

28TH YEAR OF PUBLICATION

# THE FIELD ARTILLERY JOURNAL

**MAY-JUNE, 1938**

## **LESSONS FROM SPAIN**

*—Colonel Conrad H. Lanza,*

and Articles by

Lt. Col. G. H. Franke, Lt. Col. A. R. Harris,

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and

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PUBLISHED BIMONTHLY BY  
THE UNITED STATES FIELD ARTILLERY ASSOCIATION

# May-June, 1938

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28TH YEAR OF PUBLICATION

VOL. 28

No. 3

MAY-JUNE, 1938

# THE FIELD ARTILLERY JOURNAL

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A PUBLICATION FOR THE FIELD ARTILLERY OF THE REGULAR  
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Patron Saint of Artillery

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**ARTICLE II OF CONSTITUTION**

"The objects of the Association shall be the promotion of the efficiency of the Field Artillery by maintaining its best traditions; the publishing of a *Journal* for disseminating professional knowledge and furnishing information as to the field artillery's progress, development, and best use in campaign; to cultivate, with the other arms, a common understanding of the powers and limitations of each; to foster a feeling of interdependence among the different arms and of hearty cooperation by all; and to promote understanding between the regular and militia forces by a closer bond; all of which objects are worthy and contribute to the good of our country."



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## ★ *A Message to the Field Artillery* ★

*The vast amount of constructive and progressive work accomplished by the Field Artillery during the past twenty years under the leadership of its four devoted and distinguished Chiefs—Generals Snow, Austin, Bishop, and Birnie—would seem, at first thought, to have left but little to be done now or within the immediate future.*

*Ever to be satisfied with present gains, however, is always to stop further progress. The problems of the Field Artillery today, affecting as they do its personnel, its materiel, its organization, its training, are as acute and pressing as they ever have been, save only during the late War when General Snow, in 1918, took them over in a condition of chaos.*

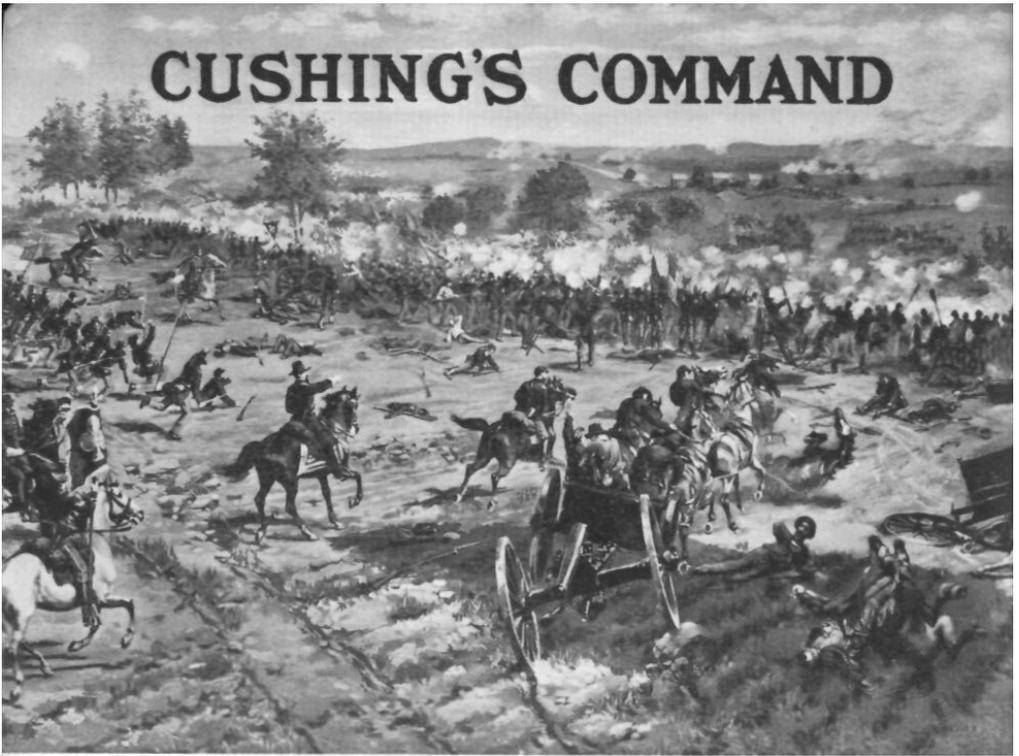
*The wise and efficient solution of these present-day problems requires the best thought and the most cooperative effort of the entire Field Artillery. As has been the case ever since the establishment of the Chief's Office, your assistance, your ideas, and your suggestions, looking to the progressive development and improvement of our arm—the arm that in the last war caused by far the largest percentage of battle casualties—are solicited and will always be welcome.*

*I shall hope by your visits to this office, and by my visits among you at your work, to learn at first hand of your difficulties, your problems, your plans, your successes, and your achievements. This applies to all components—Regular, National Guard, Reserve, R.O.T.C., and C.M.T.C.*

*In 1907 we had 170 Regular and a few National Guard officers of Field Artillery. Today we have 17,709 Field Artillery officers of all components. May our constructive efforts for the accomplishment of our mission as Field Artillery; for the efficiency of our Army as a whole; and for the welfare of our entire Country, be correspondingly multiplied and effective.*

ROBERT M. DANFORD,  
Major General, U. S. Army,  
Chief of Field Artillery.

# CUSHING'S COMMAND



Picture by the courtesy of Colonel Stephen Elliott, 109th FA



ON the Gettysburg ridge splashed a fountain of steel,  
Where the cannon of Cushing ranged wheel beside wheel,  
And just to the left was the cluster of trees,  
The target to splinter that last lance of Lee's.

Alexander was spanning the Emmitsburg road  
With a bridge formed of shell, as though drawn by a lode  
To the rock-like abutment where Cushing stood bold,  
Defying the flood that the thunder foretold.  
And the faded red guidon of "A" of the Fourth  
Was reddened again by the blood of the North,  
As the six sturdy sections by Cushing arrayed,  
Supported the Shamrock that Hancock displayed.

Though few are the years the commander can boast,  
His battle-learned art is to Hancock a host;  
And proud of their leader, his gunners, who stand  
To their posts at the pieces of Cushing's Command.

A limber explodes with a deafening crash,  
And axles drop earthward, but quick as a flash,  
To cannon disabled the spare wheels are brought,  
While galloping caisson replenishes shot.  
Though hot now the barrels to cannoneer's hand,  
Cool are the gunners of Cushing's Command,  
As loading and laying and firing, and then,  
As swiftly they're loading and firing again.

## CUSHING'S COMMAND

And the guidon that waves by the  
battery's guns,  
Is red from the blood of the battery's sons:  
One section surviving the death-dealing  
hail,

And Cushing, twice wounded, still fights  
by its trail.

Then, out of the smoke of the last  
cannonades,

Like a wave from a fog, surge the  
Southern brigades,

While down to the fence where the  
footsoldiers stand,

Is rolled the last cannon of Cushing's  
Command.

*Wherever red guidons float over this  
land, Let them dip to the mem'ry of  
Cushing's Command;*

*Wherever a driver has tightened a cinch,  
Let him mount to the whistles of  
Cushing's "Three-Inch";*

*Wherever a wheeler leans into a load, Let  
him follow the leaders that Cushing's  
men rode;*

*Wherever, at lanyard, awaits Number  
One, Let the answer re-echo to  
Cushing's last gun.*

For Pickett's men come, although blown  
like the chaff,

And the cannoneers meet them with  
rammer and staff,

And back rolls the wave with a wake that  
is red —

But close by his cannon, young Cushing  
lies dead.

—ROLLIN QUEZON

---

*"Lieutenant Cushing of Battery A, Fourth U. S. Artillery, challenged the admiration of all who saw him. . . . At last, severely wounded himself, his officers all killed or wounded, and with but cannoneers enough to man one section, he pushed his gun to the fence in front, and was killed while serving his last cannister into the ranks of the advancing enemy." — Norman J. Hall, Colonel, Commanding. (3d Brigade, 2d Division, II Corps, Army of the Potomac.)*

## SEVENTY-FIVE YEARS AGO THIS JULY

### The Picture

Not quite historically accurate, the stirring scene here shown contains many points mentioned in the verses. In the distance may be seen the Emmitsburg Road. On the left is the "cluster of trees." The central figure in the foreground is Lieutenant Cushing. Behind him, "Hancock the Superb," corps commander who never lost an action in which he was in direct command, grandson of Winfield Scott, under whom he fought in Mexico. In several places, notably in the left foreground, may be seen the "Shamrock," the trefoil insignia of Hancock's Corps. Four pieces are shown in action, another being brought "down to the fence where the footsoldiers stand." On the right is the limber struck by a hostile shell. In the middle background are the gallant hosts of Pickett, marching into the cannon's mouth.

The story of the battery's engagement is told on the following page.

## *"Right Here and Fight It Out!"*

"CUSHING'S Command" and its accompanying illustration are portrayals of one of the great, heroic incidents of the Civil War. Longstreet's assault on the third day at Gettysburg. Pickett's division forming the spearhead, was directed toward a clump of trees on Cemetery Ridge, where Hancock's Second Corps was posted. The attack was preceded by a heavy preparation fired under the direction of Alexander, Longstreet's chief of artillery. Battery A, 4th US Artillery, commanded by Lieutenant Alonzo H. Cushing, supported the Second Corps from a position on the ridge, where the mass of fire had its heaviest concentration. In spite of repairs made to carriages under fire, five of Cushing's six guns were out of action at the end of the Confederate preparation. The last remaining gun was then run down to the fence on the line of the defending infantry, so that its fire would not be masked, and the oncoming ranks were met with double and triple charges of cannister, Cushing, himself, serving the piece. The young battery commander had been suffering for over an hour from two severe wounds. In personnel, Cushing, 1st Sergeant Frederick Fuger, and a handful of cannoneers were all that remained of the firing battery. Of Cushing at this moment, Sergeant Fuger afterward wrote: "He called to me and told me to stand by him, so that he could impart his orders to the battery. He became ill and suffered frightfully. I wanted him to go to the rear. 'No,' he said, 'I stay right here and fight it out, or die in the attempt.'" When the assault approached to within 100 yards of the gun, Cushing said to General Alexander S. Webb, who commanded the Second

(Philadelphia) Brigade of Hancock's Corps, the organization which received the brunt of the attack, "General, I will give them one more shot." At the moment of the discharge of this last remaining round, Cushing was shot in the mouth by a musket ball, and fell dead.

Battery A of the 4th lost, at Gettysburg, two officers killed and one wounded, of three; seven enlisted men killed and thirty-eight wounded, of ninety; eighty-three horses killed of ninety; and five guns put out of action of six. According to Sergeant Fuger, who was afterward commissioned in the regular army for his bravery, "not an uninjured wheel remained, and nine ammunition chests were blown up."

Alonzo Hereford Cushing was born at Milwaukee, Wisconsin, January 9th, 1841; graduated from the United States Military Academy, 1861; breveted Captain at Fredericksburg, Major at Chancellorsville, and Lieutenant Colonel at Gettysburg for conspicuous gallantry on the first day of the battle. Because of the slow promotion which existed in the artillery, his permanent rank was only that of first lieutenant. He was buried at West Point.

General Webb, in his official report of the part played by the Philadelphia Brigade in the battle, wrote: "Lieutenant A. H. Cushing, 4th US Artillery, fell mortally wounded, at the fence by the side of his guns. Cool, brave, competent, he fought for an hour and a half after he had reported to me that he was wounded in both thighs. . . . I recommended, for promotion, Sgts. Frederick Fuger and Edward M. Irving of that battery; also Acting Gunner Francis Abraham. This battery was nobly served."

# THE FIELD ARTILLERY JOURNAL

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## Lessons From Spain

BY COLONEL CONRAD H. LANZA

**T**HE fate of the battles of the next war is being decided by present peacetime preparations. War has become extraordinarily complex. We used to believe that tactics changed every ten years, but in these days, not only tactics, but organization, equipment, arms, and munitions change yearly. It is no longer a question of simple principles, such as whether the offensive is preferable to the defensive. It is necessary to know whether we are able to carry out either of these types of warfare.

Over thirty kinds of divisions, and other large units, varying as to organization, mechanization, motorization, and armament exist. There are divergent opinions as to which of these will be most suitable for the next war. Nations doubt whether their armies as now constituted and equipped will stand the test of war. Everywhere there is discussion and experiment.

This uncertainty is a prime reason why the great war, which is being anticipated with incredible energy, has not started. General staffs wish to know more as to what can be expected from new weapons now available; and they desire to increase the quantity of materiel which apparently is absolutely required as a prerequisite for victory, and which is a greater quantity than until recently had been foreseen and provided for.

Now nothing that can be done in peace will give the information that war alone

offers as to what materiel will give the best results, how much of it is needed, and how it is to be used. Consequently recent campaigns are being carefully studied. Italy has had considerable experience in Ethiopia, where she has tested her materiel in difficult country; and tried out new forms of tactics. A war is now occurring in China. This is far away, and it is hard to obtain information as to details. In both Ethiopia and China, success has attended the power markedly superior in equipment and leadership.

Our best available recent lessons come from Spain. Observation of this war has been practicable. Reports are not lacking. The fact that this war is occurring just at the time when there has been a change of tactics, organization, and weapons among nations, makes it important, and desirable of close study. Some nations have thought that this was an excellent opportunity to try out materiel and ideas. Germany, Italy, and Russia have intervened, on an unofficial basis, but effectively, with organized forces, which are testing, on European battlefields, tactics, implements, and organization. France has had no organized force involved, but she has furnished some of her materiel. These nations are profiting from their experiences.

Let us first consider the forces involved:

At the end of 1937, the Loyalists had

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around 600,000 men under arms. About 5,000 were former members of the Spanish Army, and 20,000 were foreign volunteers. Of the foreigners 90% had no previous military training. About 10% of them were trained specialists, including officers of artillery, tanks, and aviation, and mechanics and noncommissioned officers of all arms and services.

During the first year the Loyalists were handicapped by lack of competent officers, and lack of training of the enlisted personnel. Within their ranks were those who, while admitting the necessity for officers, objected to any obligation of obedience, unless orders were acceptable to those receiving them. They reserved the right to investigate and form an opinion on orders. They carried this so far that during the advance of the enemy on Madrid, at a time when a hostile turning movement was noted, a debate was started as to whether an order to change front towards the threatened flank was to be obeyed. Motions were made to substitute for the order a retreat, also to stand fast, etc. While the unit concerned, acting as a committee of the whole, was hotly discussing the subject, the enemy completed his movement, and opened fire with machine guns. This immediately ended the debate, all present suddenly arriving at the unanimous decision that a very rapid retreat was necessary.

On the Barcelona front, dominated by the Federation of Iberian Anarchists, command of companies and battalions has been by roster, for a day at a time. Orders of the commander of the day were not necessarily to be obeyed; anyone who disagreed was free to do as he pleased. This front has had a superiority in numbers over their enemy of not less than 3 to 1, but it has never been able to accomplish anything, except to hold

positions. Several offensives have been tried, but they have failed, sometimes through disagreements after the operation had commenced, and sometimes through failure of supply, either through inability to decide what to do, or failure to do it.

Defeats, and no victories, have proved that discipline is necessary for an army if it is to do more than carry out a passive defense. A corps of officers has been established, and a training school for them is functioning at Valencia. Leadership is now improving, but is not yet satisfactory, especially on the Barcelona front, where there is strong opposition to the Valencia methods.

In the Valencia-Madrid army, soviet discipline prevails. This system of discipline prescribes that everyone, from general to private, is called "comrade." General officers have soldiers visiting their headquarters to investigate what is being done, and to suggest what ought to be done. This practice was at one time so bad as to make it impossible for staffs to function. The soviet practice of having a commissar as political representative for battalions and higher units has now been adopted. The commissar explains orders to the soldiers, with a view to eliminating soldier committees of investigation. He explains the reasons for wars, distributes government propaganda with appropriate explanations, lectures on the advantages of communism and the disadvantages of other forms of government, and is in general charged with the maintenance of morale, and the securing of obedience to orders without undue delay.

Provided orders are received sufficiently in advance to allow the commissar time to do his explaining, this system in a way works. It fails in offensives, after the men become fatigued or disheartened. When this happens,

## LESSONS FROM SPAIN

they revert to delays in obeying orders, under pretext that a discussion is necessary to determine the proper procedure for the future. To date the loyalist offensives have, after a few days, failed to make progress.

Men for the Loyalist army are obtained by conscription, and through voluntary enlistment. A soldier has an assured means of living—quarters, food and clothing. His base pay of 300 pesetas a month is high. Life is hard in Spain, and opportunities for sudden death have not been, and are not now, lacking. Wearing a government uniform has been an excellent way to keep out of trouble, and has furnished a strong incentive to men to join the army.

The Nationalist (Franco) army, at the end of last year, had under 500,000 men under arms. Inferior in numbers to their opponents, they have surpassed them in discipline and in leadership. The nucleus of their forces consists of:

*a.* The old Spanish army, about 80,000;

*b.* The old Guardia Civil, about 15,000, nearly all reenlisted men;

*c.* Moors, probably about 30,000, with their own officers—these are excellent attack troops;

*d.* Three Italian divisions—about 36,000;

*e.* Italian specialists—aviation, services, arms and supplies; variously estimated as 10,000 to 30,000;

*f.* German specialists, of all arms and services—5,000 to 10,000.

There have been sufficient officers from the beginning of the war to enable training schools to function continuously.

The Nationalist enlisted personnel is maintained by conscription and by voluntary enlistment. Devotion to ideals such as religious enthusiasm, monarchical traditions, Carlism, Fascism, have been effective in securing recruits. The base pay is just one tenth of that paid in the

Loyalist army. The various Nationalist components, including the officers, differ widely as to political beliefs, but they have decided to postpone a decision on the final form of government for Spain, in order to unite on the immediate mission of suppressing communism and anarchism, and establishing law and order.

Loyalists and Nationalists are now well equipped with materiel. Sometimes one side has the advantage, and sometimes the other side. The Nationalists, with their trained officers, have been able to use their materiel to better advantage both as to technique, and as to tactics. The Loyalists have been at a disadvantage, due to lack of trained personnel. This difference has been strikingly noticeable in the artillery. We will mention this later.

Recollecting the differences between the two sides, let us see what lessons have issued from Spain.

The outstanding one has been the power of the defense. It has taken unexpectedly stronger forces, ammunition, and time, to break the simplest lines, held by poorly trained, and sometimes poorly equipped units. All kinds of terrain have been able to hold off an antagonist. It was not news that mountain lines were hard to break, but lines in open country have been difficult to overcome. Towns, large and small, have been held by very mediocre forces, notwithstanding in many cases the presence of large numbers of inhabitants to hamper the defense.

Defensive positions during the early stages of the war had some regular formation. It was easy to locate these, and a combined infantry and artillery attack could break them. Concealment became the rule, and with practice camouflage became excellent. The skeleton of the defense was a dispersed system of machine-gun posts, supported

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by artillery in defiladed positions. The dispersion was both as to distance and as to interval, and was as irregular as possible. The machine guns afforded no targets that were visible from air or ground observation, and their positions were changed frequently.

Machine guns have not needed extensive fields of fire—100 meters has sufficed. Positions on reverse slopes, with a mission of stopping attacks at a crest in front, have been successful. If the enemy remained on, or just in rear of the crest, the artillery destroyed him by shell fire—crests are easy targets to bracket. It has been found to be almost impossible to discover even approximately the location of concealed machine guns. They have been as close as 100, and as far as 2,000 meters from where infantry has been stopped. In general, defensive positions had several lines in rear of one another.

Woods have been defended by machine guns which could not be located by any kind of observation. Open ground in front could be covered by fire through tunnels cut through the underbrush. Ravines inside of woods afforded excellent defense positions, especially if protected by wire, but any kind of position has been found difficult to seize. Where time permitted, machine guns have had overhead cover. The artillery mission has been, for the defense, to provide emergency barrages, and to shell hostile troops which have been halted by the machine guns.

Spanish towns have stone buildings, and have been important centers of resistance. Only selected buildings, or parts of buildings, were occupied. Defenders could be posted as desired between roofs and cellars, and on either or both sides of streets, and anywhere within a radius of several blocks. Passages opened between buildings enabled the defense to shift from a building being shelled to one which was

temporarily safer. Even when close by, it was no easy task for the attack to determine where the enemy was.

The initial attack on Madrid was stopped by a force of 8 machine guns, 1,400 rifles, and 1 75-mm. gun. This force was outnumbered 20 to 1, but it held. The castle of Alcazar sustained prolonged shelling over a period of six weeks; it was mined, and repeatedly attacked by superior forces, but it was never taken.

Stone, concrete, and steel-framed buildings have been difficult artillery targets; not hard to hit, but hard to drive defenders out of. Light and medium artillery have caused but partial destruction, and have not driven out personnel in lower stories and cellars. Heavy artillery, firing with delayed-action fuzes, especially if of 210-mm. caliber or larger, may bring down entire buildings of considerable size. But there has been little artillery of this caliber in Spain. Bombing with delayed-action fuzes, using bombs up to 300 kilograms, has been very destructive, but it has not been very accurate. Battles for towns, of even minor importance, have lasted for weeks and months, there not having been sufficient heavy artillery and ammunition to destroy the enemy's positions within a reasonably short time. Successive destructions have afforded the possibility of occupying old positions previously shelled, and have given no solution.

Machine guns have formed the nucleus of the defense, but they have needed artillery to support them. The machine guns have arrested the attack, and have forced the attackers to seek cover. The artillery has had the mission of searching out the enemy, destroying him, or causing him to retire. Usually the artillery has been inferior in strength to that of the enemy, and has been unable to cover the entire front at one time. When an attack

## LESSONS FROM SPAIN

was received the artillery fired successively at targets which had been stopped by the machine guns. In brief, the machine guns immobilized the enemy; the artillery destroyed him.

The defense has profited by terrestrial observation. In the early days attacks were loosely made, and were visible to the OP's. With improved training and experience, infantry is no longer often seen; but the auxiliaries of the infantry—tanks, infantry cannon, and the like, are hard to conceal, and have given the OP's at least some idea as to the location of the hostile infantry.

In general, the result has been that a defensive line which averaged 20 machine guns to the kilometer of front, if suitably sited and camouflaged, has been unbreakable by any infantry attack, regardless of support by tanks, aviation, and accompanying weapons, unless it was supported by strong artillery forces.

A hundred men have been able to hold a kilometer of front; a regiment, three kilometers with triple lines of defense. Nine to ten kilometers has been a good front for a division, which could provide a defensive position of such depth that it would be impracticable to break the rear lines, without the enemy first causing a displacement forward of his artillery. Where only a single line of defense has been necessary, as for temporary positions, extensive fronts have been held by small forces.

The power of the defense, through extensive use of machine guns supported by artillery, has caused battles to be prolonged over days and weeks, has

involved heavy losses, and especially for the offensive, has required the expenditure of enormous quantities of ammunition.

The defense, in Spain, is constantly improving, from experience, training, and new materiel. Both sides are now provided with antitank and anti-aircraft artillery as basic elements. Mustard gas would be an excellent defense weapon, but reports to date do not indicate its use in Spain.

How has the offensive succeeded in overcoming such difficult and tenacious resistance, which has caused battles to last over prolonged periods of time? Before we answer this question, let us see what tanks have done.

Much had been expected of tanks, and much had been hoped for from them. There had been speculation, most interesting, as to what tanks would do when their opportunity came. The artillery has been interested from the viewpoint of bringing effective fire on a rapidly moving target, which could shoot back. Infantry has been interested both in the use of tanks as an offensive weapon, and as to how, when on the defensive, best to meet their attacks.

What are the facts?

Tanks in Spain have been German, Italian, and Russian. Germany sent units from, or the same as, those assigned to her mechanized units. Italian tanks were those which had been successful in Ethiopia. Russia sent two kinds of tanks—a light type and a heavy. The characteristics of these four kinds of tanks, in round numbers, were:

| Type                                | Unknown | Fiat | T-26       | T-28       |
|-------------------------------------|---------|------|------------|------------|
| Weight, tons .....                  | 6       | 3    | 9          | 20         |
| Speed, maximum miles per hour ..... | 30      | 25   | 30         | 25         |
| Armor, inches .....                 | .6      | .25  | .37        | .6         |
| Machine guns .....                  | 2       | 2    | 2          | 3          |
| Antitank guns .....                 | None    | None | One 47-mm. | One 47-mm. |
| Crew .....                          | 2       | 2    | 3          | 4          |

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The first tanks appeared in October, 1936. They were Russian, and were near Madrid. At this date there were no antitank guns or mines in the field, and tanks were not employed against tanks. Conditions were most favorable for their use. They were employed in groups not exceeding twenty to make turning movements, and then to operate against the enemy's flank. These tanks had some success, and they inflicted losses. But they never had a decisive effect on the engagement. They were not tied to the infantry, nor to any artillery fire; they invariably scattered, and were destroyed, or were put out of action by the hostile artillery. Light batteries were a dangerous antagonist. Certainly batteries had to take precautions for their own safety. A sharp lookout, the ability to change the direction of fire of at least one piece to any direction, with a fair field of fire all around, were necessary. In the Madrid battles, tanks never broke through the artillery line.

