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MARCH-APRIL, 1934

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EDITED BY
DEAN HUDNUTT

MAJOR, FIELD ARTILLERY, UNITED STATES ARMY



Patron Saint of Artillery

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MAJOR GENERAL HARRY G. BISHOP

THE FIELD ARTILLERY JOURNAL

VOLUME XXIV

MARCH-APRIL, 1934

NUMBER 2

MAJOR GENERAL HARRY G. BISHOP RETIRES AS CHIEF OF FIELD ARTILLERY

ON MARCH 9, 1934. Major General Harry G. Bishop completed four years as Chief of Field Artillery and nearly forty-one years of military service. A review of his assignments and of his accomplishments brings forcibly to mind the outstanding service he has rendered the field artillery, the army and the nation.

He showed from his earliest days as a second lieutenant his ability to enlist enthusiastic support and to get things done "in spite of hell and high water." With barely two years of commissioned service he was appointed Chief of the Department of Licenses and Municipal Revenue of the city of Manila, which position he held for a year and a half, collecting all the city taxes and maintaining supervision over all of the civilian business of this cosmopolitan city of a quarter of a million people.

In the biographical sketch which follows this article a few glimpses are given of the intellectual and physical vigor of this unusual officer. When marooned in the Sonora desert, and when struck down by a serious heart attack in Walter Reed Hospital he fought his way back through sheer determination and an unconquerable spirit. By exercise of the same dauntless will combined with a remarkable clearness of vision, he has merited and received commendations from members of Congress and officers of the other arms and services as well as of his own for the progressiveness of the field artillery during his regime.

When assigned as an instructor at Fort Leavenworth, he needed a text to teach the elements of field artillery, and to meet this need he wrote a book which at once had wide circulation. As a line officer he has commanded every unit of field artillery from a platoon to a brigade of five regiments, and he has always

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thrown himself heart and soul into having a good organization. His hobby has been field artillery in all its phases. As a Major General he has kept up with the details of the lower echelons, especially those relating to firing methods, and to materiel, as well as with tactics and with war planning.

While willingly assuming the responsibilities of his office, from the time that he entered upon his duties as Chief of Field Artillery until the end of his tour, he was most careful to see that the opinions of all his subordinates were given consideration and in so doing he maintained their enthusiastic support in carrying out his decisions.

Having made a thorough study of current development projects and of the needs of the arm, he set out to tackle motorization of transport and modernization of weapons.

He saw that the arm must prepare itself to make use of the motor vehicles which would be immediately available in case of an emergency, and if necessary, to make some changes in method of employment in order to use such vehicles rather than to delay getting to the front while awaiting supply of ideal equipment. When attention to minor details was necessary to carry through his main purpose he entered into working them out with the same enthusiasm that he devoted to making the major studies of the equipment and the training of hundreds of regiments.

As an example of his methods, the organization of the first test battery required endless planning. The question was raised as to how to provide high speed gun carriages, and through lack of experience it was thought that the guns should not be fired from pneumatic tires. General Bishop joined with his staff and with the Ordnance designers in solving the problems. The ideas of the dropped hub, to permit use of commercial automobile wheels without lowering the gun trunnions, and of the steel segments, which were to be lowered to take the weight off the pneumatic tires in firing, were his.

With the help of the Quartermaster General and of the Chief of Ordnance he got the first battery to the Field Artillery Board, saw it through its test, and then pushed the experiment to that of a battalion at Fort Sill. He secured numerous types of trucks for test for the 155mm howitzer, the 155mm gun. and the 105mm

MAJOR GENERAL BISHOP RETIRES

howitzer. He gave his personal attention to all auxiliary developments to be sure that the plans for motorization were coordinated. He pushed the development of traction devices, of methods of maintenance, of devices for wire-laying, of radio communication, and supervised the writing of new drill regulations.

At the same time, realizing that we must use our present guns in case of an emergency, he pushed the modernization of gun carriages—not alone to permit high speed towing, but to provide much greater traverse on the carriage, and full elevation without having to dig recoil pits.

Recognizing the efficiency of the new pack howitzer, he drove vigorously to get this howitzer mounted on a wheeled carriage which could be towed at speed, as the artillery weapon in support of either horsed or mechanized cavalry.

When it became evident that a serious reduction in ammunition allowances was imminent, he threw his efforts into the design and development of the miniature gun. Within a week after his serious heart attack he was directing this development by pencil notes from his sick-bed. He had no time to be sick, and he fought his way back to physical strength in order to carry this job through. Batteries of these small guns have now been issued throughout the Regular Field Artillery, to Field Artillery R. O. T. C. units, and to many of the National Guard organizations. It is expected that they will now be provided in limited numbers for the Organized Reserves.

The mere enumeration of the principal efforts of General Bishop during his tour as Chief of Field Artillery gives an idea as to his energy.

One desire which he expressed frequently during his first year as Chief was "to get every member of the Field Artillery to thinking about how the arm could be improved." The results show in the advances that have been made. Suggestions as to improvements reach his office daily. Development is going ahead so rapidly it seems impossible to keep up with it.

The impulse which started this activity came from the dynamic personality of General Bishop.

The Field Artillery, National Guard and Reserve as well as

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Regular, view his achievements with pride and they regret sincerely that his tour is finished.

Brief Biography of Major General H. G. Bishop, Chief of Field Artillery

Born November 22, 1874, at Grand Rapids, Michigan. Graduated from Goshen (Indiana) High School, Class of 1892. Was assistant to County Surveyor and City Engineer from June, 1892, until June, 1893. Appointed to the Military Academy from Indiana in 1893.

After graduation, served at Fort Wayne, Michigan; Fort McHenry, Maryland; Washington Barracks, D. C.; and, during the Spanish-American War, Forts Macon and Caswell, North Carolina, until March, 1898, then to the Philippine Islands, seeing service during the Philippine Insurrection on the Islands of Luzon and Cebu.

During the period that the military was in charge of the civil government of the Islands, he was for over a year and a half Chief of the Department of Licenses and Municipal Revenue of the city of Manila, collecting all of the city taxes and maintaining supervision over all of the civilian business of this cosmopolitan city of a quarter of a million people. During this period, he drafted many of the municipal ordinances now in force in the city of Manila, including the Manila Liquor License Act.

Licensing included every form of business activity in Manila. In fact, the original orders that Bishop received from General Williston, Provost Marshal General, were verbal and as follows:

"Nobody is to conduct any business of whatsoever nature in Manila without a permit from you, issued by my authority."

This naturally included everything from the big business houses and banks to saloons, bawdy houses, peddlers, cocheros, etc. Tax collection involved the management of the city slaughter house and collection of the meat tax; the management of the ten big city markets, and the collection of the market tax; the tax on horses and vehicles, and, eventually, the testing and sealing of all weights and measures used in the city.

Naturally, this was a stupendous task. Under the old Spanish

MAJOR GENERAL BISHOP RETIRES

government, the city was honeycombed with graft and bribery: in addition, the Insurgent government was surreptitiously endeavoring to duplicate all tax collections, turning in the money to the Insurgent government at Malolos.

The underlying idea of the licensing of business was to prevent unscrupulous individuals—a swarm of whom had followed the army into Manila—from exploiting the natives by racketeering and other forms of graft.

It is noteworthy that Bishop not only succeeded in breaking up much of the established graft, but in the prevention of scandals connected with business affairs in the city.

Practically all of the city taxes had been "farmed out" during Spanish rule under contracts favorable to the contractors, who collected the limit in all cases and paid into the city only the amount stipulated by their contracts. Bishop promptly broke all of these contracts and proceeded to collect these taxes directly, resulting in a much more equitable tax levy on the natives and a large increase in the city revenues.

For example, the market tax contractor paid 150 pesos a day for the privilege. Within two weeks. Bishop's collectors were turning in over 1,000 pesos a day and applying minimum rates of taxation.

Promoted to 1st Lieutenant in the 2nd Field Artillery on October 17, 1899, transferred to the 6th Artillery on November 29, 1899, in order to remain in the islands, and to the grade of Captain in the Artillery Corps on August 22, 1901.

September, 1901, he was transferred from the islands to Fort Adams, R. I., to the command of a company of coast artillery. From Fort Adams to Fort Totten, N. Y. Harbor, where he served as Adjutant of the School of Submarine Defense and as Secretary of the Torpedo Board until 1906, when he was transferred to the Artillery District of the Columbia (Oregon) as District Artillery Engineer. In June, 1907, upon the permanent separation of the Field Artillery from the Coast Artillery, he was one of the limited number of captains transferred to the Field Artillery, taking station at Fort Sam Houston, Texas, where he served in command of a battery of Field Artillery until 1910, when he was transferred to the Army Schools at Fort Leavenworth,

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Kansas—first as a student officer and later as an Instructor in the Department of Military Art.

While stationed at Fort Leavenworth, he performed tours of duty in 1911, at Camp Perry, Ohio, as an Inspector-Instructor of the Ohio National Guard and in 1912 at Mount Gretna, Pa., in the same capacity with the Pennsylvania National Guard and was the Field Artillery Assistant to the Commanding General during the Connecticut maneuvers the same year.

August 26, 1912, promoted Major, 5th Field Artillery, with station at Fort Sill, Oklahoma. From Fort Sill, he was sent to the Mexican Border and commanded the Field Artillery troops at El Paso during the troublesome times in the spring and summer of 1916. July 1, 1916, promoted to be Lieutenant Colonel of the 8th Field Artillery and, on May 15, 1917, to be Colonel of the 11th Field Artillery. In June of this year, he was assigned to the War Department General Staff. July 9th, he was appointed a Brigadier General and assigned to the 159th Field Artillery Brigade of the 84th Division, which organization he took to France. Shortly after arrival, he was transferred to the 3rd Field Artillery Brigade of the 3rd Division, which he commanded during the Meuse-Argonne operations and the advance into Germany.

During most of this time, the Brigade was reinforced by two regiments from the 4th Field Artillery Brigade and by a battery of G.P.F.'s, giving him a total of 126 guns with mobile warfare now in full blast.

In April, 1919, he was ordered to the States for duty as Commandant of The Field Artillery School at Fort Sill, but later orders sent him to the Army War College as Director. He served in this capacity until detailed to the War Department General Staff as head of the Training Section of the War Plans Division. He was Chief of Staff, Philippine Department, from November 2, 1922, until September, 1924, when he was returned to the States and served at Fort Sam Houston, Texas, in command of the 15th Field Artillery. Transferred to Fort Hoyle, Maryland, in August, 1927, in command of the 6th Field Artillery and the Post of Fort Hoyle. Transferred to Hawaii in December, 1928,

MAJOR GENERAL BISHOP RETIRES

and commanded the 8th Field Artillery until he was appointed Chief of Field Artillery.

Appointed Chief of Field Artillery March, 1930. While on this duty, he made steady efforts to prepare the Field Artillery for motorization and thus, when funds became unexpectedly available for this purpose, the arm was ready for motorization, which was at once extended to a large part of the National Guard with an operative saving running into the millions.

This motorization involved alteration in existing gun carriages to permit their towage by trucks. General Bishop presented many of the mechanical ideas involved in this.

In addition, while sick in hospital, he devised a miniature gun for use in the instruction of Field Artillery in the conduct of fire. This has proven to be a great success as a training article and is invaluable to the service, especially during this period of little or no ammunition allowance for service practice.

Entitled to Spanish-American War, Philippine. Mexican Intervention, and World War Service ribbons.

Awarded the D. S. M. at Andernach, Germany, by General Pershing, with citation reading: "By his skill and able leadership, rendered exceptionally valuable services during the battles of the Meuse-Argonne and the subsequent advance to Sedan." Total troop service in 41 years: 12 years, 1 month, and school service.

Decorated by the French Government, Officer of the Legion of Honor for exceptionally valuable services in action in France.

Is a member of the American Legion, Member of Army and Navy Country Club, Washington, D. C., and Army and Navy Club, New York City.

He is a graduate of the School of Submarine Defense at Fort Totten, New York; a distinguished graduate of the School of the Line, and of the Army Staff College at Fort Leavenworth, Kansas; graduate of the School of Fire for Field Artillery at Fort Sill, Oklahoma; graduate of the Mounted Service School at Fort Riley, Kansas; graduate of the Signal Corps Aviation School at San Diego, California; graduate of the Center of Artillery Studies, Trier, Germany; graduate of the Army War College.

He is the author of "Elements of Modern Field Artillery,"

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"Operation Orders, Field Artillery," and "The King of Battles."

In October, 1916, Bishop was one of the four field officers of the army selected to take the course in aviation at the Aviation School at San Diego, California. In January, 1917, while attempting to fly across the hitherto uncrossed mountains to the east of San Diego to Calexico, California, in company with Lieutenant Robertson, the party lost its way in the air and, due to lack of gasoline, was forced to descend in the Sonora Desert of Mexico on the east coast of the Gulf of Lower California. They had only their noon-day lunch—four sandwiches and four oranges—with no water, except that in the radiator of the aeroplane. They figured that they were at least 120 miles from civilization, across a trackless desert devoid of food or water and in a country given over to hostile and blood-thirsty Yaqui Indians. With this parcel of food and a gallon of water carried in an oil-can, they struck out northwest for the Colorado River and civilization. They traveled continuously night and day, except for short periods of rest, when the moon was not shining, meeting with no sign of life, water, or vegetation, crossing the Great Sand Dune Country of the Sonora Desert, a locality avoided even by the Indians, and had covered nearly 90 miles when, on the eighth day, they were picked up by a rescuing party, both nearly dead from hunger and thirst, delirious, but still traveling on their hands and knees.



THREE BATTLES IN ONE

BY COLONEL CONRAD H. LANZA, Field Artillery

THE American attack in the Meuse-Argonne area commenced on September 26th, 1918. Immediately afterwards it was extended by Marshal Foch by other attacks launched from south of the English Channel, the two series of attacks being on converging lines, oriented in the Meuse-Argonne towards the northwest, and in northern France towards the east. The objective of this offensive was to pinch out the great German salient in France before the winter rains set in in November. Attacks of minor importance strategically, but important tactically, were ordered between the two main offensives to prevent the enemy from withdrawing in an orderly manner from his center to strengthen his flanks.

The battle of Montfaucon had failed to secure all the objectives which had been sought for. The right of the American First Army had suffered serious losses from enfilade fire from the right bank of the Meuse River, while the left had been similarly subjected to enfilade fire from the high ground west of the Aire. The further the Army advanced the more difficult this situation became.

Relief from these conditions had to be provided. The only solution was to drive the enemy away from the elevated ground opposite the flanks. This led to preparation of two new movements; one to push the enemy away from the east bank of the Meuse, the other to deprive the enemy of the Argonne Forest. As it was not desired to delay the main operation of advancing the bulk of the Army towards the northwest, a third operation to advance the center of the Army toward Romagne-sous-Montfaucon was also provided. With one strategical objective, but with three tactical objectives, there were fought at about the same dates:

the battle of Beaumont, on October 8th, 9th and 10th, to clear the east bank of the Meuse;

the battle of the Argonne, on October 7th, 8th, 9th and 10th, to clear the forest;

the second battle of Romagne, on October 7th, 8th, 9th and 10th, to drive in the enemy's center.

