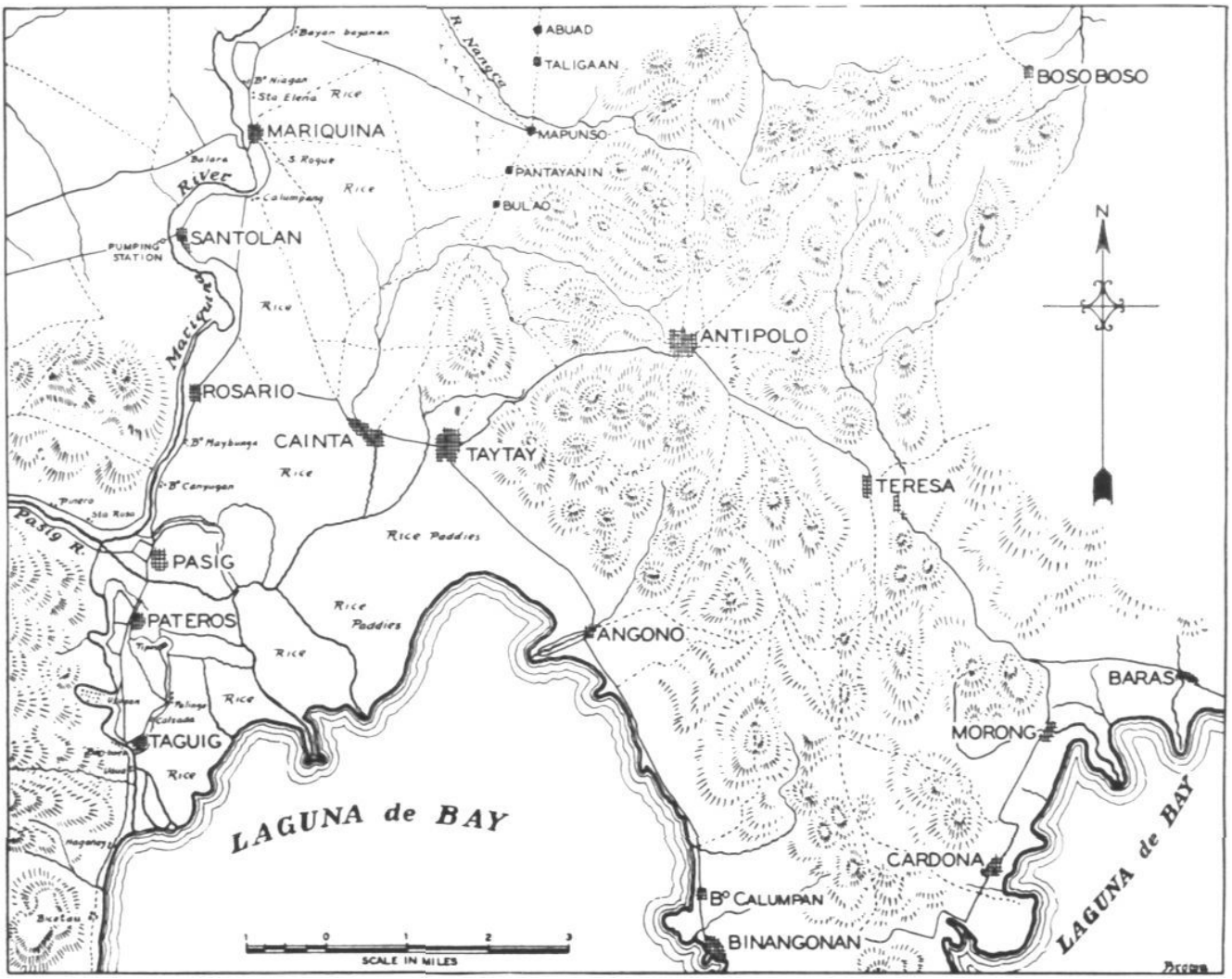
among them; they had won a battle and now the regulars were to get the credit, etc. They were debarked next morning at Morong under cover of the fire of gunboats and took that place without the loss of a man.

At daylight I again opened on the enemy defenses but it soon became evident that they were not manned. Our infantry had a little action but were soon in possession of the town. From the plaza in front of the church I fired on and dispersed a small force on the road to Angona.

The command then started for Antipolo and, to quote my own report, "I * * * was well up to the head of the column, which was rapidly disintegrating on account of the heat and the steep road, when General Hall was met and the column directed to return to Taytay." We had had no such difficulties of terrain as Hall's column had encountered but the heat was "getting" our doughboys too.

From Taytay we marched to Angona, where we spent the night. I had a bit of artillery practice at some insurgents off to the south. At this place the insurgents had a work at the mouth of the river, with two Krupp field pieces. The day before one of our gunboats bombarded the place, apparently silenced it, and turned away, whereupon a shell landed on its stern but without doing serious damage. The guns had been removed when we arrived and, I believe, were never found.

Next day we marched for Binangonan, arriving there about noon. The road was good and traversed a narrow plain between the lake shore and the wooded hills that cover most of the peninsula. Numerous small streams or stream beds crossed it, each well marked by bamboo, the ground between them usually open fields with little cover. Of course each of these stream lines was a potential defense line for the enemy, and the scouts approached them rather gingerly. We were scattered along the south face of one of these lines, keeping hidden, when to our astonishment there appeared against the background of bamboo straight across from us and about 400 yards distant, and facing us, a battalion of four companies of Insurgents, in close order. I begged the scouts not to fire and word to that effect passed along. I told them I could bring my guns up close to where we were and the first notice of our presence



would be shrapnel bursting in front of those formed troops. What a target! I ran back through the bamboo and sent a messenger on my pony to the sergeant in charge of the guns, to bring them up on the run. It would take some time; they were somewhere back in the infantry column, the head of which was just coming into sight a quarter of a mile back. Then I returned to observe the enemy. For some time they remained there while I prayed for the sound of my approaching guns. Suddenly, as mysteriously as they had appeared, they were gone! It was as though they had sunk into the ground; we certainly did not see them march off. Still no guns, and the scouts moved out into the open and we drifted into a group to talk it over. Then there arose in the middle of the field before us a Filipino officer. He was in a white uniform with black boots and sword belt, armed with sword and pistol. He surveyed us calmly, then turned and walked away at a quite leisurely pace. Several oaths were uttered and several rifles were raised, but I objected, and none were fired. That fellow continued his unhurried walk without a glance to the rear, and disappeared where the troops had been. He was certainly a game rooster.

When the guns arrived I fired a few rounds along the bamboo back of where the enemy had appeared and others still further back along and near the road beyond, then limbered up and left them to march with the infantry who were now coming up, and went on with the scouts, but we saw nothing more of the enemy, nor could we find a trail they might have made.

We rested a couple of hours in Binangonan and then took the trail over the backbone of the peninsula. It was a pretty heavy pull up, and on the other side the road dropped very steeply for a couple of hundred yards and was covered with loose boulders, in size from a man's hand to his head. The guns leaped and caromed off them and I sincerely hoped we might return by some other route. We arrived at Cardona about six PM and settled down for the night.

Next day, early in the afternoon, General Hall's command appeared, marching for home by the route we had come. I was directed to return also with the 12th Infantry. How I was going to get the guns back up that hill I did not see, though a Lieutenant McLean, 1st North Dakotas, in charge of the trains, loaned me two pair of mules, his wagons being much lightened by this time. I represented to the General that my men and animals were pretty well exhausted and begged for an infantry unit to help on the way and protect us in case we got behind. But no—the only concession I could get was to start ahead. By the time we reached the worst part of the grade the mules were completely done in. I asked one field officer after another in vain for assistance. And there we sat while the whole infantry force was passing by—complete abandonment in enemy territory the only outlook. Hope rose when the white beard of Major Harry Haskell appeared at the head of his battalion, which was the last, and by that time I had figured out a plan. I asked him to continue his march until his head of column reached the top, then halt and have every man throw off the road the boulders about his feet. It was done and in five minutes the infantry were on their way and the road looked like a boulevard compared with what it had. Doubling the teams and with everybody on the wheels, by short stages we worked the guns one at a time to the top. By that time it was dark, but we had no difficulty making the remaining three miles or so downhill to Binagonan, where we found the command in camp. One mule died.

I sought permission to start ahead next morning, as with the mules rested and refreshed and a level road, we could get along faster than the infantry, and could probably clear the ferry at Pasig before they came up. But no; I was told to march at the tail of the column. My sergeant misunderstood my instructions about this, and I found my command at the tail of Hall's infantry column. The brass hats were up front somewhere, so I quietly continued on in that position. Haskell's battalion was to march in rear of the train; if he missed me he did not mention it.