Russian tanks had certain mechanical difficulties, which were sharply brought out by war conditions. They had considerable rubber in their running gears. This melted or burnt out when crossing through gasoline fires, which in street fighting were hard to avoid. Grooves existed on the under side of the tanks. Individual hostile infantry, from the shelter of shell holes or other places, threw bottles of gasoline against the side of the tanks. The escaping liquid accumulated in the grooves, and was then ignited by a hand grenade. The resulting fire forced out the crew, and the tank was lost.

There were numerous tank actions during the winter of 1936-1937. The infantry on both sides eventually secured tanks, so most attacks had some. They secured no important results.

The lessons of the World War, that tanks should be used in masses, had not

been forgotten, but it was the spring of 1937 before enough tanks were available so to employ them. Loyalists and Nationalists both secured considerable number of tanks at about the same time, but as pointed out, the Loyalists had tanks which were heavier, and all of which were armed with an antitank 47-mm. gun.

In the Guadalajara campaign, the Nationalists used nearly 100 tanks in one mass. They were covered by a strong artillery preparation. They had considerable success, for they made a breach in a defensive line which had previously resisted numerous infantry attacks. An advance of nearly 30 miles was made, notwithstanding bad weather, with nearly continuous rain and snow. The artillery which had supported the tanks displaced forward, but because of wet ground failed to occupy positions, and remained in march order on the roads pending information as to location of targets.

At this stage, the Loyalists counterattacked with a mass of about 50 Russian tanks. The Russians overwhelmed the smaller German and Italian tanks, whose armor could not resist the Russian tank 47-mm. guns. Neither had the Nationalists at this date any antitank guns or heavy-caliber machine guns capable of stopping the Russians. The Germans and Italians fled back through their supporting troops. This battle appears to have been the first of tanks versus tanks—the one with the heavier armament and armor won.

Now came the Loyalist aviation. Finding the Nationalist artillery strung out on roads with trains in rear of them, they bombed these columns, causing serious losses and tremendous confusion. This was too much for the Nationalist infantry. Observing what appeared to be a spectacular destruction of their artillery, from which they were receiving no assistance, confronted

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by advancing Russian tanks with armor impenetrable to their projectiles, they fled after their own tanks, and streamed to the rear. The Russian tanks made a substantial advance, but they were not able to penetrate the line of reserves. The operators understood how to drive their tanks, and how to fire their weapons. But when they got in advance of their supporting troops, the tanks were not employed to the best tactical advantage, and they lost the opportunity for all except a local success.

The lessons of the Guadalajara campaign were evident. Tanks by themselves had not accomplished much. It seemed clear that thereafter, the action of tanks must be jointly with, and in coordination with:

The artillery to clear the way.

The infantry to hold what the tanks seize.

Tanks with armored cars are an intermediate weapon between artillery and infantry. They had given excellent results for exploitation, but only when the enemy had no prepared defense line, antitank guns, or artillery to oppose them. For the future, the possibility of tanks and armored vehicles being opposed by like types must be expected and provided for.

Both sides in Spain have now equipped themselves with antitank guns. Standard equipment on the Nationalist side is 4 65-mm. guns per battalion of infantry. They have been very successful, for since the spring of 1937, unless the antitank guns were first knocked out by an artillery preparation, no frontal attack by tanks has succeeded.

This brings us back to the point of determining how attacks must be conducted in order to penetrate, or drive back, a modern defense.

Many, in 1918 and afterward, thought that the great concentrations of artillery

in the closing year of the World War were exceptional, and would not again occur. They were of the opinion that the World War showed decisively the superiority of the offensive, and that this method of warfare was unduly handicapped when it was contingent on accumulating masses of guns and ammunition. They looked forward to emancipating the infantry from being tied to masses of artillery. Schools taught that extensive artillery preparations would occur only in a limited number of cases, and that effort should be directed to avoiding them, substituting mobility for fire power. To obtain mobility there has been in some places a marked tendency to decrease the artillery, on the ground that it is cumbersome and interferes with the desired mobility. If Spain has shown anything, it has been that even slenderly held positions can not be broken except through thorough artillery preparation. The rule has been—no artillery: no progress.

The facts are that the World War proved not the superiority of the offensive, but the superiority of materiel. The offensive of the Allies in 1918 won, but they then had the artillery and ammunition needed. Offensives in earlier years had been generally fruitless because of lack of materiel, and the war drifted on until the means to end it were forthcoming. Then it ended rapidly.

Once again we see the same lesson in Spain. When one side has accumulated materiel sufficient for an offensive, progress may be made, and it ends when the materiel, especially the ammunition, is exhausted. A pause results until a new stock of guns and ammunition has been concentrated. It is not of course necessary that new assemblies of means be in the same sector as a preceding one.

After one and a half years' strenuous

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fighting, through mountains and across plains, and against cities, large and small, it has been everywhere found that only artillery fire in great volume would break an even moderately defended front. Both sides in Spain had to increase, and are still increasing, their artillery. It has been necessary to provide much more ammunition than had been previously even imagined.

The artillery has been the main arm on the offensive. Not only has there had to be artillery in quantity, with lots of ammunition, but it has had to be pretty good artillery. Victories by the Nationalists have been largely due to the fact that the major portion of the Regular Army artillery joined their side. The Loyalists have from the first been suffering from a dearth of competent artillery officers. They had a deficiency of materiel at the beginning of the war, but this was later corrected by importations of artillery and materiel from Russia and France. But they have not been able to find competent artillery officers to handle the excellent materiel now at their disposal.

The offensive has won battles by piercing fronts. Excepting the early days of the war before armies had been organized, turning movements have eventually had to fight a frontal action from the local point of view. Victory depended on having sufficient *guns and ammunition*, not necessarily a superior number of personnel . . . at the decisive point. Owing to the quantity of artillery required for frontal actions, attacks to date have only been possible on narrow sectors, because of lack of materiel for more extensive operations. It has been possible to change sectors from time to time, and also theaters of operations, but this has taken time to accomplish.

War is dangerous and expensive. European armies are under constant threat of having war break out without notice.

They realize that the conditions of the World War were not exceptional, but were the necessary and reasonable consequences of improved materiel, and that the situation created by these, and newer developments, must be met and provided for.

That large quantities of artillery and ammunition are necessary to make an offensive possible is now recognized. As the artillery provided by current tables of organization is insufficient for modern needs, this situation is being temporarily met by:

- a. Increase of artillery, as far as stocks permit.
- b. Great increase in ammunition reserves.
- c. Reducing fronts of attack to a width commensurate with the number of guns and ammunition available.

France has arranged, effective upon mobilization, to double its division and corps artillery. The materiel for this is on hand. An increase of the army artillery is under consideration. The increase will provide approximately 50 guns per kilometer of front, of which a little over one-half are 75-mm. guns, and the balance of larger calibers. These figures are basic strength, and are exclusive of anti-aircraft, anti-tank, and infantry guns.

Fifty guns per kilometer is low to insure success. It is a minimum for favorable cases, such as where no cover exists and observation is good. Where cover does exist, the basic strength is to be doubled or tripled.

Germany and Italy are increasing their artillery, details not yet known. European countries are increasing the ammunition reserves, as it is evident that war will come to a standstill if very large supplies of shell and powder are not constantly available.

Cessation of hostilities, due to lack

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of materiel, occurred during the World War, and is again occurring in Spain. Such a situation is costly. Prolongation of war gives time for economic factors, finance, starvation, lack of raw materiel, to exert pressure. Economic pressure is important and effective, and no nation will nowadays start a war unless it has on hand sufficient war materiel to give more than a reasonable chance of lasting through the period of all battles needed for the mission of the war. Every effort is being made to avoid in the coming war long delays between battles. Quantities of munitions in stocks are secret. No nation wishes to allow a possible enemy to determine whether it is ready for war, or approaching that status. We can not state how nearly ready for war certain nations are.

Based on recent war experiences, battles of the future are envisaged as commencing with an artillery preparation against a front restricted in size to the number of guns available. All guns will fire at a high rate, delivering a deep and terrific barrage, largely of medium and heavy calibers. This barrage will advance slowly, starting from a range which is known to be short of the nearest hostile positions, and will continue to a range beyond the objective of the infantry. We will discuss the infantry advance later. The barrage must drive out, or destroy, substantially all enemy installations in its path, which must include those of the flanks of the attacking force. Since it has been repeatedly proved that a very small force can defend a front, it is sufficient in an attack, if only a thin line of infantry reach the objective, provided there be a short time for orientation and reorganization.

Coordination of artillery, infantry, tanks, and aviation must be arranged. In the past we have found that coordination

of artillery and infantry was far from simple. To add thereto two other arms, tanks and aviation, certainly complicates the question. But it is absolutely necessary that it be done. And it has been accomplished in Spain, the first time at Bilbao, where there was provided:

- a.* A powerful artillery barrage.
- b.* Regulated bombing, coordinated with the artillery.
- c.* Tanks in masses, closely following the artillery barrage.
- d.* Infantry closely following the tanks.

Lacking sufficient artillery, the sector of attack was narrow, but it went through.

A later example of a modern attack occurred at Santander in August, 1937. The battle was fought over terrain consisting of narrow valleys, between wide stretches of open upland. In one attack by the 61st and 62d Nationalist Divisions, the artillery preparation, aided by bombing, broke the enemy's lines, and the tanks and infantry reached their objectives without opposition.

Two Italian divisions, Black Flame and Black Arrow, had stiffer opposition. These two divisions had about 72 batteries, or 288 guns, in support, on a front of some 5 kilometers. The artillery preparation lasted 75 minutes, with an average expenditure of not quite 2 rounds per gun per minute. About 120 tanks followed the barrage. Approximately one-fifth of the tanks was of a newer type carrying an antitank gun, and covered, against hostile tank attack, the lighter Fiat 2-man tanks. In this battle no enemy tanks appeared, so that there was no tank-versus-tank action. The light tanks ran around everywhere. They concentrated against enemy nests which had not been destroyed by the artillery; they mopped up in a most effective manner. The infantry assisted in mopping

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up, and organized the territory gained.

The infantry, having reached its objective, protected itself with but minor assistance from the artillery. The latter was released for a following mission, which was to prepare for an attack in another sector, not necessarily adjacent. Utilizing long ranges, and wide traverses on carriages, the artillery, with as few changes of positions as possible, drove a second wedge into the enemy's front. This system kept the artillery constantly busy; the infantry was mainly employed by sectors.

Successive attacks on restricted fronts, each with limited objectives, are not preferable to attacks on a wide front with unlimited objectives. It has simply been a necessity, due to the strength of the defensive, which has imposed this type of attack as the only one possible. An attack on a wide front would require more guns and ammunition than either side in Spain now possesses. This lesson is becoming well understood, and has led, as stated, to a general movement to increase the artillery and ammunition supply of modern armies. If a new war occurs soon, attacks on limited fronts, delivered successively in different sectors, is what will probably occur.

The days of infantry marching on foot are at an end. Columns on roads are no longer possible, and while it would be practicable to march infantry on foot if divided into small detachments, this would require so much space as to be impracticable. Road movements for the future are clearly to be by motor vehicles, which may march at high speed, with sufficient distance between vehicles as to preclude effective bombing or shelling.

The best opinion tends to having the infantry in attack follow the artillery barrage mounted on caterpillar cross-country tractors, preferably armored. Speed is not essential, as the artillery

barrage to accomplish its mission must move slowly. The tanks in Spain have clearly shown that this is practicable. Ten tractors to the kilometer carry enough men, machine guns and ammunition to hold an objective. The artillery preparation can neutralize most of the resistance; the tanks can mop up what little escapes the artillery. Infantry so mounted can safely follow the barrage at some distance, and may march in an irregular formation.

The French War Department has announced that as a result of the war in Spain, and of their own maneuvers held in Normandy, in September, 1937, that a large increase would be made in mechanized armored vehicles. This program is being pushed, as it is realized that possible hostile states may be doing the same thing, and may seize an opportunity to commence a war before their opponents have properly armed themselves. For example, some notable discussions of what is being prepared on this line have appeared in the German military press.

New weapons and equipment are decisive in modern battles. The offensive battles of the future, and the fate of nations, now are being planned, and this requires a strong artillery with plenty of ammunition, an air force to bomb objectives beyond artillery range, tanks and armored vehicles to precede the infantry attack, infantry mounted on trucks for road movements, and on cross-country armored vehicles for attack. The days of infantry operating on foot, except for defense, are disappearing.

Another lesson from Spain has been in the use of infantry reserves. To hold out important forces until reports are received which will enable a decision to be made as to the best place to employ them, has given poor results. It has been impossible for the

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OPs' or air reconnaissance to follow battle movements, because of universal use of camouflage and the impossibility of certainly distinguishing hostile from friendly infantry. Reports giving a clear picture of a battle do not arrive until the battle is over, and it is then too late to use the reserve. If used at all, it must be during the battle. The risk of committing reserves too soon is small compared with the risk of losing the engagement by not using them. The best plan has been to have the reserves follow whatever unit is advancing, and in any case keep moving forward.

Liaison between infantry and artillery has been difficult on account of inability of OP's and air reconnaissance to keep track of battle movements. In the offensive, the infantry has been able to follow the barrage, and if the artillery preparation has been correctly calculated for its mission of sweeping enemy units out of the sector of attack, the infantry has closely adhered to a time schedule. In the later battles, the artillery has set the pace, and has opened a way for the infantry.

On the defensive, time has been required to relay information from the front line as to enemy positions. Such information has occasionally arrived simultaneously from different sectors, which has introduced the problem of the priority of artillery fire between different targets.

For both offensives and defensive, CP's of artillery and infantry have tended to be close by. Modern artillery regulations generally have required this, but in practice it has not always been done. Some regulations show artillery CP's, diagrammatically in texts, as *in rear* of the next lower units—battalion CP's behind batteries; regimental CP's behind battalions; etc. War has not demonstrated that artillery CP's must be

in rear or subordinate units. What a CP needs is:

- a. Connection with own units, and supporting units.
- b. Information as to targets, and as to the enemy.

An artillery CP which is near to an OP, and close to the front, may be better situated to secure information as to targets, and maintain liaison with the infantry CP's, than if it were in rear of the batteries. A forward CP position has been indicated as frequently desirable.

Advances and retirements near the front, for all arms, have been in deployed, or semideployed, formations. The Germans practiced this in their retreat in France in 1918, so this method is not new. Some think that it must be slow and exhausting. Even if this were true it is, nevertheless, necessary. But its truth is doubtful. Modern vehicles, and utilization of roads, including secondary ones for small parties moving at a high rate of speed, afford means of transportation heretofore unknown, and must now be reckoned with.

The high rate of movement of motorized and mechanized troops enables forces 100 miles away to be in line over night. For troops to take shelter with safety, an outpost line must be at least that far out. It can be maintained only with motor vehicles and radio installations. If security detachments thrown out to considerable distances appear liable to capture or to severe losses, it must be remembered that they have greater delaying power than formerly, that they can be reenforced quickly, and that if necessary they can get away rapidly.

Excellent motor equipment in quantities is necessary for troop movements. It may be used deployed, or in numerous small columns on roads if at considerable distances apart. The increased lengths of columns will be balanced

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by a shorter time distance, due to the high rate of speed of vehicles. If moving at 30 miles an hour, and an average distance of 100 meters between vehicles (which is probably sufficient to avoid extreme losses from bombing) more than twice as many troops may move over a road than if on foot, marching at  $2\frac{3}{4}$  miles per hour. The days of advancing at this speed, except for small units, are gone. Protection against bombing and shelling, especially near the front, has to be taken, and detours may be frequent. Cross-country vehicles are indicated as the type for future troop movements in forward areas.

### Comments

If war should come soon, there is a strong probability of repeating the sequence of events which occurred in the World War. Rushing troops to the front, stabilizing warfare, conscription, efforts to have more men at the front than the enemy, sacrifice—largely useless—and then, after a long time, costly victory, provided we furnish men, money, materiel, and ammunition absolutely necessary to win.

Why start on such a course? For some it is easier to follow a path already defined than to discover a new one. But when the old path is known to lead to destruction, it ought to be boldly abandoned, and a complete new direction taken, in the light of lessons of recent wars.

We have been basing our training on the value of the offensive. Our annual training programs have stressed this point, and have insisted on teaching our officers that the offensive must be undertaken. There seems to be a general opinion that history indicates that victory goes to the side which adopts the offensive. This is not true. A moderate knowledge of history will show that victory by no means went always to the

side which commenced the offensive. The passive defense has occasionally won decisive actions; the active defense has won the majority of decisive battles. Think about Saratoga, Gettysburg, Waterloo, and the Moscow campaign of 1812. Nowadays the tactical offensive is most difficult, and ought not to be undertaken unless there are available the means required for success—artillery, ammunition, tanks, armored vehicles, planes. No training should stress the point that we must attack, if insufficiently or improperly equipped. To do so is to play into the enemy's hands.

In the past 50 years, decisive victories have been won only against forces which have been greatly inferior as to equipment, particularly as to artillery and ammunition. This is what is occurring in Spain—a repetition of past lessons. Why blind ourselves to this fact? If we are going to win our next war, a very great superiority will be needed to win. If we do not have this superiority, it is useless to try. For this reason, nations in Europe, although having assumed missions which from their point of view would justify war now, hesitate to start one, as they do not have the superiority necessary for winning. This explains the present stalemate in Spain. Neither side has the *great* superiority required for the overthrow of the other side. Two years ago in Ethiopia, and today in China, successful offensives have occurred. In both cases, one side has had noticeably inferior numbers, but a tremendous superiority in materiel, ammunition, and leadership.

In past wars decisions were sought primarily through application of *principles*. The main one was that victory generally went to the party which had the strongest force on the battle field. There were discussions as to whether morale was more important than numbers.

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As there was not much difference between opposing forces as to morale and equipment, the result usually was that the larger force won. Many still have the same idea—at the present time a dangerous one.

The opinion that the offensive is superior to the defensive is not necessarily true. Nearly a quarter of a century ago, in 1914, the French attacks on the Belgian frontier showed this to be false. Yet our regulations have not changed. Men are no match for machines. To hurl infantry forward, improperly supported with materiel and ammunition, is to invite death and defeat. Attacks nowadays do not succeed unless correctly planned, and equipped with materiel and ammunition.

If Spain has taught any lesson, it has been that morale will not compensate for lack of means. We need morale and trained troops, but we must have weapons and ammunition, and know how to use them, before we can expect victory. Numbers are no longer the main factor. A small, trained, and well-equipped force is superior to a large but improperly or insufficiently equipped force. We need only remember the offensive at the Dardanelles in 1915, with a superiority of 9 to 1; or at Neuve Chapelle in 1916, with a superiority of 16 to 1. Both of these failed, notwithstanding overpowering strength of numbers, due to insufficient equipment, particularly artillery and ammunition.

Modern weapons have changed war, and we can not count upon the old systems of tactics being of value today. We have not had meeting engagements between large forces since our Civil war, and not many then. Seventy years after this type of warfare has disappeared, we are still teaching it. Advance and rear guards marching on roads in columns are now impossible. The British have boldly abandoned this idea, and practice

advancing on a wide front, with small mobile motorized bodies. Some of our generals have practiced this maneuver, but we continue to instruct in old formations which are completely obsolete.

What has replaced the old tactics? Advances in line; marching of troops at rapid gaits through use of motor vehicles; an extraordinary change in materiel; the great strength of the defensive due to combined use of machine guns and artillery; the increased need of a powerful artillery and immense quantities of ammunition when on the offensive; the use of air forces to bomb and reconnoiter; armored vehicles to assist the attack; the coordination of numerous and complicated kinds of weapons and troops into one joint maneuver.

Competent leadership is more than ever necessary. Spain has shown that imposing masses of artillery and tanks will give but minor results, when leadership fails to make the best use of them. A leader with a high morale, and a will to win, will not compensate for lack of artillery, munitions, and materiel, and a knowledge of how to use them properly.

How are we to obtain this leadership?

Our schools follow some old methods which ought to be discarded, to be replaced with a corresponding amount of instruction based upon modern campaigns. Campaigns of this century should be treated as normal, and not as exceptional instances not likely to be reproduced in the future. Spain once more shows that stabilized warfare is not impossible, but is the necessary consequence of insufficient artillery and ammunition to keep moving. This is a repetition of the experience of innumerable wars. For the combined arms, maneuvers are necessary, with decisions based upon modern battles, and not

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upon tactics long dead. Above all, careful attention and study of lessons demonstrated in recent campaigns.

For an offensive, the artillery and the ammunition for the artillery determine the width and depth possible for an attack. Artillery communication is the least liable to interruption; its fire is the most accurate; it acts independently of the weather, terrain, and visibility. It can deliver fire, within the range of its guns, anywhere and at any hour, and in truly destructive volume, if ammunition is provided. Artillery blasts a way for tanks and infantry, and with its barrage marks out the path which they are to follow. It protects and screens, and destroys machine guns and other hostile weapons which oppose an advance.

Twenty years have elapsed since the World War. Unexampled changes have occurred in weapons, organization and tactics. A complete new orientation is required; new training with new ideas. There may be a delay before the next war starts. No nation desires to start war, if it feels there is the slightest risk

of losing—the result would be too terrible to contemplate. No nation is sure of all changes which ought to be made in existing armies. All are rapidly changing and adjusting their forces, hoping to complete reorganization and increase of materiel, before their possible enemies can do the same thing. But on certain changes all nations are agreed. These are:

*a.* Ability of the defensive to hold fronts with only a light occupation, until the enemy has assembled a vastly superior force of materiel and munitions.

*b.* Great increase of artillery for the offensive—officers, men and guns.

*c.* Greatly increased expenditures of ammunition, which for both defensive and offensive must be provided in advance while peace still reigns.

*d.* Necessity to coordinate with the artillery and infantry, air forces, and mechanized units. For this, frequent and extensive maneuvers.

Let us take advantage of the time which may yet be available before our next war starts.



## New President of Field Artillery Association

Major General Robert M. Danford, the Chief of Field Artillery, has been selected by the Executive Council, in accordance with the terms of the Constitution, as President of the United States Field Artillery Association, to complete the unexpired term of Major General Upton Birnie, Jr., who resigned his office March 25th.



*During National Airmail Week, letters from Fort Hoyle, Md., carried a "cover" of the Sixth Field Artillery (Colonel William P. Ennis), the regimental crest in black on a scarlet background, and the reminder that a gun of this command fired the first American shell in the World War.*

# Are Private Soldiers Necessary?

BY WILLIAM HAZLETT UPSON

**N**OW that the horses have been so largely eliminated from the field artillery. I have decided, entirely on my own initiative, to start working on another much-needed reform—the elimination of the privates. And I feel that it is only fair for me to present my plans to you artillery officers who read this journal, so that—if you have any objections—you may voice them before it is too late.

In my opinion (and I ought to know, having been one of them) privates are just as objectionable as the horses ever were. To put it bluntly, the average private soldier—like the average horse—is an unmitigated nuisance. He is always in the way—always making trouble. He is a continuous source of worry to his officers, and a burden on the service of supply. And the small amount of useful work which he contributes can be handled much better by machinery. In short, the private has no legitimate place in an efficiently organized battery of field artillery.

Perhaps this point can be made clearer by a consideration of the activities which went on in our battery—D of the 13th—when we were at the front in 1918. As batteries go, this outfit was unusually efficient. We were well trained and well commanded. The officers knew their stuff, the drivers knew their horses, and the cannoneers knew their guns. The special services—cooks, telephone men, and others—performed their tasks effectively. At all times we managed to put the guns into position and deliver our fire as ordered. Judging by the standards of the day, we were a swell outfit. But judging by any

modern, common-sense standards of efficiency, we were, I regret to say, lousy.

Here are the mournful facts and figures. Our battery, which was equipped with four horse-drawn 155-millimeter howitzers, had a personnel of approximately two hundred men. (Because of losses and replacements, the number varied from 186 to 211.) Starting on the balmy summer morning of August 1, when we detrained at Chateau-Thierry, and ending in the damp and chilly dawn of November 11, when the BC, in a field near Murvaux, confirmed the rumor that the war was really over, the battery put in one hundred and two days of active service. For ninety days of this period we were constantly in action or on the march. For ten days we were in so-called rest billets, busy all the time on the equipment, and working just as hard toward the winning of the war as when we were at the front. And there were two days of real rest on a railroad journey sandwiched in between the Aisne-Marne and St. Mihiel offensives. This leaves a period of exactly one hundred days during which two hundred men labored so hard and so continuously that, even now, it makes me tired just to think about it.