We will consider the three battles separately.



THREE BATTLES IN ONE

I. THE BATTLE OF BEAUMONT THE ALLIES

A study as to extending operations east of the Meuse had been completed by the American First Army as early as September 25th. Two possibilities were considered:

- a. an attack after the Cunel heights had been captured to seize a bridgehead south of Dun-sur-Meuse
- b. an attack before the Cunel heights had been captured, with first phase: on a front from Beaumont to Sivry-sur-Meuse with the mission of seizing the crest south of La Grande Montagne, requiring two American divisions second phase: to continue north and seize the bridgehead south of Dun-sur-Meuse.

The limitation as to two divisions was because the terrain did not admit of a greater deployment. The study stated that such an attack probably would not be successful unless the enemy weakened his force in this area to reinforce west of the Meuse. It was realized that the capture of the high ground east of the Meuse would facilitate an advance west of that river and relieve our troops of a very unpleasant situation. The conclusion of the study was:

"that no matter what the situation may appear to be east of the Meuse, that all efforts be concentrated on accomplishing our general mission, which is to drive toward the north in the direction of Stonne and assist the general Allied attack and drive the enemy from the line of the Aisne."

On September 28th Army G-2 reported large enemy forces observed by the Air Corps east of the Meuse, as moving northwest, apparently en route to reinforce their lines west of the Meuse. He suggested that it might be well to conduct operations on the right with a view to forcing the enemy to retain his troops on that side of the river.

On September 30th Marshal Foch, in a letter to General Petain, who was commanding the French Armies to which the American First Army was attached, stated in part:

"The battle is developing in the North under the best of conditions. This happy development requires that the battle, which has slowed down too much in the east, shall in the least practicable time be restarted there, intensifying it and utilizing its utmost power without further delay.

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"With this mission it is desirable to extend to east of the Meuse on the one hand, and to west of the Argonne on the other hand, the use of American troops not employed between the Meuse and the Argonne, and if necessary to withdraw some now too densely distributed along the Woevre front.

"To accomplish this mission within the minimum time American divisions will be placed in French Corps now in line (2 to 3 divisions to the XVII Corps on the right and 1 to 2 divisions to the XXXVIII Corps on the left).

"As to the high command and also to avoid loss of time there should be:

1. under the orders of General Pershing the Franco-American forces on both banks of the Meuse
2. under the orders of a French Army commander the Franco-American forces on both sides of the Argonne.

"The objectives to be reached are those prescribed by earlier instructions.

"The operation to be launched on the right bank of the Meuse should have as its mission the seizure of the heights of the Meuse, Damvillers and Dun; thus guarding the flank of our general offensive towards the north and improving the movements of our Armies by possession of the roads and railroads in the Meuse valley. I request that you arrange on these lines the operations under your charge."

General Pershing received information of this letter on October 1st. On the day following he consulted with General Claudel, commanding the French XVII Corps at Verdun, as to attacking east of the Meuse. General Claudel submitted a previously prepared plan. After giving verbal approval to the plan General Pershing wrote to Marshal Foch, stating:

"1. I have already arranged to leave on the inactive front of the Woevre only those divisions which are not altogether fit for battle (3 in line and 1 in reserve) and to bring to the battle the experienced divisions thus made free.

* * *

"3. I am entirely in agreement with you as to the desirability of extending the front of attack to east of the Meuse and with that end in view to furnish 2 or 3 American divisions to the XVII Corps. I have just sent for General Claudel and instructions have already been given him to expedite the preparation of this operation.

"4. I have no objection in principle as to placing 1 or 2 American divisions at the disposition of the XXXVIII Corps. But I fear to meet with difficulties in the application of this measure on

THREE BATTLES IN ONE

account of the reliefs which I am obliged to undertake along the front of the American First Army. I am therefore forced to reserve a definite reply to this question. . . ."

On October 5th General Petain directed that, while conserving the original mission of attacking west of the Meuse, the Americans must also attack east of that river, with the following objectives:

". . . as an objective the cliffs from Dun-sur-Meuse to Damvillers. The attack will be made by the French XVII Corps, reinforced by two or three American divisions and the necessary artillery, to be taken from that present with the American First Army. Preparations will be actively pushed so that the attack may take place as near as possible to October 7th.

"The possibilities opened by this operation will free the forces engaged between the Meuse and the Argonne of all fear for their right flank. . . ."

The French XXXIII Corps was placed at the disposition of the First Army and was assigned to take over the command of the inactive front east of Verdun and to the south thereof, which was out of the area to be attacked.

On the same day the Army field order was issued for the attack to be made at a date and hour to be announced later. The objective was to secure the line Consevoye (incl)-south edge Bois de la Reine-Flabas (incl)-Beaumont (incl). The attack was to be exploited beyond this line. The French XVII Corps had at its disposal the French 18th and 10th Colonial Divisions. The American 29th Division was added, entering line on the 7th, on the left of the Corps. The artillery in sight was:

312	75mm guns
233	medium and heavy guns
54	heavy army artillery guns

599 guns in all.

The front of attack was about 6 kilometers. This gave 100 guns per kilometer, or one for every ten meters front. This did not include trench mortars.

The XVII Corps decided to have no artillery preparation but complete artillery supporting fires during the attack. This was to consist of precision fire, opened simultaneously, on the two known enemy lines of defense. The infantry was to advance rapidly under the protection of a rolling barrage. An intermediate

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objective was prescribed where the assaulting troops were to rest and reorganize, while the division artillery displaced forward, after which a final advance was to be made at H plus 4¾ hours. The American 29th Division was attached to the French 18th Division on its right; the French 26th Division was inserted in line next to the right, leaving the French 10th Colonial Division as the right division. General Pershing visited the Corps on the 7th to assure himself that all was in order.

At 4.45 A. M., October 8th, the attack started. The left of the attack was supported by the American 33rd Division mainly by tire action from across the Meuse, but infantry attacks were also made and succeeded in capturing Consevoye. The main attack at first proceeded according to schedule, the first objective being reached at 6.30 A. M. and the second at 8.00 A. M., without special difficulty. Commencing at 9.00 A. M., progress became slower opposite the French divisions, where the infantry was seriously hampered by uncut wire and good trenches. The Corps Commander consequently ordered that the final attack be delayed from 9.30 A. M. until 11.30 A. M., which period he utilized to fire an artillery preparation against the hostile lines. But upon renewal of the attack only little further advances were secured. During the afternoon the enemy delivered strong counter-attacks, which completely stopped the Allied advance and even enabled the enemy to reoccupy some of the ground they had lost in the morning.

At 8.30 A. M., October 9th, the XVII Corps renewed the attack. It met a counter-attack which had started at the same hour and over the same front, now extended to about 10 kilometers. The German attack proved to be the stronger, and they pushed the Americans and French back, recapturing the Fme d'Ormont and part of the Bois d'Haumont. After the Germans had been stopped, the XVII Corps fired a 1½ hour artillery preparation, at the conclusion of which the infantry attacked. On the left the 29th Division succeeded in advancing to Sivry-sur-Meuse, retaking in their center and right the ground lost in the morning and advancing slightly beyond.

At 9.00 P. M. the XVII Corps was ordered by the First Army to attack on the 10th at an hour to be chosen by the Corps Commander.

THREE BATTLES IN ONE

This attack led to the 29th Division making gains in the vicinity of Sivry-sur-Meuse, but it lost them shortly afterwards through a counter-attack. Thereupon the Corps ordered another artillery preparation to start at 11.00 A. M. and to stop at 12.00 noon. A renewal of the attack at this hour temporarily gained ground; but the gains were lost through another counter-attack. At 2.00 P. M. the French 18th and the French 26th Divisions each attacked in their zones of action following an artillery preparation which had also commenced at 11.00 A. M. The divisions met strong opposition, counter-attacks being delivered whenever any advance had been secured. Severe fighting took place until darkness set in, during which the French definitely secured hill 371. During the late afternoon the 29th Division made one more effort to advance, but the attack failed under strong artillery resistance.

The net result of the battle was tactically to deprive the enemy of part of the high ground held east of the Meuse. Strategically the battle contributed to the wearing out of the Germans by extending the front of the battle line to be defended by them, thus engaging a greater number of their troops and reducing the number of reserves at their disposition.

The losses of the American 29th Division during this battle, for combat units only, were 625.

THE GERMANS

The Germans had prepared for the attack by the French XVII Corps. The Sedan Corps published an order on September 30th announcing that such an attack was coming and ordered preparations made to meet it. On October 1st the Fifth Army published an order announcing that a Franco-American attack east of the Meuse was expected and would be made in the direction of Longuyon, with the mission of cutting the railroad from that town to Sedan. As this railroad was the main line of supply of the Western Armies, and because a hostile advance in that vicinity would threaten the Briey mining area, upon which the steel industry largely depended, complete preparations for defense and for suitable counter-attacks were ordered.

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The German order of battle was:

Meuse			Divisions			
River						
/	1st Austro-	'	15th	'	33rd	'
/	Hungarian	'		'		'
/		X		X		X
		X		X		X
		'		'		'
		'		'		'
						(outside zone of battle)

The plan was to abandon the forward areas and thereby escape losses from any artillery preparation, strenuously defend the main line of resistance and counter-attack any enemy forces penetrating the latter. When the attack started at 4.45 A. M. on October 8th, the 15th Division stopped the advance by artillery fire before it reached the main line of resistance. French troops broke through the left of the Austro-Hungarian 1st Division and, utilizing this gain to turn the right of the 15th Division, created a very critical situation. The only reserve at hand was one small company of engineers. Strongly supported by artillery fire, this was sent in to counter-attack toward the Bois d'Ormont. The French failed to push on and the Germans were able to establish a new front in this area with the loss of some ground. The 33rd Division lost Wavrille in the morning, but retook it in the afternoon by a counter-attack.

On the morning of the 9th, about 8.30 A. M., the 15th and 33rd Divisions counter-attacked along their entire front. A very severe fight resulted, as the enemy was encountered en route. The Germans recaptured the Fme d'Ormont and made some progress in the Bois d'Haumont. Further fighting during the day secured no additional gains. On the right the Austro-Hungarians lost more ground on their left. On the right of the Austro-Hungarians, the 7th Reserve and the 32nd Divisions started to relieve them. These new divisions participated in the counter-attack to recover ground lost the day before. This attack failed to advance the line; but it did stop a hostile advance.

By morning of the 10th the 228th Division had been brought into line to relieve the last of the Austro-Hungarian 1st Division. The relief was not completed until about 2.00 P. M. Shortly afterwards an attack by the Americans developed. Visibility being good, the OPs were able to observe infantry advancing in squad and section columns at the start of the attack. As these

THREE BATTLES IN ONE

made excellent targets, the artillery fired numerous problems and stopped the attack before it developed. Other attacks later were also repulsed, mainly by artillery fire. At the end of the day the artillery was thanked in orders for their fine work.

COMMENTS

The attempt to surprise the German lines by omitting an artillery preparation failed. The attack was expected, the preparatory orders having been issued on the same day as that on which Marshal Foch ordered the attack. The absence of the preparation left the reserves untouched and they were able to deliver numerous counter-attacks and in general stopped the advance at, or near, the main line of resistance. The improvised artillery preparations ordered during the attack by the XVII Corps were in no case of material assistance in advancing the line. The artillery had insufficient data to determine the correct areas to fire on and too little time to compute accurate firing data.

II. THE BATTLE OF THE ARGONNE

On October 5th the First Army field order directed the I Corps, then holding the front from the Argonne Forest inclusive to east of the Aire River, to seize and hold hill 244 (southwest of Chatel-Chehery) and the ridge extending south therefrom. The Corps was holding the line as follows:

	I		I	
	I		I	
77th Division	X	28th Division	X	1st Division
	X		X	
	I		I	
	I		I	

The Corps failed to attack hill 244 on the 6th. The enemy attacked and made some minor gains. The Corps made preparations to attack on the 7th and in preparation for this the army and corps artillery gassed the east edge of the Argonne Forest during the night 6-7 October with non-persistent gas. To cut off the supplies of the enemy within the Forest extensive interdiction fire was had. This consisted of a slow continuous fire by guns of 155mm or larger caliber on the Aire River crossings from Grandpré, inclusive, east along the north edge of the Forest and road entrances into the Forest.

The 82nd Division was brought up to reinforce the I Corps and

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was placed in line between the 28th and 1st Divisions during the night 6-7 October. It arrived from in rear of the left of the Corps and was delayed in its movement due to part of the Division, including some artillery, being routed over roads in the Argonne which were in possession of the enemy. One light artillery regiment almost marched into the enemy's line and was only saved from severe losses by the dense woods which concealed their hazardous march and the alertness of their colonel (Clarence Deems, Jr.), who, discovering the enemy, stopped the regiment, turned it around and found a new route. The 82nd Division faced west along the Aire with the mission of capturing the height opposite, while the 1st Division, transferred to the V Corps, covered their right and rear. The 77th and 28th Divisions were to support the 82nd by attacking north.

On the morning of the 7th, in a dense fog, the battle started. The artillery of all divisions fired a preparation, reinforced for the 82nd Division by corps and army artillery. The fog enabled the infantry to cross the Aire with a minimum of losses and to advance beyond. During the middle of the morning, when the fog lifted, it was found that the 82nd Division was in possession of hills 180, 223 and 244 overlooking the Aire valley. Later attempts to take Cornay broke down under severe enemy machine gun and artillery fire.

The 77th Division made a special effort to advance. Since the 4th a battalion from this division, which had advanced beyond the line reached by the balance of the infantry, had been surrounded by the enemy. From air reconnaissance its position was known, and as the situation of the battalion was precarious, due to lack of food, insufficient ammunition and want of rest, the division fired what was intended to be a particularly effective preparation. The infantry, in addition to the general mission of driving the enemy out of the Argonne, had the special mission of relieving their comrades. The infantry attempted to advance after the conclusion of the preparatory fire, but no progress was made. The First Army ordered its artillery to gas at once the enemy positions in front of the 77th Division. In the late afternoon this fire started. It continued nearly uninterruptedly thereafter until the end of the battle.

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On the 8th the I Corps renewed the attack at dawn. The 82nd Division, endeavoring to enlarge their success of the preceding day, met a counter-attack. After severe fighting minor gains were secured. The 77th Division was unsuccessful in advancing and its isolated battalion continued to so remain. During the day the artillery fired very heavily on supposed enemy positions and continued its intensive gassing of large areas within the Argonne Forest immediately in front of our lines and along enemy lines of communications.