Two bamboo bridges between Binangonan and Angona were in much worse condition than when we had crossed them before, and now I crossed by unlimbering and drawing over by hand gun and limber separately. I felt sure the wagons would not make it, nor did they, the first one going through into the stream below. But Hall's command was on its way "home" and went on without its train. Beyond Cainta the long causeway presented an unforgettable sight, infantry in column of fours filling it. They were swinging along and gave an impression of power. I forgot my resentment of their indifference to my arm, and developed on the spot a respect and admiration for the infantry that I have never lost.

There had been a light rain, the air was close and muggy. In the wake of the infantry I became aware of a growing feeling of weakness, of approaching nausea. Looking round at the men, I saw many paling faces, and I realized that the air fairly stank. I had never heard the term "crowd poisoning"—it had probably not been coined then—but that was what we were suffering from. I halted the command until the infantry were well on their way. The air gradually cleared, our hats made good fans, color returned to faces, we marched cheerfully along. At Rosario Hall's column had turned north; we arrived alone at Pasig about 2 PM. There followed a couple of hours' rest while waiting to get the use of the ferry, but before dark we had made the last leg of the journey to what had come to seem home—the camp at the cemetery of San Pedro Macati.

Brother, CAN YOU USE A DOODLE?

A new wrinkle in making March Graphs.

By STRUDUX

I haven't a gadget or a gimmick for our good friend who called for one in the November-December issue, but if he can use a little doodle, I've something to suggest.

The doodle I propose is, believe it or not, something to help, primarily, the brass-hatted boys. It is designed to ease the aching pain attendant upon the production of a march graph. What with our regiments running halfway across the country to maneuvers, RSOPing (I refuse to ROOP) all over the place when they get there, and then chasing back home again, any one of us may be involved in the intricacies of producing little graphs, so perhaps we are all concerned with how to simplify the process.

The plan I offer is especially important for the chap who traditionally ties things up the first time he does them. If that's you, brother, my scheme will save you lots of time and will reduce the wear and tear on your erasers.

For purposes of illustration, let us assume that we have two serials, No. 1 and No. 2, to march over Route A. The first thing we do is to make a chart of Route A on cross-section paper showing, on the left-hand vertical side, the location of all the critical points. Then in appropriate places, in time and distance, we plot the restrictions on the availability of the route introduced by such things as the traditional "regiment of cavalry crossing our front," the "army supply column moving from Umph to Arph," and "movement beyond CR 123 will be after dark and without lights."

The next step is to fit the serials into the little open spaces that are left on the chart. Traditionally this is done by the seek-and-find method. With me, such a procedure has been disastrous. Invariably I find, after I get my serial well started, that the regimental commander's nose is going to run smack into the cavalry, or the last battery is going to be cut neatly in two by the supply column. Neither of these conditions being desirable, I erase the whole business and start over again.

I have found a way to avoid such experiences. The method is as follows: The route is charted just as described above but, instead of drawing the serial on the chart itself, it is drawn on a piece of overlay paper laid over the chart. When the graph of Serial No. 1 is completed, some horizontal lines are drawn through it and over horizontal lines of the cross-section paper. These lines serve as guide lines in the next step. A similar graph is made for the second serial.

These overlays are then moved around over the chart until the most advantageous fit is determined. The guide lines mentioned above serve to keep the graph in proper relation to time and distance while different positions are tried. When the best positions have been selected, the data for the march order (or march table) can be picked directly from the chart; the serial graphs need never be drawn on the chart itself.

This scheme saves time in two ways. In the first place, since the graphs for the serials can be drawn at any convenient place on the paper, they are easier to construct. In the second place, if a serial is placed initially in the wrong part of a chart, it is only necessary to move the overlay. The whole thing need not be redrawn.

The plan is actually worthwhile even if only one route and two serials are involved. When several routes and several serials are being considered, it is a real life-saver. A problem given at Sill a few years ago involved six routes. In the field, there may readily be as many, or more, especially when a zone of advance instead of a route is prescribed.

There are a few refinements to the scheme which it is well to keep in mind. It is a good idea to draw the graphs of the serials a little longer than the actual route. This will insure good intersections at the IP and the destination for the precise determination of times.

To avoid having too many thicknesses of overlay paper to look through to pick off the data, it is advisable to cut away unused parts of the overlays, leaving only a strip showing the serials and the guide lines.

When the speed of the serial changes during the march, the point of change must be shown at a place on the overlay which is in the same relative position on the overlay as it will be on the chart; that is, if the change takes place two thirds of the distance from IP to destination, then it must be shown approximately two thirds of the way up the overlay sheet. Otherwise the graph will not intersect the horizontal lines through the IP or the destination.

In case it is difficult to determine the composition of the serials before the effects of the road limitations are fully examined,

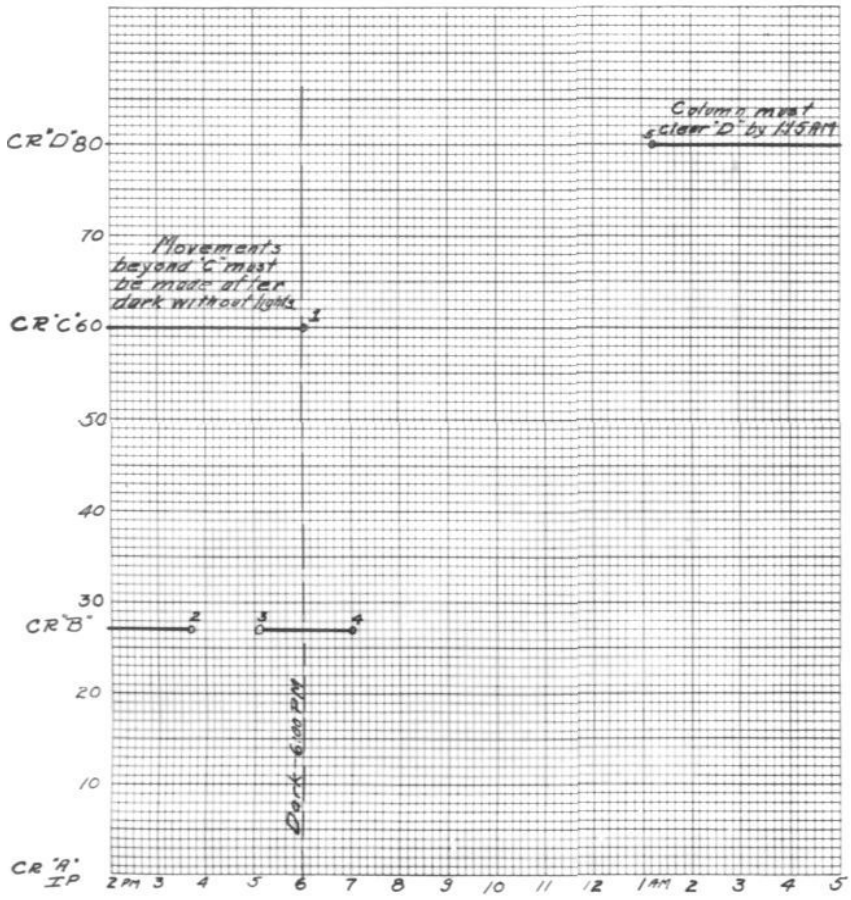


Figure 1

it is best to make overlays for one or more regiments and then to fit them into the picture. Once this is done it is easy to see what can be attached to the regiments or how the latter may be combined to make suitable serials. In other words, the problem solves itself.

This proposal is not an untried brain spasm. It has been used by groups of officers with varied experience; and it seemed to fill the bill.

Now I know that someone is going to go me one better and suggest templates. The trouble with templates is that they cannot be used readily where changes of speed are involved, and are not as well adapted to use with different sizes of cross-section paper or with improvised charts as is the proposed plan. Furthermore, the Operations Sergeant has enough gadgets and gimmicks to look after as it is. Do a doodle and save a gimmick.

ILLUSTRATIVE EXAMPLE

Figures 1 to 3 illustrate the salient features of the method in the foregoing. The situation selected is so simple that it is doubtful whether a graphical method of solution would ordinarily be employed. The situation was chosen for its simplicity. It is designed to show the *operation* of the method, not to illustrate the *type* of situation in which the method might be useful. As previously stated, the method is most appropriate in situations in which two or more routes are available or two or more serials are to be moved.