And what, in a military sense, did we accomplish as a result of all this toil? Well, an inspection of my own wartime diary, and the history of the battery which was published after the war, shows that we moved the guns, in the course of twenty-eight night marches, a total distance of 324 miles. And we fired slightly in excess of 14,000 rounds at the Germans.

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Now, 14,000 seems like a lot of rounds, and 324 miles seems like a long distance to travel—until you consider the effort that went into it. 100 days' work by 200 men makes a total of 20,000 days of man-labor. This does not include the time spent in training. It does not include the work which the railroad and steamship organizations performed in moving the battery from the United States to the front in France. And it leaves out the labor of the services of supply in delivering ammunition. In other words, this 20,000 days is purely and simply the amount of man-labor that had to be expended in order to move the battery 324 miles and fire 14,000 rounds.

20,000 days of man-labor divided by 14,000 (the number of rounds) gives 1.4 days of man-labor per round. 324 miles divided into 14,000 parts gives 122 feet as the distance travelled by the battery for each round fired. And 122 feet multiplied by 4 (the number of guns in the battery) gives 488 feet of gun travel for each round fired. All of which may be summed up by saying that in our battery it required 1.4 days of man-labor to move one gun 488 feet and fire one round.

At first sight, this seems completely cock-eyed. Does it take one man almost a day and a half to hitch up the horses, move one gun 488 feet, and shoot it off

once? Or does it take ten men two weeks to hitch up the horses, move one gun less than ten miles, and fire a hundred rounds? The answer, of course, is that no such amount of time could possibly be required for any such task, and that most of the ceaseless labor of our battery was expended on nonessentials. Instead of concentrating on the only two jobs that had any effect on winning the war—moving and firing the guns—we artillerymen of 1918 frittered away our energies in an incredible number of miscellaneous activities which had no real connection with what we were trying to accomplish.

And what were these miscellaneous activities? Well, different members of the outfit did different things. According to the roster in the D Battery history, we had five officers—a captain and four assorted lieutenants. These gentlemen—as near as I can remember—used to spend most of their time telling others what to do. (They also engaged in certain minor activities, such as orienting the guns, figuring firing data, riding around on horses, and adding to the burden of the service of supply by consuming their due quota of food.) We had thirteen sergeants and sixteen corporals, who also spent most of their time, when not eating, in telling others what to do. This means that the



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moving and firing of our four guns required the presence of thirty-four people to give directions.

It was also considered necessary to have four cooks, four mechanics, eight wagoners, one horseshoer, one saddler, two buglers, and a miscellaneous assortment of telephone and instrument men, and other specialists.

And, finally, there were almost one hundred and fifty privates, classified as drivers and cannoneers. The drivers did a certain amount of driving, and the cannoneers actually put in a small fraction of their time firing the guns. But most of their energies were devoted to odd jobs such as digging fox holes, setting up pup tents, taking down pup tents, rolling packs, carrying packs on long marches, digging latrines, cleaning harness, washing wagons, grooming horses, leading horses to water, serving on mess details, carrying hay in bales, and so on—far into the night. You know the dismal story as well as I do.

And what was the reason for all this toil and trouble? Why—if the basic function of the battery was merely to move and fire the guns—was there so much messing around with picks and shovels, pup tents, packs, wagons, kitchen equipment, curry combs, baled hay, and what not? The answer is that all this extra work was necessary because there were so many men and horses in the battery. And why were there so many men and horses? Because there was so much work. The whole thing was a vicious circle—with the members of the battery, both human and equine, spending most of their time waiting on each other. And, to make matters worse, all of them were in turn being constantly waited on by the services of supply.

So what is the answer to all this foolishness? Well, part of the problem has already been solved by getting rid of the horses. And, as I have already pointed

out, the rest of the mess can be cleaned up by getting rid of the privates—and also, if possible, the noncommissioned officers.

How this reform can be brought about is, of course, a difficult question. It is always easy to criticize; it is hard to work out a solution. However, privates—in spite of their uselessness in fighting a war—have always been noted for their wealth of ideas on how to improve the Army. And Ex-Private First-Class William H. Upson, Serial Number 563,591, Battery D, 13th Field Artillery, Fourth Division, AEF, is no exception. So here goes.

My plan is to appeal directly to the Secretary of War, and get myself appointed, through special act of Congress if necessary, as Grand High Field Artillery Reorganizer, with full authority to carry out my reforms, and plenty of funds for expense. It might take several million dollars—which is a lot of money, but not much when you consider the good I would accomplish. Without the authority and the cash, I would of course be helpless, so, for the purpose of this discussion, we must assume that I am to be granted these primary requisites.

Like any other good executive, I plan to carry out my job by referring all problems to competent experts. In choosing these experts I will always bear in mind the fact that my principal objective is the saving of labor.

I will avoid all European ordnance experts, and all Americans whose ideas are derived from them, because in Europe labor is so cheap that no European has any real conception of labor-saving technique. I will pick all my helpers from American industry, particularly such branches as automotive production, where the saving of labor has been more highly developed than anywhere else in the world.

The first problem will be the redesigning

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of the basic unit of all artillery—the gun. In tackling this job I will first get hold of one of our ancient cannons—let us say a Schneider 155-mm. short. I will hitch it onto a caterpillar tractor. I will drive the whole works up in front of the office of somebody like Mr. Kettering, of General Motors. And I will ask him to come out and give it the once over.

I will say, "Look what we have here, Mr. Kettering. This is what we used to use when we fought the Germans over in France. Since that time, however, there has been one improvement. The eight clumsy horses—which used to be urged along by four drivers, with a corporal on a fifth horse to tell them how to do it—has been redesigned into a tractor which can be handled by one man. We have now decided that this clumsy cannon, which required anywhere from four to eight men to operate, must also be redesigned into something which one man can handle. Our slogan is, 'One gun—one man.' and you, Mr. Kettering, have been selected to make this ideal a reality."

If Mr. Kettering should refuse, it is almost certain that some other competent man could be found who would be successful in putting over the job—difficult though it might be. The main problem would be the devising of some mechanical means by which the ammunition could be received from a truck, held in temporary storage in some sort of magazine, and then fed into the breech of the gun as needed. The setup would be very similar to the automatic handling of materials in factories. And the details would be left entirely to our engineering expert. He could use cranes, hoists, belt conveyers, pneumatic tubes, or even magnets. He could employ fixed or semifixed ammunition, or, for greater safety, he could keep the shell, fuse, propelling charge, and primer separate

and assemble them during the loading process. He could borrow ideas from the mechanism of machine guns, revolvers, sausage-stuffing machines, or anything else that met his fancy. The power could come from the recoil, or from a special motor on the gun, or from the tractor. And this power could be applied in any way that seemed best—electric, pneumatic, hydraulic, or mechanical. A few operations—such as screwing in fuzes, and swabbing out the bore—might possibly be done by hand. The gun tractor could be kept as separate units, or combined by mounting the gun on the tractor. The only requirement is that the gun be developed into a machine which can be operated by one man.

If any of you artillery officers doubt that such a machine can be constructed, I would suggest the examination of certain intricate machines which are already in common use. There is the newspaper press, the automatic cigarette-making machine, and the machine which permits one man to control the simultaneous grinding of a dozen or more cylinder blocks. If you feel that such intricate machinery cannot be successfully operated in the field, even by highly trained army officers, you might investigate the operation of complicated combined harvesters by ordinary farmers.

If civilians can use elaborate machines, the army can do it too. All we need is a competent engineer, two or three years for experiments, and a couple of million dollars for expenses, and I am sure that a thoroughly practicable, fully automatic one-man field piece can be produced. And, as soon as we get this field piece, the rest will be easy.

As Grand High Artillery Reorganizer, I will at once set up an experimental battery of four guns. To begin with, I will not attempt any fancy tricks like firing the guns while they

## ARE PRIVATE SOLDIERS NECESSARY?

are in motion, so I can use one man both to drive and to fire each piece. This means that, in a pinch, the whole battery could be operated by four men—let us say a captain and three first lieutenants. However, we want plenty of help in case of emergencies, so I plan to assign one extra man—probably a shavetail—to each gun. This, of course, will raise the personnel of the battery to eight—which may seem excessive. But the four extra men will be useful whenever it is necessary to run day and night shifts. They can also act as replacements in case of casualties. And they will come in handy for the few odd jobs which still remain in spite of the reorganization.

Most of the jobs which used to wear down the strength and morale of the old battery will, of course, disappear entirely. And the rest will be handled, in large part, by machinery. By getting rid of the privates and noncommissioned officers, as well as the horses, we reduce the task of supervision and the paper work to almost nothing, and we eliminate entirely the whole miserable round of grooming, feeding, and watering of horses, the cleaning of harness, and the washing of innumerable wagons. No longer will there be one hundred foxholes to dig, and one hundred pup tents to be pitched thereon. Instead, each tractor will be provided with a neat cabin, incased in steel armor plate, and containing two comfortable bunks—thus providing far better protection, both from weather and shell fragments, than the former arrangement. If elaborate gunpits are desired, they can be scooped out by the regimental power shovel. The laboriously-excavated 200-man latrines of former days will be replaced by four cute little chemical toilets, one in each tractor cabin.

Kitchen arrangements will be worked out in collaboration with some competent

firm like the Statler Hotel people or possibly the Cornell University School of Hotel Administration. Probably there should be light housekeeping apparatus in each cabin. We might also experiment with foods cooked at the rear, and delivered, along with the ammunition, in thermos containers. Or, we might have a fully-equipped armor-plated regimental dining car, mounted on caterpillar treads, and operated by a highly trained cook, who—considering the importance of good food in maintaining high morale—should rank at least as a major.

The communication problem will be referred to the Radio Corporation of America with the request that they work out a system of two-way radios for all guns and for the colonel's armored car. If they fall down on this job we shall probably have to develop a couple of regimental high-speed motor-driven armored reel-carts. Orienting the guns for map firing can be done by two or three of the spare lieutenants. If an observation post is needed, it can be established by one or more lieutenants and a regimental reel-cart. Firing data will be figured on machines developed by some adding-machine, comptometer or cash-register company. If these people can make apparatus which works out an intricate problem in compound interest with a mere flip of the wrist, they ought to be able to provide something that would handle an old-fashioned one-hour firing-data nightmare in about thirty seconds. Probably the firing-data machine should be built into the panoramic sight, so that the results of all computations, including corrections for barometer, wind, temperature, drift, site, and so on, can be applied directly to the laying of the gun.

There will, of course, be other problems. But in an article of this length it is not possible to discuss everything,

## THE FIELD ARTILLERY JOURNAL

and I have therefore attempted to list only a few of the high spots.

On the whole, I think my plans are rather conservative. Instead of taking on the whole army, and attempting to eliminate the privates from the infantry as well as from all other branches, I am confining my efforts to the artillery alone. And I am proposing only a very moderate reform. Later on, with machine-operated guns, it may be possible to shoot each piece four times as fast, thus using a one-gun battery, and reducing the personnel to one captain and one lieutenant. At present, however, I am content to let it go at eight men to the battery instead of the former two hundred. And there is no reason, in my opinion, why this change cannot be brought about—if the problem

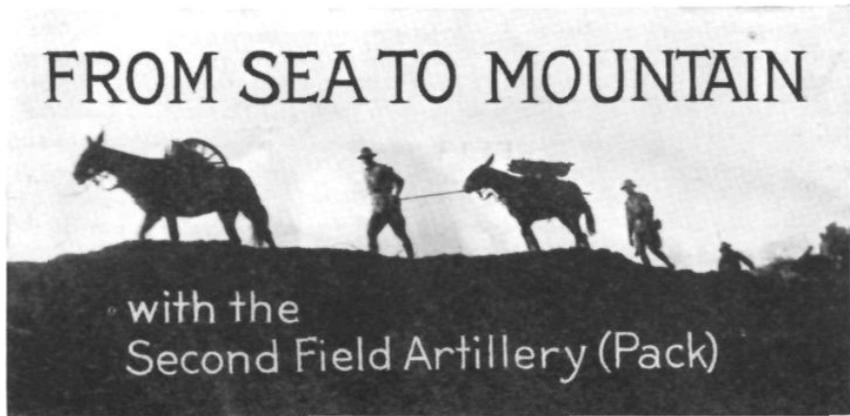
is taken up in a systematic way, and the services of the best experts in the country are utilized.

At any rate, it is a swell idea. And, if it can be accomplished, everybody—except perhaps the enemy—ought to be satisfied. The taxpayers will have a much less expensive army to support. The service of supply will be relieved of tremendous burdens. The artillery privates should be delighted at this opportunity to help win the war by sitting around at home. And you artillery officers ought to be more than delighted at the prospect of carrying on a whole campaign without being hampered by the presence of vast herds of stupid horses, privates, and noncommissioned officers. So what do you say?



### ROUGH GOING

Dry-point etching by Kerr Eby  
*Courtesy of Charles Sessler, Philadelphia*



BY LT. COL. G. H. FRANKE, FA

EARLY in December last year the commanding officer of the 1st Battalion 2d Field Artillery, stationed at Fort Clayton, Canal Zone, was confronted with the problem of putting on the finishing touches in preparation for Pacific Sector and Panama Canal Department maneuvers to be held the following February and March. His "ship" had been in "dry dock" the previous eight months of the rainy season, undergoing repairs, and in his crew of six hundred and seven enlisted men, three hundred and twenty, more than fifty percent, had never sailed before. A like proportion applied to the 15 officers for duty with the unit. A "shakedown cruise"; in the form of a tactical march and to include reconnaissance, selection, and occupation of positions and some service firing, promised a happy solution.

La Venta, located in the Republic of Panama some eighty miles southwest of the Canal and on the Pacific Coast, offered itself as an ideal terminal camp site. It possessed, for these parts, the rare combination of an ample supply of fresh water and several miles of excellent ocean beach in close proximity to one

another. Nineteen thousand acres were also already under lease to the U. S. Government as an air-corps bombing and machine-gun range. The open cattle-grazing country suggested service practice and the nearby mountains some real pack artillery marching which had hitherto been extremely limited on the jungle-covered terrain in the vicinity of the Canal Zone. Suitable intermediate camp sites en route to this ideal spot were to be had—but only after many man-hours of under-jungle clearing to provide the cover demanded by tactical conditions imposed.

Permission to make the march having been secured in late December, plans were devised for a combined animal and truck movement to La Venta, to provide training in certain phases of current defense plans. Early January was devoted to polishing off the conditioning of men and animals. Practice in loading weapons, equipment, and men on trucks was included in the schedule. The number of trucks required to supplement our ten-vehicle motorized section had to be determined. Native officials and private property owners had to be contacted for the approved use of necessary camp sites,

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without cost to the Government. Thus ended the important features of the final preparatory phase for the battalion maneuvers to say nothing of innumerable details covering such matters as supply, boot-fitting, training in antimalarial measures; and teaching the recruit how to trim and notch his toenails.

The animal column of two hundred and thirty officers and men and four hundred and twenty-three animals departed from Ft. Clayton at 4:00 AM on Monday, January 17th, crossed Miraflores Locks, and arrived at the La Venta camp site at 11:00 PM on Wednesday the 19th. Better to simulate such a move under combat conditions, it was placed under the command of a lieutenant. First Lieutenant Carl Darnell, who was assisted by First Lieutenant R. G. Baker. In addition to the Second Field Artillery, this column included the

62d Quartermaster Pack Train of fifty-eight mules and fourteen men, and attached veterinary and medical personnel. Conforming to the tactical situation and at the same time avoiding the tropical sun, all marches were made under cover of darkness with daylight finding men and animals hidden along a stream under the shade of the trees. The march of four laps, totaling seventy-eight miles, was made in the total elapsed time of sixty-seven hours. The last two hikes, thirty-eight miles, were made in the final twenty-three hours, with men and animals arriving in excellent condition.

Forty-four vehicles, mostly borrowed from the Pacific Motor Pool and the 33d Infantry, and consisting largely of 1½-ton Dodge trucks, comprised the motor column. This column departed at 6:00 AM, January 17th, crossed the



### NOW WHERE DID THAT OUTFIT GO?

Within the area marked "A," 600 men and 400 animals are bivouacked on the beach at La Venta, Panama, "C" marks the Santa Clara Inn.

## FROM SEA TO MOUNTAIN



### WITHOUT BENEFIT OF TIRE CHAINS

"Come on, pal!"

The Bn CO supervises the crossing.

Balboa Ferry and arrived at La Venta before noon the same day. All borrowed motor vehicles were now released and henceforth the Second Field was to depend only upon its own transportation. This proved an easy trip for these mountain artillery soldiers, but their two days' wait for their buddies with the animal column was not to be spent in play. Camouflage was still demanded. The camp site overlooked the ocean from one-hundred foot heights and extended along stream lines leading to the sea. Large trees promised concealment from the air, but jungle growth underneath had to be removed to make the area comfortable for a rather extended stay. A small freshwater stream, flowing but seventy-five gallons a minute, had to be dammed in two places for potable water supply and fresh-water bathing. The arrival of the animal column found these jobs completed, while a limited schedule provided at the same time some training in the Service of the Piece, and Communication.

Streams in the Republic of Panama, particularly near the seashore, are most likely to have high precipitous banks or treacherous muddy shores. To overcome

this handicap, a small engineer detachment of four enlisted men, equipped with gasoline-motor water pumps and canvas troughs, supplied the command with its fresh water requirements. They occasionally had to be reenforced by a few artillerymen. This detachment served us until our return to Fort Clayton and, except when in the mountains, where motor transportation was prohibitive, they met every water demand with well-known Engineer efficiency.

With the command assembled, daily training began, radiating from La Venta. The working day generally began at dawn and, except for occasional afternoon care of equipment and the usual chores in an animal outfit, it was over by midday. There were instances, however, when departure from camp long preceded the glow of the morning sun, and an all-night problem further augmented the variety of the training. Marches and RSOP's covering appreciable distances were the order of the day, but the experience also included two days of excellent service practice with all batteries participating. The artillery range in the Canal Zone is covered with dense jungle or thick

## THE FIELD ARTILLERY JOURNAL

cogon grass, the latter growing to heights of eight or more feet. Eight months of the year the whole remains saturated with water. Percussion problems have proven impossible with the ammunition thus far furnished. The Air Corps Bombing Range just north of La Venta enabled us to use shell for a change.

Mention should be made of the Sunday morning ride, with all officers and their orderlies participating. Leaving camp at 7:30 AM, we traversed jungle growth along the streams and grazing lands in the higher regions. Five gorge-like stream lines were crossed, requiring

had saved us a good Sunday dinner and, although the trip had thwarted a few contemplated week-end family reunions at Santa Clara Inn, all gave evidence of feeling that the experience was well worth such minor sacrifices.

Initially only a two-week sojourn was contemplated but, so unanimous was the wish to prolong it, extension of another week was secured. The fact that all was not work undoubtedly contributed greatly to this desire. There were many features of a lighter and recreational nature, the most popular of which was the surf bathing by men and animals. Many of



SEAHORSE AND MERMAN

leading down the steep rocky descents of several hundred feet and up again on the opposite slope. Much of the route was not even marked by native footpaths and the experience very nearly cost us one animal and one officer. The horse, which had paused on a precipitous trail and backed away from the officer leading him, would, with one more step to the rear, have crashed a hundred feet or so below. The threatened officer casualty was due to near heat exhaustion. With a little slowing up he survived the march but learned, it is hoped, that service in the Pack Artillery requires superior physical endurance in ability to hoof it as well as to ride astride a sturdy steed. After an estimated twenty-five miles we were back in camp at 12:30 PM. The mess sergeants

them had never experienced the exhilarating thrill of a plunge in the ocean. The Canal Zone offers no nearby surf bathing. La Venta furnished the best surf beach in the Republic. Even a motorized field artilleryman would have experienced difficulty in repressing a thrill, when each afternoon some four hundred mules and horses and some six hundred "red-legged mountaineers" took to the salt water together. For many of the animals, the mules particularly, their first approach to the ocean was with suspicion and they required considerable urging. Once their feet were wet most of them took to the water like ducks. They seemed to enjoy going beyond their depth and the splashing around—as much as the soldiers who clung to

## FROM SEA TO MOUNTAIN

their backs, their necks, their tails, and even their ears. Many a soldier acquired his first real tan in the tropics and, that the folks back home might know, it was not an uncommon sight to see them remove their shirts when a buddy's Kodak came into play. The modest but excellent Santa Clara Inn nearby provided other facilities for evening relaxation. It was here that the two senior bachelors entertained all of the officers at a superior dinner, properly embellished. Many will likely return to this fascinating spot at a time when their consciousness of the next day's work at dawn is not so apt to induce early evening departure from the Inn.

All good things come to an end and after two weeks based on La Venta, orders were issued for the trek back home. However, a new experience was awaiting the crew. The first part of the trip was to provide the diversion—a detour north *from the sea into the mountains* at El Valle and thence southeast again to the route followed on the outward journey. Located well up in the hills, some thirty miles to the north of the Pacific, via devious trails, if trails there were, El Valle presents a picturesque and fascinating settlement inside an ancient volcano. Its valley floor, at an altitude of 1865 feet, extends from east to west some five miles, and its breadth averages about a mile. Mosquitoes are declared unknown in its environs. Among its products are the sweetest and most luscious oranges of the Republic and truck loads of watercress find their way therefrom to Panama City.

No negotiable trails, for pack animals, that led directly north from La Venta to this alluring spot were known to exist. In consequence, a small pioneering group of one lieutenant, fourteen men, and nineteen animals, with light packs, and led by a native guide, was dispatched

several days early to reconnoiter and improve a prospective route. They attained El Valle on the second day, when a message came from the lieutenant to the battalion commander to "please come look at the trail." The battalion commander reached El Valle that same afternoon by motor, over a circuitous and difficult route, and interviewed his subordinate. The report revealed that with a little work the route was feasible until the descent of some 600 feet into El Valle. This descent was regarded as impracticable for the heavily loaded pack animals and, upon inquiry, an estimate was offered requiring the labor of the whole battalion for a month to make it negotiable. Otherwise, there were visions of guns, equipment, men, and animals tumbling down this slope in one wild scramble. This called for inspection and the battalion commander hoofed it to the top before making a decision. After seeing the problem he directed that the detachment devote the next day to specified improvement of this part of the route, that the following day be spent on sections over the balance of the trail and that on the third day the group return to La Venta. Subsequent events proved the decision correct. The relation of this incident is not for the purpose of praising the battalion commander for his decision nor to criticize the estimate made by his subordinate. Its object is to emphasize the seemingly impossible terrain that can be traversed by pack artillery. The lieutenant displayed unusual initiative and aggressiveness upon this task, for which he was highly commended upon its completion. The whole of his experience involves a story of its own.

The pioneer detachment returned on the third day as planned and on the day thereafter, Tuesday, February 1st, an hour before daylight, the command, less its motor section, began its hike

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UP FROM THE JUNGLE

into the mountains. The first day's march took us to an altitude of only some 700 feet, but included traversing four of the five same difficult stream lines described in the officers' Sunday ride. The cooler air that night brought forth many covering blankets not previously so used. Impressive sights of the command were panoramically presented, as in the case when the column formed an almost perfect tremendous "S"; with its tail on one ridge line, its center deep in the bottom of a stream, and its head on the opposite heights. That night found the camp along a beautiful rocky stream, with limited cover but abundant grazing to substitute for the long forage which could not be brought along. One soldier, a malarial suspect with a high temperature, had to be evacuated. Given a hypodermic and a little rum, he was strapped to the pack mule ambulance and started for El Valle at 5:00 PM, in a delirious condition. Lieutenant R. G. Baker in charge, the soldier's brother and two other enlisted men, all dismounted, accompanied the patient. The trip, mostly in the dark, was completed by 10:00 PM, without mishap, although he had to be carried by hand over the sharp 600-foot descent near the end. In spite of the arduous trip the lad was less delirious upon arrival at El Valle

where a motor ambulance, summoned by radio, whisked him to the Zone, over eighty miles away. A week later he was back in barracks for duty, none the worse for his experience.

Dawn of the second day saw the beginning of the climb to some 2,500 feet before the sudden descent to the floor of El Valle. The morning was cool, a light rain fell, and a twenty-five-mile wind was blowing. To many, such weather in the tropics was not even imaginable and the



PACKING OUT THE CASUALTY

appearance of snow flakes would have added little to the pleasant surprise. A full half-circle rainbow, with its ends against a background of distant higher mountains, completed the picture. Precarious

## FROM SEA TO MOUNTAIN

going, to include a two-foot passage, which could not be widened because of the sheer drops on either side, was encountered throughout the journey. Noon, however, found the entire force in camp enjoying an excellent dinner and neither animal nor man had to be evacuated because of the journey.

The cold night air made welcome the departure at 1:00 AM, the following morning. Together with a twenty-five-mile tail wind, it made easy the ascent to the saddle that took us out over a different and relatively perfect route. With the third lap completed, only three more uneventful ones remained. But coming down the home stretch the boys did open up and made the last two laps of thirty-nine and a third miles in twenty-three hours. This cannot be considered bad marching when one appreciates that almost two-thirds of the command carries the same light packs as the doughboys and that the automatic riflemen on foot set the pace of almost three and one-half miles an hour. And, all automatic riflemen do not meet the specifications of at least five feet ten inches for pack artillerymen. The pace setters in Battery A would be classified by some as "runts" but none ask them to step on it when they are out in front.