The third day of the battle opened on the 9th. The usual fog was dense. Under cover of this the 82nd Division captured Cornay about 9.00 A. M., while the 1st Division on their right, at the same hour, entered Fléville. The French XXXVIII Corps on the left of the 77th Division made a considerable advance and the 77th shortly afterwards found the territory between the division and its isolated battalion evacuated. They consequently advanced up to this line with little opposition. Further efforts during the afternoon to advance our lines failed. The gassing by the artillery of the Argonne Forest continued steadily. About 4.00 P. M. the enemy started an artillery preparation on the captured town of Cornay, which was followed by an infantry attack which retook the town. By night the 82nd Division was nearly back to where it had started. Our artillery did not know of this counter-attack until after the enemy had reached his objective.

On the morning of the 10th the battle was renewed along the entire front. Protected by heavy concentrations of artillery fire, the infantry advanced. The advance was slow. It met little artillery fire and only scattering infantry resistance, which was nowhere prolonged. By dusk it was realized that the enemy had abandoned the Argonne Forest and we thereupon completed its occupation. Our losses in this battle in killed, wounded and prisoners were:

October 7	557
8	983
9	553
10	451
<hr/>	
Total	2.544

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The Argonne Forest was defended by part of the 76th Reserve, 2nd Landwehr and 45th Reserve Divisions from west to east. They were below strength and rated as 3rd and 4th class divisions. All had been in line in this sector since September 26th or 27th. They were under the LVIII Corps. It expected to be attacked on October 7th and it had warned its divisions. The plan of battle was to hold everywhere.

On the morning of the 7th there were severe losses from American artillery fire. In consequence ground was lost along the east edge of the Argonne, where this fire had been most severe. In the Forest itself the line held, machine gun and trench mortar fire being sufficient to stop the attacks of the front lines, while the artillery stopped the rear lines. Prisoners taken stated that the mission of the attack was to free the American battalion separated from their lines, but all efforts to this end were broken. Later, additional losses occurred due to gassing by hostile fire.

On the 8th further severe losses occurred from artillery fire. Special efforts were made to capture the American battalion cut off from its lines before it might be relieved, but these failed. A counter-attack was ordered to retake the high ground along the Aire valley lost the day before. The attack broke down when it met an American attack moving west and north from the Aire River. Instead of gaining ground, hill 180 was lost by 9.00 A. M. Efforts to restore the situation were ordered, but the troops were exhausted and were unable to undertake another attack. The Fifth Army, realizing that nothing further was to be expected from the troops and having no reserves available, resigned itself to the loss of the Aire hills and at 4.00 P. M. ordered that during the coming night there be a withdrawal to the line Taille wood-high ground north of Cornay-Cornay-railroad station between Fléville and Cornay, all inclusive.

The morning of the 9th found the troops nearly exhausted. They had had additional losses from gas and HE fire. By 9.00 A. M. the French troops just west of the Argonne had driven forward and had connected with the American battalion which had been separated in the west part of the Forest, thereby freeing it. At about the same hour Cornay and Fléville, on opposite sides

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of the Aire, were lost, the enemy succeeding partly by surprise, as the attacks came during a dense fog. When reports of these reverses reached Corps headquarters about noon it was decided that in view of the reduced strengths of divisions and the lack of reserves it was impracticable to recover the ground lost. Without the high ground along the east edge of the Argonne, which afforded excellent artillery OPs for conducting fire east of the Aire, there remained no important reason for holding the interior of the Forest. The defense was here successful, but under severe losses from constant gas shelling. The Corps recommended that they be authorized to evacuate the Argonne and withdraw to north of the Aire. The Army having approved the recommendations, orders were issued about 1.00 P. M. directing the withdrawal to commence at dusk and to be completed by daylight the next morning.

The withdrawal order had not reached the front line when about 3.30 P. M. an artillery preparation, supplemented by trench mortar and machine gun fire, was gradually started to recapture Cornay. At 4.00 P. M. the infantry attack was launched by small groups of men, advancing separately, without regard to alignment. The attack succeeded and by dark Cornay was back in German hands. The order to withdraw arrived shortly after.

During the night, under slight losses from artillery shelling, the entire Argonne Forest was evacuated. By daylight the corps, less contact patrols, was north of the Aire. During the morning of the 10th heavy rolling barrages and important artillery concentrations were noted on old positions, thereafter gradually moving north. These caused no damage.

COMMENTS

The Argonne Forest was captured by flanking operations assisted by heavy gassing by the artillery, which fire weakened the enemy by causing severe losses. All attacks made by us through the fog along the Aire valley, in open ground, made more or less progress; those made in the interior of the Forest, where there was thick underbrush, made no progress. German counter-attacks usually scored some success, due to the fact that they were made at unexpected times and places and met little artillery resistance from our side. Due to the difficulty in sending back information

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from the front to artillery CPs and the inability of OPs to see infantry when in battle, the artillery often failed to know of counter-attacks until they were over. When the enemy was in condition to counter-attack, by attacking with relatively small forces well supported by artillery fire he often recovered ground previously lost by him.

To avoid this, it is necessary either to:

- a. leave the enemy in no condition to counter-attack, by overwhelming his reserves with an artillery preparation, which must have this mission in view; or
- b. arrange for proper artillery defensive fires to cover new fronts. This is theoretically possible, but seldom practicable, as in a great battle the front line is constantly changing and at any particular moment nobody knows just where it may be.

III. THE SECOND BATTLE OF ROMAGNE

On October 5th, General Petain, in his letter to General Pershing already quoted in Part I, *ante*, also stated:

"The general objective assigned to the American First Army . . . remains unchanged. They contemplate the seizure of the Hindenburg position from Brioules-sur-Meuse to Grandpré, via Romagne-sous-Montfaucon, with an eventual development towards Buzancy and Mézières.

"The possibilities opened by this operation (the attack on Beaumont) will free the forces engaged between the Meuse and the Argonne of all fear for their right flank and will enable them to renew on their right the effort which gave such good results on October 4th, particularly in the vicinity of Cunel, so as to cause the fall of the entire position from Romagne-sous-Montfaucon to Champigneulle.

"It will be advisable to arrange, as far as practicable, coordination between this attack and that of the French XVII Corps."

On the 7th the First Army issued an attack order directing the V Corps to seize and hold the high ground west of Romagnesous-Montfaucon. The right of the attack was to be covered by capturing and holding the Cunel heights, while the left was to be covered by suitable precautionary measures against the line Fléville-Sommerance. The 1st Division and one brigade of the 91st Division in line on the left of the V Corps were transferred to it for this attack.

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The chief of Army Artillery (Major General E. F. McGlachlin), knowing of the letter from General Petain and foreseeing that there would soon be an attack by the V Corps, had a conference at the Corps CP on the evening of the 5th. This was conducted in an old dugout close to the front lines and was bombed by hostile planes during the conference. The Corps Commander (General Cameron) and his chief of artillery (General Alexandre of the French Army) were present. At this time no one at the V Corps knew of the coming attack. The corps commander stated that he was never consulted and explained the difficulties to be met with in taking Romagne. He stated that the failure to take that village in the first battle of Romagne was due to the infantry being stopped by machine gun fire. The men could find cover from the machine guns but they could not advance. After the line was stopped, enemy artillery would register and then shell the immobilized line. This caused terrific losses and usually resulted in forcing the line back, unless darkness arrived. It was agreed that it was absolutely necessary to suppress these machine guns and that this was the mission of the artillery. It was decided that there ought to be an artillery preparation on the entire enemy front covering an area of sufficient depth to be certain of including therein front line machine gun elements. A large part of the enemy front lay in woods, and it was believed that here neutralization was the best procedure. The enemy commenced to shell the vicinity of the dugout, but in spite of this the conference continued and arrangements were made to provide the guns and ammunition required to carry the proposed program through. This front line conference adjourned about midnight, the members dodging shells and bombs to return to their respective posts.

The Air Service having secured photographs of the enemy front, these were studied. They showed in places belts of wire in good condition, shallow trenches in the woods, and strong positions about Romagne and the high ground west and southwest thereof. The V Corps artillery was reinforced and authorized to control the artillery preparation, since no other corps would be seriously engaged. They had at their disposition:

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320 75mm guns
306 medium and heavy guns

626 guns in all

for a front of about eight kilometers. This gave $78\frac{1}{4}$ guns per kilometer of front, or one gun to every 12.7 meters, nearly equal to two complete lines of batteries at normal intervals.

The V Corps artillery preparation provided for a bombardment of designated objectives and areas. The quantity of shells required to neutralize or destroy each target was calculated. The length of time needed to fire these shells was computed. The rate of fire being known and the number of batteries fixed, the length of the artillery preparation was determined. It worked out at $19\frac{1}{2}$ hours, being the sum of the time needed for firing all the problems contemplated by the plan. Eight-thirty A. M., October 9th, having been designated as H Hour, deducting $19\frac{1}{2}$ hours from this gave 1.00 P. M., October 8th. The artillery preparation commenced at that time.

The artillery plan was drawn by General Alexandre, of the French Army, Chief of Artillery for our V Corps. It provided for using medium and heavy batteries for destructive and neutralizing fires during daylight hours, where observation was essential, and neutralizing fires during the night, where firing by map was sufficiently accurate. The light artillery during the night 8-9 October was to fire gas and HE shell to prevent reconstruction or repair of hostile works destroyed on the 8th prior to darkness. Light and heavy artillery were to fire continuously along roads and defiles to hamper movements to reestablish or reinforce the enemy positions.

No enemy batteries were visible. Fire was directed against their reported or suspected positions. The woods southwest of Romagne, the high ground around the Cote Dame Marie and the Bois de Gesnes in particular were severely bombarded. All trench lines, OPs, wire and other known enemy objectives received intensive shelling. The destruction of nests of machine guns in woods was assigned to the six 8" howitzer batteries of the 59th Coast Artillery. Provision was made for having at battery emplacements not less than 400 rounds of ammunition at H hour for 75mm batteries and 200 rounds for heavier batteries.

THREE BATTLES IN ONE

At 8.30 A. M., October 9th, the infantry jumped off. The III Corps was to assist on the right by advancing on Cunel. The order of battle was:

					I			
Divisions	1	1 Brig.	32	3	X	80		4
		91			X			
Corps			V		X		III	
					I			
					I			

There was a dense fog. The advance followed a rolling barrage fired by 75mm batteries, doubled and in places trebled by 155mm guns and howitzers. Considerable progress was made from the beginning. The enemy offered resistance but the artillery preparation had produced excellent results and large casualties among the enemy forces. On the left the 1st Division advanced to near Sommerance, capturing the Cote de Maldah. The 91st Division cleared the Bois de Gesnes and advanced as far as the Cote de Dame Marie. The 32nd Division advanced slowly but steadily and at noon entered Romagne-sous-Montfaucon, which was a mass of smoking ruins, and thence east along the road to Cunel.

At noon the 3rd Division was in the Bois de Cunel. After halting for reorganization it advanced in the early afternoon, seized Cunel and went still further into the Bois de la Pultière, achieving the greatest success of the day. The right of the 32nd Division being thus covered, an advance forward was started from the Romagne-Cunel road about 2.00 P. M. Just at this time an enemy counter-attack came from north of Romagne, strongly supported by hostile artillery. The enemy recovered Romagne and drove on south, reoccupying the high ground southwest of Romagne before he was stopped. Another attempt to advance was now made to recover Romagne and to advance across the Cunel road, which had not been in the area of the counter-attack. The attack broke down under strong machine gun fire. Two later attempts to cross the road met the same fate. The division artillery made strenuous efforts to neutralize the hostile machine guns. Due to mist and rain the OPs could not see any targets and the artillery fire was directed on probable positions in front of the infantry. No effect having been obtained, the assistance of corps artillery was asked for and a heavy artillery preparation was fired from 5.30 to 6.00 P. M., thoroughly covering the front of the

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32nd Division. At the latter hour, with the help of tanks and covered by darkness, a final attempt to retake Romagne and to cross the Cunel road was made. The attack received a storm of shells, several tanks were disabled and the infantry was forced back to positions south of the Romagne-Cunel road.

In the zone of the III Corps, elements of the 80th Division entered the Bois de la Pultière. Their division headquarters did not know of this at the time and no support was arranged for these troops. Their right being completely exposed and only small numbers of men from the 3rd Division being on their left, they were subjected during the afternoon to vigorous counter-attacks. They had no artillery support, there being no liaison with any troops or headquarters to their rear. After dark the enemy made a strong counter-attack and cleared all our men out of the Bois de la Pultière. Continuing the advance, the enemy reentered Cunel and continued on into the Bois de Cunel. It being night, the OPs saw nothing except the fall of shells and the noise of the fighting. For fear of hitting our own men, our own artillery did not fire in the immediate foreground.

The net results of the day's fighting, which had been very severe, was to advance our lines about two kilometers.

At 9.00 P. M. of the 9th the First Army ordered the attack to be continued at 7.00 A. M. on the following day to the line Sommerance-Bantheville. The order stated:

"No objectives are assigned. All troops will take advantage of the enemy's retreat. Each unit will push ahead, gaining progressively points which will assist the advance of adjacent units. Contact with adjacent units must be maintained by flank detachments." The Army, at the hour this order was issued, did not know about the counter-attacks.

The 32nd Division ordered an artillery preparation to start at 7.00 A. M., but it delayed the advance of the infantry, which did not occur until 2.00 P. M. on the 10th. When the infantry started there was no rolling barrage, whereupon the advance halted, while the artillery was called on to explain why they were not supporting the infantry. It appeared that the plan of attack had been received by the division artillery so late that there had not been time to prepare barrage charts. The infantry thereupon, about 2.30 P. M., jumped off again without a barrage. The attack immediately

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broke down under terrific artillery and machine gun fire from north of the trench of de la Dantrise. Patrols advanced as far as Romagne, but they were unable to enter it.

Prior to this, the 80th Division, which had also started an artillery preparation at 7.00 A. M., advanced at 7.45 A. M. with a rolling barrage. The left brigade stopped at once and the right brigade in part, due to the barrage falling short on two front line companies. The balance of the right brigade advanced into the Bois des Ogons where, meeting strong opposition from artillery fire, the attack finally stopped.

The 4th Division also attacked at 7.45 A. M. The infantry met such a storm of shells from guns and trench mortars that the attack broke down at once. The rolling barrage rolled along without any infantry behind it. During the afternoon, by slow infiltration, troops penetrated into the Bois de Peut-de-Faux and later into the Bois de Foret. Due to lack of support on the flanks, the troops were withdrawn from the Bois de Foret at dusk.

There was no appreciable advance on the 10th.

At 6.00 P. M. the First Army ordered the advance to be resumed at 7.00 A. M. on the 11th:

". . . rapidly towards the general line Clery-le-Petit-Barricourt-Buzancy-Briquenay. The Bois de Barricourt must be seized at the earliest opportunity.

"The Army Artillery and the Air Service will support the attack. They will not permit the enemy to reorganize along the heights of the Bois de Barricourt. The attack will be pushed with vigor. All troops will take advantage of the enemy's retreat."