Figure 1 is the "chart." It shows the route and the limitations on the use thereof. It indicates that troops are to be moved from CR "A" to CR "D"; that CR "B" is available between 3:40 PM and 5:10 PM and after 7:00 PM; that beyond CR "C" movement must be made after dark and without lights. (Note that this means that movement as far as "C" may be made in daylight *or* with lights at night); and that the column must clear CR "D," where we may assume that guides meet the units to lead them to positions, by 1:15 AM. On the chart certain key points have been numbered 1 to 5 for ease in reference.

Figure 2 represents an overlay on which the graph of the movement of a serial has been drawn. It shows that this particular serial has a time-length of 55 minutes and that it moves at an average rate of 20 MPH in daylight or at night with lights, and an average of 8 MPH at night without lights. These rates include times required for routine halts. It is further assumed that there is a prohibition against other than the routine halts. For ease in plotting, a piece of tracing paper is placed over the chart, and the graph is drawn through the origin of the cross-section paper. The lines of the graph are extended below the CR "A"-line and above the CR

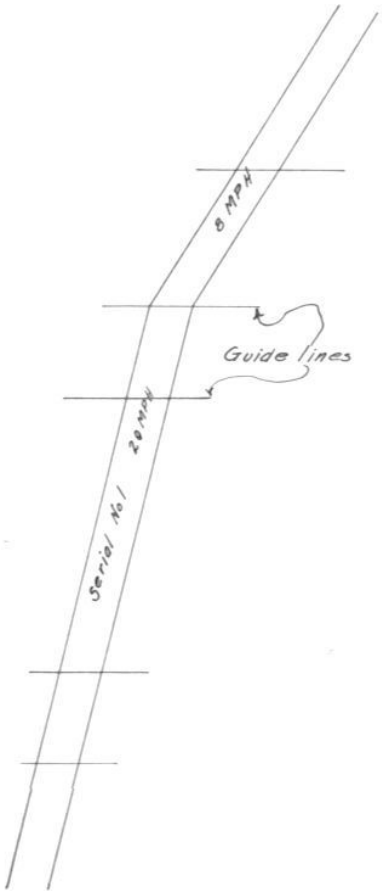


Figure 2

"D"-line to facilitate the reading of times later on. The guide lines are drawn over horizontal lines of the cross-section paper and are used to place the graph of the serial at the angle which shows the speeds correctly when the overlay is moved to any other part of the chart.

In this situation, it would be most advantageous to have the serial reach CR "C" just after dark. In that case it could march as early as possible and cover the maximum distance in daylight hours. In order to determine whether, under the limitations imposed, this is possible, the overlay is placed on the chart so that the point where the change in speed is shown is just to the right of point Number 1. In placing the overlay, care must be taken to see that the guide lines lie on, or parallel to, the horizontal lines on the chart.

Figure 3 (solid lines) shows the results of this step. It reveals that, if the head of the column is to get to "C" just after dark, the march must start by 3:10 PM. But it also shows that in that case the column can not clear "B" at Number 3 by 5:10 PM.

Had this problem been approached in the traditional manner, the graph would have been drawn directly on the chart and it would next be necessary to draw others in different positions until a suitable solution were found. By using the overlay, however, it is necessary only to move the overlay to other positions on the chart to determine workable solutions.

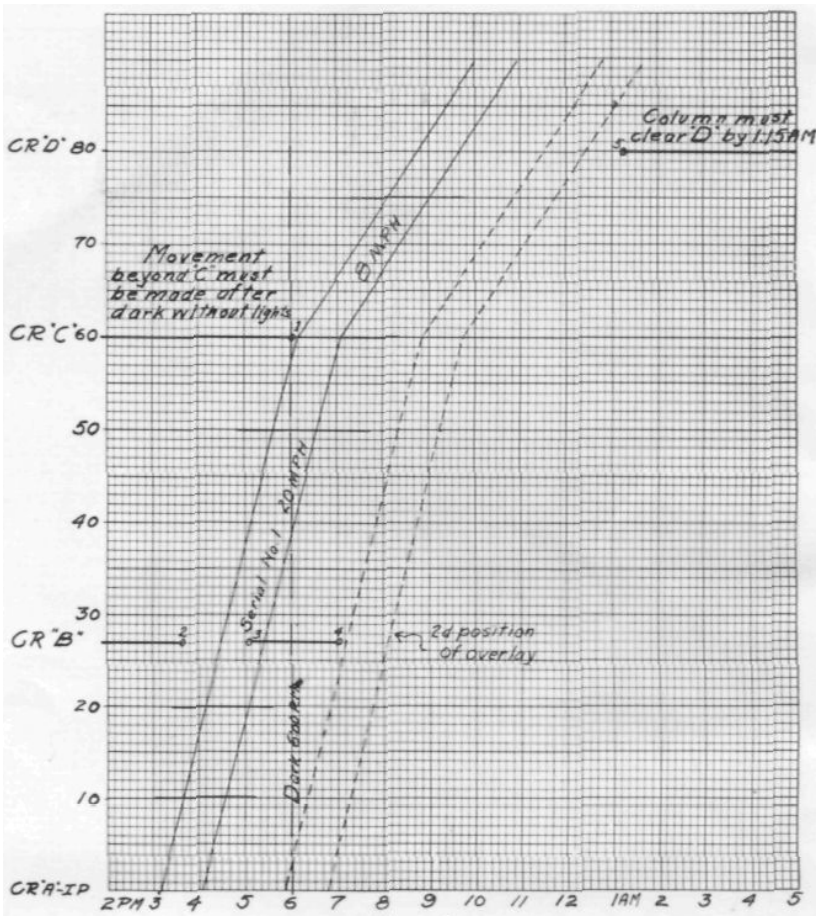


Figure 3

Figure 3 also shows the overlay in a second position (broken lines). If, because of the block at "B," the troops cannot be moved so as to reach "C" just at dark, a suitable plan is to march them so that they clear point Number 4 at the earliest possible time. In the figure, the overlay has been placed so that the graph clears Number 4 by a slight safety margin. It shows that in order to accomplish this the march must be started by 5:50 PM and that, if it is started at that time, the serial will clear "D" at 12:25 AM, well ahead of the limit imposed, 1:15 AM. It should be noted how extending the lines facilitates reading times at "A" and "D."

Another possibility can be investigated by placing the overlay so that the tail of the column clears point Number 5 with a suitable safety margin.

In this very simple situation the use of the overlay method permits the investigation, with but one graph, of the possibilities of three situations. It is apparent that when several routes are under study and several serials are to be moved, the plan will effect a considerable saving of time and effort.

FRANCE, 1914-1918

A certain Corps Commander came round one day to inspect some gun positions. He thought it would be a good thing to test their gas drill. This particular battery had been shelled by gas shells very often and knew all about it.

On arrival at a gun pit there was a limber gunner cleaning the gun. The Corps Commander suddenly said "Gas!" The limber gunner sniffed and, instead of doing what the Corps Commander expected—sounding the alarm and lowering the gas curtain—said: "No, sir, that's all right, there's no gas about."

The Corps Commander realized at once that he had been caught, and laughed heartily.—*The Gunner* (British).

FIELD ARTILLERY ABROAD

ARTILLERY IN MODERN WAR. Col. G. Mancinelli, in *Rivista di Artiglieria e Genio*, March, 1940. Digested from translation by O. L. S.

In this article, written and published shortly before the launching of the May offensive against Western Europe, the author shows that Italians had correctly evaluated the lessons of the Polish war and accurately foresaw the nature of the greater struggle yet to come.

Col. Mancinelli says that cautious military writers, deeming the campaigns in Spain, Poland, and Finland as "very special cases," are prone to draw pictures of a conventional war of tomorrow rather than treating of the *war of today*. Yet in the three wars mentioned, there appeared one phenomenon common to all—large offensive groups pushed boldly forward, disregarding flanks, penetrating deeply, and exploiting local gains. Thus tactical success is converted into brilliant strategic victory.

How does this new concept affect the artillery?

First, on the offensive: Artillery may get separated from its infantry. Unless special precautions are taken, it will fall easy prey to mechanized or motorized forces, or to air infantry. Special infantry groups may be assigned to its protection, but better yet, the commander should so dispose his general reserve that it will afford protection to the mass of the artillery. (Isolated units will have to provide their own protection.) Hence, the commanders of the artillery and of the general reserve should maintain close liaison.

On the defensive, the organization of the artillery for close defense may constitute a definite element of the whole scheme for combat. In any event, defensive disposition should be by battalion, so that the armament of the individual batteries may be used to the best advantage.

It should be noted that while the artillery with its machine guns is equipped to meet the attack of low-flying airplanes, it is less favorably situated to meet tanks. Except for some of the smaller calibers, most guns and howitzers are not adapted for this purpose. Nevertheless, the zone of the artillery deployment will certainly be one of the important objectives of the tanks.