The battalion returned to its luxurious stables and barracks in Fort Clayton at 10:00 PM, on February 5th, after one hundred and five miles in the last series of marches. It had covered, in all,

approximately three hundred miles during its twenty days in the field while, for much of this period, it was at the same time engaged in tactical exercises and firing. No claim is made that the experience was completed without ailment to man or animal. Some mules and horses, previously suspected of being unable to take it, had to be condemned. There were limited casualties among the men in such matters as malaria and blistered feet, but such as these saw the light in adherence to prescribed precautions, as no instruction or disciplinary action could equally have accomplished it. Although recognizing that a chain is as strong as its weakest link, this battalion operates upon the principle that the remedy lies in strengthening that weakest link. The weaklings must be culled or brought to a higher standard just as they were in the marches of Stonewall Jackson in his Shenandoah Valley campaigns.

The experience reemphasized and brought forcibly home to everyone the all-time need for perfect physical condition in the Second Field Artillery Pack—motorized standards in this respect, apparently prevalent in some instances, simply would not suffice. For those in doubt and who had no service with the other types, overwhelming evidence was furnished that horse, horse-drawn, or motorized artillery could not displace pack artillery in certain rugged terrain.



HI HO, HI HO—

3½ MPH, 120 steps a minute, automatic-riflemen setting the pace.

# Fire Direction Indoors

BY MAJOR G. D. WAHL, FA

THE Field Artillery has developed a system of fire direction during the past few years which is simple, rapid and accurate. It is readily adaptable to almost any situation provided the commander has the requisite technical qualifications and the unit headquarters is accurate and dependable. The development of qualified commanders is the purpose for which our special service schools were devised. The development of qualified headquarters personnel is the responsibility of the Field Artillery units concerned. The purpose of this article is to suggest a method of developing efficient fire-direction centers and training the necessary communication personnel to the end that when used in connection with actual firing the results will be satisfactory.

## Communication

Chapter 4 of the "Digest of Field Artillery Developments, 1935" gives a rather complete discussion of the usual communication set-ups for fire direction. The one best adapted to the exercise to be suggested is Figure 23 on page 67 (See Fig. 1 hereof). At most stations the air-ground set will have to be eliminated because of a lack of an airplane or suitable substitute to work with it. Because of the development of the present fire-direction center, two lines to the battalion OP are no longer necessary in the average situation. For the battery set-up the operator at the guns can be placed about 20 yards from the OP and a plane table with a range-deflection fan can be substituted for the guns.

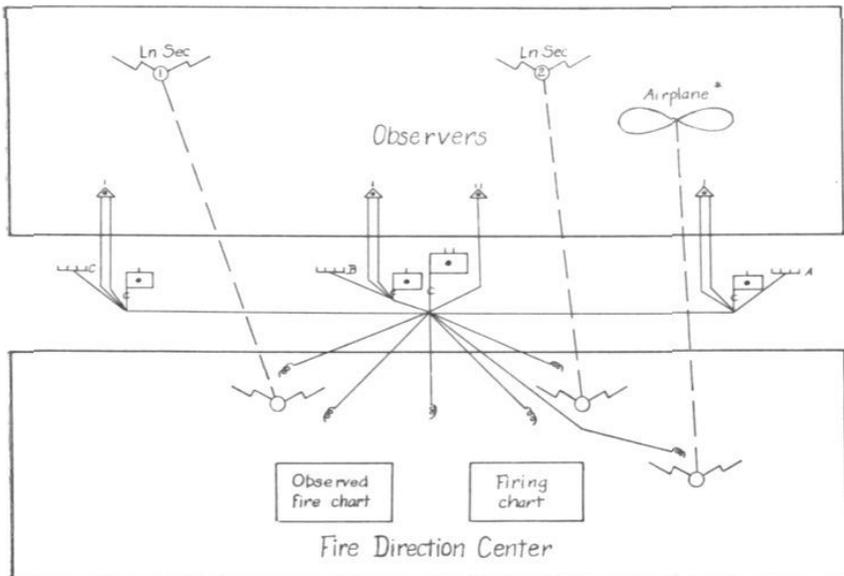


FIGURE 1

## FIRE DIRECTION INDOORS

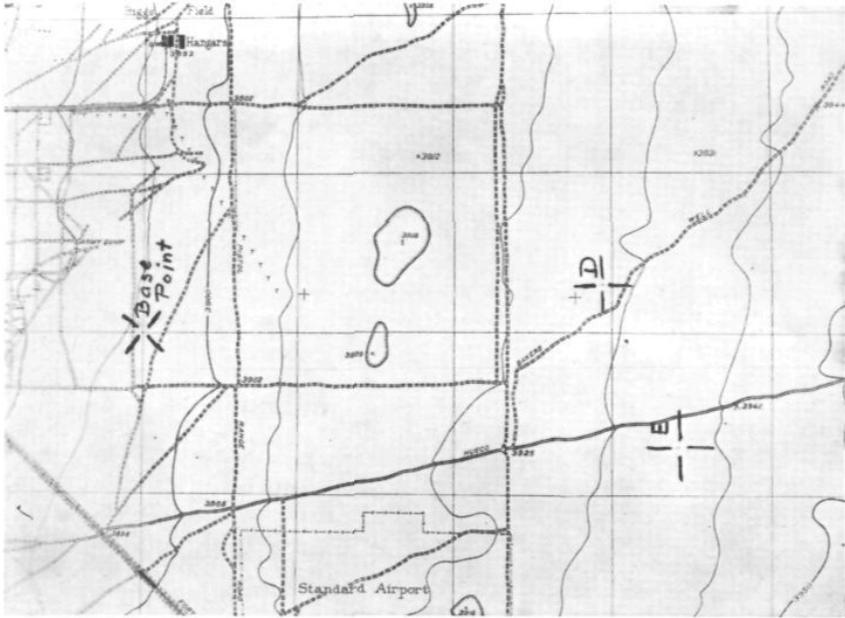


FIGURE 2

In installing the system greatly reduced distances are used. Battery switchboards normally should not be more than about 30 yards from the battalion board. Distances between phones should be only enough to make a normally pitched voice inaudible except over the phone.

### Preparation of the Problem

#### *Setting up the Map*

In preparing the problem any 1/20,000 map<sup>1</sup> can be used provided sufficient copies are available to furnish one for the fire-direction center and one for each battery. This map is used in place of the blank grid sheet normally used as the observed-fire chart.<sup>2</sup> A convenient grid

<sup>1</sup>Any scale map can be used for the problem by ignoring the true map scale and using the range deflection fan as if the map were 1/20,000.

<sup>2</sup>For a discussion of the observed-fire chart see paragraph 8, page 8 of the Digest of Field Artillery Developments, 1935.

intercession is used as the base point. Battery positions should then be chosen with respect to the base point so as to permit easy and accurate plotting with the range deflection fan. The board when set up should appear as in Figure 2.

### Liaison Targets

The next step is to prepare a series of sensings for a liaison section such that when "Fire for effect" is given the fire of the adjusting battery will be within 25 yards of a given point on the map. This is not so hard to do. For example, let us arrange a set of data which should bring down a battalion concentration on the "D" in the words "Army Dump" just northwest of the battalion base point in Figure 3. Using a plotting scale, we find that it is 550 yards north and 250 yards west of the base point. We can write down our initial report of this target as: "Base point 600 Left; 300 Short; Counterattack; Request Battalion; Can observe."

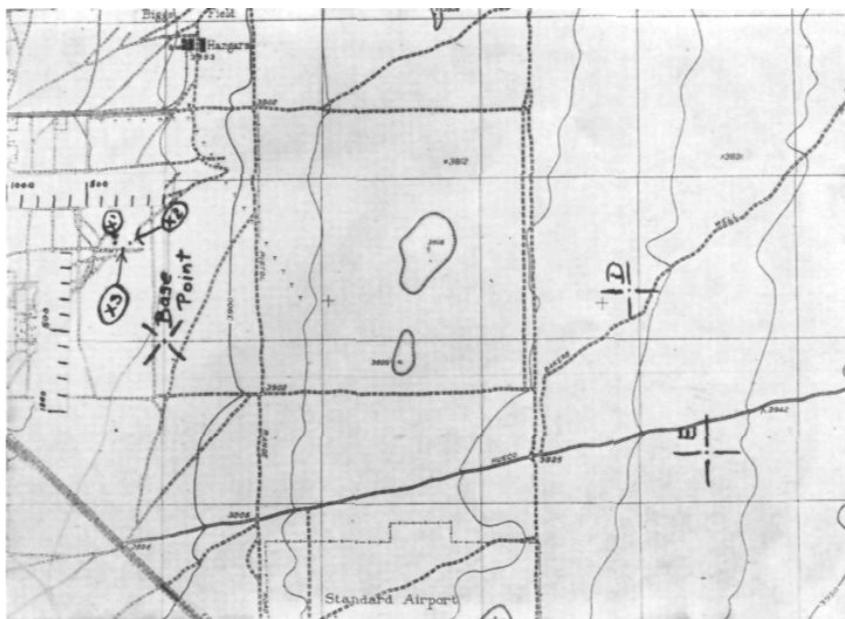


FIGURE 3

When this target is received at the fire-direction center one battery will be adjusted. It is very important that the one selected for adjustment be the one for which the problem was designed, or the sensings will not work out. We must tell the fire-direction center which battery to adjust. Let us assume that we will adjust Battery D on this target. The range from Battery D to the base point is 3000, so the deflection shift ordered should be Right 200 and the range 3,300 for the first salvo. Using the range-deflection fan we can plot these data from the Battery D position and find that the shots should fall at  $X_1$  in Figure 3.

Again using the plotting scale parallel to the grid system in making our "estimate" we see that this first salvo is somewhat right and about 100 yards over. We can then write down our next sensing as "100 Over" and leave the deflection

unchanged. When fired, this salvo should fall as shown by the  $X_2$  in Figure 3.

This  $X_2$  is very close to the target, so we can sense it as "Right; Short; Fire for effect." This sensing should move the deflection Left 3 (or 5) and the range to 3250 for the center of the bracket.

As a check on the accuracy of the board operator we can note that the data for Battery E should be: Base Deflection Right 135; Range 3900.

We said at the start that our drill must produce prompt and accurate results. There are two checks on the work. The first is the time it takes to work the problem. The second is the point upon which the batteries end up firing.

To check the batteries their boards are set up with the same battery position and base point as shown on the battalion board. As a command is received from the fire-direction center

## FIRE DIRECTION INDOORS

the officer with the battery puts a pin in the map at the deflection and range ordered and reports "Battery has fired." When the next command is received he shifts the pin to the new location and makes a similar report. All the instructor has to do is to check the location of the pin when the battery is supposed to be firing for effect; it should be within 25 yards at least of the assumed target.

### Targets Adjusted Upon from OP's

A similar method may be used in determining data for a target presumed to have been located from an OP. The test again is the point where the final pin rests in the map. The test is absolute and there can be no alibis!

### Operation of the Fire Direction Center

A battalion commander at any time should be able to:

- a. Tell which of his batteries are available for missions.
- b. Tell how much each has fired.
- c. Tell the type and location of each target his batteries have fired upon and the time the firing occurred.
- d. Maneuver the fire of his batteries with the same facility with which a battery commander handles his battery.

It is the function of the fire-direction center to keep him informed of these facts and its records should furnish the data. If a battalion is firing schedule fires only the task is easy—the schedule and the overlay tell the tale. However, if observed fires only are used the story is different. The system used in the 2d Battalion 82d Field Artillery is as follows:

a. Upon occupying the position each battery is assigned a normal zone, given an allotment of ammunition to fire upon targets of opportunity, and then the types of targets to be sought out and fired upon are indicated.

b. When a battery locates a target the fire-direction center is notified (while the data are being computed) of the type of target and the initial deflection shift and range to be used. The fire-direction center assigns a number to the target.



FIGURE 4

c. On the edge of the observed-fire chart is kept a blank graphical time schedule (Figure 16, page 35, Digest of Field Artillery Developments, 1935) (Figure 4 hereof). When the call comes in, a vertical mark is made in the battery's line under the time the call was received: a horizontal line is drawn from this point to the right, and the mission number is entered over the line. This entry shows that the battery is busy. At any time, then, this time schedule shows what batteries can be used for missions without interrupting their fire.

d. Also on the edge of the observed-fire chart is kept a table with three columns. The first column shows the target number; the second, the battery firing; the third, the type of the target fired upon. When the battery makes its call as discussed above, appropriate entries are made on this form.

e. On the observed-fire chart itself a faint *x* is made with the mission number adjacent at the point where the initial data show the battery's fire should fall. This entry is made because a call may be received from another source calling for fire on a target in the same locality, and this will prevent duplication.

f. When the battery finishes firing it calls the fire-direction center, giving the mission number, the adjusted deflection, the range (with site 300), and the number of rounds fired. This completes

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the transaction as far as the battery is concerned.

g. The fire-direction center, upon the receipt of this call, completes the graphical time schedule entry started in *b*. by ending the horizontal line under the appropriate time and inserting the rounds fired under the line. It also corrects the plot of the target on the chart.

Thus the fire-direction center records should tell a battalion commander what batteries are firing, the type of targets they are firing upon, what targets they have fired upon, their location and the number of rounds fired upon each one. In active service, this observed-fire chart, with its supplementary tables, can be filed with the war diary to give a complete picture of the operation from the battalion viewpoint.

### Framing the Problem

If the best results are to be expected it is not desirable that targets come faster than would normally be expected in working with service ammunition. From target designation to completion of 40 rounds for effect should not take more than 8 or 9 minutes. Hence, targets should not be reported from the batteries more often than once in 10 minutes. In fact, one every 15 or 20 minutes is not too slow if targets are being looked for.

Liaison targets should not take more than 10 minutes from initial report to completion of fire for effect in a battalion concentration. Hence, one every 20 minutes is enough for a starter.

Using these factors, one can build up a sort of loading chart, as follows:

|                | 5 | 10 | 15              | 20 | 25 | 30              | 35 | 40 | 45 | 50 | 55              | 60 |
|----------------|---|----|-----------------|----|----|-----------------|----|----|----|----|-----------------|----|
| D              | x | 1  | 3               | 5  |    |                 |    | 10 |    |    |                 |    |
| E              | x | 2  |                 |    |    | 7               |    | 8  |    |    |                 |    |
| L <sub>n</sub> |   |    | 4 <sup>10</sup> |    |    | 6 <sup>20</sup> |    |    |    |    | 9 <sup>30</sup> |    |

The first reports at H Hour are the adjustments on the base point. The others are targets reported in by the agencies as shown. These ten targets should keep the system busy for an hour. Target 9 should call for a battalion concentration. With practice, more targets can be inserted. However, it is best to start slowly and speed up later. It is absolutely essential that accuracy be exacted at every step. If complete performance is required for each fire, the fire-direction center will be reasonably busy and the men will become quite interested in finding the right spot at the end of the problem.

### Starting the War

The first operation is to get the observed-fire chart set up. The fire-direction center should start with a map marked only with the base point. Each battery should have a map showing the location of the base point, OP, and gun position. The batteries call the fire-direction center as soon as communication is established and report the adjusted compass and range to the base point as measured on their maps. This allows the fire-direction center to start its observed-fire chart in a normal manner.

While this is going on, each liaison section and OP is given the target reports and sensings on fire that it is supposed to make. Each problem has the time indicated when it is to be started. With H hour the "War" starts. All the instructor has to do is check the batteries from time to time to see where the pin holes are, and to watch the performance of the personnel to detect errors of procedure.

### Conclusion

During the last three years I have given much thought to the development of a fire-direction center. It will work if the personnel is properly schooled. It has been found that speed can easily

## COMMUNICATION WITHIN THE LIGHT BATTALION

be developed in drill when the men are allowed to cut the corners. However, this practice leads only to grief when service ammunition is to be fired and preparation for service firing should be the purpose of any drill. To obtain satisfactory results frequent drills must be held and precision exacted at all times. When proficiency is attained at the slower rates, the problem can be speeded up. The problem may be complicated by having two targets arrive

at the CP at the same time; targets may be reported from time to time which should not be fired upon; a target may be placed so that the fire-direction center must decide whether to refuse to fire or break in on a battery adjustment. These decisions must be made in service so why not at drill? There are really only two rules: Avoid demanding too much speed for precision and do not ask too little and forfeit interest.

# Communication Within the Light Battalion

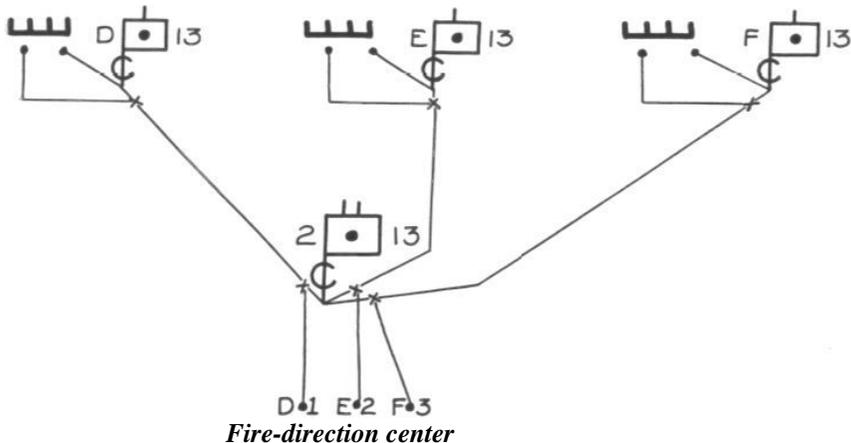
BY 1ST LIEUT. A. V. DISHMAN, FA

**T**HE present system of Fire Direction as now employed by the field artillery puts an added burden on the communication system within the battalion. In order to lighten this load and to increase its efficiency the following setup was devised and is now effectively used by the 2d Bn 13th FA.

1. Normal communication, with either one or two lines to each battery switchboard.
2. Superimpose on this a simplex

or phantom circuit on the trunk lines to each battery and terminate it at the CP and at the post of the executive at the firing battery. The Fire Direction Center at Battalion CP will then be in direct communication with each battery executive. This eliminates two switchboards, the battalion and battery.

3. There are three telephone operators at the CP, each with a telephone clearly marked with the battery with which it communicates. Sufficient slack



## THE FIELD ARTILLERY JOURNAL

wire is left for each telephone, in order to permit it to be moved to either base radio station or work with a telephone at the CP.

Take the following example: Ln O 1 observes activity in the enemy lines and calls for fire. Base Set 1 receives the call and the operator calls out: FIRE MISSION. S-3 assigns the mission to one of the batteries by calling; FIRE MISSION, BATTERY FOX. The telephone operator on the "F" telephone at once turns the crank and immediately has the operator at the gun position, and states: FIRE MISSION, STAND BY.

Thus two switchboards are eliminated, along with the probability of breaking an existing connection. The "F" battery

telephone operator at the CP then moves directly to Base Set I, to carry on any further communication. If a Battalion Mission is called for, S-3 calls: FIRE MISSION, ALL BATTERIES. At this time all three telephone operators call their respective batteries and move to the proper station to carry on further communication. This eliminates four switchboards and much trouble in making a party call. The saving in time is apparent and is of prime importance in observed-fire missions where these are employed. In addition, the system is simple, easy to install, and adds to the efficient operation of the battalion fire-direction center.

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### SPRING NATIONAL GUARD AND RESERVE CLASS AT THE SCHOOL

Membership of the spring term, National Guard and Reserve Officers' Course at The Field Artillery School, is as follows:

Captain Henry C. Coles, Calif.—NG.  
Captain Charles D. Colman, N.H.—NG.  
Captain Harold Crellin, Ill.—NG.  
Captain Clifford L. Dean, Maine—NG.  
Captain Roy O. Gray, Wash.—NG.  
Captain Leon B. Humphrey, N.H.—NG.  
Captain Geo. R. Huntsman, Utah—NG.  
Captain John H. Kohnen, N.D.—NG.  
Captain Orville D. Lysaught, Ga.—NG.  
Captain H. L. McCullough, Tenn.—NG.  
Captain Cassius H. Miller, Va.—NG.  
Captain John E. Motell, Calif.—NG.  
Captain Robert J. Nichols, Ohio—NG.  
Captain John E. Weiler, Okla.—NG.  
1st Lt. Leo J. Conway, Mich.—NG.  
1st Lt. A. L. Fitzsimmons, Tex.—NG.  
1st Lt. Paul J. Grady, N. J.—NG.  
1st Lt. Donald B. Harriott, Conn.—NG.  
1st Lt. Arthur S. Hassell, R. I.—NG.  
1st Lt. Samuel S. S. Kale, N. J.—NG.  
1st Lt. Leslie B. Keeny, Mich.—NG.  
1st Lt. Sam H. Long, Miss.—NG.  
1st Lt. Ray A. Nichols, Wis.—NG.  
1st Lt. William R. Rogers, Ark.—NG.

1st Lt. Walter A. Siegert, Mich.—NG.  
1st Lt. Charles J. Sullivan, Conn.—NG.  
1st Lt. Edmond J. Swann, Fla.—NG.  
1st Lt. Henry P. Ward, S. C.—NG.  
1st Lt. Floyd N. Warner, Minn.—NG.  
1st Lt. Ray E. Williams, Ark.—NG.  
1st Lt. Charles H. Wilson, S. C.—NG.  
1st Lt. Desmond P. Wilson, Kans.—NG.  
1st Lt. Frank E. Winkler, Kans.—NG.  
2d Lt. Thomas J. Bishop, Tex.—NG.  
2d Lt. George C. Thomas, Mich.—NG.  
Captain Victor G. Baddock, FA-Res.  
Captain John C. McLendon, FA-Res.  
Captain William R. Noack, FA-Res.  
Captain Mayo T. Tilghman, FA-Res.  
Captain Paul Van Tuyl, FA-Res.  
Captain William C. Young, FA-Res.  
1st Lt. Thomas C. Adams, FA-Res.  
1st Lt. William C. Bays, FA-Res.  
1st Lt. James A. Cowan, FA-Res.  
1st Lt. Chester L. Dane, Jr., FA-Res.  
1st Lt. John J. Fleisch, FA-Res.  
1st Lt. Paul I. Freiburger, FA-Res.  
1st Lt. Chester W. Mebus, FA-Res.  
1st Lt. Cedric A. Peterson, FA-Res.  
1st Lt. Harlen C. Ray, FA-Res.  
1st Lt. Willoughby I. Stuart, FA-Res.  
1st Lt. Platt L. Welker, FA-Res.

# Type Problems

*Prepared by Instructors in the Department of Gunnery, FAS*

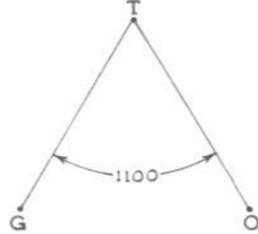
## PRECISION LATERAL, LARGE T (75-mm.)

Target: Covered machine-gun emplacement.

Mission: Destruction.

Deflection obtained: Plot.

Range obtained: Range finder.



$R = 3800$        $r = 3800$        $T = 1100$        $c = 5$        $d = 24$   
 $s = 50$       Fork = 3       $c/d = .2$       Modified  $s = 3/5 \times 50 = 30$

Initial data: BDR 280, Shell Mk I, FS

| Commands | Elev. | No. | Dev. | Rn | Df | Remarks   |
|----------|-------|-----|------|----|----|---|
| #1—1 Rd  | 120   | 1   | 40L  |    | ?  | 40×.2=8   |
|          | 128   | 2   | 5L   |    | —  | 5×.2=1    128+1=129   |
| L60      | 134   | 3   | 5L   |    | —  | 5×.2=1    134+1=135   |
| L60      | 141   | 4   | 10L  |    | ?  | 10×.2=2   |
|          | 143   | 5   | 10L  |    | +  | 10×.2=2    2+143=145  |
| R30      | 142   | 6   | 5R   |    | +  | 5×.2=1    142—1=141   |
| R15      | 138   | 7   | 3L   |    | —  | 3×.2=.6    138+1=139  |
| L8       |       |     |      |    |    |   |
| 3 Rds    | 140   | 8   | 7L   | —  | ?  | Fired at 141<br>4—<br>2+<br>—<br>2—<br>2/12×3=.5<br>preponderance (—) |
|          |       | 9   | 5L   | —  | ?  |   |
|          |       | 10  | 3L   | —  | ?  |   |
|          | 142   | 11  | 3L   | —  | ?  |   |
|          |       | 12  | 5R   | +  | ?  |   |
|          |       | 13  | Line | +  | +  |   |
| R4       | 141.5 |     |      |    |    |   |

### CRITIQUE

This problem was an adjustment for destruction upon a COVERED emplacement. The proper type of ammunition and fuze were chosen. A satisfactory adjustment in elevation has been obtained. Continued fire at this elevation should result in destruction of the target. The deflection adjustment is not complete.