The Army Artillery was advanced during the night to support this attack. The V Corps ordered each division to attack within its own zone of action, without specifying details. The Corps order stated:

"Each division will attack in its own zone, pushing forward with the utmost vigor and without waiting for adjacent divisions. The advance will not be permitted to be delayed by isolated machine gun nests; these must be overcome by maneuver and echelonment in depth. The Commander-in-Chief is extremely anxious that the advance continue and directs that no effort be spared to secure that end. The Corps Artillery Commander will assist the advance by all available means at his disposal."

To the corps order was attached a memorandum for division commanders, in part as follows:

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"The enclosed map shows known artillery objectives, as well as likely dangerous points in the path, or on the flanks, of the infantry advance.

"The Corps Commander reminds you that you have at your disposal ample and adequate artillery means to neutralize these points to a great extent. He directs that in your advance you utilize these means to the fullest extent and impresses on you the fact that more progress will be made by suitable preparatory concentrations on these and other known points than by useless bombardments and barrages which do not fit the march of the infantry.

"Accompanying batteries must be pushed forward and must, whenever possible, actually accompany the infantry and aid the latter to advance by either direct or indirect fire, as may be most suitable in each case.

"Commanders of all arms and grades will be held strictly responsible that all instruments and means at their disposal are utilized to the utmost to secure an uninterrupted advance."

On the left of the V Corps, the I Corps, having completed occupation of the Argonne, prepared to advance and assist the V Corps. The artillery section of their attack order read:

"One regiment of 75s will support the attack of each infantry brigade; at least one forward gun will accompany each leading infantry battalion.

"Artillery observers will move forward with advance infantry lines for the purpose of directing fire of supporting batteries. All artillery should join in the preliminary barrage and pass under control of the artillery brigade commander as soon as the action stabilizes. The open terrain should be used to full advantage for the advancement by echelon of the supporting artillery.

* * *

"Division commanders will determine the amount of artillery preparation necessary and the use of the barrage."

The III Corps orders for their artillery stated:

"Preparatory fire by 155mm howitzers as divisions may direct, with due regard to ammunition supply. The corps artillery will exert itself to the utmost to give effective counter-battery work. Non-persistent gas will be used freely by divisions, each in its own zone of action, whenever suitable conditions exist and the enemy is known to be or is probably present."

The troops were exhausted on the evening of the 10th. An inspection of divisions by an experienced officer resulted in the following report as to the 1st Division:

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"The chief of staff stated that the men had been living for one month in the woods and that those who had survived were lean and tough. The infantry strength of the Division is now reduced to 2,500 men (one battalion reports 90 men still in action). Five hundred engineers have been sent in as infantry, bringing the total strength for tomorrow's attack to a scant 3,000.

* * *

"The tactics to be followed in tomorrow's attack are not yet fully decided upon. The commanding general of the division (Summerall) feels that the driving power of the division has been so reduced that an assault is impossible and probably an attack by patrols and infiltration will be attempted."

The inspector's report on the 32nd Division stated:

"The commanding general of the 32nd Division (Haan) states that the men are tired, but this is no indication that the division should be withdrawn from the line. Yesterday (October 9th) there were cases of exhaustion, but the good weather of today (October 10th) has bettered the situation."

On the 3rd Division (Buck) the report was:

"The chief of staff . . . stated that the physical condition of the men is good and the morale excellent. It has been difficult for the officers to hold them back. They have gone forward several times to Romagne and brought back prisoners into our lines. The strength of the Division in going into line was 27,000; casualties up to noon today were about 3,000, of whom 2,300 were sick and wounded."

As to the 4th Division the inspector stated:

"In response to the question as to the physical condition of the men in the division, the chief of staff replied 'they have been fighting constantly for fifteen days. The Colonel may draw his own conclusions.' General Hines replied 'all of them who are not in good physical condition are dead.'"

According to the Army order an advance of from 7 to 9 kilometers was expected on the 11th. The battle started with a large number of artillery concentrations in the early morning. This led to similar activity by the enemy artillery. During the entire day front lines on both sides received an almost continuous severe shelling. At various hours some infantry made attempts to move forward. Every effort was met by a devastating fire of artillery and machine guns. The V Corps made no gains of terrain: the III Corps made a slight advance. At 9.00 P. M. that night the First Army ordered the battle discontinued. The losses had been:

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October	9th	4,143
	10th	3,624
	11th	3,363

Total	11,130
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The line at the end of the battle was Fléville (incl)-Cote de Maldah (incl)-Romagne (excl)- Cunel (excl)- Bois de Cote Lemont (incl).

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The order of battle was:

		Romagne	Cunel					
	I	I		I	I			
Divisions	37th X 52nd	X	115th 228th 236th	X	28th X	X	5th Bavarian	
	X	X		X	X	X	Reserve	
	I	X	XXI Corps	X	I			
	I	I		I	I			

The front line was only slightly in front of the main line of resistance, which extended from Gesnes (excl)-north side Rau de Coup-Madeleine Fme-Bois des Ogons (excl)-Bois de Fays (incl). In each regiment of infantry the front was held by two battalions; the third battalions were in reserve along the line through Romagne sous Montfaucon-Cunel. Lines were intrenched, both partly covered by wire which was in good condition before the battle. Particular attention was given to artillery fire. The artillery was reminded of its excellent work in the past and advised in orders that its continued helpful assistance in the coming battle was counted upon.

The front line was completely overwhelmed by our artillery preparation which commenced at 1.00 P. M., October 8th. The attack on the morning of the 9th by the Americans was further favored by the fact that H hour was not known and a dense fog prevented all observation. The usual defensive barrages consequently did not fall at the proper times and places. One and one-half hours sufficed to overthrow the entire front, the Americans arriving opposite the line of reserves by 10.00 A. M. This line was being shelled with great intensity. The reserve battalion west of Cunel, unable to stand the artillery fire, had withdrawn before hostile infantry arrived in front of it. This left a gap about one kilometer wide in the last defended line. About 10.15 A. M. a regiment in the 52nd Division opposite Sommerance gave

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way, leaving another large gap. The remainder of the line held, fighting, until, at 11.45 A. M., the 171st Infantry, near and west of Romagne, withdrew, followed at 12.00 noon by the 136th Infantry, which had been holding Romagne. The 173rd Infantry continued to fight until around 1.00 P. M., when it also withdrew from west of Romagne. At this hour nothing remained in line of the 52nd and 115th Divisions and there was a large opening of several kilometers in the German line, defended by artillery fire only, which continued to hold the enemy. This task was now easier, as visibility was fair, rain and mist prevailing. With this situation before it, the XXI Corps, at 1.15 P. M., believing that it was impossible to prevent a further deep advance by the enemy, ordered the evacuation of the Bois de Cunel to prevent the troops therein from being turned and surrounded.

An infantry brigade commander, realizing the situation resulting from the giving way of the two divisions about Romagne, rallied a few men from three different regiments. He arranged with the artillery commander for a powerful barrage of all calibers and with this assistance at 1.30 P. M. personally led a counter-attack towards Romagne. With the assistance of the heavy artillery, with only slight losses, he recovered Romagne by 2.00 P. M., and also the high ground just west and southwest of Romagne. On this high ground machine guns were emplaced to fire east over Romagne toward Cunel and to fire south and southwest. OPs were also established here. It was these machine guns which stopped the American attempts to cross the Romagne-Cunel road. Apparently these machine guns were not located by the Americans, and they continued to fire uninterruptedly.

The reserve battalion north of the Bois de Cunel counter-attacked shortly after 1.30 P. M. This counter-attack arrived in the Bois de Cunel and at the Fme de la Madeleine just in time to save these places. In view of these successes, when the Corps order to evacuate the Bois de Cunel later arrived the local commander disregarded it and held his position.

About 5.30 P. M. an artillery preparation by heavy artillery fell on the 236th Division holding the Bois de Cunel and Cunel. It completely destroyed the morale of the infantry and they streamed to the rear, closely followed by Americans who were

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able to enter the Bois de la Pultière. It was not until 10.00 P. M. that the 459th Infantry could be brought into line to counterattack. Protected by strong artillery fire, it swept south through the Bois de la Pultière, recaptured Cunel and, with the assistance of a battalion of fresh infantry on its left, reentered and held part of the Bois de Cunel. For some time the Bois de Cunel had Americans holding part of the north edge, while Germans were holding part of the south edge.

The final American attempt against Romagne was made at 6.00 P. M. The artillery preparation here fell on the line along the Romagne-Cunel road. This gap had not been filled and Romagne itself had only a few men in it. The defense lay with the forces on the high ground west of Romagne firing over the town and with the artillery. The American attack failed, being observed almost immediately and being met by a tremendous artillery barrage. Tanks were included in the attack. Three were shot down by the same gun, a worn out 77mm gun, detailed to anti-tank duty.

During the night 9-10 October the 37th Division was withdrawn from the line and replaced by the 41st Division. The reports for the 10th were briefly as follows:

Early A. M.: The right of the 236th Division repulsed two attacks.

8.30 A. M.: The 115th Division by machine gun and rifle fire stopped an attack east of the Romagne-Charpentry road.

11.00 A. M.: The 40th Infantry and the 110th Grenadiers (28th Division) broke an attack. The enemy suffered severely from machine gun and artillery fire.

11.30 A. M.: An attack from the vicinity of the Moussin brook was stopped at its commencing by excellent artillery fire.

12.30 P. M.: The left of the 236th Division repulsed an attack.

3.00 P. M.: The right of the 236th Division repulsed an attack.

4.30 P. M.: The right of the 236th Division repulsed another attack.

4.45 P. M.: The enemy reached Robinette Farm. A counter-attack is to be made.

Late P. M.: Robinette Farm retaken by a counter-attack.

There was no change in the front during the day.

On October 11th the 123rd Division was inserted in line between the 115th and 228th Divisions, which had been led back to

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their positions along the Romagne-Cunel road. No important attacks developed and there was no change reported in the front line.

COMMENTS

The 17½ hour artillery preparation fired on the 8th and 9th October was so successful that at noon of the 9th the enemy's front was broken and his reserves forced to evacuate the territory along the line Romagne-Cunel. For a time our troops occupied both of these places and were in a fair way to accomplish the mission of the battle—to seize and hold Romagne. The action of a single German commander, who rallied not over two or three hundred infantry and supported by his artillery counter-attacking, retook Romagne and high ground adjacent to it, sufficed to turn the tide of battle and saved the Romagne-Cunel line to the Germans. The machine guns installed were outside the zone of action of the 32nd Division which was attempting to advance between Romagne and Cunel. According to the rules in effect, even if the machine guns had been located, which seems doubtful, the attacking division would not have been authorized to fire with artillery on them without first securing the consent of the division in whose zone they lay. Such approval in practice was not readily granted. The division whose permission was requested, in order to protect its own infantry, wanted to know exactly where the fire was to be delivered and when it would start and stop. It then needed time to warn its infantry to stay away from those localities. All of this took so much time that most divisions rigidly confined their artillery to fire within their own zones of action. The German practice placed all division artillery under the corps and army chiefs of artillery when engaged in a common battle. This enabled any artillery within range to fire into any division zone, without reference to division headquarters.

The orders of the First Army for the 10th and 11th were based upon assumptions that the enemy was in retreat. This was the result of the early reports of the 9th to this effect and these reports were correct up to 1.30 P. M. of that day. The Army did not hear about the counter-attacks in the afternoon and evening. Most units hesitated about reporting losses of terrain from attacks by the enemy. In some cases they failed to report such

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events and in other cases minimized them. This gave higher headquarters a picture that indicated that there was no serious opposition. If failure to report losses or lack of success in attacks was due to a desire to avoid a possible relief from command it had the contrary effect. Higher authority hearing of successes gained, which were always reported, frequently with exaggeration, believed that further successes could be had with only ordinary effort. When these failed to materialize, the tendency was to relieve commanders for incompetence in failing to advance when ordered. It is better to tell the truth, even if unpleasant. Concealment reacts on the very individuals expecting to profit from it.



LIEUTENANT COLONEL FRANK THORP, JR.

With the death of Lieutenant Colonel Frank Thorp, Jr., on January 10, 1934, the rolls of the Field Artillery suffered the loss of an historic name, distinguished for two generations in that branch of the service.

Colonel Thorp was born in New York in 1884 and entered the service after graduating from Johns Hopkins University in 1907. He served in the Field Artillery in successive grades from Second Lieutenant to Lieutenant Colonel. At the outbreak of the World War he was returned from the Philippines and sent to Fort Sill as an instructor in the School of Fire and was temporarily advanced to the grade of Colonel in August, 1918, and as such commanded the 84th Field Artillery at Camp Sheridan, Alabama.

Colonel Thorp was on the General Staff Corps Eligible List; was a distinguished graduate of the Command and General Staff School; a graduate of the Mounted Service School and of the Field Artillery School, Advanced Course.

Colonel Thorp came of a distinguished army lineage, his father having served through the Civil and Spanish-American Wars, retiring in 1907 with the rank of Brigadier General. His great grandfather, Eliphalet Thorp, was a Captain in the Massachusetts Bay Regiment and served throughout the American Revolution.

Of a quiet and self effacing disposition, Colonel Thorp was conscientious and forceful in all his military duties and, while his kindness and thoughtfulness endeared him alike to officers and men, his outstanding ability as a soldier caused deeply felt admiration and respect.

Colonel Thorp was married in 1918 to Alice Burke of Fort Smith, Arkansas. He is survived by his widow and two sons, Frank, Jr., and Mathew Burke.

His death from pneumonia, coming suddenly and only a week after the loss of a young daughter, was a distinct shock to his many friends throughout the service.



Above is Lieut. H. C. Larter's sketch of the first meeting between a U. S. Army regiment and plains Indians of Southwest Oklahoma at a point midway between the present location of the Fort Sill Officers' club and Medicine Bluffs. In the center are the symbols of peace, the soldier's white flag on a pole beside the Indian buffalo hide on a spear. At the head of the soldiers' group is Col. Henry Dodge, commander of the Dragoon Expedition, next is Major S. W. Kearney, Lieut. Jeff Davis, Sgt. Hugh Evans and Lieut. Wheelock. For the Indians, their chief Ee-shah-ko-nee is riding the white horse, followed by Is-sa-wah-tam-ah and Ish-a-ro-yeh. In the background are Medicine Bluffs No. 1, 2 and 3, while at the dark spot to the right is located White Wolf Crossing, another historical point of interest. This meeting occurred July 15, 1834.

FORT SILL SCENE OF HISTORIC PARLEY

Soldiers and Plains Indians Met First Time Near Medicine Bluffs; Interesting Event

ON July 15, 1834, midway between the Fort Sill officers' club and Medicine Bluffs to the northwest, is believed to have occurred the first meeting of the U. S. Army regiment and plains Indians of what is now southwest Oklahoma.

In contrast to later years when the "redskins" and "palefaces" met, this initial meeting and conference was entirely peaceful.