Commanders of the higher units may, under suitable

Italian tank that builds its own bridges.

conditions, assign to the artillery, for its immediate defense, a certain proportion of the antitank guns available. Accordingly, the artillery may proceed with greater freedom to its main mission, which is, at all times, to support the attacking troops.

Exceptionally it may become necessary to meet, with all available forces, hostile reaction against the flanks of the column of attack. But even in this case the action of the artillery should be coördinated. The necessity of securing continuity of action by the artillery will bring about, automatically, in the course of the action, a certain echelonment of the artillery in depth, so that units farthest to the rear will be able to intervene effectively and promptly in such an emergency.

The more advanced units should be prepared for quick, partial changes of position, changes of front, readjustment of observation posts and communications, possible changes in assignment.

In the case of a large unit delivering a counterstroke against the unprotected flank of an attack, or against a zone of weak resistance, moves of 100 kilometers or more may become necessary. Artillery will rarely be called upon to assist; armored vehicles will as a rule answer all requirements for security during the short time required for the movement of the entire unit, for this will proceed rapidly and in mass formation to the assigned objective. The artillery will move with the main body, well closed up, and protected by the general security dispositions of the unit.

If the enemy blocks the way, the whole unit will have to act swiftly and powerfully to regain its freedom of movement. The artillery will have to act in the same manner.

As a rule—and instances were not lacking in Poland and in Finland—the high-speed column will reach its objective in a single dash. But the moment when it reaches the objective may be critical. The enemy, having had time to recover from surprise and to estimate the situation, will react promptly. The gap through which the column has passed will begin to close; the troops will find themselves cut off at the very moment when they will require resupply and support. They will be compelled to undertake a defensive battle under very difficult conditions, fighting perhaps on a 360-degree front. Procedure will vary according to the strength and composition of the enemy—a mobile defense, adapted to the make-up of the column, or a stationary defense to gain time for the main body to restore the situation by other means.

Normal formations cannot be prescribed. The troops should be held well in hand, whether they act by counterattack or in a defensive position, in order to get the best results out of the small force which they possess. The spirit and endurance of the troops and the character and ability of the officers will be severely tested.

In Poland, detached German motorized units often met violent reaction by strong Polish forces suddenly appearing in their rear. Far from feeling themselves endangered by envelopment, these German units, by their energetic combat, gave the enemy the impression of being himself enveloped, and gained victory.

The Russians, on the other hand, after penetrating readily over 100 kilometers into Finnish territory, proved unable to exploit their success, in spite of their superiority in numbers and armament, when opposed by small, but light and energetic, groups raiding their communications.

The commander should hold his guns in hand as far as possible, so that he may be able to concentrate the whole mass in one sector after another, as required. All possible dispositions should be made to give batteries and battalions the maximum flexibility of fire, over a broad front — echeloned positions, prearranged changes of front, numerous interchangeable observation posts and lines of communication.

The problem of ammunition supply will be serious. When the unit has made a definite advance, it can hardly depend upon the same route for ammunition supply. The operation of this service will have to depend upon the outcome of the action of the unit itself, and of the main body from which it is detached. Except for supply by air, which is not always possible, the unit must for the time depend only upon what it has brought with it. It is necessary for the unit to carry with it all the ammunition that it will need for the entire operation. It would be well to send the first echelon of an ammunition column along with the troops.

The strength of the air force available—the only arm which the higher command can employ in aid of the detachment — evidently influences, more or less, the amount of action to be expected from the artillery.

This kind of combat calls, first of all, for very high professional skill on the part of commanding officers, by reason of the necessity of swift action, of frequent movement, of comprehension of the requirements of the other arms and close coöperation with them in changing situations. These requirements are enormously increased, in comparison with the static conditions of what we still call "the great war."

All must possess a high spirit, capable of carrying through the boldest of undertakings, and of overcoming those difficulties which we are in the habit of calling "technical" in order to impress those who claim to be nontechnical—ready to meet any situation with rapid intuition and appropriate decision.

We can not repeat too often that the artillery must be prepared, in any emergency, to show appropriate and effective dispositions to meet the necessity, not only theoretical but practical, of defense of its own areas against *aircraft, tanks*, and *infantry*.

THE GERMAN ARMORED DIVISIONS. *Rivista di Artiglieria e Genio*, February, 1940.

This is a review of the book *Achtung, Panzer!* by the German General Guderian, wherein the author explains the principles followed by Germany in the organization of its armored divisions and their tactics. The fact that these theories have been given a practical test in the Polish campaign makes the book very interesting reading.

As she began to reorganize her army in 1933, Germany, lacking either a doctrine of her own or adequate experience in the training of motorized troops, adopted the English regulations; however, these were gradually modified in conformity with her particular situation.

Unity in command and in training was the guiding principle adopted from the very outset. The lessons derived from the experiences of the World War were not ignored, and thus these forces were limited in their use to the function of accompanying units for the infantry. Likewise, considering the possibilities arising from the speed and the radius of action of the tanks, their potentialities for quickly deciding a battle and a war were not sacrificed by chaining this new weapon to the slow development of infantry and artillery combat. Thus there was created, at one stroke, a corps capable of being trained for combat in large groups and eventually of achieving greater missions.

The Armored Divisions, therefore, were composed, in a predetermined ratio, of vehicles and of all the motorized formations necessary to their support and maintenance.

According to the most reliable data, the German motorized division includes:

—Headquarters;
—A *motorized reconnoitering unit* (group);
—A *tank brigade;*
—A *rifle brigade* on motor trucks;
—An *artillery regiment;*
—An *engineer battalion;*
—An *antitank battalion;*
—A *communication battalion;*

All elements of the divisions are motorized, each being composed of:

I. MOTORIZED RECONNOITERING GROUP:
   a) 1 independent company, including an armored section and a liaison section on motorcycles;
   b) 2 *companies of light and heavy armored cars* in 4 sections—40 cars in all;
   c) A *motorcycle company* in 3 sections (composed of 3 groups of 3 light machine guns), and 1 section with 4 heavy machine guns;
   d) A company with three *75-mm. mortars* and three *37-mm. guns*.

II. TANK BRIGADE
   a) 2 *regiments* of 2 battalions each (a battalion including headquarters and 5 companies, 3 of which light in 4 sections of 6 tanks, armed either with light machine guns or with a 20-mm. machine cannon);

International News Photo, courtesy "The Military Engineer"

A Polish village fire brigade making a valiant but futile effort to quench the blaze from German incendiary bombs.

b) A *heavy tank company* composed of 4 command tanks and 4 sections of 4 tanks armed with either 37- or 75-mm. antitank guns;

c) A *heavily armed company*, with two 75-mm. mortars, three 37-mm. guns, and 1 heavy machine gun.

All in all, the battalion is composed of about 90 combat tanks, 25 tanks attached to headquarters and 10 tanks as reserves. A regiment has about 180 combat tanks, 70 at disposal of the various headquarters and 20 as reserves. The brigade includes about 375 combat tanks, plus 130 at disposal of the headquarters or as reserves.

III. RIFLE BRIGADE:

a) 1 *Rifle regiment;*

b) 1 *motorcycle battalion*.

The *rifle regiment* is composed of 2 battalions on 6-wheeled vehicles. A battalion consists of 5 companies of which:

3 are armed with light and heavy machine guns, 1 has two 75-mm. mortars and three 37-mm. antitank guns, and 1 (accompanying company) has 8 heavy machine guns and 6 80-mm. bomb throwers.

The motorcycle battalion is composed of 4 companies (3 rifle companies each having 9 light machine guns and one machine company), with 12 heavy machine guns.

IV. ARTILLERY REGIMENT

2 groups of 12 105-mm. gun-howitzers.

V. ENGINEER BATTALION

3 *engineer companies;* 1 pontoon section.

VI. ANTITANK BATTALION

2 *companies*, each equipped with 12 37-mm. antitank guns transported either on partly girdled trucks or on 8-wheeled motor trucks.

Altogether, a division includes about 50 antitank guns.

VII. COMMUNICATION BATTALION

1 *telegraph company;* 1 radio company

The total number of vehicles of every sort comprising an armored division is about 1,000, including motorcycles. Of this total, 500 represent tanks and armored cars, and 24 pieces of artillery. They would form a column 100 kms. long.

The reviewer now gives Gen. Guderian's conception of the armored division's action in the breaking through, in cooperation with the other arms, of a field defense position on hilly grounds.