On the third round, the elevation change of 6 mils was not added to the computed line shot. This round should have been fired at 135. The sixth round was fired at 142 which was obtained by coming down in elevation 1 FORK from the computed line shot at 145. This elevation should have been 140, obtained by splitting the bracket between computed line shots of the third and fifth rounds  $145 - 135/2 = 140$ . (This problem was actually fired.)

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**PRECISION LATERAL, LARGE T  
(75-mm.)**

Target: Dugout entrance.

Mission: Destruction.

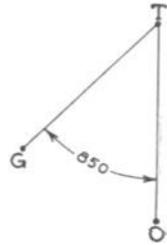
Deflection obtained: Plot.

Range obtained: Range finder.

$$R = 4700, r = 5000, T = 850 \quad c = 7 \quad s = 26$$

$$d = 14 \quad \text{Modified } s = 7/7 \times 26 = 26 \quad \text{Fork} = 7 \quad c/d = 1/2$$

Initial data: No. 1 Adj, BDR 100, Shell Gas, Fuze Long.



| Commands    | Sensings |      |    | Df | Remarks   |
|-------------|----------|------|----|----|---|
|             | Rn       | Dev  | Rn |    |   |
| #1, 1 Rd, Q | 180      | 80R  |    | ?  | $80 \times 1/2 = 40$                                |
|             | 140      | 60L  |    | ?  | $c/d = .3 \quad (60 \times .3 = 18)$                |
|             | 158      | 2L   |    | —  | L — at 159  |
| L26         | 166      | 10R  |    | ?  | Estimated Df error=30 mls<br>( $.3 \times 10 = 3$ ) |
|             | 163      | 20L  |    | ?  | Split   |
|             | 165      | L    |    | +  | L+165   |
|             |          |      |    |    | —   |
| R13         | 162      | 10L  |    | ?  | $.3 \times 10 = 3$                                  |
|             | 165      | 13L  |    | ?  |   |
|             | 168      | 7L   |    | ?  | $.3 \times 13 = 4 \quad (169)$                      |
|             | 170      | 13R  |    | ?  |   |
|             | 169      | Lost |    |    | (Dud)   |
|             | 168      | L    |    | —  | ' — 168   |
| L6, 3 Rds   | 166      | L    | +  | +  |   |
|             |          | 5L   | —  | ?  |   |
|             |          | 2L   | +  | +  | Terrain sensing                                     |
| R3          | 166      | 2R   | +  | ?  | Fork=6  |
|             |          | L    | —  | —  |   |
|             |          | 4R   | +  | ?  |   |
| L2          | 165      |      |    |    |   |

CRITIQUE

The target was a dugout entrance which would call for a short fuze when firing H E Shell. However, the long fuze was used with the gas shell in order to get better bursts above the ground. The mission was accomplished.

The target was situated on the top of a knoll, with a ridge line running generally parallel to the line of fire. The most interesting point in this problem is the fact that a line *short* was obtained at a *greater* elevation than that which gave a line *over*. Note that when a deflection bracket small enough to permit firing for effect was obtained, that splitting between the line shots determining the deflection bracket gave more line shots. Note further that factors were of little value during the problem, because of the difficult terrain, and the fact that the effects of dispersion were more apparent with this size of angle T.

TYPE PROBLEMS

**PRECISION LATERAL, SMALL T  
(75-mm.)**

Target: Check point.  
Mission: Registration.  
Deflection obtained: Rapid plotting.  
Range obtained: Range Finder.

$T = 280$  mils                       $R = 4100$  yds.                       $r = 2200$  yds.  
 $F = 5$  mils                               $s$  (modified) =  $28/4.1 \times 5/6 = 6$  mils.

Initial data: No. 1 Adjust, BDL 90, Shell Mark 1, Fuze Long,  
No. 1 1 round, Quadrant 140.



| Commands                       | Elev | Dev  | Rn | Sensing<br>Df | Remarks  |
|--------------------------------|------|------|----|---------------|--|
| Quadrant                       | 140  | 20R  | ?  | $r/R = 1/2$   | To get on line $20 \times 1/2 = 10$              |
| L10                            | 140  | 4L   | +  |               | To get on, $4 \times 1/2 = R2$ . To stay on, L12 |
| L10                            | 130  | 6R   | +  |               | To get on, $6 \times 1/2 = L3$ . To stay on, L12 |
| L15                            | 120  | 3L   | —  |               | To get on, $3 \times 1/2 = R2$ . To stay on, R6  |
| R8                             | 125  | 4L   | —  |               | To get on, $4 \times 1/2 = R2$ . To stay on, R3  |
| R5, 3 Rds                      | 128  | 3R   | —  | ?             | Range sensed on rule.                            |
|                                |      | Line | —  | —             | Positive deflection sensing. Shift               |
|                                |      | 5R   | —  | ?             | $1/2 s$ since it is <i>greater than</i> 2 mils.  |
| R3                             | 130  | Line | +  | +             | Range adjustment: Fired at 129                   |
|                                |      | 2R   | —  | ?             |  |
|                                |      | 4R   | —  | ?             |  |
| Cease firing.                  |      |      |    |               |  |
| Next command: L1, 6 Rds, 130.8 |      |      |    |               |  |

CRITIQUE

The target: A check point.

Mission: Registration. The proper fuze was used.

An adjustment was obtained. The final adjusted elevation is incorrect. It should be computed as follows: Fork at 129 is 4.  $4/12 \times 4$  is 1.3 mils. 1.3 plus 129.0 is 130.3 mils.

The second series of 3 rounds should have been a series of 2 rounds and the round previously fired at 130, an over, should have been used for the third round in the series for the adjustment.

The final command, L 1, 6 Rds, 130.8, should have been L 2, 3 Rds, 130.3, since the deflection is not correct. A 3-mil deflection bracket has been split, not a 2-mil bracket.

Deflection, excepting the last command, was excellently handled.

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**LATERAL BRACKET, SMALL T**  
(75-mm.)

Weather: Clear.

Target: Infantry deployed in the edge of some woods.

Visibility: Excellent.

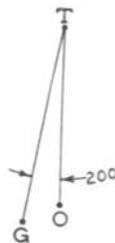
Mission: Neutralization.

Df obtained: Rapid plotting. Rn obtained: Rn Finder Guns on the left.

$R = 3500$        $r = 3100$        $T = 200$        $r/R = .9$

$s = 6$  (use 5)

Initial Data: BDR 160, Si + 5, Sh Mk I, FL.



| Commands | Rn   | Dev | Observations | Sensings |         | Remarks by Instructor   |
|----------|------|-----|--------------|----------|---------|---|
|          |      |     |              | Rn       | Df      |   |
| #2. 1 Rd | 3500 | 20L |              | —        |         | Commands: Cv at 3500, on No. 1 Op 9, were omitted in Initial Data. 3500 is an effective Rn. |
| R20      | 3900 | 10R |              | +        |         | R18+L20. No Df shift called for.  |
| L5 BR    | 3700 |     |              | ++++     | Correct | No Df shift called for. Df of the salvo is +; not correct.                                  |
| B 1 Rd   | 3600 |     |              |          |         | On the way. (Reported by instructor but not fired.)   |
|          | 3500 |     |              |          |         | On the way. (Same as above.)  |
|          | 3700 |     |              |          |         | Cease firing. (Instructor.)   |
| BR       | 3500 |     |              | ? + --   | +       | Checking.   |

CRITIQUE

The target was enemy infantry deployed in the edge of some woods. Mission: Neutralization. It called for a bracket adjustment, open sheaf, with a 200-yard bracket for effect.

The fire for effect was only about 50% effective because the bracket selected (3500-3700) was not the best bracket, the deflection was about 10 mils over, and the sheaf was parallel instead of open. A better bracket would have been 3400-3600.

The initial data were excellent. However, the officer firing failed to take advantage of this fact. The deflection was handled poorly with the result that the deflection for effect was slightly in error.

TYPE PROBLEMS

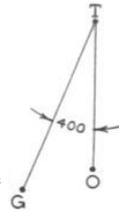
**LATERAL TIME BRACKET (Large T)**

Target: Infantry weapons, clearly visible.  
 Mission: Neutralization, using shrapnel.  
 Guns: 75-mm. to left rear.

$T = 400$       $R = 5000$       $r = 3900$       $s = 8$       $d = 10$

(Corrector for the day is unknown).

Data obtained from range-deflection fan, in conjunction with range finder.



| Commands   | Results | Sen               | Remarks   |
|--|---------|-------------------|---|
| BDL 60, Cv 5000, on No. 1 open 6, Si+5, Kr 40, No. 2, 1 Rd, 5000 |         | Df<br>?           | Air burst, 8 mils above base of target. Effect not seen.  |
| D 10, 5200   |         | Df<br>?           | Change in range should not have been made. 5 points on the corrector changes the range 100 yards. |
| 5000   |         | Df<br>+           | Burst is close enough to warrant 2-s shift.   |
| R15, U5, BL, 4800  |         | Rn—<br>Df—        | Height of burst good for adjustment.  |
| L10, 4900  |         | Rn<br>Cor.<br>Df+ | Range correct.  |

Next command: R5, U3, B, 2 Rds, 4900. (End of problem).

CRITIQUE

Target: Infantry weapons clearly visible.

Mission: Neutralization, using shrapnel. A speedy adjustment was required in order to obtain quick effect with a 100-yard bracket (or good single range), other elements being correct.

A correct deflection, height of burst, and range have been obtained, but the sheaf is too wide.

The initial data were good; time was lost during adjustment by firing the second round at 5200 instead of 5000; before going into effect the sheaf should be closed by moving the burst from No. 4 gun to the point where that of No. 2 was last seen. (Appropriate command: On No. 1 close 4).

This problem brings out two major points:

(1) In time bracket lateral, deviations cannot be sensed from air bursts; the trajectory must be visualized.

(2) In firing for effect, the sheaf may be narrowed as a result of positive deflection sensings.

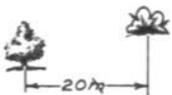
(NOTE: In the foregoing problem, it is assumed that the target did not move before the beginning of fire for effect; any such movement would automatically neutralize it.)

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### AXIAL TIME BRACKET

1. You are BC of a battery of French 75-mm. guns. You wish to fire on machine guns known to be in the vicinity of a large tree. Purpose: Neutralization. You decide to use shrapnel. The guns are 300 yards to your right. You estimate the range as 4400 yards. The initial commands are given below, followed by sensings and subsequent commands.

BDR 70, Converge at 4500, Site 0, Kr 35, No. 2, 1 Rd, 4400.

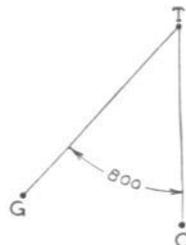
| Commands   | Range | Burst Observed  | Sensing  | Remarks   |
|--|-------|---|--|---|
| #2, 1 rd   | 4400  |  | Graze above over                                       | Make 400-yd. range change, data being estimated. Do not change corrector after graze above.   |
| L20  | 4000  |  | Graze over   | Continue to make 400-yd. bound. Go up on corrector.   |
| Up 10  | 3600  |  | Air Short  | Split range bracket. Split corrector bracket. Bring in battery when making 200-yard change.   |
| Down 5 BR  | 3800  |  | Graze short, Graze short, Air doubtful, Graze doubtful | Two sensings at 3800. One sensing at 4000. Go to effect at 4000. Sheaf measures 10 mils. Desired sheaf = $90/4 = 22$ mils. $22 - 10 = 12$ mils. Open $12/3 = 4$ #3 is about in correct position. Three grazes, one air. Go up 5 for effect. |
| On #3<br>Open 4,<br>Up 5,<br>Btry, 1 Rd, 4000<br>(4000-3800) |       |   |  |   |

### A WRIT

(Solution on page 239)

#### CONDUCT OF FIRE, LARGE $T$

- In large  $T$ , what is a trial deflection?
  - In large  $T$ , when is the deflection correct?
- You are to fire a large  $T$  precision adjustment. Angle  $T$  is 800,  $R$  is 5600,  $r$  is 5000. You decide to use 75-mm. Shell Mark I, fuze long. Compute and list the factors which you would use in making this adjustment.
- You are making a precision adjustment with 75-mm. Shell Mark I, fuze short. The battery is on your left. Angle  $T$  is 600,  $R$  is 5800,  $r$  is 4000. Your data were obtained by rapid plotting. You calculate the following factors: Modified  $s$  is 8,  $d$  is 14,  $F$  is 6,  $c$  is 8,  $c/d$  is .6.



## MOUNTAIN GUNS FORWARD

Give the necessary sensings and commands to complete the problem as given below:

| Command  | Elev. | Rd. No. | Deviation | Range | Df | Remarks |
|----------|-------|---------|-----------|-------|----|---------|
| #1, 1 Rd | 240   | 1       | 50R       |       | ?  |         |
|          |       | 2       | 7L        |       | —  |         |
|          |       | 3       | 7R        |       | ?  |         |
|          |       | 4       | Line      |       | +  |         |
|          |       | 5       | 3R        |       | —  |         |
|          |       | 6       | 3R        |       | ?  |         |
|          |       | 7       | 4R        |       | ?  |         |
|          |       | 8       | Line      |       | +  |         |
|          |       | 9       | Line      |       | —  |         |
|          |       | 10      | 2L        |       | ?  |         |
|          |       | 11      | 3R        |       | ?  |         |

Next command?

## Mountain Guns Forward

**T**HE story ended with the death of Colonel George W. Van Deusen, USA Retired, in Los Angeles, March 3d. That distinguished field artillery officer was born in Van Deusen Villa, Massachusetts, February 11, 1859, and entered the U. S. Military Academy the year of the Custer Massacre, graduating in 1880, as a cavalry officer. Since 1884 he had been in the artillery. He retired January 30, 1919, after forty years' service.

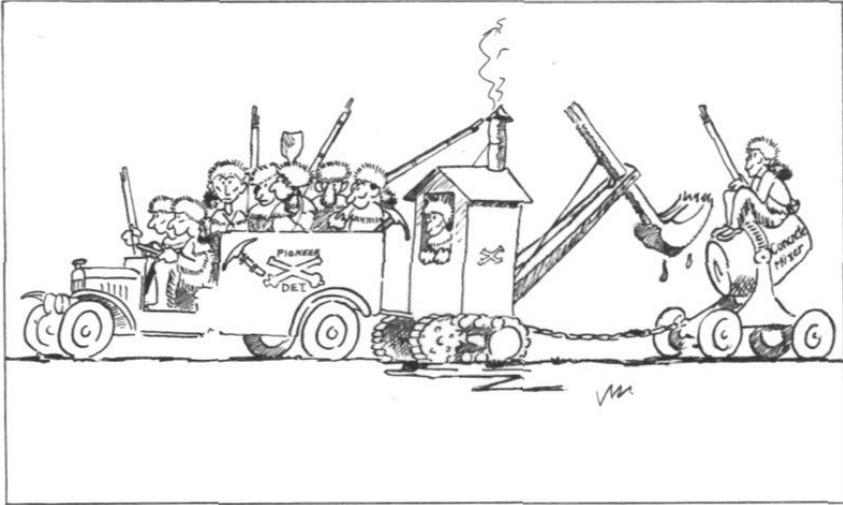
But the story began when the adjutant of the first battalion of the 27th U. S. Volunteer Infantry, at the pumping station near Manila, P. I., in December, 1899, saw an officer leading a column of four spring wagons, which conveyed some mysterious objects concealed under tarpaulins, toward Montalban, whence a force of insurgents was to be driven, on the morrow, with the very effectual aid of the mysterious objects. Himself the only officer, and with but a small detachment, Captain George W. Van Deusen was on his way to write his name in the pages of the history of the United States Field Artillery.

His own report of the operations

will appear in the July-August number of this JOURNAL. But to whet the curiosity of our readers, we publish extracts of the indorsement of the then Chief of Staff, Major General Nelson A. Miles, forwarding the report to the Secretary of War:

" . . . inviting attention to the within excellent, thorough, satisfactory, and scientific report of Captain George W. Van Deusen, 7th U. S. Artillery.

"When it is considered that this officer hurriedly left the United States on September 27, 1899; proceeded to England; there made himself familiar with the construction, mechanism, etc., of a new and modern type of mountain gun; and with two batteries that had been ordered by cable, proceeded to Hong Kong, thence to Manila, which place he reached November 21st, 1899, then manning and mounting his batteries, participating in a campaign involving difficult marches and engagements, on completion of which he returned to Washington—all within a period of less than seven months—it will be seen that his services have been most unusual and commendable."



## Field Artillery Family Party

The design reproduced herewith is from the pen of Lt. Col. S. L. Irwin, FA. It was that of the place card on the occasion of the Field Artillery Family Party, held at the Army and Navy Country Club in Washington, April 8th, to honor the departing Chief, Major General Upton Birnie, Jr., and to welcome his successor, Major General Robert M. Danford. The largest attendance of any such recent affair, 190 officers and ladies, from within a 100-mile radius of Washington, heard General Birnie introduce the diners to the new head of the family, General Danford;

and the latter respond in a hearty welcome, and a tribute to his predecessors and contemporaries. Before the dinner General and Mrs. Danford, General and Mrs. Birnie, and Colonel and Mrs. O. L. Spaulding received the guests. Lt. Col. L. E. Hibbs led the assemblage in the singing of the Caisson Song and the Mountain Battery Song.

Col. Irwin's drawing represented his conception of a field artillery pioneer section, which at one time had been under consideration as a corollary to pioneer sections of other arms.

# Counterbattery in War of Movement

BY LT. COL. JOHN S. WOOD, FA

THE World War offered the first instance of large-scale action between opposing forces of modern artillery—an action termed *counterbattery*, but an entirely different affair from the pre-1914 idea of separate artillery duels between batteries prior to the infantry attack. The increase in number and power of cannon, the improved means of observation and communication, and the long periods of stabilization permitted careful and detailed organization of fire action intended to disrupt the entire artillery system of the enemy, to keep cannoneers from firing, drivers from bringing up ammunition, observers from seeing, and chiefs from commanding. This ideal was rarely attained even with the expenditure of enormous quantities of ammunition, as the objectives were small, scattered over wide areas, and usually well concealed. The only effective solution was to neutralize all suspected areas and to provide prompt response to vigilant air observers in constant watch for new batteries throughout combat.

In open warfare, evidently, there is neither time nor ammunition for systematic neutralization, hence air observation becomes of vital importance. The brief period of movement in 1918, however, was too short to compel full recognition of this fact and a counterbattery organization to conform to it. Nor have the twenty years since the Armistice brought much change in this regard, in spite of the usual peacetime insistence on war of movement and in spite of the development of new means and methods of fire. Counterbattery, one of the most

important essentials of mobile warfare, is still considered mainly from the standpoint of stabilization. The organization and procedure remain as developed to meet the static conditions of trench warfare: largely complex, often cumbersome, and little suited to the changing situations of war of movement.

In general, counterbattery is treated as a corps affair to be handled by medium and heavy artillery. Separate staffs or special sections of the corps intelligence and operations bureaus are formed to handle the work and coordinate the efforts of the numerous and varied agencies involved: Air, balloon, and ground observers; flash and sound units; corps and division groupments. The corps organization is complicated and requires from twenty-four to forty-eight hours or more for complete installation.

Although provision is made for decentralization of effort by attaching units of corps artillery to front-line divisions and by sending forward officers of the corps counterbattery staff to assist, the efficacy of the usual counterbattery system in the early stages of combat is questionable. Complete centralization and control by the corps may be needed as the situation stabilizes, but war of movement is the slogan today and the counterbattery arrangements prescribed by most artillery regulations are not likely to satisfy its requirements nor overcome its difficulties.

There is no need to dwell on the great importance of counterbattery in open warfare nor on the greater difficulty of the task. The combat regulations of all nations emphasize the one and the common sense of all artillerymen will recognize the other. An

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examination of the various counterbattery systems may, however, be useful.

Generally speaking, there are three systems in vogue, the British, French, and German. All three remain about as developed at the end of the World War. The first two are corps affairs, differing only in details of command, while the German system is on a division basis. We tried both the British and French systems during the war; and American artillerymen generally favored the French organization, but our subsequent paper reorganization adopted the British form. The general procedure of short mass concentrations of battalions on various objectives is well known and more or less the same in all armies.

British artillery regulations provide for the general control of counterbattery at corps headquarters, "if the means of inter-communication exist." It is to be executed by medium or heavy artillery with air observation. A corps counterbattery officer and separate staff are provided to handle counterbattery information and missions. During the early stages of action, corps medium artillery brigades (four batteries) may be attached to front-line divisions for counterbattery, in which case assistants of the corps counterbattery officer are sent to division headquarters to aid in the work.

Many British artillerymen consider control by a separate counterbattery staff under the corps chief of artillery as too unwieldy and slow for mobile warfare and as likely to create confusion through two sets of orders for the same artillery. They believe that counterbattery should be handled as one of the regular duties of the corps medium artillery operations section and recommend its study as part of the general training of every artilleryman, citing the portion of their regulations which states that

"counterbattery forms part of the artillery fire plan in operations of every kind and, in varying degree, lies within the sphere of responsibility of all artillery commanders."

In the French organization, the corps chief of artillery is charged with general supervision of counterbattery, but the direct control and execution are left to the colonel commanding the organic artillery of the corps. His operations section handles the work, assisted by an officer detached from the artillery information section of the corps staff to insure close contact between the two sections.

The latest French regulations recognize the necessity of decentralizing counterbattery control in mobile situations. They state emphatically that a groupment commander can not direct counterbattery effectively unless he has a well-organized artillery information section and an airplane at his disposal throughout combat to seek out targets and control fire in the groupment zone of action.

The Italians also handle counterbattery on a corps basis, and they, too, recognize the fact that the corps chief of artillery cannot deal with its execution. Since he must remain in direct contact with the corps commander, following the course of combat and standing ready to modify the artillery employment accordingly, he cannot become involved in the details of action of counterbattery groupments. This task is entrusted to the commanders of such groupments, as in the French system.

The Germans provide a logical and complete counterbattery organization, including flash-and-sound units and air observation, to meet the needs of their basic unit of maneuver, the division. In conformity with their doctrine giving the division the main role in combat, they assign to it all the artillery

## COUNTERBATTERY IN WAR OF MOVEMENT

required. Their corps retains artillery only when it cannot be handled effectively under division control. Such a case implies stabilization and large masses of reenforcing artillery which mean, in turn, the centralization of counterbattery in the corps. In other words, the Germans consider the matter initially from the standpoint of mobile warfare and organize accordingly, while other nations which emphasize war of movement do just the reverse.

Our own organization, centralizing counterbattery control in the corps chief of artillery through a member of his staff designated as counterbattery officer, has all the defects of the British system and is subject to the same criticism, insofar as war of movement is concerned. Both systems would operate effectively, perhaps, in stabilized situations, but not when movement begins. As a matter of fact, counterbattery organization on a corps basis appears questionable for either ourselves or the British, in view of the recent steps toward motorization and mechanization in both armies.

Corps counterbattery control conforms to the needs of the French and is entirely logical for them, but not equally so for us. They look on the corps as the main element in combat from the start and they organize on that basis. Moreover, their situation leads them to believe that early stabilization is still possible, and even probable, in spite of the development of motors and tanks since 1918. Our trend, however, in conformity with our ideas of wide movement, is toward lighter, more maneuverable divisions as the main units in combat. Hence, a counterbattery organization of the German type would appear more logical for us.

Other factors are involved, however, and we must develop our own system, suited to our needs, after we determine what those needs may be. At the present

time we are in no way certain of the organization of either division or corps. Nevertheless, we can be certain that the present paper corps organization is not suited to contain units of the "proposed infantry division" type. We can also be certain that counterbattery requirements will be a deciding factor in the artillery make-up of either unit, particularly as concerns ammunition. We need not, necessarily, organize a division to handle all counterbattery missions; but neither can we afford to say, "Leave it to Corps," and remove artillery ammunition from division trucks in order to transport infantry rapidly forward, only to have it rapidly decimated by enemy artillery that the ammunition might have silenced. Except on rare occasions, none of the proposed units of all arms are likely to exist in our country in time of peace—they are too large. Nevertheless, they must be organized with the most scrupulous attention to reality, for even in paper form, they exert a far-reaching influence on our military thought and preparation of war. But, reality is hard to determine when dealing with imaginary affairs. *Les jours de poudre sont les jours de vérité*—only in battle is the truth to be discovered.

As regards counterbattery, however, the truth has been pointed out already by battlefield experience, even though it may not have been recognized fully. First, in mobile warfare, early action against enemy artillery is particularly necessary and particularly difficult, for the first fire that impedes movement comes from batteries which have learned to conceal themselves in all types of terrain. Second, the three prime factors in counterbattery at this stage of action are decentralized control, volume of fire, and air observation. These are the realities to be considered.