The First Dragoon Expedition, commanded by Colonel Henry Dodge and including the then youthful Lieut. Jefferson Davis, was the American Army regiment.

Indian leaders from a Comanche camp, some 250 yards to the northwest, rode out on horseback to meet the strange visitors. The Comanches camp extending for nearly a mile, was just at the southeastern edge of four Medicine Bluff Mountains.

Chief Ee-shah-ko-nee and two warriors advanced from his band to meet the soldiers. Meanwhile Colonel Dodge and four other members of the regiment advanced from the opposite direction.

The meeting had been arranged by Hiss-oo-son-ches, a Spanish halfbreed guide, who had led the regiment on a four-day trip from the southwest to the Comanche's camp.

SYMBOLS OF PEACE

Before the two groups of leaders met, the symbols of peace were placed halfway between them. The army symbol was a white flag on a pole while the Indians was a buffalo hide on a spear.

The brief conference was entirely friendly and the soldiers were invited into the Indian camp, which hospitality they readily accepted.

A lone tree, now at the side of the north and south road through the post, marks the approximate place of this conference 99 years ago.

A large painting by Lieut. H. C. Larter of Fort Sill, picturing this original meeting between the whites and Indians, is now hung over the back of the fountain at the Post Exchange. This

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piece of art portrays each Indian and army officer mounted, some 20 paces apart with the two symbols of peace standing between them.

In contrast to the current opinion of the Comanches. George Catlin, writer and painter, pictured the Indians as very friendly to the whites.

* * * *

Accompanying Colonel Dodge were Lieut. Col. S. W. Kearny, later prominent in the Mexican War; Lieut. Jeff Davis, Sgt. Hugh Evans and Lieut. Wheelock.

The Comanche chief, Ee-shah-ko-nee (meaning "the bow and quiver") was accompanied by Ish-a-ro-yeh, "he who conquers," and Is-sa-wah-tam-ah, "the wolf tied with hair."

The soldiers gained their first view of the Comanche camp when they topped a rise in the prairie about at the point where the post library is now located.

Notes on Colonel Dodge's meeting the Comanche Indians, taken from the Journal of Sgt. Evans, covering the first and second campaigns of the U. S. Dragoon regiment in 1834 and 1835, transcribed from the original and edited by Fred S. Perrine give an interesting description.

OFFICERS IN GROUP

Officers in the expedition included Colonel Dodge, Lieut. Col. Kearny, Lieut. Jeff Davis, Lieut. Thomas Swords, Capt. E. V. Summers, Capt. David Hunter, Capt. Nathan Boone, Lieut. P. St. G. Cooke, Lieut. Wheelock and Sgt. Hugh Evans. Gen. Leavenworth accompanied the expedition at the start but died in Marshal county on July 21, 1834. Catlin was also a member of the expedition.

Excerpts from Evans' Journal follow: "on July 15, 1834, we resumed our march wet and cold through high elevated prairies. In looking in our front we could see some very high peaks and those whom we think have the best right to know tell us that the Pawnee Indians (when Evans speaks of Pawnees he is using the common term employed in those days to designate collectively the Pawnee pique or Wichita, Comanche and Kiowa Indians) live on the other side of those peaks.

"We crossed over some very deep ravines, the banks of which

FORT SILL SCENE OF HISTORIC PARLEY

were covered with thick undergrowth, briars, etc. After much difficulty and fatigue we came into a highly romantic elevated prairie when we arrived at the summit of which we could see as far as the eye could extend. Then we could look forward and have a beautiful sight of the Comanche village looking like a great meadow with small stacks of hay scattered promiscuously over it. When we came near this Indian village they came out on horseback to meet us in friendly appearance."

COLORFUL DESCRIPTION

The writer and painter Catlin gives a colorful description of the meeting.

"In the midst of this lovely valley we could just discern amongst the scattered shrubbery that lined the banks of the water courses, the tops of the Comanche wigwams and the smoke curling above them. The chiefs of the war party requested the regiment to halt, until they could ride in and inform their people who were coming.

"The regiment was drawn up in three columns, with a line formed in front by Colonel Dodge and his staff, in which rank my friend Chuckwick and I were also paraded.

"In the center of our advance was stationed a white flag, and the Indians answered to it with one which they sent forward and planted by the side of it.

"The head chief of the band came galloping up to Colonel Dodge and having shaken him by the hand, etc."



THE MURDEROUS POWER OF THE ARTILLERY

BY GENERAL FREDERIC CULMANN, FRENCH ARMY

THE proportionate share of the artillery in the total losses inflicted on an enemy varies widely and is influenced by numerous factors, of which the following are the principal:

The ballistic properties of the guns, and the potential killing power of their projectiles;

The tactical employment of the arm in accordance with its regulations and its traditions;

The organization of the Army, that is, the number of cannon it has per infantry unit;

The relatively large or small consumption of ammunition;

The form of the operations (open, position, or siege warfare);

The form of the battle (offensive or defensive).

The sum of the losses shows only the total influence of these complex causes; it is therefore difficult to ascertain the particular value to be assigned to any one of them, in spite of the interest which would be attached to determining, for instance, the importance of the technical characteristics of guns and of their ammunition, or of the tactical employment which is made of them.

Moreover, the statistics of the losses from 1914 to 1918 are as yet very incomplete, and this renders questionable, to a certain extent, the conclusions deduced therefrom.

In spite of all these difficulties, it is possible to discover certain general rules; but on condition that use is made not only of the data of the World War, but also of those of previous wars, which, moreover, are much better known.

Amongst the factors mentioned above, the form of operations exercises a considerable influence on the relative share of the losses caused by the artillery and by the infantry. In the following discussion, this will be the first emphasized, by grouping together operations of the same nature, without reference to their dates.

* * * *

THE MURDEROUS POWER OF THE ARTILLERY

OPEN WARFARE: 1870-1871 AND 1914

For forty-four years, both French and Germans considered the war of 1870 as the main source from which to draw lessons valid for a next war. The teachings of that war had the greatest influence on the conduct of operations and even on tactics in 1914. In form, therefore, these two campaigns are quite similar.

The relative parts played by the gun and by the rifle in the total losses suffered by the belligerents were approximately as follows:

TABLE I

		Losses suffered by the:	
		Germans	French
		per cent	per cent
1870-1871	{	cannon	8 25
	{	rifles	91 70
	{	other causes (a)	1 5
1914	{	cannon	? 75
	{	rifles	? 23
	{	other causes (a)	? 2

(a) Missing, prisoners, etc.

This table shows that:

First—In 1870 the losses inflicted by the German artillery (25%) were triple those inflicted by the French artillery (8%). This fact was due to the technical inferiority of the latter, and perhaps even more to its faulty tactical employment.

Second—In 1914, the proportion of the losses due to German cannon (75%) was triple that of 1870 (25%), while the share of the rifle decreased in the same proportion, in spite of the appearance of the machine-gun. *In 1870, the killing power of the infantry was still greatly preponderant: in 1914, the artillery became the principal agent of destruction.* This new fact is attributed to the following causes:

A PROPORTIONAL INCREASE IN THE NUMBER OF CANNON

In 1870 the German Army Corps consisted of 24 to 26 battalions supported by 14 to 16 batteries of 6 pieces each; say 3.6 guns for each 1,000 rifles.

In 1914 the same number of battalions were supported by 160 cannon (21 batteries of 77mm guns, 18 batteries of 105mm howitzers, 4 batteries or 16 heavy howitzers, 155mm in calibre), a total which corresponds to 6.4 cannon for each 1,000 rifles. But

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this proportion reached 8 at least, if we take into account the great amount of artillery which was mobilized as non-organic but ended by fighting within the framework of the division. Thus, in the German army, the number of guns had more than doubled from 1870 to 1914, thanks to a correct appreciation of the necessities of modern warfare, inspired by the Russo-Turk and Russo-Japanese campaigns, and also to the application of the principle that technical perfection, when applied to materiel, has for its consequence, not a diminution, but on the contrary an augmentation of the artillery in the general organization of the army.*

In the French Army the proportion of artillery in 1914 was still very close to that of 1870, say 4 guns per 1,000 rifles.

A CONSIDERABLE INCREASE IN THE POWER OF MATERIEL

In 1870 the German rifled gun fired, at the rate of two shots per minute, percussion shell which broke into about thirty irregular fragments. The French gun fired, at the same cadence, either common shell giving about fifteen fragments, or time shell containing 85 balls; but the fuzes of the latter could function only at three ranges and their faulty construction resulted in a great number of duds.

In 1914 the 75 and 77mm guns fired practically 10 to 12 rounds per minute of shrapnel containing 300 balls. The rate of fire of the German light howitzer reached 5 rounds per minute, and its projectile weighed nearly three times that of the 77mm gun. The rate of fire of the heavy 15cm howitzer was 2 to 3 rounds and its projectile weighed seven times that of the field gun.

Per minute, the organic artillery of the German Corps could consume 1,100 kilograms in 1870 and 10,500 kilograms in 1914. This is a ten-fold increase in munitions; the projectiles were incomparably more deadly.

*This principle, apparently paradoxical, is based on the fact that, except in the case of surprise, the efficacy of protective means always outstrips the efficiency of the means of destruction; for if man desires to kill, he is yet more desirous of not being killed. On the target range, technical perfection results in a greater hecatomb of the immovable wooden silhouettes; on the battlefield, in a diminution of losses.

THE MURDEROUS POWER OF THE ARTILLERY

SIEGE AND POSITION WARFARE: 1854 AND 1914-1917

The stabilized warfare from the end of 1914 to the beginning of 1918 is comparable to the Siege of Sebastopol in the Crimean War. There follows a table showing the proportionate part of the losses inflicted on the French Armies by the hostile artillery and infantry, as well as those due to other causes (sidearms, missing, prisoners, etc.)

TABLE II

	Artillery and grenades (a) per cent	Infantry per cent	Other causes per cent
Crimean (Siege of Sebastopol).....	43	54	3
Attack: Aisne-Marne (April, '17)	73.5	21.4	5.5
Limited Objective { Flanders (July, '17).....	78.3	9.7	12
Attacks: { Verdun (August, '17).....	77.2	6.1	16.7
{ Malmaison (October, '17)	77	17	6

(a) The part played by grenades was insignificant.

In the Crimean War, the percentage of the artillery (43%) approached that of the infantry (54%); it was better than one-half of the percentage of the artillery in 1917 (mean 75%); and was incomparably greater than that of 1870-1871, although the smoothbore in service in 1854-1855 had a range only one-third as great as, and an accuracy one-tenth that of, the Krupp rifled gun used fifteen years later in the Franco-Prussian War (see Table I). Thus two facts became apparent:

The form of warfare has a preponderant influence on the proportion of losses due to the artillery. In fact, siege or position warfare demands the use of a great proportion of batteries, and the defender can not reach the adversary with the rifle until he leaves his entrenchments in order to make the attack.

The relative value of technical perfection when the materiel used by both belligerents are similar is slight. Along this line, it is interesting to note that the appearance of rifling resulted, in all wars, whatever the nationalities of the belligerents may have been, in a sudden, very noticeable, decrease in the percentage of losses based on the effectives engaged in the battle. These losses, which exceeded 20% under Frederick the Great and Napoleon, amounted to scarcely 10% in the second half of the 19th Century. This seems due principally to the fact that rifling, by increasing considerably the range, likewise separated the combatants, and thus protected them.

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SEMI-OPEN WARFARE: 1904-1905 AND THE END OF 1918

Of all modern campaigns, the War in Manchuria is the one which offers the closest analogies with the war in 1914-1918, from the standpoint of armament and also with respect to the forms taken by the operations or the engagements. The following table shows the percentages of wounds caused by cannon and by rifles, as well as losses from other causes:

TABLE III

		Artillery shell and grenades	Infantry	Other causes	
		(a) per cent	per cent	per cent	
1904-1905	Mean of the war: Japanese	8.5	85	6.5	
	Mean of the war: Russian.....	14	86	?	
	Jap	I Army to Liao Yang	11.3	86.1	3
		II Army to Liao Yang	8	91.4	?
		II Army at Cha-Ho.....	8.6	82.2	?
Russian 2d Corps for the entire war	14.5	83.5	2		
End of 1918 (b)	defensive	Picardy, Mar., '18.....	51.7	34	14.3
		Aisne, May, '18.....	56.3	31.6	12.1
	offensive	3d, 4th, 6th, 10th Armies, July....	67.9	23.9	8.2
		4th, 5th Armies, Sept. to Nov.	56.1	27.4	16.3

(a) The proportion of wounds by grenades was insignificant.

(b) Losses of the French Armies.

Examination of this table permits, among others, the following observations to be made:

First—In Manchuria were used for the first time in a great war: the small caliber clip-loading rifle, smokeless powder which permitted a greater continuity of fire, quick or rapid fire cannon (but without shields), shrapnel and high explosive shell, the latter in increasing proportion, as in 1914 to 1918.

Second—Since 1870, the destructive power of cannon had noticeably increased both in absolute value and *in comparison with the rifle*, and yet the portion of losses inflicted by the artillery in 1904-1905 was considerably less than the losses suffered by the French Armies in 1870 at the hands of the German artillery. *The experience of the Russo-Japanese War maintained the relation previously existing between the destructive power of the cannon and the rifle, preserving to the latter a considerable preponderance.* This fact, which today causes astonishment, is easy to explain, however. In reality:

THE MURDEROUS POWER OF THE ARTILLERY

(a) In the Russian and Japanese Armies, the proportion of artillery remained as in 1870, say 3.5 guns to approximately 1,000 rifles.* This mounted to 15 in the period from 1914 to 1918.

(b) In comparison with the Japanese cannon, the Russian cannon had superior range and power, and yet it was the latter piece, the better technically, which inflicted the lesser loss (8.5% as against 14%). This fact is attributable to defective tactical employment.

As a matter of fact, the Russian artillery systematically maintained reserves and did not maneuver: not being provided with shields, it dug entrenchments for itself in which it became immobile. And thus on such battlefields as at Dachitchao, where its effective strength was more than half that of the Japanese, it fought, not as one against two, but as one against four or five. *On the battlefield, the holding out of reserves of artillery has not been commendable since the introduction of rifling.*

And, again, the Russian artillery took the field with regulations, methods of observation, and habits all out of date. On this subject Colonel Biélaïew expressed himself as follows:**

"In conformity with the teachings of our regulations, direct fire on the target, and consequently the location of the artillery in the open, was before the war the general rule for the Russian artillery, its normal mode of action in accordance with which instruction was conducted. . . ."

The great losses suffered led to a reaction, and as usual the pendulum swung too far in the other direction:

"The initial combats have made it obvious that no longer can positions in the open be considered. Actually the Commander-in-Chief

*At the Battle of Cha-Ho (autumn, 1904): The Russians had 760 field and mountain pieces for 200,000 rifles and sabers, corresponding to 3.5 pieces for each 1,000 rifles or sabers. The Japanese had 558 field or mountain pieces, plus 50 heavy pieces for 170,000 rifles, corresponding to the same proportion of 3.5 per 1,000 rifles.