Once the terrain has been reconnoitered by the engineer unit, and all eventual obstacles removed, the various phases of the break-through would be:

1. Initiating the attack. The first wave of the first echelon confronts the outposts and the mine fields covering the main line; the assault planes attack the first lines with machine guns and bombs, while bombers attack the reserves.

2. *The tanks of the first echelon attack the antitank units;* the infantry advances under cover of the third echelon, whose mission is to destroy machine-gun nests; the artillery opens fire, aiming at the destruction of observation posts and at impeding the bringing up of the enemy's reserves.

3. The echelons continue their progress, the first of them debouching at the crest, from where they begin the attack down counterslope against the retarding line.

4. The first echelon—which by now has crossed the retarding line and the artillery position of the enemy—advances in order to destroy the headquarters organs and to annihilate the defense. The second echelon attacks the batteries dislocated behind the retarding line; the third echelon and the infantry, who have crossed the main lines, proceed towards the crest.

5. This phase represents the *combat between tanks*. Those of the defense by successive waves place themselves before the first echelon of the attacker; the artillery of the defense fires upon the various echelons of the attacker; the infantry which follows the attacker's tanks, occupy the retarding line; the motorized antitank pieces, which during all this time have very closely followed the first echelon, take position for supporting their own tanks during the combat against the enemy's armored formations. The attacker's artillery comes forward.

Also analyzed is the combat between single tanks, and considering the importance that this fighting has upon the ultimate success of the battle, the reviewer points out the lessons that can be derived from the tests applied during the World War and during the Spanish Civil War.

Going back to the breakthrough battle, the reviewer seeks to determine the main requirements of success.

The force of the impact of an armored unit is essentially a function of the stronger or weaker resistance which the armor of the vehicles offers to the projectiles of the antitank units. Since it seems that the Germans, in order to have cars both fast and capable of a great radius of action, have to a certain extent sacrificed protection to speed, the success, then, of an attack by armored units of this type against positions organized for defense will be based mainly on the element of surprise, which might be strategic and tactical.

In the reviewer's opinion, the armored divisions are capable, under fairly favorable conditions, of furnishing to General Headquarters the benefit of a strategic surprise if they be employed against a weak point in the enemy deployment. They could, on the other hand, expect to effect a tactical surprise only if operating against an enemy who is in process of shifting its positions and who has not taken necessary measures of protection against the tanks; but rarely against an enemy in position.

As regards the capability of a breakthrough by an armored division, the reviewer observes that if it is limited against an enemy abundantly supplied with modern armaments, its chances of success become great in case the enemy has already been badly shaken, as confirmed by the experiences of the Polish campaign.

NIGHT MARCH OF A MOTORIZED ARTILLERY BATTALION IN POLAND. Corporal Dr. Herbert Lauch, in *Artilleristische Rundshau*. March, 1940. Translated by O. L. S.

Our first objective in the enemy's country was reached; but the situation required sending into action at once every unit that could be made available. Hence we continued the march along the Polish roads, in blazing heat and clouds of dust. But there was a continuous series of rumors, whose origin could never be determined; and we had to march in a closed column, so that wandering bands of Poles could have no chance of cutting out isolated vehicles.

About noon on September 6th we reached Jedrzejov, where we were to halt for the night. The men were at last to have a roof over their heads again, and they were looking forward eagerly to their well-deserved rest. Every one began to make himself comfortable. In the field kitchens chickens were being dressed. Beside the well there was a great washing party. The drivers were cleaning their trucks. The rest of the men were preparing camp.

In the midst of all this, came the blast of a whistle, and the order—"prepare to march at once." The rest was over. A battle was developing at Radom, and all available troops were needed. Since the battalion was attached to a light division, it always had to be ready for a sudden move.

And so, after two hours' halt, we moved out again in column.

Night fell suddenly, as it does in Eastern Europe. Just before dark, the batteries received short but clear orders: "Fire upon any suspicious person in sight. Fire upon lighted windows. Vehicles march tightly closed up, at the best possible speed. If a vehicle falls out, the men with it must give it protection in all directions. Mount; start motors; forward, march." Light signals from vehicle to vehicle controlled the march and assured holding the column together.

The night march continued without accident, through Cheziny (its burning houses overshadowed by the ruined castle of Podzamidze, famous in the Polish wars of independence) to Kielce. Torn-up roads and broken bridges, forcing us to detours through the open fields, were a matter of course by this time, and no one troubled himself about them. Here in Kielce we saw the first actual signs of fighting, in the form of fresh graves.

The next morning, after all had enjoyed the bounty of the field kitchen and the ration wagon, orders were given to continue the march. The dust clouds rose again above the column. Tanks had met us, to protect the flanks. In addition to the previous orders, the men were directed, in case of appearance of suspicious objects, to

International News Photo, courtesy "The Military Engineer"

German infantrymen and supply wagon being transported across Bug River on improvised raft.

leave the vehicles at once and to open fire. Village after village was passed. Eagerly the men kept watch in all directions, to meet the slightest sign of armed opposition. The way often led through villages, of whose houses nothing was left but smoke-blackened chimneys. The smell of smoke mingled with that of dead horses. Again thick darkness fell over South Poland. The lamps were screened. Carbines were loaded, and each man took his proper place in the vehicles. The trees to left and right gleamed, gray-white from the Polish dust. Posts and signboards were mistaken for figures; but all remained quiet. In the batteries, alongside young peace-trained soldiers, were veterans of the World War, whose calmness often prevented fire upon useless targets.

The monotonous Polish landscape was now varied by kilometers of woods. Dense black walls closed in upon the road, to right and left; Polish detachments might easily be concealed there. Each driver tried to get the last burst of speed out of his motor, to keep touch with the vehicles ahead. Motorcycles assisted in maintaining contact, and guarded the road crossings. Then the woods opened out. On a hill ahead of the column stood a great burning building, the castle in Opatov, seat of a Polish administrative district. The battalion passed rapidly through this town, no driver losing his place. Then came woods again. There was not a spark of light; but the heavens welcomed the German troops with falling stars.

To the drivers, sitting at the wheels, the dense black wood seemed to extend to infinity; but in spite of the nervous strain they kept their posts. In the vehicles one could see the polished barrels of the carbines, and behind them faces under steel helmets. Woe to any Pole who might be seen in the darkness!

These first night marches brought security and confidence to the whole battalion. The feeling spread that the command was ready for any action, artillery or infantry, that might fall to the lot of a light division.

A MOTORIZED ARTILLERY BATTALION IN POLAND. Translated from *Artilleristische Rundschau,* January, 1940, by J. S. W.

At the end of August, 1939, with certain of my officers and noncommissioned officers, I was on my way to take part in the 25th anniversary celebration of the battle of Tannenberg. Orders came suddenly en route, directing our immediate return to our station at Swinemünde.

I arrived at the barracks in great haste at 4:30 AM on August 28 and found the guard taken over by reserve troops and my battalion in march column ready to take the field under its new commander, assigned by the general mobilization orders. I did not hear of it again until the Polish campaign was ended, when I learned that it had moved from Bromberg in the advance on Kutno and had then taken part in the subsequent victory and the siege of Warsaw, with great success and few losses.

My own orders sent me at once, with one of my active lieutenants, one reserve officer, and about twelve noncommissioned officers and specialists of my old battalion, who had returned with me from leave, to take over a newly formed battalion and to move it toward the border that night. The battalion comprised a small training cadre from various regiments, and a few veterans of the World War, the remaining men being reservists with three months' training. Except for a few here and there, I had never seen any of them before.

The comparison with my old splendidly equipped battalion was striking—only a mixture of various commercial trucks and private passenger automobiles and not a cross-country vehicle among them! The engines were generally low-powered and of old model.

Considering their equipment and training, the work of the batteries and the trains was remarkable. All twelve guns were in place in every combat position along the 4,000 km. march of the battalion in this campaign, during which most of the vehicles registered about 8,000 km. For the greater part of the time and from the first day, the battalion was employed in support of active motorized and armored divisions. On the afternoon of its first engagement on the Polish border, it received its initial instruction in the operation of the communications net.

The itinerary was as follows: Advance over the border near Friedlend, Tucheler Heide—Brahe sector—Byslaw—Rykowicz. From Graudenz, the battalion moved by Tuchel—Konitz—Stargard to Danzig. It then marched on the east flank of the northern army group by Elbing—Braunsberg—Heilsberg—Bichofsburg—Rastenburg—Lötzen to Arys. Halting here for two days, our first battalion training exercise was conducted.