Decentralized control of counterbattery

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and immediate response of artillery to its requirements can be obtained only by studying the problem primarily on a mobile warfare basis. At present, our training in counterbattery is very limited because it is visualized as a corps affair. Since both corps and corps artillery exist only in the imagination, counterbattery training is equally imaginary. Actually, it should be a part of the general training of every field artilleryman. No artillery exercise should be conducted without a practical consideration of appropriate counterbattery action, and our course at Sill should familiarize every graduate with counterbattery possibilities and procedure as part of the normal regimental and battalion staff work. In battle, such knowledge is likely to be of more value to our artillerymen than proficiency in the well-known problems of adjusting shrapnel on "infantry in the open" or precision fire on "a disabled tank." Every artillery brigade, regiment, and battalion should be ready to direct, as well as execute, counterbattery operations. In all exercises and maneuvers much attention should be paid to the location of actual batteries; and the collection, confirmation, and interpretation of information regarding them should be a practical problem, the results of which should be checked against the actual enemy situation.

Volume of fire depends on the number of guns, the proficiency of personnel, and the amount of ammunition available, chiefly the latter. In this connection, it must be remembered that a large amount of counterbattery fire will be done by light artillery, especially in open warfare. As the French state in their combat regulations, division artillery is particularly effective against the enemy's advanced batteries. Moreover, the light

artillery, firing rapid concentrations of gas shell, will be able to deliver a very effective volume of neutralizing fire on any objective within range. A considerable and constant supply of ammunition is vitally important for effective counterbattery. In this regard, the amounts and manner of delivery visualized for our new division are not reassuring.

The last, and most important, essential is air observation. Without it, there is no effective counterbattery. Every groupment must have a plane constantly on watch for new batteries in its zone of action. A major difficulty in air observation for artillery is the lack of properly trained observers. This problem is not likely to be solved satisfactorily in our army until we provide every field artillery brigade and regimental headquarters with artillerymen trained as air observers. Air-force officers can not be expected to give their whole thought to the needs of the artillery. Naturally, they are chiefly concerned and interested in the affairs of their own arm. The air observer for artillery, however, must have his mind on the artillery problem alone. He should know the air people intimately, but artillery must be his main concern and thought.

At the present time, we are in the midst of a reorganization of our large combat units. This must include changes in counterbattery organization. The final form should be based on study of the subject from the standpoint of war of movement. No matter what the final form may be, however, we should at once place counterbattery training on a practical footing throughout the artillery, remembering that it "lies within the sphere of responsibility of all artillery commanders."

# The Bigger They Are the Harder They Fall\*

BY LIEUT. COLONEL ARTHUR R. HARRIS, FA

GUSTAVUS ADOLPHUS is commonly credited with being the "Father of Light Artillery." Gustavus wanted artillery on the battlefield during the battle, and not stuck in the mud ten miles in the rear. To accomplish this he ruthlessly sacrificed *power* for *mobility*. Not that he did not desire powerful artillery. He did. But his logical mind decided that he could not have both, so power was reduced and mobility increased. So great in fact was his mobility increased, that two men and one horse could maneuver his light guns on the field of battle. But his cannon were woefully weak in power.

In 1765 the great French artilleryist, Gribeauval, classified and standardized the French artillery into Light (or Field Artillery) and Siege and Garrison Artillery. The light artillery was limited in weight to that which six horses could pull economically. It resulted in the 4-, 8-, and 12-pounders being classified as light artillery. Nearly all nations followed Gribeauval's classifications. Ever since then, down to the present time, light artillery has been limited in general to calibers that six horses could pull across country. It has scarcely been a question of what caliber would best meet the needs of the infantry—but rather a question of what six horses could pull.

Light artillery, after nearly two hundred years of six-horse domination, seems about to enter a new era. The era of motorization. In coming years the pulling ability of six horses will not determine

the weight of all light artillery weapons. If we are going to motorize, we can now obtain 50 or 60 or even 100 horsepower instead of six horses to pull our light artillery cannon. With this power, will we not be able to use *larger* and more powerful light artillery weapons to good effect?

Before answering this question it might be well to inquire into the proposition as to whether or not it is desirable to have more powerful artillery than we now have for direct infantry support.

I would like to present for the approval of the reader a comparison of our present available "direct support" weapons under two headings:

First: Mechanical efficiency at the "business end" of the trajectory.

Second: Moral effect on those receiving the fire.

In comparing the mechanical efficiency of *direct support* artillery weapons, there is just one thing we have to know about each weapon. That is: *How great an area can it cover with death-dealing fragments or splinters in a given period of time?* All comparisons must ultimately rest on this basis. The area, of course, is a resultant of the following functions:

(1) Weight of projectile (steel).

(2) \*Weight of high explosive in projectile.

(3) Rapidity of fire.

\*Note: It is assumed that the same high explosive is used in all shells.

These three functions go to make up the element we are interested in. That is the area covered by death-dealing fragments in a given period of time.

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\*Being somewhat in the nature of a reply to "The Queen's Husband," November-December, 1937, issue.

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This discussion will not consider the trajectories of the various cannon—but will deal only with the "power" of the different types. The question of trajectories is worthy of a separate discussion.

In making our comparisons, let us fire several different cannon at the maximum authorized rate for five minutes and compare the weight of the projectiles, and the weight of the high explosive, thrown at the enemy by each of the different types in a given period of time, say five minutes. Also glance at the areas covered by fragmentation of the shells thrown.

From the above it will be seen that,

| Type                             | Five-minute Period    |                       | Maximum Rate of Fire |                              |
|----------------------------------|-----------------------|-----------------------|----------------------|------------------------------|
|                                  | No. of<br>Projectiles | Wt. of<br>Projectiles | Wt. of<br>Explosive  | Area covered by<br>fragments |
| 75-mm. Gun (Mark IV Shell) ..... | 30                    | 420 lbs.              | 42 lbs.              | 4,500 sq. yds.               |
| 75-mm. How. ....                 | 30                    | 540 lbs.              | 35 lbs.              | 4,500 sq. yds.               |
| 105-mm. How. ....                | 20                    | 660 lbs.              | 99 lbs.              | 7,200 sq. yds.               |
| 155-mm. How. ....                | 15                    | 1,440 lbs.            | 228 lbs.             | 9,450 sq. yds.               |

firing for short intervals of time at the maximum authorized rate, a 105-mm. howitzer will fire 57% more steel, 135% more high explosive, and will cover 60% more territory with death-dealing fragments than will a 75-mm. gun.

A similar table made up for the number of projectiles the same weapons would fire in one hour at the maximum prolonged rate of fire gives the following results:

| Type                             | One Hour Period       |                       | Prolonged Rate of Fire |                              |
|----------------------------------|-----------------------|-----------------------|------------------------|------------------------------|
|                                  | No. of<br>Projectiles | Wt. of<br>Projectiles | Wt. of<br>Explosive    | Area covered by<br>fragments |
| 75-mm. Gun (Mark IV Shell) ..... | 180                   | 2,520 lbs.            | 252 lbs.               | 27,000 sq. yds.              |
| 75-mm. How. ....                 | 180                   | 3,240 lbs.            | 209 lbs.               | 27,000 sq. yds.              |
| 105-mm. How. ....                | 120                   | 3,960 lbs.            | 594 lbs.               | 43,200 sq. yds.              |
| 155-mm. How. ....                | 60                    | 5,760 lbs.            | 912 lbs.               | 37,800 sq. yds.              |

From a study of above tables it is clear that the following conclusions can be drawn:

(1) *The larger the caliber the greater the weight in projectiles, and in high explosive, which can be thrown at the enemy in any given period of time, and*

(2) *the larger the caliber the greater the area covered by shell fragments in short periods of time.* For extended periods of time at the prescribed rate of fire the 105-mm. seems to cover more territory than the others considered. (Note: Data for tables taken from FA Book 161.)

These conclusions would seem to indicate that *mechanically* the output of the heavier weapon is more efficient than that of the lighter weapon. In other words, if a commander of a small force had an opportunity to choose what sort of a battery would support him, and if he could disregard all questions of mobility,

supply, cost, etc., and concentrate his thoughts solely on the "business end" of the projectile; namely, the weight of metal and high explosive that could be thrown at the enemy in a given period of time, and *the area covered by shell fragments*—he undoubtedly would choose one of the heavier batteries.

There is another factor which should be taken into serious consideration when the "business end" of a projectile is being

considered. This is the question of morale. Do, or do not the heavier shells drive the enemy to cover and hold him there longer than the light shells? Do, or do not the heavier shells sap the enemy's courage, and weaken his "will to resist" more than light shells?

## THE BIGGER THEY ARE THE HARDER THEY FALL

In an effort to get expert opinion on this matter,—and we now enter the realm of *opinion*, not *facts*—the writer sent a brief questionnaire to about twenty of his friends in the infantry who had a great deal of experience in the front lines during the World War. The average time spent under shell fire of those replying was over 200 hours (several replies were difficult to evaluate, such for example as: "three months," "64 days," "too long.")

The first proposition was:

When under cover \*(in a trench or shell hole)

- (1) I soon grew accustomed to all kinds of shell fire and ceased to fear it.
- (2) I never grew accustomed to shell fire and never ceased to fear it.
- (3) I grew accustomed to small-caliber (75-77-mm.) shell fire but always feared the heavier calibers.

\*Strike out two sentences.

Fifteen percent of those replying stated that they grew accustomed to all kinds of shell fire and ceased to fear it. One explained his statement by saying that being a battalion commander he was so busy and had so much responsibility on his shoulders that he did not have any time to devote to his own personal feelings. He added that if he had had less to do, or had been forced to move in a narrower orbit, he probably would have felt differently.

Forty-five percent of those replying stated that they never grew accustomed to shell fire, or even if they did grow accustomed to it, they never ceased to fear it.

Forty percent of those replying stated that they grew accustomed to the small caliber (75-77-mm.) shell fire but always feared the heavier calibers.

The replies received were interesting, indicating, as they did, that shell fire

affected different persons in different manners. However, it is interesting to note that while 55% grew more or less accustomed to the 75's, only 15% ever grew accustomed to the heavier calibers.

The next question was a more general one along the same lines:

"Is the following sentence true or false? In general, the greater the caliber of the shell, the more I feared it."

Eighty-five percent asserted that the sentence was true.

Fifteen percent asserted that it was false.

This question brought out more unanimity of reaction. As long as they were going to be shot at, 15% did not care what caliber was used—but the vast majority was clearly in favor of being shot at by the light projectiles, 85% feared the heavier projectiles more than the lighter ones. This proves, conclusively I believe, that the heavier shell, as a morale destroyer, is more valuable than the lighter ones.

Another question was: "The shells which had a greater velocity than sound, and arrived without warning, were the most terrifying of all. (True or false?)"

Fifty-four percent stated the proposition was true.

Forty-six percent stated the proposition was false.

Some of those who stated that it was true, qualified their statement by adding that it was only true when they were above ground; that when they were in a trench or shell hole, it was not as terrifying as a heavier caliber shell.

An analysis of the replies to this question would involve the question of flat or curved trajectories, with which this article has nothing to do. The question is included here as a matter of interest only.

The questionnaire asked for any remarks

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the officer cared to make regarding the effect of artillery fire on morale. Some of the remarks were most interesting and are given below:

"The bigger the stuff they put down on you the more you sat up and took notice. Nobody really gets used to, or enjoys being shot at. But shell fire is less terrifying than machine-gun fires. They are really bad."

"Artillery fire from a flank or rather from a diagonal is terrific on the morale."

"You always fear artillery fire, or, if it sounds better, you respect it."

"As a general rule, neither myself nor the men in my battalion (as nearly as I can state) were *much* concerned about enemy light (75) artillery fire when we could find cover in trenches or even in shell holes. On the other hand when we were above ground and have to move, this light artillery was most disturbing, if it fell near us and there was a reasonable amount of it. Certainly I can say that the more I experienced this 75-mm. fire, the less I feared it,—*given any reasonable cover*, I never did like to receive the heavy shells."

"The 75 is a relic of the day when it was the largest caliber that had the requisite mobility. That day has long since gone. The motor (tractor) improvements make a heavier caliber more mobile than the old 75 *used to be*. (This including the ammunition problem.) To use a pop-gun like the 75 when you could get a real gun is silly—in other words, I don't know of a single valid reason for the 75 gun except that we have a heluva lot of them on hand."

"I recall only two instances when any big ones fell in my vicinity. However, I won't hesitate to say that the heavy calibers are much worse on the morale than the lights."

"Heavier calibers certainly tend to

lower morale to a greater degree than light."

"Did not pay much attention to caliber. Number of shells had more effect. . . . Sudden burst of heavy fire had worse effect on morale than routine firing."

"(Artillery fire) . . . has less effect against trained and experienced troops than against green troops. The 75-77-mm. least effective and least terrifying."

"Shells with greater velocity than sound are the least terrifying of all shells. When you are in the front lines there is so much to do that if you spend your time worrying about something that might not happen, you would never do anything or get anywhere. When the shell travels faster than sound, it is here and gone before you know anything about it; so why worry? If it hits you, you will never know it, and if it misses you, it is just another horror of the battlefield. That is the best answer I can give to that question."

Although the expert opinion is not unanimous, it may be summarized by the statement that *in general the heavier calibers tend to lower hostile morale much more than the light calibers*.

In any discussion between a "small gun" advocate and a "big gun" enthusiast, the former will invariably pose the question: "But why drive a tack with a sledge hammer?" Conceding that there may be times when it will be uneconomical to use the larger guns, it should be borne in mind that even the 75 does not fire except at "worthwhile" targets. And any target that is "worthwhile" for the 75, can be handled better by a heavier weapon. The correct response for the "big gun" man to the above question would seem to be: "Why send a boy to do a man's work?"

Again there arises the difference in cost. Perhaps it will turn out that it

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will be twice as expensive to fire the heavier shells. What of it? Are we interested in efficiency on the battlefield or in economy? If the heavier shells will win battles, then in the long run they will prove the cheapest. Where would our Air Corps be, where would our Navy be, if they had sacrificed efficiency for economy? What the nation wants is the most efficient, not the cheapest.

And if my figures are correct, and if the opinions of my "experts" are of value, it would seem that the heavier guns are more efficient mechanically and are more destructive of hostile morale than the light calibers. Therefore if the "motor era" is upon us—if we can now follow the infantry with the heavier guns as easily as we could with the light guns in the "horse-drawn" era—then why not use the more efficient weapon to a greater extent?

And if it is finally decided after weighing all the pros and cons that the heavier weapon is more efficient on the battle field, should not every effort be made to use it on the battle field? It has been stated that the 155-mm. howitzer, when it is being towed behind a truck, starts bouncing dangerously at speeds over 30 miles per hour. It may be that this is being used as an argument against this weapon. But surely we have enough bright minds in the Army to eliminate this bounce by some such scheme, for instance, as shock absorbers. In other words, should any difficulties, no matter however great they may appear, stand in the way of furnishing the infantry the best and most efficient support it is possible to give it?

The new "streamlined" Division brings up an interesting point in this connection. The new Division has fewer infantrymen than the old. But the infantry fire-power of the new Division is approximately the same as that of the old. The Division will attack and defend on about the same frontage as formerly. However, the

artillery, in number of guns and consequently in firepower, has been materially reduced. The artillery seems to be called upon to provide the same efficient support as formerly with a reduced number of weapons. A partial,—and it is only partial,—remedy would seem to be to use more efficient weapons; namely, weapons which will cover a greater area with shell fragments in a given period of time.

One final argument may be advanced in favor of the heavier weapon. It is more efficient logistically. Let us take for example a situation in which the supported infantry has called for concentrations which require 1,000,000 square yards of terrain to be swept by artillery fragments. Let us compare the tonnage of 75-mm. howitzer and 105-mm. howitzer shells required to cover this area once.

It will require 6,667 75-mm. shells weighing 60 tons, or it will require 2,777 105-mm. shells weighing 46 tons.

Conclusion: The purpose of this article is not an attempt to convince anyone that all 75-mm. guns should be replaced by heavier calibers. (Personally the writer is far from convinced that the day of the horse-drawn artillery is ended.) But *if* and *when* the motor replaces the horse, wholly or partially, would it not be well to give serious consideration to the greater efficiency of the heavier weapons which the motors can maneuver?

### On the Other Hand—

I have read Colonel Harris' article with great interest, and was much impressed by the valuable data he has assembled and computed. His conclusions, however, are not aimed at the same target. My own contention was that the 105 was neither as powerful as the 155 for general-support missions, nor as rapid and effective for direct support as the 75. His very illuminating questionnaire replies, indeed, seem to me to lend

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even more authority to my own argument—that the high velocity of the gun will effect casualties before considerations of "morale" will permit unprotected personnel to take cover. I believe casualties are more morale-depressing than anything else. Troops standing up, caught by high-velocity fire, are casualties before they can take cover. After taking cover, nothing but a direct, or almost direct, hit, can effect casualties. The 75 gun, firing 50 per cent more rounds, has that much greater probability of scoring such a hit. Once substantial coverage is obtained, however, a larger shell, with greater penetration, is required. My vote for such a shell is the 155-mm.

—UT PROSIM.

### Riposte by the Author

DEAR UT:

I see your point, and must admit you have some ground for argument. However before we can reach an agreement we will have to go a little deeper into the *effect of artillery fire on personnel*. Underlying all my arguments have been the following beliefs,—which may or may not be correct, but which to me—in my present state of "searching for the truth,"—seem to be so true that they are almost axiomatic. I will list my so-called axioms as follows:

1. That trained troops, when artillery fire falls on them, will seek cover below the surface of the ground, at least temporarily. They will be trained to do this, even in an

attack, because *if* they do not, they become casualties.

2. That this seeking cover will not be instantaneous, but will require several seconds, or minutes, depending on available cover. Therefore a high-velocity shell is not absolutely necessary.

3. That once under cover (in shell holes, etc.) they are practically safe from artillery fire except direct hits, or from shrapnel or ricochet bursts.

4. That getting direct hits is entirely too costly in ammunition to be sought after. Seeking for direct hits becomes "fire for destruction," and is usually out of the question.

5. That once enemy personnel is under cover, further artillery fire on them is practically a waste of ammunition.

6. That all fire on enemy personnel should therefore be by very violent, very sudden, and very short, concentrations.

If these "so-called" axioms are true, then the weapon we need is the one which will cover, with death-dealing fragments, the *greatest area in any given period of time*. If increased moral effect can be gained at the same time, so much the better. A high velocity weapon is not indicated. From available data the gun best meeting these conditions would seem to be the 105-mm. howitzer.

Q. E. D.

## BUCKIN'

On guard tomorrow and I've gotta buck;  
I may hit orderly (if I play in luck)  
My boots are so crummy I can't make 'em  
shine—  
Oh, Bill! Loan me yours; they're much  
better than mine.  
Say, Jones, how's your cap? Mine's a  
canteen;  
The visor's all cracked and I've no  
vaseline.  
Slim, loan me your blouse if the buttons  
're OK,  
'Cause I didn't have time to shine mine up  
today.  
Hm-m, shirt's all right and my overcoat,  
too,  
But these cockeyed breeches really won't  
do.  
I can borrow a pair from Jim Pasternak,

And his belt and his holster when he  
comes back—  
Some G. I. ornaments—wool gloves, O.  
D.—  
Guess I can get 'em from that rook,  
McKee.  
I'm a real bucked-up man, and this is my  
boast—  
Made nine orderlies; never walked post.  
Boy, am I tired! I've been buckin'  
tonight.  
But I've sure got my stuff a-lookin' just  
right!  
I'll go draw my gat, wipe her off with a  
rag,  
And then I'll have ORDERLY, right in  
the bag!

—P. R. HOWELL,  
*Hq. Btry. 76th FA.*

# Acoustical Phenomena Associated With Gunfire

BY CAPTAIN W. S. NYE, FA

THE excellent view of a gaseous ring emerging from the bore of a howitzer photographed by Major Metcalf and published in the January-February issue of THE FIELD ARTILLERY JOURNAL recalls that there are several interesting but little-understood phenomena associated with gunfire. A few of them are presented here—not in the nature of a scientific exposition but simply as curiosities.

The noise which the casual observer notes as originating at the muzzle of the piece is complex, and is not always the fundamental or primary wave propagated by the firing of the cannon. The sonorous gas ring mentioned above is one manifestation of the complexity of this sound. Unfixed ammunition generally contains a base or igniter packet of black powder which burns almost instantaneously, and just prior to the slower combustion of the propelling charge. The gas thus formed sometimes escapes between the projectile and the bore of the gun; this probably occurs where the projectile is not firmly seated or the piece is worn. Forced rapidly forward by its own force of expansion and by the quickly following pressure of the propelling charge and projectile, this small cloud of gas whirls from the muzzle in the form of a ring or corona. On account of its velocity it is sonorous in character; it screeches off at a tangent to the trajectory, and may be responsible for that not uncommon (but probably erroneous) exclamation: "That shell stripped its rotating band!" Figure 1 shows six consecutive exposures of an

ultra-high-speed motion picture camera, taken by Esclagnon in 1917; the first two views show the emergence of the corona, followed by the combustion of the propelling-charge gasses. The latter discloses the interesting fact that the muzzle blast is not a single simple expansion but rather a succession of puffs. This is in contradistinction to the ancient and popular conception.

The muzzle wave (sound of the cannon) is produced by a combination of flash and violent expulsion of gas. That it is caused largely by the former may be seen from the fact that Maxim silencers and flashless powders partially suppress the sound because they reduce the flash at the muzzle and not the force of expulsion. Ordinarily the quick combustion of the gas produces a compressional or shock wave. The air, being an elastic medium, springs back through the decompression following the shock, and continues to oscillate for a brief instant until the various damping factors bring the pressure of the air back to normal. Thus there is produced a compressional wave, followed by a rarefaction and several ripples of decreasing amplitude projected out into the air with a velocity of about 1,100 feet per second. The average observer thinks he hears merely a loud "boom," intense and abrupt. Actually the sound is somewhat prolonged, as is clearly shown on sound-recording devices. The amplitude and frequency of the muzzle wave varies with the caliber of the gun and the size of the powder charge. The frequency of a 75-mm. gun is about 25 cycles,

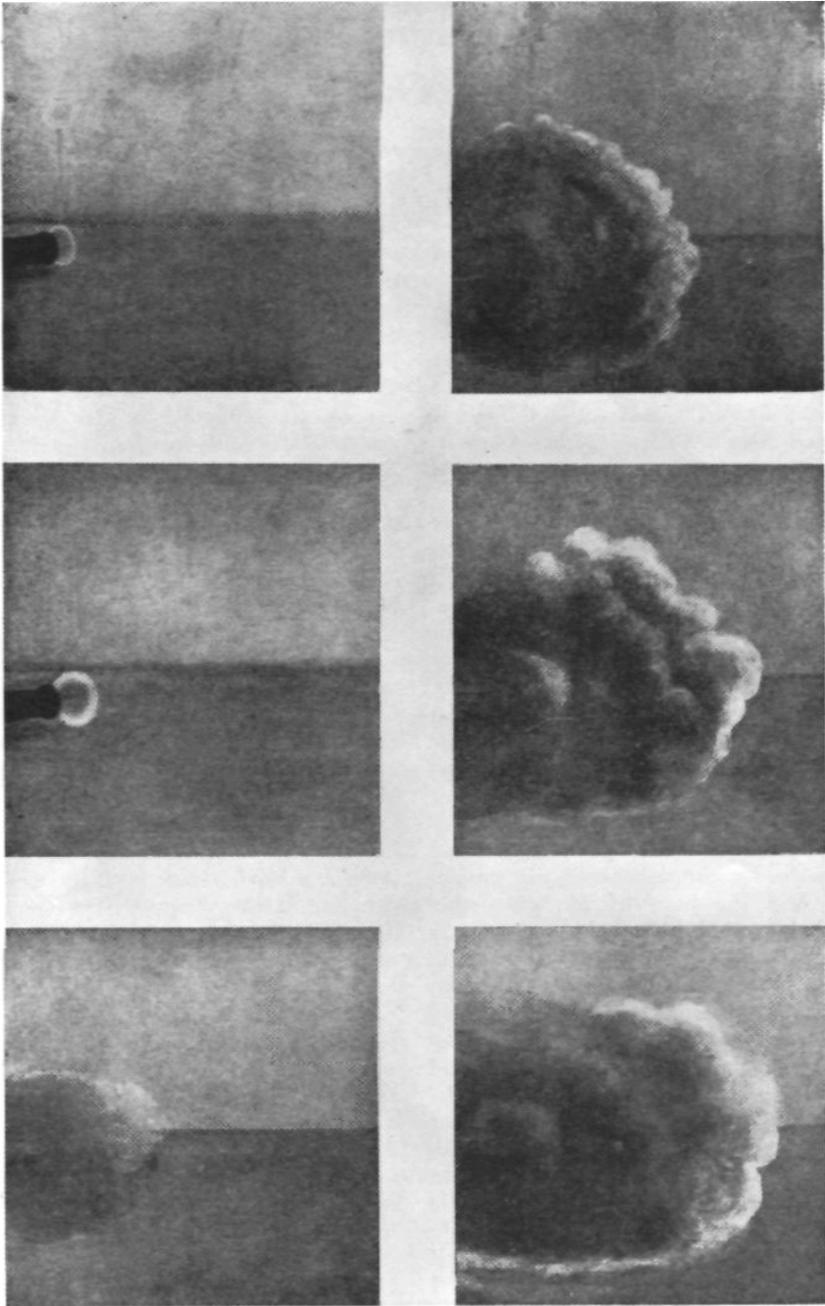


FIGURE 1

## ACOUSTICAL PHENOMENA ASSOCIATED WITH GUNFIRE

that of a 155-mm. howitzer about 16. Thus it is evident that the muzzle waves of the larger guns are below the range of human audibility; that is, they are *infra sounds*.