At the beginning of the Battle of Mukden (February 23, 1905) the effectives were: Russian: 310,000 rifles and sabers; 1,200 cannon, of which from 200 to 300 were of heavy caliber; whence the proportion was 4, Japanese: 290,000 rifles and sabers; 1,060 cannon, of which 170 were of heavy caliber; whence the proportion was 3.7.

**Queries on artillery tactics, based on the Experiences of the Russo-Japanese War.

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of the Army took the most severe measures. First of all, emplacements permitting direct fire disappeared forever. . . The artillery always will be entrenched; the battery commander, having with him telephones, signallers, etc. . . . will himself direct the fire. This preparatory work was not long in bearing its fruits, as can be appreciated in the battle of Dachitchao (23-24 July, 1904)"

The Battle of Liao-Yang convinced the Russians they were on the right track, and after the battles of the autumn on the Cha-Ho, positions of deep defilade became almost the unbroken rule. Whence arose an obsession whose inconveniences did not escape far-seeing spirits:

"This obsession is a terrible evil against which we must fight with all means the instinct of self-preservation plays the greatest role.* It causes the batteries to fail to displace forward, and the infantry, suffering great losses, is obliged to fall back without having obtained results. In order not to sustain enormous losses when a direct fire position is occupied, shields must be provided. . . . The battery which is preoccupied in finding sheltered emplacements will always remain far from the infantry and lose its liaison with it."**

In fact, in proportion as hostilities were prolonged, the Russian artillery stayed further and further behind its infantry and fired at longer and longer ranges. The Japanese artillery did the same.

The misuse of long ranges seems to be a general phenomenon at the end of all wars, probably due to the breakdown of morale. It happened in 1918 on the French as well as on the German side; it had already manifested itself in the second half of the campaign of 1870.

* * * *

In comparing the information furnished by the three preceding tables, it is seen that the French Armies have suffered the following losses by reason of German guns and rifles:

*The percentages of losses admitted by the infantry and by the artillery with respect of the effectives of each arm, were:

Russian: Infantry 26.6 per cent, Artillery 8.7 per cent.

Japanese: Infantry 32.0 per cent, Artillery 14.0 per cent.

**From a letter from Colonel Gavrilow, who served in the entire campaign, and acquired a brilliant reputation as an artilleryman.

THE MURDEROUS POWER OF THE ARTILLERY

Guns: 1914: 75%—Stabilization 74 to 78%—1918: 52 to 68%
 Rifles: 1914: 23%—Stabilization 21 to 6%—1918: 34 to 24%

The losses inflicted by artillery from 1914 to 1918 are revealed as being incomparably greater than those due to infantry.

In 1917 the share of the artillery rose again slightly and that of the infantry decreased, as is natural in stabilization. We still observe that the replacement of the rifle by the much more deadly automatic has not exercised any noticeable influence.

In 1918 the marked falling off of the percentage of the gun is explained by the material and moral collapse of the German artillery—a collapse of which excessively long range fire was but one of the manifestations. On the contrary, the German infantry still frequently showed remarkable ability in utilizing its machine-guns as demanded by the terrain.

The fact that the artillery had become by far the more efficient agent of destruction seemed all the more surprising in 1914 as it overturned all previously accepted ideas. But it must be noted that the murderous power of guns in comparison to rifles has fluctuated widely at different epochs, and that the infantry, during the latter half of the 19th century, has profited by notable technical advances. This is shown by the following table, which, paying no attention to differences in range, compares the rifle and the cannon.

TABLE IV

1 Smoothbore gun was worth	72	smoothbore rifles
1 French rifled 4-kg gun was worth.....	30	rifles, Model 1866
1 German gun, M-1870, was worth.....	60	German needle rifles
1 French gun, Cal. .90, was worth.....	60	rifles, Model 1886
1 German quick firing gun was worth.....	150	rifles, Model 1886 or
	90	magazine rifles
1 Rapid fire gun is worth.....	500	rifles, Model 1886 or
	300	magazine rifles

This table shows the direction of evolution, although it is not insisted that its numerical indications are strictly correct. It is only since the appearance of the quick-firing gun that the artillery has obtained its great technical superiority over the infantry.

During the last war, the greatly increased relative power of artillery was also multiplied by its numerical importance. Actually the infantry found itself considerably behind the times: moreover, it was insufficiently equipped for modern combat, as its flat

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trajectory armament permitted it only to forbid the enemy from leaving an entrenchment or a defiladed zone.

But the question is raised whether, once provided with accompanying mortars and with curved trajectory weapons abundantly supplied with munitions on the battlefield by the aid of small tractors, will it not regain its superiority as a casualty-producing agent?

An increase in the percentage of losses which it will inflict is then assuredly possible, especially if the attack is facilitated by the emission of artificial fogs, and if bombardment aviation hastens the retreat of the defender; in other words, if the war of movement is reborn. Nevertheless, we believe that the great lead will still be maintained by the artillery for a long time, for:

(a) if, in all countries, infantry armament is on the road to perfection, the cannon and especially the high explosive shell whose radius of action is too small, can and must themselves be considerably bettered;

(b) it is principally the infantry which, by the power of its fires, forever necessitates increase in the numerical proportion of the artillery. When the former becomes capable of covering its fronts with denser and more impenetrable fires, the latter ought, in order to break them, to make new technical and numerical progress, especially so as the semi-permanent concrete fortification will be employed more widely and often. The great progress made in the manufacture of rapidly drying cement opens a wide field in this respect.

Tables II and III show that the percentage of losses due to causes other than fire is swinging upward, when compared with previous wars.

The number of wounded attributable to sidearms being rather negligible, probably less than one per cent, and the missing few in number, it is evident that the prisoners captured by the enemy constituted the majority in this category of losses, the proportion of which varied from 5 to 16%.

The great moral effect and the immobilizing power of modern fires, the multiplication of shelters, the severe neutralization methods used by the artillery which paralyzed the defender, seem to be the determining factors in this new trend. The losses in prisoners having increased in proportion as the war was prolonged,

THE MURDEROUS POWER OF THE ARTILLERY

the conclusion fairly thrusts itself on one that the duration of hostilities had progressively decreased the will to fight.

A COMPARISON OF LOSSES IN THE OFFENSIVE AND THE DEFENSIVE BATTLE

On this subject, as on the preceding, there are few statistics. In France, no study of this has been made. In Germany, the Great General Staff had not, at the beginning of 1932, yet published anything, although before the World War it had published very complete studies on all the wars since the time of Frederick the Great, including those in the Transvaal and in Manchuria.

A search for information on this subject covering sufficiently long periods of time to permit conclusions to be drawn therefrom has revealed only the following:

First—*Losses suffered by the two adversaries, English and German, from July to December, 1917*, a period which contains the long and arduous battle of Flanders and that of Cambrai (extracted from the *Militar-Wochenblatt*, Number 29 of 1932):

	Officers	Men	Total
English on the offensive	23,300	426,300	448,600
Germans on the defensive	6,900	263,000	269,900

Second—*Losses suffered by the two opponents, German and English, from March 21 to April 30, 1918* (as extracted from the same source):

	Officers	Men	Total
Germans on the offensive	12,300	336,000	348,300
English on the defensive	14,800	228,000	302,800

Third—*Losses suffered from July to November, 1918, by the English and French together, and by the opposing Germans*:*

	Killed	Wounded	Missing, etc.
English on the offensive	53,800	304,977	52,859
French on the offensive	65,000	368,000	98,000
Totals	118,800	672,977	150,859
Total losses by fire.....		791,777	
	Killed	Wounded	Missing, etc.
German—on the defensive and in retreat	78,186	359,670	347,867
Total losses by fire.....		437,866	

*According to the Statistisches Zerbuch. The losses indicated are only those on the front in France.

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It appears from the three preceding tables that, in the hard-fought defensive battle, and especially in the defensive accompanied by retrograde movements, losses by fire are very much inferior in number to those suffered in an offensive battle (35% as against 65%). The variations which are shown between different armies seem to be attributable to differences in the tactical skill of the combatants, and in the technical value and employment of materiel.

The very much less onerous character of the defense is a phenomenon already old, and dates for the most part from the appearance of rifled weapons. Immediately after 1866, and again after 1870, the elder von Moltke recommended "a strategic offensive, a tactical defensive," without, however, having been able himself to apply that formula, offensive strategy naturally leading to equally offensive tactics. It is proper to conclude only that the offensive, inviting losses heavier and heavier, ought more than ever before to be carried on in conjunction with the defensive, both in the direction of operations and in the conduct of battle.

The conclusions relative to the economical character of the defense do not at all invalidate the premise that, in an attack by *bounds limited* to the effective range of the field gun, with a *superabundance of technically superior and well utilized artillery*, the losses of the assailant should be decidedly inferior to those of the defender. It was noticeably thus at Verdun, during the battle of attrition of the first half of 1916, where the losses of the German Army, in comparison with those inflicted on the French Army, were in the proportion of two against five, according to General von Falkenhayn. Chief of the Imperial General Staff.

* * * *

RELATIVE PROPORTION OF LOSSES SUFFERED BY THE DIFFERENT ARMS

With respect to the losses suffered by the different arms, we have been able to find only one English reference.*

In the course of five great battles fought by the British in 1916 and 1917 (the Somme, Arras, Messines, Ypres, Cambrai), the losses were, for:

*The Volume entitled "War Losses" of the "History of the Great War based on official documents," published by the Stationery Office.

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	Per cent
The Infantry.....	88.18
The Artillery.....	6.06
The Engineers.....	1.55
The Aviation.....	0.27

Thus artillery losses were but one-fourteenth of those of the infantry.

* * * *

INFLUENCE OF THE INCREASE OF THE AMOUNT OF ARTILLERY ON THE CHARACTER OF THE TOTAL LOSSES SUFFERED BY THE ARMIES*

In the period extending from the first of January, 1915, to the first of January, 1917, the number of batteries in the French Army increased from 1,272 to 1,838; the monthly losses decreased from 1.05 to 0.45 per cent of the effectives engaged, and the absolute losses per year were lowered in the same proportion.

In 1918 the number of batteries amounted to more than double the number in 1914; losses were reduced from 2.95 to 0.75 per cent of the effectives present at the front, and this in spite of the fact that the operations of the last seven months of the war were conducted with especial vigor.

In the great offensive battles fought by the French Armies, the absolute losses decreased as the engaged artillery increased.

Battles	Absolute losses men	Number of batteries per kilometer
Champagne (September, 1915)	175,000	13
Somme (July, 1916)	165,000	19
Aisne (April, 1917).....	136,000	25
Champagne (September, 1918)	126,000	26

Whence the conclusion that *artillery able to gain fire superiority over its rival*, as the French was able to do in the above battles, *is the most efficient protection the infantry can have*.

CONTINUED INCREASE IN THE CONSUMPTION OF AMMUNITION

The following table indicates the weight of ammunition consumed by the artillery of one of the adversaries in order to put *one* adversary out of action, during several battles of 1870 and of 1904-1905:

TABLE V

At St. Privat..... (1870), the French used:	90 kilograms for 1 German
On the Yalu..... (1904), the Japanese used:	160 kilograms for 1 Russian
At Wafangou..... (1904), the Russians used:	385 kilograms for 1 Japanese
At Liao-Yang..... (1904), the Russians used:	240 kilograms for 1 Japanese
At Mukden..... (1905), the Russians used:	255 kilograms for 1 Japanese
Mean consumption by the Russians	250 kilograms for 1 Japanese

*According to General Herr, Inspector-General of the French Artillery during and after the war.

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After 1870 it was generally said that in order to put a man out of action a weight of ammunition equal to his own weight was needed: that was about what was used at St. Privat. But at that time the French were not entrenched and the Germans did not have heavy artillery.

During the war in Manchuria, the Japanese artillery needed 160 kilograms (to be sure, this is but one example); the Russians needed even more, 250 kilograms, but the latter, using tactics taught at that time and which were suitable only on the target range, adjusted in a hasty and rough manner, thereafter executing an expensive zone fire. Be that as it may, the lapse of thirty years showed the weight of ammunition consumed to be at least double that of 1870 in order to obtain the same result.*

For the war from 1914 to 1918, General Gascoulin,** using approximate but seemingly correct data, calculated that *at the beginning of the war* the French artillery, almost exclusively armed with light cannon, put out of action 4 or 5 men for each ton of ammunition fired, a rate sensibly equal to that of the Russo-Japanese War.

The Germans inflicted on us, during the first five months of the war, in 1914, total losses amounting to 301,000 men, 75 per cent of which (see Table I), say 225,000, were due to their artillery, which already was provided with a number of heavy batteries firing very heavy ammunition. From other sources it is known that the *total* tonnage of their projectiles, on the 2d of August, 1914, amounted to 190,000 tons, of which approximately 166,000 were earmarked for the front in France. Now it happened that the munitions situation reached a crisis early in the German Army, and industrial mobilization, planned for on an extremely small scale, had, five months after the outbreak of hostilities, still only an infinitesimal output. Assuming that 166,000 tons had been used up, the cost to the German artillery to put one Frenchman out of action amounted to 730 kilograms—a sum probably less than the reality, if the mode of calculation adopted is considered.

*The same statement also applies to the infantry. During the entire campaign, the Russians consumed 155 million cartridges in order to kill or wound about 156,000 Japanese, while in 1870, in order to put out of action a reasonably equal number of French, the German infantry needed but 25 million cartridges.

**The Evolution of Artillery during the War.

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Two and a half years later, on the Aisne (April 7 to 17, 1917), the French artillery fired 93,000 tons of ammunition, and 100,000 Frenchmen were killed or wounded by hostile shell.* Assuming equal losses on the part of the Germans would give us a figure of 930 kilograms per man.

For the year 1918, General Gascoulin calculated that the French artillery consumed from two to three thousand kilograms for each single adversary put out of action.

The relative figures for the World War are much less certain than are those of 1870 or of 1904-1905; but, even if they should be 50% in error, they would still permit the statement to be made that the murderous efficiency of the artillery after 50 years, and even in the course of the hostilities from 1914 to 1918, has diminished noticeably, finally to become disturbingly mediocre. This decrease is but the result of the instinct of self-preservation opposing technical progress; it will also manifest itself in the future.

The rapid increase in the consumption of ammunition is due, without any doubt, to the following general causes, all of which have for their object the obtaining of guaranties against the power of hostile fire: the increase of ranges, the use of defilade, protection, dispersion, and camouflage of objectives, the ever-costly increase in rates of fire, and the considerable increase in the number of heavy cannon, etc. The latter, nonexistent in 1870, constituted in Manchuria a fifth or a sixth, and in the last war a half of the total cannon. Heavy artillery is certainly indispensable, but its shell have killing power often much inferior to that of an equal weight of projectiles of smaller caliber.