We then moved by Ortelsburg—Mlawa to Plonsk on the Vistula, where we fought for three days and nights in support of a force consisting of one battalion of infantry, one machine gun company, one antitank platoon, and two antiaircraft batteries defending an unbelievable front of 30 km. against a Polish force pushing northward. The battalion command post and observation posts were in the forward infantry lines. On the third day, the batteries were in a semi-circle, firing toward the southwest, south, and east, with the ammunition columns in the middle in case we were surrounded entirely.

The battalion then fought in the attack on the Polish positions at Modlin, the operations along the Bug at Debe, and in the attack on Warsaw. Before the fall of Warsaw, it was moved to the Narev, and took part finally in the capture of Modlin. About 9,000 rounds were fired by the battalion during the campaign.

EMPLOYMENT OF MACHINE GUNS IN THE GERMAN FIELD ARTILLERY. Digested from *Artilleristische Rundschau,* January, 1940, by Capt. H. D. Kehm, FA.

German batteries were recently equipped with a limbered vehicle for transporting their machine guns. These guns can be fired from the vehicle or from a tripod

mount. Because German regulations contain no instructions concerning the employment of these weapons, a compilation of the following suggested procedures were published in a recent artillery periodical.

In general these precepts follow our own ideas on the proper use of our automatics.

Emphasis is placed on the fact that intelligent, well trained, fearless men should be designated to man the guns and that their primary mission is defending the battery against aircraft.

When artillery is in bivouac and the batteries widely separated, the guns should be at least 350 yards from the batteries and separated by about 50 yards. When the batteries are close together the defense is coordinated by the battalion.

At the start of a march the machine guns remain in position until the last vehicle has moved out. They then move at an increased gait to their proper places in the column. In an advance the guns are marched at the head of the battery; in a withdrawal at the tail. The guns are prepared for action, and if an air attack occurs they unlimber and fire from the vehicle. Similar methods may be used against ground attacks. Whenever time is available the machine guns are put into position on the ground.

At halts the machine guns take positions similar to those in bivouacs. Alternate positions are selected, and ranges to key points are determined.

During the occupation of position by a battery the machine-gun vehicle moves in ahead of the battery. The chief of section ascertains the position selected for the machine guns from the executive or instrument operator 2 and sets up his guns to protect the battery. In these situations also, alternate positions, suitable for antiaircraft and ground defense, are promptly selected, and ranges to objectives in various directions are determined. The vehicle is sent to the battery limber position. A coordinated plan of defense is worked out by the battalion when the situation indicates this to be desirable. (The considerations described under employment in bivouac apply.)

During a displacement the machine-gun vehicle comes to the vicinity of the guns and is held there. Detailed plans for the change of position are made in advance but the guns remain in action until the last battery vehicle has pulled out. They then join the battery at an increased gait.

In stabilized situations, the employment of the artillery's machine guns must be coordinated with that of the infantry in the sector so that all battery positions will be protected against air attack and against hostile penetrations in front of the battery positions. Emplacements must be constructed for the machine guns.

COUNTERBATTERY, MODEL 1940, GERMAN. Digested from *Artilleristische Rundschau*. March, 1940, by Capt. H. D. Kehm, FA.

According to "an approved solution," the German method of executing counterbattery fire on a hostile battery reported by an air observer is about as follows: The battalion commander designates a battery to adjust with air observation. When the adjustment is completed the fire-direction center is notified to that effect and is given the adjusted data. The staff then prepares the commands for all three batteries. In the meantime, an officer is called to the phone at each battery and all are simultaneously notified that there is to be a concentration of a given number of rounds per battery (in this particular case 25 rounds were specified), the commands for each battery are announced, the batteries are directed to report when they are ready to fire and are instructed that the concentration will commence on signal from the battalion. When all batteries have reported that they are laid, the signal is given by announcing: "Concentration on target No. ; 30 seconds to go; 20 seconds to go; 10 seconds to go; 5 seconds to go; NOW!" It is estimated that this fire will be delivered within about one minute.

It is suggested that the initial concentration be followed by one or more others, depending upon the situation, at intervals sufficient to give the hostile gun crews time to get back to their firing positions.

It is considered highly desirable to have friendly planes observe and report upon the accuracy of the fire for effect.

THE RETREAT TO DUNKIRK. From *The Gunner*, July, 1940. Brief experiences culled from the lips of eyewitnesses.

An improvised battalion of 25-pounders was rushed up at short notice from the lines of communications at the moment of the first German breakthrough. It got right up to La Bassée Canal and came into action as an antitank battalion—successfully too!

A 25-pounder battery was in action. It had suffered heavy casualties, and at one gun only the Sergeant remained unwounded. Then they were overrun by German tanks. The Sergeant fired three rounds from his gun—and bagged three tanks!

On one occasion a fleet of bombers swooped over a battalion and dropped no less than 80 bombs. The detachments were in their shallow gunpits and not a single one of them was hit. This adds point to the remark made by a senior officer that he preferred being bombed in this war to being shelled in the last.

As to FLASHLIGHTS

BY MAJ. F. W. WATROUS, FA

The present standard Signal Corps flashlight (TL-122A) is a commercial item using a prefocused lamp which throws a powerful beam of small diameter. For certain military purposes this *type* of illumination is entirely suitable, but for others, requiring fine close-up work, it is altogether unsuitable. The *amount* of illumination, although satisfactory for most uses, is undesirably large for outdoor use in the face of an enemy. Our requirements, then, are for a flashlight with a beam, with a diffused light, with a bright light, and with a dim light. Such a flashlight is not known to exist and, if it were to be constructed, would be of such complexity, size, and weight as to be wholly unsuitable. However, with only a few insignificant pieces of materials the TL-122A can be made to perform practically all of its desired functions without any permanent alterations or damage to it; unfortunately it cannot be forced to provide sufficient illumination for extensive command post plotting and map work.

The beamed light can be converted to a well diffused one in several different ways with no great loss in intensity. The simplest method is to tie or paste a very thin piece of white paper or cloth over the outside of the lens; if a minute or two are available to make the conversion, a neater job would result if the material were placed behind the lens where it would be held in place by the reflector. A second method is to insert, in front of the polished reflector, a dull finished one cut from thin uncolored celluloid. If not already frosted the celluloid should be sandpapered lightly to obtain that effect. The illustration shows such a reflector. A usable one can be cut from plain white bond paper. A third way to obtain the desired result is to replace the clear glass lens with one frosted on the inside; glass is not easily frosted, but clear plastics, now in general use and not difficult to obtain, can readily be sandpapered. This last solution appears to be the most satisfactory in the long run.

The second problem, of providing a method of dimming the light, also has more than one solution without considering the crude and wasteful practice of taping or hooding the lens to allow only a small light aperture. The following expedients result in a saving in batteries, a point which may well be of great importance in combat when resupply is uncertain. Both methods are based on the same general principle of supplying a current of only 1½ volts to a lamp designed for operation with two cells in series

(about 3 volts). Using only one cell in the flashlight will produce the desired effect with nothing more complicated than an ordinary door key to replace the rear cell. Of course any object of the proper size and making the necessary connections can be used, but a key is suggested because it is often readily available and the end of the shank fits nicely into the base spring, thereby insuring a good contact. The second method is to change the normal series circuit of the cells to a parallel circuit. This requires the use of two brass strips, properly cut, bent, and insulated, and a small disk of cardboard or other insulating material. These items are shown in the illustration in their proper relative positions for insertion in the battery case. Only the forward brass strip requires insulation which can be supplied by a few inches of friction or adhesive tape. This parallel circuit not only dims the light but increases battery life approximately *fourfold*.

Let us see now what we have gained with these simple devices. With the diffused light we are relieved of considerable eye strain in the reading of maps and messages and we have increased the usefully lighted area; the powerful beam, which may be carelessly used outdoors with fatal results, has been eliminated; a large percentage of field artillery flashlight users have light far better suited to their work than they had with a beamed light. With the dimmed light we can eliminate a large part of the unnecessary wholesale lighting of the terrain which so often takes place; messages can still be read if necessary; scales and reticles of instruments are adequately illuminated; the pieces can be served satisfactorily; with the parallel circuit, flashlights can be used as aiming lights and as position marking lights with assurance of burning through the night without replacement of batteries; one still has enough light to find his way in the dark on foot; battery resupply will no longer be such a potential problem.

MUZZLE BURSTS

This page is for "Letters to the Editor," or any other random thoughts which readers wish to share with others. Let your conscience be your guide. *The Field Artillery Journal* pays for all "Muzzle Bursts" accepted.

MARCHING TRUCK-DRAWN FIELD ARTILLERY

The lessons which General Danford brought out in his excellent article "Marching Animal-Drawn Field Artillery" are ones which apply with equal force to our other means of transportation in the Field Artillery; that is, our motor transportation.