Near the muzzle this wave has great power, the decompression being particularly effective in picking up clods of earth and producing on the ground that disturbance known as muzzle blast. One may easily observe the pressure and decompression effect in loose soil in rear of a large cannon as it fires. This effect should not be confused with the actual blast of disturbed air which quickly follows the sound wave. The fall and detonation of a giant meteor some years ago in Siberia produced a large-scale effect similar to the muzzle wave of a cannon. The initial compression flattened the surrounding forests for a radius of many miles, and the rarefaction sucked out huge chunks of turf from the surrounding terrain.

It has long been known that the muzzle wave of seacoast or naval guns, or the sound wave from the destruction of a munitions factory will cause the window panes of nearby buildings to fall outward. It seems reasonable to suppose that the compressional wave, being of as great an amplitude as the rarefaction, would cause many of the panes to fall inward. It may be that the membrane (pane of glass) resists the first pressure but the principle of resonance causes the pane to swing outward with such increased amplitude that it is broken by the rarefaction.

If the muzzle wave of a large cannon is an *infra sound*, why is it heard at all? The audible sound is a secondary effect. Within the bore of the gun, and before the projectile has emerged, there is a reflection back and forth. This, together with the progressive nature of the combustion shown in Figure 1, produces sounds which follow the primary note of the cannon. These may be of different

frequency and phase; certainly there is a great deal of heterodyning, reflection, and confusion, resulting in a complex sound of audible frequency, and one which is even more prolonged than the original disturbance. All this is shown on the sound track of a recording device. As the observer is farther and farther removed from the gun the sound becomes even more prolonged, until at great distances it becomes a low rumble lasting a perceptible period. This latter effect may be traced to additional causes. Some of the sonorous rays pass close to the earth and are subjected to various deformations, reflections, refractions, and absorption, owing to the nonhomogeneity of the medium. The rays which are refracted into the higher atmosphere are similarly distorted, some being retarded, others accelerated by wind or temperature variations. The result is that all sonorous rays do not reach the distant observer at the same time, and some do not reach him at all.

On a cold day, especially if there is rain or fog, the sound of a cannon is loud and sharp, whereas on a hot clear day it may be entirely imperceptible at a range of two or three miles. This is in spite of the fact that sound travels faster in a warm medium than in a cold one; but on a hot day the temperature gradient is such that most of the sound rays are deflected upward, few of them reaching the observer.

On rare occasions, where peculiar meteorological conditions obtain, sound rays may be refracted by different amounts and in a periodic way so that they tend to collect again at a distance from the source, where they actually come to what might be called a *focus*. This produces a "ghost" or pseudo sound which has been called an acoustical image or mirage, and actually has been noted, in the field, at times when

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ballistic waves, echoes, or other sources of sound definitely were not present. The acoustical image may be detected sometimes from the fact that it shows on a recording device as being of the same phase as the original sound, thus proving that it is not a reflection or echo. Rarely has this acoustical image been sufficiently separated from the gun wave to be perceptible to the unaided ear, but such phenomena have been observed.

Another acoustical phenomenon often heard but frequently misinterpreted by the layman is the ballistic wave. Observers at forward observation posts hear this sound if the weapon has a muzzle velocity much in excess of 1,100 feet per second, but they usually think that what they have heard is the sound of the gun, and that the latter, when it arrives, is an echo. The ballistic or shell wave is analogous to the bow wave of a vessel moving in water, and is produced whenever the projectile's velocity exceeds that of sound in air. The sharp crack which an observer hears from the target pits of a small-arm range is the ballistic wave, not the muzzle wave of the rifle. Similarly, in the fire of cannon, the ballistic wave may be distinguished

from the gun wave by its loud, abrupt sound, whereas the gun wave is generally a low, dull boom or a rumble.

Projectiles also produce noises variously described as roars, whistles, screams, and the like. These sounds are created by the wobbling of the shell and by the turbulence set up in its rear. To date no one has succeeded in photographing the ballistic wave of a cannon projectile, but excellent photos of this phenomenon relating to small arms have been shown many times since 1887. Figure 2 shows one of these; it illustrates the fact that the ballistic wave is produced at the tail of the projectile as well as at its nose, and at any other projection such as a rotating band. The observer, however, notes only one wave, because the succeeding sounds are too close to the bow wave to be distinguished therefrom.

One of our ballistic experts who first saw a photo of a ballistic wave in 1890 gave an interesting if inaccurate theory as to the cause thereof. It was his idea that the lines seen receding from the nose of the bullet were particles of air and dust caught up by roughness on the surface of the projective, and

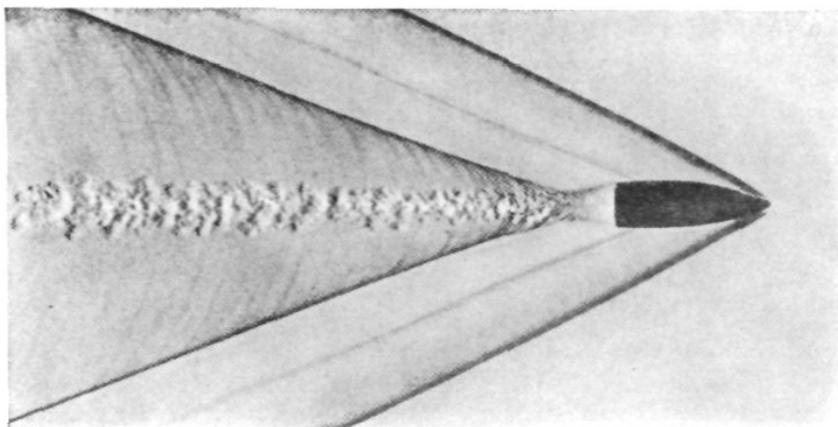


FIGURE 2

ACOUSTICAL PHENOMENA ASSOCIATED WITH GUNFIRE

thrown off in a conical spray. He advocated that all artillery shells be carefully smoothed along the bourrelet in order to reduce this "undoubtedly injurious" effect! It is of interest also to read as late as 1930, in an article by a leading authority on meteors, statements indicating a lack of knowledge concerning ballistic waves. This scientist, after carefully investigating reports of reliable eyewitnesses to the fall of a 900-pound meteor in Arkansas, recounted

descriptions of the tremendous detonations which were noted when the meteor exploded in air. Inasmuch as the observers were over one hundred and fifty miles away from the point of the supposed explosion, it is evident that the sound produced thereby would have been a low prolonged rumble (if audible at all!) and not a sharp deafening detonation as described. What they heard was the ballistic wave produced as the meteor tore through the air overhead.

CONDUCT OF FIRE, LARGE T (See page 222)

A Solution

1. a. A deflection giving a target hit.  
The center of a one-s deflection bracket.  
The center of a 16-mil or less deflection bracket when s is greater than 16 mils.
- b. When a target hit is obtained.  
When a 2-mil deflection bracket is split.  
When sensings of deflection over and deflection short are obtained at the same deflection setting.
2. From the firing tables: s is 19, d is 14. F is 12, c is 9.

Modified  $s = \frac{12}{9} \times 19 = 25$ .  $c/d = 9/14 = .6$ .  $F = 12$ .

3. c/d is .6, Mod. s is 8, F is 6.

| Command          | Elev. | No. | Dev. | Range | Df | Remarks  |
|------------------|-------|-----|------|-------|----|--|
| #1, 1 Rd,        | 240   | 1   | 50R  |       | ?  | .6×50=30. 240—30=210.  |
|                  | 210   | 2   | 7L   |       | —  | .6×7=4. 210+4=214. Line at 214.  |
|                  | L16   | 226 | 3    | 7R    | ?  | 2-s change with plotted data.<br>2-F change from a line shot.<br>.6×7=4. 226—4=222.  |
| R8               | 222   | 4   | Line |       | +  |  |
|                  | 218   | 5   | 3R   |       | —  | Splitting brackets in Df and Elev<br>.6×3=2. 218—2=216.<br>Line at 216.  |
| L4, 3 Rds,       | 219   | 6   | 3R   | +     | ?  | Range sensed on rule.  |
|                  |       | 7   | 4R   | +     | ?  |  |
|                  |       | 8   | Line | +     | +  | Positive deflection sensing.   |
| R2               | 216   | 9   | Line | —     | —  | Elev decreased ½ Fork.<br>Df bracket split.  |
|                  |       | 10  | 2L   | —     | ?  |  |
|                  |       | 11  | 3R   | +     | ?  | 6 Rds for effect fired at 217.5<br>Fork is 5.<br>4 overs, 2 shorts.<br>2/12×5=.8.<br>217.5—.8=216.7.<br>Df correct because a 2-mil bracket has been split. |
| L1, 6 Rds, 216.7 |       |     |      |       |    |  |

# The Songs of The Field Artillery

A VOICE: Mr. Chairman. I rise to voice a protest at the perversion — indeed the downright corruption — of all that we of the Field Artillery hold —

CHAIRMAN: Will the speaker identify himself?

VOICE: The speaker will not. He has a passion for anonymity, and by private arrangement with the press he withholds his name, although he will be pretty free with those of others.

CHAIRMAN: What is that volume you are brandishing so vehemently?

VOICE: This, sir, if you will pardon my emotion, is the cause of my indignation. It purports to represent the true verbiage of many songs inspired by patriotism and soldierly spirit, and now hallowed by tradition. And it most confoundedly does *mis*represent the words, clauses, conjunctions and other parts of speech dealing therewith. Not only does it deviate, sir, from the words first penned by the bards themselves; it fails to follow the usages long sanctioned. The first charge is a mere detail; the second is a positive crime.

CHAIRMAN: The chair will give ear while you qualify yourself as an expert on the matter you have introduced to the discussion.

VOICE: Sir, I sat in the same mess in the old Fourth Mule night after night with Doc Griffin who wrote many of these songs, and with George Gatley—God rest them both—who led the singing, and having served in the same Fourth for ten

years (a chunk out of any man's life) I beg to submit the following renderings as being the only true and authentic versions—

CHAIRMAN: The allegedly authentic versions may be printed under "Extension of Remarks." What the chair—and he is certain, the audience—would like to hear now is something of the composition, operation, and maintenance, of the mess of the old Fourth Mule.

VOICE: Well, sir, it was a joint bachelor mess of officers of the 2d and 4th regiments of field artillery. The first battalion of the 2d, and C, D, E, and F of the 4th were at Fort D. A. Russell, Wyo. (now Ft. F. E. Warren) in March, 1909. Half the 4th had come from Sheridan, and the other half were just back from the Islands. Lt. Col. C. F. ("Fighting Charlie") Foster, 2d FA, commanded the provisional regiment, while Lt. Col. E. ("Cully") Gayle, had the battalion of the 4th, and Major John Conklin ("Uncle John"), 2d FA, the battalion of *his* regiment. At first we were in the 9th Cavalry Mess, during which "Rolling River" ("The Wild Missouri") served as our theme song, we wagon-soldier bachelors always bearing down hard on the fact that the lady's trip to Kansas City disclosed that her real lover "must have been a Ninth Cavalry soldier." Then the artillery post was completed, and we started our own mess. Other lieutenants were Leo P. Quinn, Edwin DeL. Smith, Roy Collins.



**"Should Auld Acquaintance Be Forgot . . . ?"**

## THE SONGS OF THE FIELD ARTILLERY

Ballard Lyerly, Robert Kirkwood, and Joe Clement. Doc Sturgill brought back some songs from Cuba. He and Kenneth Perkins and Harold Marr, with Doc Griffin, were ringleaders as songsters, and Harold Marr, to my personal knowledge, has kept a fine pair of vocal chords in serviceable condition as of even date.

William McK. Lambdin—captain, if you please—was the senior officer of the mess, and set a noble example of relaxation in its finer forms to us humbler fry. For in those days a captain was a very senior officer, indeed.

The practice was to have a bottle of wine at the end of dinner, and sing a few songs. (One couldn't very well sing, "Here's a How and a How, and a How, How, How," with a tumbler of water. Water, as is well known, contains germs.)

At that time, a man's work was done at Retreat. In fact, after noon Officers' Call, courts and schools took up the afternoons. There was no Field Artillery School at Sill then—"

CHAIRMAN: How about Leavenworth?

VOICE: A man who went to Leavenworth was a pitied highbrow.

CHAIRMAN: Proceed.

VOICE: After awhile, the Second left, and Regimental Headquarters of the Fourth, with Batteries A and B, came from Vancouver Barracks. Colonel A. B. Dyer, a fine gentleman of the old school, then had his regiment together for the first time, with A. S. Fleming as adjutant. The mess gained, therewith, Herb Hayden, John Tyndall, Fred Barrows, and Allen McBride. With Herb's arrival, we took on some dog. Out went the oilcloth, and so on, and in came linen tablecloths and napkins, and we all dressed for dinner, mostly mess jackets. Herb, as social arbiter, was repeatedly shocked at our gaucheries—particularly at Bob Kirkwood's—until Wilbur Rogers joined,

and it was discovered that one of them did not handle his spoon properly.

When the Fourth reached Texas City as a part of the 2d Division, a club was established at once, and Major George G. Gatley began to contribute to the regiment the abilities of the most versatile and adept story-teller and songster the field artillery of his generation ever saw.

CHAIRMAN: Can you cite any other authorities in support of your claims?

VOICE: Recently I had some correspondence with the Assistant Commandant of the Field Artillery School on this matter. It was prompted not only by some misplaced commas I detected above the uproar when some 400 of us sang Field Artillery songs at the St. Barbara Day banquet at the Kenmore Hotel in Boston last December, but even more by my reading, in this songbook I hold in my hand, the perversions of some of the most exalted, the most inspiring—

CHAIRMAN: Your feelings do you credit. But tell us about this correspondence.

VOICE: I had written Don Cubbison, because I had discovered that even the wellspring of field artillery knowledge, the School, was being poisoned by song alterations. I complained that the first two verses of the Caisson Song, as distributed in printed form thereat, were not as I recalled them, unless Snitz Gruber, the composer, had changed them meanwhile. Don replied that Snitz had visited him in December, and on several occasions most accommodatingly had played the piano while his famous song had been rendered by divers persons, some of whom sang from memory, and others from the book to which I took exception. And further that the composer had made no comment whatever as to any corrections that should be made in the words.

CHAIRMAN: What does this prove?



## THE SONGS OF THE FIELD ARTILLERY

### THE CAISSON SONG

E. L. GRUBER

Over hill, over dale, we have hit the dusty  
trail,

And those caissons go rolling along.

"Countermarch," "Right about!"

Hear those wagon soldiers shout.

While those caissons go rolling along,

CHORUS

For it's Hi-yi-yeel in the Field Artillery,  
Call off your numbers loud and strong  
(Spoken:—"Call off!")

And where'er we go, you will always  
know,

That those caissons are rolling along.

(Spoken:—"Keep 'em rolling!")

That those caissons are rolling along.

To the front, day and night,

Where the dough-boys dig and fight.

And those caissons go rolling along.

Our barrage will be there,

Fired on the rockets flare,

While those caissons go rolling along.

CHORUS

With the cavalry boot to boot,

We will join in the pursuit.

And those caissons go rolling along.

Action front, at a trot,

Volley fire with shell and shot,

While those caissons go rolling along.

CHORUS

Should the foe penetrate,

Every gunner lies in wait,

And those caissons go rolling along.

Fire at will, lay 'em low.

Never stop for any foe,

While those caissons go rolling along.

CHORUS

But if fate me should call,

And in action I should fall,

Keep those caissons a-rolling along.

Then in peace I'll abide

When I take my final ride

On a caisson that's rolling along.

CHORUS

(After last chorus)

Bat!—try, Hal!—t!

### O'REILLY'S GONE TO HELL

GERALD E. GRIFFIN

O'Reilly was a soldier man, the pride of  
Battery B,

In all the blooming outfit, no better man  
than he,

The ranking duty noncom, he knew his  
business well,

But since he's tumbled down the pole  
O'Reilly's gone to hell.

CHORUS

O'Reilly's gone to hell, since down the  
pole he fell,

He drank up all the bug-juice the whisky  
man would sell,

They ran him in the mill; they've got him  
in there still,

His bobtail's coming back by mail,  
O'Reilly's gone to hell.

O'Reilly hit the bottle after six years up  
the pole,

He blew himself at Casey's place, and  
then went in the hole,

He drank with all the rookies, and shoved  
his face as well,

The whole outfit is on the bum, O'Reilly's  
gone to hell.

CHORUS

O'Reilly swiped a blanket, and shoved it  
up I hear,

He shoved it for a dollar, and invested  
that in beer,

He licked a coffee-cooler because he said  
he'd tell,

He's ten days absent without leave,  
O'Reilly's gone to hell.

CHORUS

They'll try him by court-martial, he'll  
never get a chance,

To tell them how his mother died, or  
some such song and dance,

He'll soon be down in Company Q, a-  
sleeping in a cell,

A big red "P" stamped on his back;  
O'Reilly's gone to hell.

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**THE MOUNTAIN BATTERY  
SONG**

GERALD E. GRIFFIN

Fall in! Fall in! Attention!  
You red-legged mountaineers;  
With your gun and your pack,  
And your box of tack,  
Non-coms and cannoneers.  
Baptized in Mindanao  
Beside the Sulu Sea;  
    With a tow, and a tow,  
    And a tow, row, row,  
    From a Mountain Battery,  
    With a tow, and a tow,  
    And a tow, row, row,  
    From a Mountain Battery!

Oh I'd rather be a soldier  
With a mule and a mountain gun;  
Than a knight of old  
With spurs of gold,  
Or a Roman, Greek or Hun,  
For when there's something doing,  
They always send for me,  
To start the row,  
With a tow, row, row,  
From a Mountain Battery.  
To start the row,  
With a tow, row, row,  
From a Mountain Battery.

For when we are commanded  
To open up with ball,  
We slap our guns together,  
And with them stand or fall.  
To right and left before us  
Our shrapnel bursts we see;  
    With a tow, and a tow,  
    And a tow, row, row,  
    From a Mountain Battery.  
    With a tow, and a tow,  
    And a tow, row, row,  
    From a Mountain Battery.

Here's to pack and aparejo,  
And to cradle, gun, and trail;  
And the damned old fool,  
The battery mule,  
Who was never known to fail.  
Then fill your glasses high,  
And drink this toast with me;  
    Here's a how, and a how,  
    And a how, how, how,  
    To a Mountain Battery.  
    Here's a how, and a how,  
    And a how, how, how,  
    To a Mountain Battery!

**KEEP THEM ROLLING**

GERALD E. GRIFFIN

Hear the blast of bugles calling from the  
    paulins in the park;  
Hear the chiefs of sections bawling as we  
    line up in the dark.  
Get that whiff of "slum" and coffee? Hear  
    the cursing as we load.  
Foward! March!—behind the Guidon—  
    and we're out upon the road.

CHORUS

Roll. Roll. Roll. Oh, keep them rolling;  
    Roll. Roll, Roll by battery.  
Roll. Roll. Roll. Oh, keep them rolling;  
    As we roll 'em in the Field  
    Artillery.

There is foam upon the leather and there's  
    sweat upon the hide,  
As the lead and swing together pull the  
    wheelers to their stride.  
There's a rumble from each caisson and a  
    rattle from each pole;  
There's a growl from all the pieces as  
    along the trail we roll.  
When the guns are hot and smoking and  
    there's blood upon the trail,  
Keep the shrapnel rolling forward,  
    bursting to the front like hail.  
Do your damndest, like a soldier. Let the  
    beggars see that we  
Are now sending what's expected from  
    the Field Artillery.

## THE SONGS OF THE FIELD ARTILLERY

### THE RED GUIDON

GERALD E. GRIFFIN

Come fill up your tankards, I'll give you a  
toast—

We'll drink to the Artillery;  
The first in the battle, the last at its  
post—

Old comrades, drink standing with me.  
To friends who have passed o'er the last  
long divide,

Their spirit is still marching on,  
The spirit of those who once rode side by  
side

With the guns of the Red Guidon.

#### CHORUS

For me the crossed cannons They  
never will run—

The limber and rolling caisson,  
The trace and the collar,

The rumble of gun  
As we follow the Red Guidon.

We've soldiered together, brave hearts  
ever true;

We've marched, we have fought and  
we've bled

For the dear old flag with its red, white,  
and blue

That streams in the breeze overhead.  
We've joked and we've laughed in the  
campfire's red glare

From Cuba to distant Luzon,  
And told the old stories that drive away  
care

Near the tents of the Red Guidon.

Come! Up with your tankards and drink  
long and deep,

Brave hearts ever gallant and true,  
To those who now rest in their long  
peaceful sleep,

They once wore the red and the blue.  
Prove true in the future as they in the past  
Old comrades of gun and caisson;

Then go to your God like a soldier at last  
If you fall near the Red Guidon.



# Lines of Communications

To the EDITOR:

The leaders of the present Regular Class at the Field Artillery School were concerned over the number of brides and grooms in the class who had not been honored with the caisson ride considered the due of all good field artillerymen. A column of brides and grooms was hit upon as the solution. The ride was arranged as a surprise for the principals by one means or another, involving plenty of staff work, all the ladies of the class were assembled behind the Administration Building just before the close of the school

—and beer and liverwurst to all, including onlookers.

Complete statistics on the personalities appear below. Of special interest is that five of the nine couples were of the Marines. By some mysterious catalysis, orders to the School appear to have precipitated matrimony among the sea soldiers. For the purposes of the ride, any couple married during the current fiscal year were defined as "bride and groom." In some instances, marriages had taken place immediately before the opening of school; in others, during the fall term, or at Christmas time.

So far as is known, no Marine was ever before honored with a caisson ride.

## Troops

1st Lt. and Mrs. Francis Hill, FA. (Mrs. Hill was formerly Miss Ansley Lues Spalding, Fort Sam Houston, Texas, Bride's parents: Lt. Col. and Mrs. Isaac Spalding, FA.)



1st caisson—1st Lt. and Mrs. Wm. Y. Frentzel, FA.  
2d caisson—1st Lt. and Mrs. Francis Hill, FA.

day, Friday, February 11. Then they and their warrior husbands took over the convoy, in gallant array of artillery scarlet and gold, which had been awaiting them.

The procession circulated around the post, with the band playing, and came to a halt at the Polo Club, where the blessings of the Commandant and the Assistant Commandant were administered to the brides and grooms



1st caisson—2d Lt. and Mrs. L. F. Chapman, Jr., USMC.  
2d caisson—2d Lt. and Mrs. Jack Tabor, USMC.  
3d caisson—2d Lt. and Mrs. Wm. T. Fairbourn, USMC.

## LINES OF COMMUNICATIONS

- 1st Lt. and Mrs. William Y. Frentzel, FA. (Mrs. Frentzel was formerly Miss Thalia K. Sweeney, El Paso, Texas. Bride's parents: Mr. and Mrs. Joseph Ulster Sweeney.)
- 1st Lt. and Mrs. Harrison King, FA. (Mrs. King was formerly Miss Grace O'Hara, Washington, D. C. Bride's parents: Lt. Col. and Mrs. J. J. O'Hara.)
- 1st Lt. and Mrs. Marcus Tague, FA. (Mrs. Tague was formerly Miss Charlotte N. Swift, Crafton, Nebraska. Bride's parents: Dr. and Mrs. C. H. Swift.)
- 2d Lt. and Mrs. William T. Fairbourn, USMC. (Mrs. Fairbourn was formerly Miss Laura B. Smith, Bellefontaine, Ohio. Bride's parents: Mr. and Mrs. Bion H. Smith.)
- 2d Lt. and Mrs. Kenneth A. Jorgensen, USMC. (Mrs. Jorgensen was formerly Miss Betty Ann Michaelis, Kansas City, Missouri. Bride's parents: Mr. and Mrs. F. H. Michaelis.)
- 2d Lt. and Mrs. Leonard F. Chapman, Jr., USMC. (Mrs. Chapman was formerly Miss Emily Donelson Ford, Nashville, Tennessee. Bride's parents: Mr. and Mrs. C. W. Ford.)
- 2d Lt. and Mrs. Frederick P. Henderson, USMC. (Mrs. Henderson was formerly Miss Eva Holland, Eastville, Virginia. Bride's parents: Mr. and Mrs. Edward Holland, Sr.)
- 2d Lt. and Mrs. Jack Tabor, USMC. (Mrs. Tabor was formerly Miss Helen Ann Seelbinder, Birmingham, Alabama. Bride's parents: Mr. and Mrs. P. H. Seelbinder.)