The falling off in the efficiency, most particularly pronounced in 1918, was due to extremely complex causes both technical and tactical, associated for the most part with the material and moral wastage of every long war. Precisely for this reason, it would be only rational to consider as valuable lessons for the future certain tendencies adopted at this time.

*From April 7 to 17, there were fired:

4,000,000 rounds of 75mm at 7 kg each, say	28,000 tons
1,300,000 rounds of heavy artillery with a mean weight of 50 kg, say	65,000 tons
Total	93,000 tons

French losses totaled 136,000 men, of which 73.5% were attributable to
German artillery fire, say

German artillery fire, say	100,000 men
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TECHNICAL CAUSES

First—Diminution in the ammunition supply of the proportion of shrapnel (50% in 1914, only 10% in 1918), and its replacement by high explosive shell, powerful, but with restricted radius of action, with difficulty capable of attacking inconsiderable targets or those of small dimensions (machine-guns, shelters, etc.), inefficient against an enemy concealed in foxholes, and particularly costly in the almost constantly practiced zone fire.

Second—Less value, towards the end of the war, of the explosive used and of the true efficiency of the shell.

Third—Lack of *clockwork fuzes* suitable for great ranges, and of *base fuzes* suitable for calibers greater than 150mm for use in firing against shelters.

CAUSES DUE TO THE METHODS OF FIRE

The necessity of securing for oneself the benefit of *surprise* in the attack on fortified or entrenched hostile lines had led to the use of various artifices to replace *adjustment* directly on the objective, as this was certainly a warning to the enemy. Since the autumn of 1917, the determination of firing data by calculations referred to targets registered on with terrestrial or aerial observation had come into general use. But under the most favorable conditions; the precision obtained by such methods is from one to two probable errors* instead of half a probable error as in the adjustment by direct terrestrial observation of the fire.

Moreover, as a consequence of the adoption of the machine-gun, and in order to make the hostile fire less dangerous, the infantry had adopted combat formations in depth in the offensive as in the defensive.

Fire on *areas* was thus substituted, for various reasons, for fire on *objectives*, and became the usual thing, although it was but a mediocre expedient leading to great ammunition expenditures, especially with the high explosive shell of the war.

However, zone fire necessitated only a summary adjustment, which was rapid and *easy* and was convenient in practice. Some

*For a good modern materiel, the probable error in range is about 1/300th of the range, at ranges less than two-thirds of the maximum range. Thus it is about 30 meters at 9 kilometers, for a gun having a range of 14 kilometers. Half of the rounds will thus fall in a zone 60 to 120 meters in depth in perfectly adjusted fire.

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abuse was made of it, even when it was not absolutely relied upon under all conditions.

Today the idea of the *objective* must be revived.

It is, moreover, essential to manufacture: for one thing, a heavy shrapnel whose striking power will be sufficient all along the trajectory, even if the height of burst is not absolutely correct; and for another, high explosive shell with systematic fragmentation into numerous splinters sufficiently heavy to demolish the fragile parts of materiel, and sufficiently regular to travel easily through the air without prematurely losing their velocity.

TACTICAL CAUSES

First—In the last months of the campaign, there was a noticeable decrease in the number of German effectives and especially of their density in the face of our artillery.

The German batteries, having lost much materiel, had become less numerous and occupied positions at increasing distances. The infantry, impoverished, operated mostly by holding lines of crossed or flanking fires with machine-guns, utilizing to a remarkable extent the slightest fold of the ground or cover in order to hide themselves.

Second—Long range fire, whose efficacy is limited for technical reasons, especially the difficulty of observation, was misused.

Third—The artillery was improperly used, and too often was requested to execute useless fires on non-existent or only indefinite and assumed targets. The causes of these habits have various sources.

On the one hand, the Command was forced to maintain the morale of its exhausted infantry.

On the other hand, the infantry itself constantly begged for the support of the guns.

Finally, the artillery, having been given our plan of attack, the lines to be occupied by our infantry during the successive phases of the combat, and the terrain features to be conquered, had gotten into the habit of firing on those positions susceptible of being or of becoming dangerous. In other words, fire was planned as a function of calculated needs, rather than in accordance with the real situation of an enemy actually seen. And here again is found

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the tendency to mechanize the attack, to render its success automatic, the fond hope at various times during the war.

CAUSES DUE TO INSUFFICIENCY OF INSTRUCTION

As hostilities were prolonged, the role of the artilleryman became increasingly difficult. But the officers of 1918 had received less instruction in firing than had those of preceding years, and this explains the losses and the wastage caused by a war lasting four years.

Whatever may be the remedies applied to the want of efficiency of the artillery of 1918, the consumption of ammunition will be much greater in the future. The time is past when, in order to put one individual enemy out of action, it needed only 80 kilograms of projectiles as in 1870, or 250 kilograms as in 1904-1905, or 500 kilograms as in 1914-1915. This latter expenditure, already enormous, seems no longer to be hoped for, even with more nearly perfect projectiles, with less costly methods of fire and tactical employment. The reason for this statement is the general principle already mentioned, that defensive means are always improved more rapidly than is the power of destruction. This principle holds good, or finally after several hecatombs holds good, except in the case of surprise.

The perplexing question is thus raised as to the stocks of ammunition to be set up in time of peace, of the rate of manufacture to be demanded of the munitions factories, of the delays necessary before industrial mobilization reaches the desired efficiency. These are difficult and complex problems whose solution, before 1914, had not been prepared in a satisfactory manner by any of the armies, German, English, or French; since, beginning with mid-September, after only six weeks of campaigning, a grave crisis burst upon each of them—luckily at about the same time.

The French artillery started the campaign with the following stocks of ammunition:

75mm gun	1,475 rounds per piece
155mm howitzers	1,100 rounds per piece
120mm long	600 rounds per piece

The plan of manufacture and of supply drawn up in peacetime contemplated a production, per day, of:

75mm projectiles	13,600, say 3½ rounds per piece
155mm shell	465, say 4½ rounds per piece

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Fifty thousand workers were to be maintained at the rear.

During the war, the factories had to be forced to attain a final figure of:

75mm shell	230,000 per day
155mm shell	50,000 per day

In 1918, the effective total of personnel employed in the 15,000 munitions factories was of the order of 1,700,000 workers, both male and female.

The German artillery started the campaign with the following stocks of munitions:

77mm gun	1,300 rounds per piece
105mm light howitzer	900 rounds per piece
15cm heavy howitzer	1,750 rounds per piece
10cm gun	1,800 rounds per piece
21cm mortar	840 rounds per piece

These totals, very different, are significant as indicating the tactical employment foreseen for the different materiel.

The stocks set up for the 75 and the 77 are comparable, but those for the heavy German guns are triple and quadruple those set up by France.

Particular note should be made and kept in mind, in view of future conflicts, of the enormous provision made for the heavy 15cm howitzer, a provision justified by the fact that that piece used only high explosive shell. Through severe tests on the proving grounds, the Germans had really proved the mediocre efficiency of this type of projectile, which while crushing in a restricted radius, is variable in its effect from round to round, and necessitates a particularly precise fire and a great expenditure in order to secure decided results.

As to the still greater stock of munitions for the 10cm gun which had a range of 11 kilometers, a distance nearly double that attained by field guns at that time, it showed the desire conceived by the Germans to begin the battle at long distance in order to demoralize the enemy even before the real fight began.

The efficiency predetermined for manufacturing was still more mediocre in Germany than in France.

For the 77mm gun, the initial production was less than one round per piece per day: it reached 1½ rounds only at the end of two months, and reached 9 rounds only at the end of 1914.

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The percentages to be stocked before the outbreak of war vary according to the nature of each gun and the tactical employment foreseen for it, and taking into account the larger or smaller radius of action of its projectile.

The quantities of munitions, on the other hand, rest very strictly on the delay necessary for national industry to attain a suitable degree of efficiency, that is to say among other things on industrial organization, on the quantity of strategic materials found in the country and on those which it is necessary to import, etc.

Totals are therefore difficult to determine.

Let us recall, however, that Napoleon I sought to have a stock of 3,000 rounds per piece at his base of operations, in addition to the munitions existing at home. It was to a large extent the lack of munitions which caused the loss of the Battle of the Nations at Leipzig (1813) and determined the fate of the French Empire.



WHY USE AIMING POINTS FOR RAPID PREPARATION OF FIRE?

BY CAPTAIN C. C. PARK, FIELD ARTILLERY

THE advent of indirect laying for field artillery required methods for giving the guns a direction with reference to an object other than the target. The object selected for this purpose came in the course of time to be called the aiming point. To meet the requirements of observation, when using indirect laying, the OP had to be some distance from the guns. This required that measurements made at the OP be corrected for application at the guns. For correction of OP measurements various methods, based upon geometric and trigonometric formulas, were evolved. Preparation of initial data was for many years the outstanding characteristic of field artillery training, and it became a tradition that artillery officers should be proficient in applying the principles of geometry and trigonometry. When suitable declinating instruments were provided, methods for obtaining the initial direction by "compass" were superimposed upon the other methods previously used.

After a time considerable attention began to be paid to adjustment and methods for utilizing the results of adjustment. Our present regulations emphasize that a base deflection should be recorded as soon as an adjustment can be made upon a visible target. Therefore, aiming points are now useful only for determining data for the initial adjustment,—and for referring the pieces. But, with enemy aircraft active, gun positions will not usually be selected in open country or near crests; and, for a night occupation of position, aiming points will not be visible; hence, data for the initial adjustment often will have to be determined using a "compass" for direction.

Much valuable time is devoted by troop schools, extension courses, and at the Field Artillery School, to instruction in the use of aiming points. During service practice data is frequently determined from a number of different aiming points for each position. This deviation from service conditions is designed to afford practice in the mental gymnastics involved. Thought has been given to the practicability of reducing the time devoted to so

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rudimentary a subject as direction, with a view to providing more time for advanced training. However, under rapid preparation of fire, the current TR 430-85 devotes nearly 30 pages to direction and distribution. Much of this space is given to methods for determining deflection and deflection difference, using aiming points. Notwithstanding some improvement in mechanics of method, proficiency in all of the methods still requires careful instruction, much practice, and considerable mental agility and facility with figures and formulas.

Many years ago, when the instruction contemplated only axial conduct of fire, without maps, by professional officers who spent most of their time with troops, general proficiency could be reasonably expected. But field artillery training has become much more complex. Regular field artillery officers today compose a minor fraction of those receiving field artillery training; and much of the time of Regular officers is spent away from troops. In addition to more complicated communication and transport systems, there have been added to our curriculum many essential features in regard to preparation, conduct and direction of fire, among which are the following:

- Lateral conduct of fire (complicated by four different methods).
- Aerial observation.
- Liaison observation.
- Determination and application of K's (correction factors), based upon adjustment on targets of known locations.
- Materiel and weather corrections.
- Schedule fires.
- Adjustment by high bursts.
- Fire direction (as a gunnery subject).
- Construction and use of firing charts and fire direction charts.
- Use of air photos of varying scales as firing charts and fire direction charts.

Reports of service practice indicate that, except at the Field Artillery School, few of the above subjects are generally covered during the training year. The National Guard and Organized Reserve field artillery units, with their limited time for training, find it difficult to progress beyond the rudiments. As indicated above,

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proficiency in determining deflection and deflection difference is not easily attained. The question arises: Is the expenditure of time for this purpose justified; or, could we, in the interest of simplifying instruction, especially for the civilian components, dispense with the use of aiming points for rapid preparation of fire?

Let us compare the operations for determining a deflection and deflection difference with those for determining a "compass."

TO DETERMINE A DEFLECTION AND DEFLECTION DIFFERENCE

Assuming an instrument is set up, leveled, and directed on the target with scales at zero, the following is a general summary of the required operations:

- (1) Measure (or estimate) angle TOG.
- (2) Measure (or estimate) distance OG.
- (3) Measure (or estimate) distance OT.
- (4) From the above determine the obliquity factor and target offset, and set the offset on the instrument.
- (5) With the lower motion relay the instrument on the target, and with the upper motion turn to the aiming point.
- (6) Measure (or estimate) angle POG.
- (7) Measure (or estimate) distance OP.
- (8) From angle POG determine the obliquity factor, and with this factor and the distances OG and OP determine the aiming point offset.
- (9) Set this offset on the instrument and read the firing angle.
- (10) From the firing angle determine the obliquity factor for deflection difference.
- (11) Using this obliquity factor, the interval between guns, and the distance GP, determine the deflection difference.

(Note: If the guns are staggered (the usual service condition), deflection difference can not be accurately determined at the OP).

TO DETERMINE A "COMPASS"

Assuming the declination constant has been set on the aiming circle, the needle centered, and the vertical hair directed on the target, the first four (4) steps listed above permit reading from the instrument the "compass" to be set to the battery. Only one offset is involved: and no deflection difference need be computed, as the

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guns (whether staggered or at normal intervals) are automatically laid parallel.

Some may be inclined to consider this discussion as an unorthodox assault upon a field artillery tradition; but it is believed this tradition is in part obsolete. The following objections to relying upon a "compass" may be offered:

- (1) A "compass" is inaccurate due to local attractions and errors of personnel.
- (2) Declinated instruments may not be available.
- (3) Instruments may not be declinated for the locality.

With reference to the first objection, rapid preparation of fire is defined as "the determination of approximate data when need for opening fire is pressing, or when facilities for an accurate preparation are lacking." The real object of rapid preparation of fire is to promptly place a visible burst in the target area so that adjustment may be begun. Promptness and elimination of large errors are the principal requirements. When consideration is given to the difficulty of finding, designating and identifying suitable aiming points, the fact that they will usually be close, and the additional formulas involved in determining data from aiming points, it appears doubtful whether such data will be more accurate than a "compass."

That a field artillery officer should be able to conduct fire "in his birthday suit" is an adage of the days when direct laying was normal. An aiming circle will usually be available before any communication equipment, and, if the OP is close enough to permit conduct of fire without telephone or radio communication, direction should offer no difficulty. Equipment tables authorize three (3) prismatic compasses for each gun, howitzer and battalion headquarters battery. In campaign, the prismatic compass or some similar item of equipment should be on the person of each officer who may have to prepare firing data.