We probably are all agreed that at times the truth is rather rough on our sensitive hides, but I believe that if we face the facts and admit our mistakes of omission and commission and make an honest effort to correct them the Field Artillery will be benefited thereby; that is my sole reason for sounding off herein. I further wish to make it clear that I am not trying to belittle the animal or trying to enhance the value of the motor vehicle. I consider them solely as two means of transportation available to us in the Field Artillery; as such they are of prime importance to us in accomplishing our mission.

We all know that it is our duty and responsibility to properly care for and use any government property issued to us. It makes little or no difference whether the misuse or abuse of such property is due to ignorance or neglect; the results are the same. The only vital difference between the animal and the motor vehicle when they are about to give up the ghost is that the animal assumes some very humanlike attitudes, whereas the motor vehicle cannot squeal when in pain.*

General Danford quotes as follows from Field Artillery Drill Regulations, 1916—"The horse's temperature is the surest index of his fitness to continue work." Likewise with a gasoline engine! The average engine operates, under normal conditions, at a temperature approximating 160 degree Fahrenheit. If the temperature reaches 200 degrees, care should be exercised, and at 212 degrees it is nearly always necessary to stop work. When overheated, an engine will give very definite indications of its condition by means of the heat indicator, by its lack of power, and the boiling-over of the cooling medium. If we are too blind to see the signs or do not understand them, the results are apt to be disastrous.

The deliberate destruction of a piece of precision machinery, even in time of war, is seldom necessary and usually indicates ignorance or lack of attention to duty on the part of the responsible personnel from the lowest ranking to the most senior.

The recent publication Basic Field Manual FM 25-10 (supplemented by the Field Artillery School books) allows no alibis for ignorance of the proper methods to be used in caring for and operating our motor vehicles. We could with little difficulty take Basic Field Manual FM 25-5, Animal Transport, and apply its teachings to our motor transport. However, that is not necessary, since Basic Field Manual FM 25-10, Motor Transport, does that for us. All we need do is to read and apply its instructions. Paragraph 140 c. FM 25-5, states that the first ten minutes after leaving camp should be at a walk. Paragraph 14, FM 25-10, states that special attention should be devoted to the proper starting and warm-up period in order that unnecessary engine wear may be prevented. Paragraph 6 *b* (2), FM 25-10 and paragraph 14, AR 850-15 (September 29, 1939), list the item of "Racing engine, particularly when cold," as one of the vehicle abuses which are the chief causes of mechanical failures, and of excessive operating and maintenance costs. The horse is a complicated piece of machinery and must be properly warmed-up before having heavy work required of him. The same conditions and requirements exist with the motor vehicle.

The reference to watering of overheated animals applies as well to the motor-vehicle engine.

Paragraph 175, Field Artillery Book No. 140, refers to the fact that animals must be in suitable physical condition prior to calling upon them for any unusual effort. The same can be said for our motor vehicles. When we receive a new motor vehicle we find that it has been designed and constructed with the idea of performing work of a certain type and amount. In other words, it has been placed in "Condition."

Now if we insist, either through ignorance or neglect, upon this motor vehicle doing more than it was designed for or doing work for which it was not built we have little of which to complain when it fails in one respect or another. In the animal-drawn artillery we have to learn the characteristics of our individual animals as well as of our teams, and use them accordingly. For instance, one animal will pull his heart out if you let him, while the animal at his side will loaf along all day. A motor vehicle will pull its heart out too if the driver is dumb enough to force it or some one higher up doesn't stop him. When a team of horses hits hard going it was never too far beneath our dignity to dismount and give them a hand while at the same time making them do their job. However, it seems to be quite an indignity for some of us to get down and help our trucks over the rough spots into which we have stumbled through our lack of reconnaissance. Paragraph 6 *d* (1) (e) lists "Recognition of the capabilities and limitations of all types of vehicles in operation" as one of the factors which materially affect the service rendered by motor vehicles,

*Surely, Captain, you have heard the agonized cry of a dry bearing?—EDITOR.

and should be impressed upon all operating and command personnel.

The horse has what we might term three speeds ahead and most of them have one in reverse. By that I mean he can start the load at a walk, get it rolling into a trot, and then finally into a gallop. Now if the going becomes hard he will of his own volition come from a gallop down to a walk and if necessary really get down and dig, at which time we might say he was in low range. At that time we do not expect him to be moving the carriage at sixteen miles per hour; in fact, we are usually glad if he keeps it moving at all. We don't try to force him to move as fast when he has a hard pull, because we know he will probably damage himself and thereby reduce the transportation efficiency of our organization. Neither do we expect a draft horse to travel as fast as a single mount, or a single mount to pull a heavy load. Why, then, should we put our fastest, lightest vehicles in the lead and expect our prime movers to keep up with them on the heavy pulls?

Ferry's *General Physics* states that work may be defined as a change in the position of a body against an opposing force. The amount of work done is dependent upon the magnitude of the force applied and the displacement of the body. The forces we have to deal with are the strength of the horse and the power of the motor vehicle. There is definitely a maximum limit to both. Now we may use this force in one of two ways, either rapidly or slowly. Energy has been defined as the capacity for doing work, and power as the rate of doing work. If we have a certain definite amount of energy to be expended we can either do a lot of work slowly or a little work rapidly. By that I mean a horse can walk and pull a heavy load or he can gallop and pull a light load. The motor vehicle, similarly, should not be placed in low gear and expected to travel as fast as it can in high gear. Requiring this of a motor vehicle is an abuse which is quite common and reflects no credit on anyone concerned.

General Danford states that "Sore backs, sore necks, and sore shoulders are absolutely avoidable." Their presence indicates nothing in the world but ignorance or carelessness or both on the part of officers, chiefs of sections, and drivers. Similarly, many of the failures we have in our motor vehicles—caused by improper use of controls, overspeeding, improper lubrication, and deferred maintenance—can be laid at the door of the same agencies: ignorance and carelessness. The knowledge necessary to prevent these casualties both in the horses and the motor vehicles is so little and so easily obtained, while the supervision and inspection necessary to insure the use of this knowledge must of a necessity be great and constant on the part of everyone.

Tradition doesn't change but our observance of it may become rather perfunctory. I'm inclined to believe that this applies to the question of "caring for our trucks first." In an animal-drawn organization, at the end of the day's march the animals are cared for first. By that I mean they are groomed, watered, and fed. Any incipient sores are taken care of at once and everything is done not only to make the animal as comfortable as possible but to insure that he will be ready to do his job the next day or whenever called upon to do so. After that the men are cared for. After the entire organization—animals, materiel, and men—are taken care of, the good organization commander may think of himself.

The same tactics should apply to the motor-drawn organization. The trucks should be cared for first. The motor vehicle is no more capable of caring for itself, in fact it cannot care for itself as well, as the animal. The day's work is not finished for the motor-drawn organization until every vehicle is ready to move at a moment's notice. This of course infers that the necessary replenishment of fuel and lubricants has been made, that the necessary checks for incipient troubles and the condition of the loads have been made. Even a good soldier will at times slip over things if he thinks he can get by with it. Proper instruction of all personnel and strict and constant supervision is the only remedy. Disciplinary action at the proper time works untold wonders and is a very important item of preventive maintenance for our motor vehicles.

—CAPTAIN J. M. BURDGE, FA

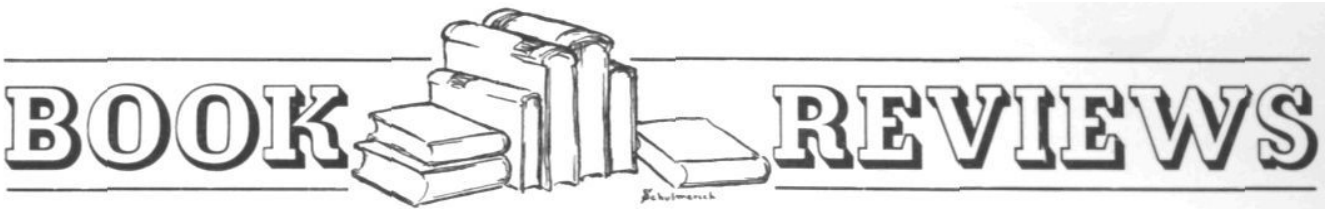
MORE HOURS AND CREDITS FOR ROTC TRAINING

Under the present emergency we have an opportunity for a constructive program for improving conditions in our ROTC units. Certain improvements, needed for a long time, might be accomplished under present conditions. The most important of these is an increase in the hours and credits over those generally allotted this training.