CAPTAIN C. P. NICHOLAS, FA,  
*Secretary, The Field Artillery School.*

### TO THE EDITOR:

Discussions of the new mechanized armies suggest or imply that in future, animals will be excluded from scenes of armed combat. This comes from a habit of mind which applied the term *animals* only to the equine quadrupeds, that is, horses and mules. Nevertheless there are other animals which should be considered, whose possibilities have been neglected, whose capabilities have scarcely been explored.

I allude, Sir, to Dragons.

The characteristics of the Dragon warrant his inclusion in our modern formations. Capable of shock action, provided with an

offensive weapon (a Flammenwerfer or flame-projector), highly mobile, defensively armored and prodigiously enduring, he offers an aid to infantry by which enemy resistance may be overcome and machine guns neutralized or destroyed. He would greatly relieve the burdens now laid upon the supporting artillery. He is effective against tanks. His single weakness I will deal with later.

Whether Dragon units should be organically a part of the division or be assigned to GHQ reserve is a small problem which a few simple field exercises can readily settle. In the opinion of the writer, at least a squadron of Dragonry should be a part of the Division. Except for this, the unit should be the Regiment, belonging to GHQ reserve and attached for special operations.

The Dragonry Regiment should consist of headquarters, headquarters troops, service troop, three squadrons and attached medical personnel. The squadron should consist of three troops and the troop should have three platoons or *flights*.

Each flight should consist of three dragons, two of which mount machine-guns and one (provisionally) the 37-mm. gun.

Each dragon should carry a crew of three, a sergeant as chief-of-dragon, an operator for the weapon and a driver or dragoman. The flame projector is operated by the dragon.

The tactical employment of Dragonry readily suggests itself.

*Dragons of Preparation* precede the assaulting infantry and prepare a path for them. They should be habitually employed in units of at least a troop, except that where the frontage exceeds 600 yards, the allotment of Dragonry is proportionately increased. The employment of Dragonry in small units does not give results commensurate with the expenditure of effort.

*Accompanying Dragons* render close assistance to the advance of the assault units. Such Dragons should be attached directly to the infantry, and once the men are accustomed to them, their value is very great. The usual allotment should be one troop per infantry battalion, or roughly one squadron of Dragonry to an infantry regiment.

*Antitank Dragons* directly engage the enemy tanks, at the ratio of a Dragonry flight to each 6 hostile vehicles.

The writer has given some thought to the role of Dragonry in the advance guard. Dragonry is readily detected from the air and the presence of even a flight could hardly fail of notice. It therefore seems likely that Dragonry has no place in operations where the surprise element is important. For the same reason, Dragonry can be used but sparingly on reconnaissance missions.

## THE FIELD ARTILLERY JOURNAL

Whether Dragonry should advance over the ground or by flying will depend on the tactical situation, and it should be the duty of the Dragonry Commander to advise in this respect. It is frequently forgotten that the present-day dragon is not capable of sustained flying. He can in the air traverse distances of some twenty miles, during which he attains an estimated speed of 97 miles per hour. His progress, therefore, is a series of short hops. He can take the air regardless of weather conditions and to that extent offers an advantage over conventional types of aircraft. Accordingly there will be a temptation, which the Dragonry Commander must resist, to use Dragonry on missions which belong properly to the Air Service.

In addition to flying, the dragon can hover for short periods and where concealment is not paramount he is capable of observation missions.

With some attention to the matter of breeding, the flying powers of the dragon could be greatly enlarged. It is too early to say whether flying dragons would ultimately develop into types different from hovering dragons, but such an outcome is not impossible. The use of hovering dragons for artillery observation will certainly have a profound effect on the conduct of fire. Indeed, the writer considers it not unlikely that dragons could be trained in observation and signal back to the guns their sensings, by puffs of smoke or, perhaps, telepathy.

The dragon's one weakness may be dismissed very briefly. That is the matter of feeding. Once broken of cannibalistic habits, the average dragon consumes under field conditions five sheep or 1½ steers per diem. A Dragonry troop, therefore, demands a daily issue of 45 sheep or 13½ steers. While this presents a certain problem in procurement and distribution, it is hardly a serious drawback, and certainly

not one incapable of ready solution.

It is the hope of the writer that we may yet see the convening of a Dragon Board to initiate a more serious study of this problem.

Yours, etc.,  
SOUTHWORTH LANCASTER,  
*Major, FA-Res.*

●  
*To the EDITOR:*

This picture is of an oldtime stage coach. The scene is a skit featuring a stage holdup, which was the hit of a horse show held here in El Paso, the afternoon of Army Day.

Our regiment, the 82d FA (Horse), is descended from the original regiment of dragoons organized in 1833 to meet the menace of the mounted Indians of the southwestern plains. From the First Dragoons they became the First Cavalry, and their history is entwined with the winning of the southwest, in which these coaches played so large a part.

This coach is not one of the original Butterfield Trail vehicles used by the Overland Mail Company, but appears to be one made in Mexico, and used out of Chihuahua. However, except for the workmanship, it is a good copy. The Overland Mail coaches were very finely constructed, and this one is rather crude in spots. However, it is at least 50 years old and the way it has stood up under lack of care speaks well for the stuff that is in it. I found it last Christmas in the city corral at El Paso, and the city has turned it over to us for rehabilitation until needed. It is expected to be a feature of the next Sun Carnival here, when it will be incorporated in the pageant depicting the history of the Regiment.

MAJOR G. D. WAHL,  
*82d FA, Fort Bliss, Texas.*



# Reviews

THE COMMAND AND GENERAL STAFF QUARTERLY. *March, 1938.*

Attention is invited to the 320 pages, liberally illustrated, of this interesting and instructive number, whose contents are given below.

Cavalry at Lodz.

Military News Around the World.

Abstracts of Foreign-language Articles. This Section contains abstracts of important articles from foreign military periodicals; the remaining articles for each magazine are listed.

Book Reviews.

Library Bulletin. This Section lists books, recently accessioned, which are of particular significance.

Academic Notes, C, & G.S.S. Reprint of current School material, which affects instructional procedure or tactical doctrines.

Directory of Periodicals.

Catalog of Selected Periodical Articles. A systematic review of the contents of selected military periodicals. Foreign-language periodicals are digested to a degree to furnish an adequate idea of contents and significance.

Readers' Guide and Subject Index. All subject-headings are arranged in alphabetic sequence and can be consulted like a dictionary.

The Spanish Civil War.

The Sino-Japanese War.

THE LOST BATTALION, by Thomas M. Johnson and Fletcher Pratt. Bobbs-Merrill. \$3.00.

It appears that the Lost Battalion was "lost" twice inside four days. The second time was the hard one. They did not think themselves lost. (They knew exactly where they were.) Nor did the Germans,

who referred to them as "the beleaguered battalion." During their 6-day stay in the "pocket" east of Binarville, in the Argonne, they suffered many things, and sustained casualties. And many of the latter from artillery fire they said was American. Of that, later.

Mr. Johnson, who, as a war correspondent, covered the event at the time, joined hands with Mr., Pratt, who has written many a fine historical article for this JOURNAL, to fix the details of this story with some precision. Their labor must have been monumental, as they have pieced together the accounts of every living survivor of the battalion, and many who were in support of it. Let no one, however, imagine this to be a dry-as-dust assembly, complete with footnotes. On the contrary, it is a fascinating and absorbing account. Its reading kept this reviewer, who has reason to be somewhat sated with war stories, up to 2 AM.

Those who like their literature sprinkled with profanity will find some in here that sounds natural, not as though written by a lady author who pens it with delight at her own horror. Some of it, indeed, approaches prayer, if not quite in the same terms, particularly the shocked and spluttering ejaculations of those wounded, exhausted, famished men, scarce able to pull trigger after near a week's besiegement, who leapt standing, with trembling knees, when they learned of the German order to surrender.

There is hardly a hair-raiser in the book, though, that compares with the description of the night march through the forest up to the position behind which the infiltrating Germans cut off the battalion. The best-laid plans went haywire when man lost touch with man.

## THE FIELD ARTILLERY JOURNAL

Misunderstanding, how many military crimes are committed in thy name!

(That there is no substitute for *time* in training soldiers becomes more evident on every page. "I can't get the bullets into this thing," had said one of the 77th Division's soldiers, not long before.) Planes buzzed all over the place, finally found a fake panel the Germans put out, and then showered the enemy lines with assorted goodies, gratefully accepted. No wonder the soldiers of the lost battalion snuck out to retrieve them, and no wonder the Germans waited a reasonable interval themselves, before gathering in the baited traps.

Now as to that artillery fire—the method of showing the terrain is that of photography of a relief map, on a scale of approximately 1/12,000. While extremely advantageous in certain respects, it presented to at least one pair of eyes a puzzling optical illusion, with all the streams on the ridge tops, and vice versa, from which impression the reviewer was rescued only by a powerful exertion of what he is pleased to term his will. The photo is printed five times, each time with a different situation overprint, and not until its fifth appearance, facing page 70, is a scale apparent, and the direction oriented. Among the statements made to support the inference that friendly artillery fire caused casualties are that the Germans had no guns within range—odd, since the target was within their own lines—and that the "pocket" was in German dead space. (Despite several statements like one on page 102, indicating that a German battery . . . ranged on the besieged.)

But let us examine a 1/10,000 fire-control map of the area in question, and what do we find? A Y-line through the pocket area shows the terrain falling 35 meters in 125 on the German side, and the same difference in altitude in 95 meters on the American side! The

American slope of fall is thus 1/2.7. This corresponds to a range of 4,000 yards for the 75-mm. normal charge (somewhat long for artillery in the offense!) and whether reduced charge was used is not stated. The ranges and positions of none of the friendly 75-mm. are given. So, to that extent, an artilleryman reading the book is somewhat less than satisfied with this portion of the account, otherwise so well documented and excellently edited it sets an extremely high standard. Lacking further data, one might assume the position to be vulnerable to German enfilading fire down Charlevaux Brook from the northwest. And the method of delivery of the alleged "friendly barrage" militates against the theory the shells came from the friendly southeast.

Let this, however, be the book to end any criticism of the gallant battalion commander, Lieutenant Colonel Charles E. (Gallopig Charley) Whittlesey. Of him and of his men, his German opposite number said gruffly they were stout soldiers; his division commander, Major General Robert Alexander, wrote: "Whittlesey did what he was told." The book makes these points well, if at the expense of some less-than-subtle grumbling at professional-soldier psychology. One of these psychologists is well satisfied with reading a good and instructive book, if not at all convinced of American artillery faultily shooting short—often charged; never, so far as is known, proved.

WHAT ABOUT THE AIRSHIP? The Challenge to the United States. By Commander C. E. Rosendahl, USN. Charles Scribner's Sons. \$3.50.

It is difficult to read this reasoning of America's foremost airship authority and come to any other conclusion than the author's: That the airship should be here to stay, even if it isn't. His is

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a masterly summation of the entire situation. He does not laugh off any of the handicaps of airship construction and operation, but he ascribes to them their true value when compared—to what, the advantages of the airship? No, the comparable hazards and difficulties involved in other forms of transportation. It can still be said, and Commander Rosendahl says it, that the statistics indicate the airship is a pretty safe contrivance, based on miles per passenger, per dollar, and per pound.

It is the tragedy of his argument that he faces a public apathy, even distaste, based lately upon the disaster that befell the hydrogen-filled Hindenberg. Commander Rosendahl will discuss with you, technically and fairly, the failures of American helium-filled craft, but one can sympathize with his anxiety that helium operations not be further biased by hydrogen failures. It is an ironic situation, surely, which finds the country with a helium monopoly unwilling to make use of it partially because of a hydrogen disaster.

The author's chapters on the military and naval powers of the airship are illuminating, to say the least, and it is doubtful whether examination of the subject by even military men has scratched the surface.

As to that argument, originating in contradictory press accounts after the Hindenburg burned, as to the lifting powers of the two gases—they vary. And according to relative purity, and temperature. But, for rough calculation, and without peeping into a gas table, formula, or curves, the average lift for 1,000 cubic feet of each, at same temperature, is, for hydrogen, 70 pounds; for helium, 65, a proportion of 14 to 13. If any one knows, Commander Rosendahl should. He has been lifted by both.

THE POWER OF DIVERSION. By Charles Thorpe Griffith. 48 pages, \$1.00. Dorrance and Company, Philadelphia, Pennsylvania.

Major Griffith's book has nothing at all to do with tactics, strategy, logistics, or gunnery, but it is a worthwhile piece of work. The author has suffered greatly, and found a way of overcoming the influence of pain by turning his mind aside from the thought of it. There is nothing new in the thought behind the system, nor does Major Griffith claim originality for his idea. He says, however, that the methods he describes have helped him, and that he wants to give them to other people for what they are worth.

At base, Major Griffith's solution to the problem of pain is religious, and he falls back on the old statement that there is nothing evil in God. Then he says that pain is evil, and brought about largely by man's failure clearly to comprehend God's love. These two points accepted on faith, it is easy to see how he can claim that there will be no cognizance of pain in the man who concentrates his entire thought on God. To those who will not believe, there is only one answer to such a contention, the internal evidence of the book itself that Major Griffith's solution worked for him. Unhappily that is not to say that it will work for everybody. The power of faith cannot be denied, but that faith must be strong in its own right and be adhered to blindly before it can help the conscious mind.

Whether you accept Major Griffith's contention or not his booklet is interesting as any account of the triumph of a man's faith over the pains of his body must always be interesting.

—Brooke Maury.

## THE FIELD ARTILLERY JOURNAL

THE MEN I KILLED. By Brig. Gen. Frank Percy Crozier. 269 pages. \$2.50: Doubleday, Doran & Company, Garden City, Long Island.

*The Men I Killed* is not a military book. British General Crozier might have opened with the bold statement that he is a pacifist. He might have explained his pacifism by saying that he had seen too many men killed ever to be willing to face another war. He might have argued that the last war proved nothing, decided nothing, ended nothing, and that the next war should be the downfall of civilization as we know it now. In saying all these things he would have been in notable company. He might have ended his book with an argument for the complete separation of church and state, and a brief description of at least one soldier's religion.

He did not do one of these things, despite the fact that his material is all there. His book suffers not from lack of material, but from lack of cohesion, and from a total absence of logic. His main thesis, or at least the statement he repeats most constantly throughout his two hundred sixty-nine pages, is that for real pacifism the church should be separated from the state because a state church is bound to favor state wars. History proves him wrong there too many times for his belief to warrant consideration, but he might even so have made an argument of his contention if he had done anything but repeat it. General Crozier's sole contribution to the science of dialectics is a whole-hearted devotion to unwearied reiteration.

He repeats things that have a bearing on his arguments, and things that have no bearing on anything but his own peace of mind. On at least fifty pages of his book he makes reference to the men of his own army whom he himself pistolled or caused to be shot to keep them from running from the field of

battle. No doubt arises in the reader's mind that General Crozier is telling the truth, or that it is a very unpleasant truth. The reader merely feels that one statement of it would have been more effective than fifty. The frequency of the statement makes you feel that perhaps General Crozier is whistling in the dark because he has done things that trouble him greatly.

It is unfortunate that reading the book leaves one unhappy and thoroughly dissatisfied with General Crozier as a man and as a soldier, for occasionally flashes of characteristics come through the almost impenetrable verbiage which make one think that General Crozier must have been a good man and an able soldier. Furthermore, it is unfortunate for the propagation of his teaching that the General writes no better than he does.

However, the General's prose style, although unformed and chaotic, is not a bit more confusing than the punctuation he has seen fit to visit upon his book in a whirlwind of commas, exclamation points, dashes, and quotation marks. He is no more consistent with his punctuation than he is with his repetitions. He is merely lavish in both cases.

In spite of all the obvious defects of his book General Crozier is very plainly honest. He thinks he has something to say; he is trying to say it; and it is really pitiful that he does not say it.

*Brooke Maury.*

THE STORY OF RECONSTRUCTION. By Robert Selph Henry. The Bobbs-Merrill Co. \$5.00. 631 pages.

The author has followed his authoritative Story of the Confederacy with this searching history of our unhappiest period. The book begins with the collapse of the Confederacy, with the assassination

## REVIEWS

of President Lincoln, and proceeds, minutely, and step by step, to record the causes at issue and the temper of the people in that vast program inaugurated under President Andrew Johnson. It ends with the disputed election contest of Tilden and Hayes. No brief review could adequately present the worth of such a volume to those interested in its subject. This is a narrative built up of a thousand incidents, each a streamer headline in its day, not the least important of which is the chapter "Seven Senators Save the Constitution." This refers to Senators Fessenden (Maine), Fowler (Tennessee), Grimes (Iowa), Henderson (Missouri), Ross (Kansas), Trumbull (Illinois) and Van Winkle (West Virginia), who voted "No" to the proposal to impeach President Johnson. Of them, the author writes: "The seven senators, when they refused to vote that the President had committed a crime in differing with the Congress, did two things. They did justice, at great cost to themselves, and in the face of almost overwhelming popular pressure and hysteria. That most certainly was no

small thing to do but they did more. They preserved the American form of government—a government of coequal branches, each independent in the sphere assigned to it by the Constitution which established and governed them all."

THE JOURNAL OF THE AMERICAN MILITARY HISTORY FOUNDATION.  
Frederick P. Todd, Secretary, 3022 Porter St., N. W., Washington, D. C.  
Price \$3 per year.

The spring issue of this interesting quarterly contains 56 pages, and articles by Mr. A. P. James, Mr. Siert F. Riepma, Mr. James E. Hicks, and Mr. F. Stansbury Haydon, besides miscellany under the head of Notes and Antiquities. Of interest to the reader will be Mr. Haydon's account of an invention submitted to the War Department in 1862, proposing an artillery shell to be filled with liquid chlorine, the conception anticipating not only the celebrated Ypres attack, but later, and even up-to-date methods of chemical employment.

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## Announcement

It has been decided that no Digest of Field Artillery Developments will be issued for the year 1938, as has been done for 1935, 1936, and 1937, at the Field Artillery School. Instead, whatever information on changes in technique or method which become approved, but must await official printing, will be first broadcast to the arm in the pages of THE FIELD ARTILLERY JOURNAL.

When so published, they will be conveyed with the same authority which attached to the former Digest, having

been approved by the Commandant of the School and by the Chief of Field Artillery. Such articles will, in each case, be introduced or accompanied by this statement, to differentiate them from the general content of the JOURNAL, which is strictly unofficial.

This arrangement will add even more to the value of the magazine, without which no United States field artilleryman may consider himself completely abreast of the developments within his chosen arm.



YES, this Mr. William Hazlett Upson is the same W.H.U. who writes those amusing soldier and tractor stories (often illustrated by Tony Sarg) for the *Saturday Evening Post*. A timid request that he do something for our JOURNAL was met with so prompt a response it was apparent he had had this article on the fire for some time. His concern is understandable. Once upon a time (when grooming the "wool," as Mr. Upson once termed it, of a particularly muddy wheeler) we thought how nice it would be if all one had to do was pour a gallon or so of gas in the tank, press a button, and hie over hill and over dale. This was in 1916, when rumors of motor-drawn artillery first reached us from abroad. We are wiser now, if no sadder. What impresses us most, in view of the fact that a 75-mm. can, as has been printed in these pages, deliver its own weight in metal five miles away in an hour and fourteen minutes, at prescribed rates of fire, is that the greatest laborsaving device science could give us would be an effective round of ammunition of zero volume, and zero gravity. But we ask Mr. Upson to withhold his request to the mechanical industry that they develop a one-man gun until they have had a chance to act on our own proposition—that they devise an automatic proofreader.

THIS ECHELON does its best to keep track of your address and rank, but assumes no responsibility therefor unless notified by you. If you have flitted about the country for years with no notification here as to your change of address, and find that your JOURNAL has followed you faithfully, you are to be congratulated. And we will take a bow.

Perhaps your orders send you to foreign service on or about a certain date, which coincides with the mailing of a JOURNAL. The files are changed, and your JOURNAL is on its way. Then, perhaps, the orders are changed, or rescinded, and a post card comes into the office with the plaint that your copy of the JOURNAL has not arrived. So we change the address back again, send you another copy, and lay the conventional odds of 8 to 5 that before the next number is mailed, your address will be changed again. We always win. But the only ones who cash in on this bet are the postmen and the people who cut the stencils for us at five cents per stencil. The money thus expended is your money. It just occurred to us you'd rather we spend it some other way.

And among the dues payments received in April, billed in January, and to whom second-notice statements had to be sent, were those of 13 organizations. Just thought you'd like to know.

## SOME FORWARD OBSERVATIONS

THEY FIND TIME to work for the Association, despite the fact that of our Executive Council, Colonel Leroy W. Herron, FA-Res, is First Vice-President of the newly formed Reserve Officers Mutual Aid Association, was marshal of the Reserve division in the Washington Army Day parade, and as Advertising Manager of the *Washington Star* has held the advertising lineage of that paper up to No. 1 standing for American newspapers for six years. He commands the 313th Field Artillery.

Lieutenant Colonel Ralph C. Bishop, FA-Res, is the Executive Secretary of the Civilian Military Education Fund.

Colonel William H. Sands, 111th FA, Virginia, an attorney of Norfolk, was at one time the youngest colonel of field artillery in the National Guard. He is a graduate of the Command and General Staff School (National Guard Course),

of the Army War College (G-2 Course), and has served a tour on the General Staff.

Colonel C. C. Haffner, Jr., 124th FA, is an executive of the Lakeside Press, Chicago, which prints several of the country's publications of largest circulation. His regiment recently added new leaves to its laurels when its indoor polo team captured the national championship in the junior (12-goal) division, Capt. R. Mura, Lts. D. Rice and W. Fergus defeating Ridgewood (N. J.) Polo Club 14 to 12 in the last of a two-out-of-three series, having taken the first game from the defending eastern and national champions 13 to 5.

The Association is fortunate in the services of officers so active, and that they can spare time and thought for its welfare argues much for the worth they attach to it.



**EIGHTH FIELD ARTILLERY BOXING SQUAD, CHAMPIONS OF HAWAIIAN DIVISION, SECOND CONSECUTIVE YEAR.**

# MILITARY BOOKS

Following is a list of books on military subjects which are recommended for their professional value as well as interesting content:

|   | <i>Price</i><br>(Domestic postage included) |
|---|---|
| FIELD ARTILLERY: The King of Battles— <i>Maj. Gen. H. G. Bishop</i> ..... | \$1.00                                      |
| THE AMERICAN ARMY IN FRANCE— <i>Maj. Gen. James G. Harbord</i> .....      | 5.00  |
| THE WAR IN ABYSSINIA— <i>Marshal Badoglio</i> .....                       | 6.00  |
| CARBINE AND LANCE, A HISTORY OF FORT SILL— <i>Nye</i> .....               | 3.00  |
| R. E. LEE— <i>Freeman</i> (4 vols., each).....                            | 3.75  |
| A MODERN MILITARY DICTIONARY— <i>Col. Max B. Garber</i> —Cloth .....      | 2.50  |
| —Leather .....  | 2.75  |
| INFANTRY IN BATTLE .....  | 3.00  |
| THE INFANTRY BATTALION IN WAR— <i>Lt. Col. Walter R. Wheeler</i> .....    | 3.00  |
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| MILITARY HISTORY OF THE WORLD WAR— <i>Col. G. L. McEntee</i> .....        | 7.50  |
| GENERAL VON STEUBEN— <i>Brig. Gen. J. M. Palmer</i> .....                 | 4.00  |
| THE SIEGE OF ALCAZAR—( <i>McNeill-Moss</i> ) .....                        | 3.50  |
| ARMY MESS MANAGEMENT SIMPLIFIED— <i>Maj. E. A. Hyde</i> .....             | 2.00  |
| THE CAISSONS ROLL— <i>Hanson W. Baldwin</i> .....                         | 2.50  |
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| THE OLD ARMY: MEMORIES— <i>Parker</i> .....                               | 4.00  |
| ULYSSES S. GRANT— <i>McCormick</i> .....                                  | 5.00  |
| AMERICAN CAMPAIGNS (2 vols.)— <i>Steele</i> .....                         | 8.00  |
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| LIFE OF GRANT— <i>Fuller</i> .....  | 5.00  |
| HORSE SENSE AND HORSEMANSHIP— <i>Brooke</i> .....                         | 5.00  |

A reduction of 10% will be made to JOURNAL readers who purchase any of the above books through the U. S. Field Artillery Association.

The Association is in a position to obtain for its members not only books on military subjects but biographies and fiction as well, at a reduction of 10%.

# The United States Field Artillery Association

ORGANIZED JUNE 7, 1910

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