At present, hours and credits vary with the institution. However, the generally accepted allotment in our land grant colleges is three hours a week with one credit for basic students, and five hours with three credits for advanced students. Some schools give as much as five hours a week to basics with three credits, and six hours a week with four credits for advancd students. Some schools give an additional six credits for summer camp. This variation in hours and credits naturally makes for a lack of uniformity in instruction and gives advantage to the more liberal institutions.

Needless to say, the normal allotment is not sufficient to turn out a reserve officer who will meet the standards required of him in case of any large expansion or mobilization. It is therefore suggested that efforts be made to standardize the credits and hours to a minimum requirement of four hours a week with two credits for basics and six hours with four credits for advanced students, with an additional six credits for summer camp. By this procedure we can definitely take ROTC training out of the category of physical education and place it on a really worthwhile basis.

—CAPT. R. A. ELLSWORTH, FA.



THE MARCH OF THE BARBARIANS. By Harold Lamb. Doubleday Doran Co., 1940. 377 pages. $3.75.

In the 13th century the Mongol General Hulagu was leading his veteran divisions west toward the rich and powerful city of Baghdad. Hulagu sent to the Kalif a message which today has a curiously familiar ring: "You know the fate of the different nations of the world at the hands of the Mongol armies. How then can you forbid entrance to us who have so much power? Take care not to struggle against the Standard."

The Kalif, however, struggled. He and his city were blitzkrieged for their pains. After his army had been obliterated and his city sacked, the Kalif was brought before the conqueror. Harold Lamb describes what ensued:

Hulagu had been struck by the wealth of the palaces on the Tigris and by the futility of their resistance. It seemed to him to be a faulty economy. The tale is told that instead of offering the unfortunate Kalif food, he set before him his gold dishes and silver hand basins and jeweled incense burners, while he ate himself from plain dishes.

"Eat what you have stored up for yourself," he urged the Kalif.

The master of Baghdad complained that he could not eat gold.

"Why have you kept it then?" the matter-of-fact Mongol demanded. "Why have you not melted these iron grills into barbs for your arrows? Why have you not paid these jewels to your men, and advanced into the hills to meet me and oppose me?"

"It was the will of Allah."

"Then what will happen to you is the will of God also." He reassured the Kalif, saying he would provide him with a house where he would feel no cold and suffer no thirst. The Kalif was wrapped in a felt robe and trampled under the hoofs of horses. Ninety thousand Moslems were slain, methodically, and the ruined Baghdad was burned. It never regained its importance in the Moslem world.

Is the parable plain? We urge you to read Harold Lamb's history of the Mongol conquests; it will show again how a warlike, disciplined people is able to obliterate ancient empires—not through numerical superiority or greater intellect, but through cohesiveness, hard, frugal living, and able, unscrupulous leadership. The reader will be impressed with the obvious fact that the great cycle of time has again rolled around to the 13th century, that the cataclysm of today has occurred before, and doubtless will happen again.

TIXIER'S TRAVELS ON THE OSAGE PRAIRIES. Edited by John Francis McDermott. The University of Oklahoma Press, 1940. 286 pages, $3.00.

At one time one of the rarest works on western Americana, M. Tixier's descriptions of his travels from New Orleans to Missouri thence into the prairie has been rediscovered, translated and made available in an attractive form by Prof. McDermott and the University of Oklahoma Press. The first part of the book is full of lively and often amusing observations on the social customs of the Americans of that period (1840), and it supplies an excellent contemporary description of the terrain, the slaves, the Indians, and the wild life of the Mississippi basin. The latter portions of the book deal with a hunting trip into the buffalo country. The French traveler lived for a time with the Osage Indians, becoming well acquainted with their tribal life and customs. It is fortunate that this vivid picture of early American life was made available to us before the invasion of France, which doubtless destroyed many obscure collections in which similar works were preserved.

THE 101ST FIELD ARTILLERY, A.E.F. By Russell Gordon Carter. Houghton Mifflin Company, 1940. 280 pages. $3.00.

Although this regimental history was written some eighteen years after the World War, and by a writer who was not a member of the organization, it still manages to retain much of the flavor of the war adventures which the regiment experienced. It is evident, too, that much careful preparatory work was done in assembling the material for the book; the history is carefully done, is full of names and places, and apparently is as accurate and complete as is possible until the records now being classified at the Historical Section of the War College are made available. Especially noteworthy are the maps, carefully redrawn from the French originals, and which show clearly yet in detail the areas in which the various engagements occurred.

PROPAGANDA FOR WAR. THE CAMPAIGN AGAINST AMERICAN NEUTRALITY, 1914-1917. By H. C. Peterson. University of Oklahoma Press, Norman, Okla. 1939. 357 pages. $3.00.

This book is a complete and scholarly study of propaganda in America during the first World War. Its last paragraph is significant:

"To some the history of the 'neutrality' period demonstrates that the United States cannot keep out of war. But the facts do not bear out any such contention. What it does prove is that it is impossible to be unneutral and keep out of war."—H. W. B.

S-2 IN ACTION. By Shipley Thomas, Lieut. Col., Res. The Military Service Publishing Company, Harrisburg, Pa., 1940. 128 pages. $1.50.

The thing which impresses one in reading *S-2 in Action* is that here is a downright practical book written by a man who really knows what he is talking about, one who has had intensive combat experience in his subject and understands how to interpret it. When war occurs many hundreds of young officers without much previous theoretical and no actual experience in intelligence work will suddenly find themselves S-2's. Here is a case where precedent is invaluable and seasoned advice indispensable. Personally, this reviewer would wish to have Col. Shipley's excellent book handy at such a time. Though it is written for the infantry S-2, artillerymen will profit by it too; there is much in the duty of an intelligence officer that is common to all arms.

THE ART OF MODERN WAR. By Hermann Foertsch, of the German General Staff, Veritas Press, 1940. 265 pages. $2.75.

Col. Foertsch, an active member of the German army, wrote this book before the present war commenced. However, it gives a fair general idea of present German organization, armament, and methods of warfare. It is divided into three parts, the first of which deals with the fundamental principles of war, the second with wars of the past, and the third with modern warfare. The reader may be disappointed, perhaps, that the author fails to stress the importance of any of the spectacular new weapons—dive bombers, Panzer units, parachutists—that the Germans have been employing. But a little reflection will show that in this is the true reason for German success. Every German soldier has his part to play, from the aviator down to the pioneer who labors with pick and shovel to further the advance of the army. Teamwork, coordination of all arms and units, is the real prime characteristic of the German armed forces.

The author hits the nail on the head where he says. "The *line strategy* that was the rule as late as the commencement of the World War has been replaced by *depth strategy*." He misses it badly where he says, "The fighting will not result in such quick and startling successes as we remember in the Wars of Unification," and "The belief that the motorization and mechanization of weapons will again make quick decisions possible seems to be a fallacy." And elsewhere he stubs his toe when he attempts to prophesy. But in this he is in good company.

AMATEUR GUNNERS. By A. Douglas Thorburn, William Potter, 30 Exchange Street East, Liverpool, England. Six shillings.

Captain Thorburn relates in an interesting way his experiences during the World War with a field artillery battery which served in Flanders, Macedonia, Palestine, then back in France for the closing months of the war. The account is full of hints which are of value to any gunner in campaign; those which deal with "wangling" will not be found in training regulations anywhere, but are probably as useful bits of information as more official instruction. The latter part of the book treats also of such subjects as discipline, map reading, camouflage, shooting, popular fallacies exploded, courage under fire, etc. The author faced war in a practical, realistic manner which makes his observations as valuable as they are entertaining. We recommend this book highly.

MOBILIZING CIVILIAN AMERICA. By Harold J. Tobin and Percy W. Bidwell. Council on Foreign Relations, New York. 276 pages. $2.75.

Major General Frank R. McCoy, in his foreword to this book, says that "the Council on Foreign Relations has done an important national service in planning and publishing this book on industrial mobilization." Actually this excellent book has a wider scope than the quoted comment indicates for it includes discussion of propaganda and censorship, and mobilization of the armed forces. Recommended reading for War Department General Staff officers and for congressmen.

—H. W. B.

It is the duty of a commander to be the first to employ new tactics, and through them advance to victory. Nothing stays still in war—it is a dynamic phenomenon. The side which fails to produce new ideas may be left behind, may be doomed. Initiative as to changes in tactics, and employment of new weapons or munitions, should be sought during a war. Subordinates should be encouraged to submit and try out changes. Insisting on blind obedience to doctrines, however good they may have been at the time they were introduced, discourages improvements, and may eventually lead to defeat.

—COL. C. H. LANZA, *in* FIELD ARTILLERY JOURNAL, *1939*.