The problem of local declination is not a very serious one. When maps are available instruments may be declinated quickly. When maps are not used declination constants are merely calibrations to cause instruments of the same group to read corresponding angles. Such calibrations need not have been made in the immediate locality. They may be readily determined for all instruments of a battalion or regiment as follows:

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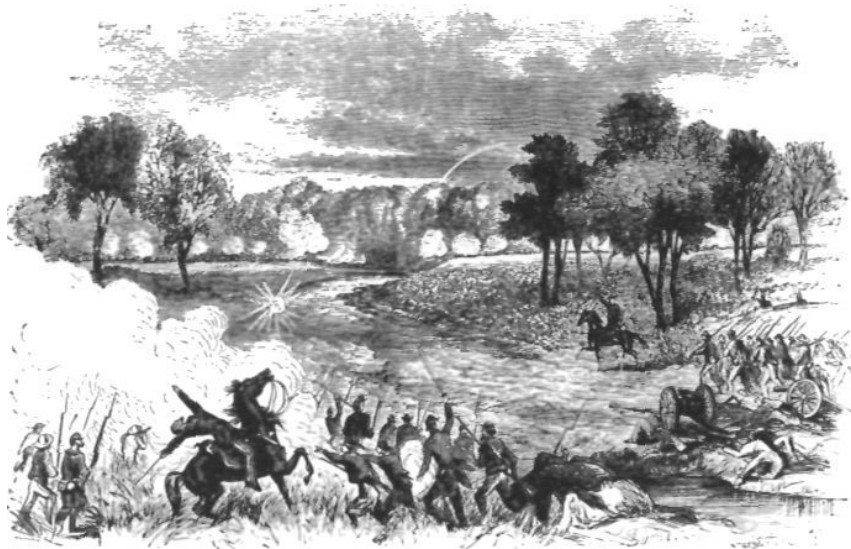
- (1) Record the magnetic bearing from a given place, of one or more distant points as read by each instrument.
- (2) Select one instrument as the standard, and record the deviation of each other instrument as the declination constant of that instrument.

(If operated on schedule, the declination of all instruments will require but a few minutes for one or two men from each battery.)

The ability of field artillery officers to determine quickly an accurate deflection, when an aiming point is available and conditions favor that method, is recognized as desirable,—but proficiency is difficult to obtain, and we have a much easier method which is adapted to more general use.

For training of the civilian components it is believed that omission of the aiming point method of determining initial data for direction in rapid preparation of fire would result in better initial data and permit more progress in training than is possible at present.

Editor's Note: It is believed that the points brought out in the above article warrant further discussion and the Journal will be pleased to consider other articles along this line.





LANDSKNECHT

PAVIA—THE RENAISSANCE MASTERPIECE

BY FLETCHER PRATT

TO military men of this age, there is something remote and almost barbarous about the sixteenth century, however deeply that period, which was the great time of the Renaissance, may have left its impress in every other field of human thought. It was an age when stone balls of uncertain roundness were propelled to unpredictable distances and directions by gunpowder of dubious explosive quality; when knights still ranted around in surcoats and vile tempers, when bad barons still twirled moustachios, and a masonry wall made a valid defensive position.

Examined at closer range, however, the Renaissance presents in war, not less than in the other arts, those characteristics of mental flexibility, energy, and above all that profound correctness of proportion that make it the greatest epoch of human thought. Not in strategy, to be sure; strategy hardly began till the three-crowned banner of Sweden appeared over the ramparts of Stralsund. Not in engineering, or the details that impinge on it, for the military instruments of the sixteenth century bear the same relation to the elaborate war-machine of today that the bowstring turning-gear of Cellini bears to a turret lathe. But in tactics, in organization, in the control of morale and discipline, in everything that concerns anyone under the rank of commander-in-chief in war, the Renaissance produced a series of masterpieces, each as perfect as a Cellini cup.

The great age of military science, like the great period of Renaissance painting, did not begin till the French crossed the Alps. The Italian city states never succeeded in making war anything but a rather dangerous chess-game. Perhaps it was a too deep devotion to art for the sake of art alone; at all events the Italians had a maxim that inquired "Why shed blood when you can accomplish the same result by maneuvering?" and another that proclaimed the most successful general to be the man who succeeded in buying the enemy's commander at the lowest price. Machiavelli gives us a thrilling description of two long and desperate battles, fought out between thousands of steel-clad warriors—and when one reaches the casualty list one discovers

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that in one of the these great victories there were no deaths at all, and in the other, one man, smothered in mud.

They were the last battles before the lilies of France burst into Piedmont. The French were met under the walls of Genoa by a Milanese army that out-generaled them with exquisite tactical skill. And a shock of horror went through the whole peninsula when they heard that these rude Gallic barbarians, instead of admitting defeat, had charged home into the carefully arranged Milanese formations, shattered them to fragments and strewn the field with five thousand dead men. These northerners fought to kill!

But the Italians of the Renaissance were too curious and too intelligent not to seek out the reason for the effectiveness of the murderous French method of making war. They found the secret in the free use of infantry and artillery. At the same time Frenchmen like Gaston de Foix and the Chevalier Bayard began to discover that infantry and artillery could be made more effective by Italian tactics; that is, by handling them with precision. The two systems approached one another, finally to meet on a high plateau of military skill, and the result of that meeting was a series of Renaissance classics of war—battles in which the very imperfection and transiency of the weapons enhance the effect of the leaders' skill. These classics are both peculiarly pleasing and especially informative to the student, for in them one meets consistently with that rarest of events in war—clashes between opponents perfectly matched in ability and determination.

Ravenna was such a battle and Marignano was another. The third of the series, Pavia, is in some ways the most interesting of the three—the ancestor of Aspern as Ravenna was the precursor of Friedland and Marignano the pattern for Austerlitz. It was the perfect complement of Marignano—as the latter was the last great victory of the armored cavalryman, the former was his first great defeat, and as Marignano was the first triumph for the effective use of artillery, so Pavia was the first great battle lost because the artillery was not allowed to develop its full effectiveness.

It came about in February, 1525, as the climax of a campaign of singularly blundering strategy. King Francis I of France

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was engaged in his second invasion of Italy, this time opposed by the troops of the Empire. He had broken up organized resistance by a series of Napoleonic dashes in the Piedmont plain, but instead of pursuing the Imperialists to the eastern passes of the Alps as Bonaparte was to do three centuries later, he turned aside to besiege the fortress of Pavia, situate where the Ticino river falls into the Po in the wide plain south-southwest of Milan and near the scene of Marignano.

The governor of the town, Don Antonio de Leyva, made a wonderful defense, incidented by sorties, midnight raids and heavy fighting. He had 6,000 regulars and some town militia, probably not less than 9,000 all told at the beginning of the siege, probably not more than half this at the time of the battle. In the first month the French artillery breached the walls in two places and there was an assault. It was beaten back with loss; the King wished to raise the siege, mask the fortress and continue field operations. He was persuaded to keep on by his second in command, the Grand Admiral Bonnavet, the evil genius alike of France and of Francis, whose only qualification for the post he held was that he had seduced the King's sister.

Reinforcements were brought up and the siege turned into a blockade; a three months' blockade that reduced the garrison to severe straits but also permitted the Imperialists to gather an army of relief. It swept into the north Italian plain early in February, a pick-up force of Spaniards and Germans, 20,000 strong, commanded by King Francis' former friend and tutor in the art of war, Prince Charles of Bourbon. Bourbon's first effort was to maneuver Francis out of his siege-lines; he swung wide north of Pavia to cut the King's communications with Milan near Marignano, and threaten his base.

Milan, however, was strongly held and Francis was perfectly aware that the Imperialists were alike incapable of storming or besieging it. As for supplies, he had an alternate line through Genoa and the sea. He disregarded the feint and sat tight in his siege-lines; Bourbon, after one or two rather aimless raids, came down toward Pavia, then sheered off to the east and offered battle from that direction. The Imperialists were especially weak in artillery and most of their 6,000 cavalry were light horse. The

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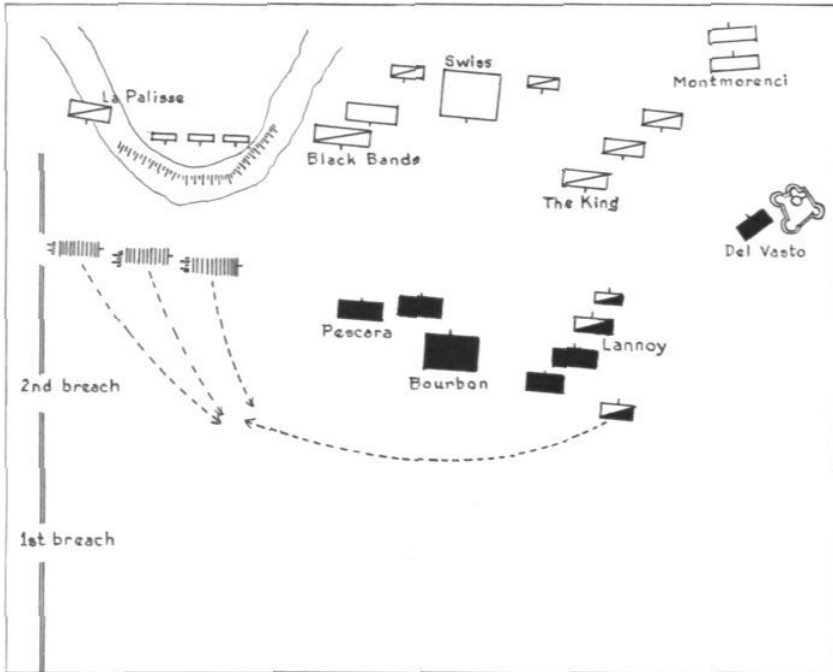
rest of the army was a splendid body of landsknechts—pikearmed heavy infantry—and a big brigade of Spanish arquebusiers under the Marquis of Pescara, trained by that officer in a tactic of his own invention, whose leading features were mobility and dispersion. It was an excellent force for a defensive battle, but not one with which most commanders would venture on an attack against the artillery and heavy cavalry in which the French were strongest.

For three weeks Bourbon tried to tempt the King into an attack without results; then de Leyva ran through a message to say that his provisions were only good for a week more. Bourbon had to attack or abandon the campaign; he made the best of a bad job by planning a daybreak surprise. The French siege-lines were covered on the north by the Park of Mirabello, a huge hunting-ground of open trees and high brush, surrounded by a big wall. On the night of February 23 the Imperial pioneers were sent forward to breach the eastern side of this wall. There was a small castle mid-way through the park and right behind the French lines: Bourbon meant to carry it with a rush in the night and at daybreak push a rapidly-moving column through the lines toward the city. De Leyva, advised in advance, was to make a sally to meet it. The brush and trees were depended upon to keep the French cavalry off his flanks and spoil the aim of the artillery, for which Bourbon entertained a healthy respect.

The wall was old and very stout; the pioneers were an unconscionable time in digging through it, and dawn was already at hand when they finally achieved three practicable breaches. The Marquis del Vasto was hurried through the first with 3,000 infantry to storm the castle. Marshal Lannoy followed through the second breach with the Imperial cavalry covering his head of column, and a couple divisions of landsknechts and arquebusiers; then came Bourbon with the main-guard of pikemen, Pescara with the rest of the arquebusiers, and finally, through the third breach, General Freundsberg with the last of the landsknechts and all the Imperial artillery. In effect it was a movement in battle order by the right flank.

Meanwhile the French scouts had become aware of the breaching operation. A few prisoners were picked up and thumbscrewed

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into revealing the whole plan, and Francis at once called a council of war in his tent. Sit tight, hold the castle in force, and post the artillery to blow their advance to pieces as they come on, advised the Lord of Montmorenci; draw out and fight them, said Bonnivert. He pointed out that although the French army was slightly inferior to both Imperial forces together it was superior to Bourbon alone, with a force of heavy horse that was ideal for offensive action. The King swung to the latter view and just before daybreak drew out of his lines to give battle.

On the extreme right of the position, next to the wall, was some high ground. Here the whole French artillery service, fifty or sixty guns, were placed, wheel to wheel, under the command of the victorious artillerist of Marignano, Galiot de Genouilhac, now become Seneschal of Armagnac. They were supported by a few infantry and their right flank covered by a squadron of the gendarmerie—heavy cavalry—under Marshal La Palisse. Next in line came the famous "Black Bands" of Italian condottieri, horse and foot, led by Francis of Lorraine and Richard de la Pole, Duke of Suffolk. Next to them again was posted the

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main body of the King's infantry, the Swiss, in their usual deep, dense formation, their flanks protected by small bodies of gendarmerie. On the left was the King himself with the royal bodyguard, the flower of the French noblesse, with the rest of the gendarmerie echeloned away behind him to the left, the King himself being rather over toward the left center almost in front of the Swiss. Montmorenci was behind the left wing with more infantry as a reserve, and to cover the gate of the town against a sortie.

Francis had planned a complicated double oblique order attack, designed to throw both Imperial wings off in eccentric directions and encircle their center. The artillery was to smash the Imperial left; into the wreckage would be flung the Black Bands, who would turn inward on the center when they struck Bourbon's line. The King himself would head a charge against the Imperial right center to break the line where Bourbon joined Lannoy and hurl the latter off into the wilderness of the park, then turn back to take Bourbon in flank and rear. The Swiss were ordered to "march forward ceaselessly, but with small steps," holding Pescara and Bourbon in play till the flank attacks did their work; then close.

Del Vasto opened the ball with the attack on the castle. It made only a pretense of resistance, and he sent back the tidings of victory to Lannoy. But just then the sun popped over the horizon and the Imperial leaders suddenly realized that instead of surprising they were surprised. Pescara and Bourbon were in disorder and some distance back; Lannoy, who alone was ready for battle, found his light horse staring into the formidable heavy cavalry of the French bodyguard; the third breach was only just finished and Freundsberg's men were clambering through it in column, with their flanks exposed to the enemy and hampered by the guns they were dragging.

Armagnac's artillerists could not have asked for a better target; they opened up a tremendous fire on the landsknechts, and "Ma foi!" ejaculates the chronicler with evident satisfaction, "you could see nothing but heads and arms flying in every direction." The landsknechts could not stand it; very soon they also were flying in every direction, abandoning the guns. Most of

them took shelter in a fold of the ground at the left rear, near the second breach. Armagnac wheeled his guns round and opened up against the Imperial center. The range was long, but he caught them doing a left wheel into line and made excellent practice, and their formations began to shake. Simultaneously, La Palisse charged out with the supporting cavalry along the wall to complete the rout of the Imperial left.

On Bourbon's right, Lannoy was faced by a hopeless situation, but if he stood still in the face of the mustering charge of the bodyguard it would be worse yet. "Gentlemen," he said, "there is no hope but in God; make the sign of the cross and follow me." As he gave the order to advance the French chivalry came thundering down onto him. They went through the light horse of the advance guard as though it were tissue paper—"The Marquess of Sant' Angelo was transfixed by a single blow of the King's lance and four hundred men fell dead as though struck by lightning from heaven"—right through Lannoy's own brigade of heavy cavalry behind, and into the supporting pikemen. These held for a moment; then the echeloned squadrons of gendarmerie came up on the King's left, took them in the flank and ground them to powder. Though they swung right at this point against Bourbon instead of finishing with Lannoy the charge was a brilliant success. The Imperial right wing was completely broken up, their left was already in flight, the center wavering under Armagnac's guns with the Swiss moving ponderously forward to attack it in front. The victory seemed won.

But neither Bourbon nor Pescara thought of giving up. A laggard squadron of horse from Lannoy's division was hurried over to the left wing, opened out, and mixed with some of Pescara's arquebusiers to hold head against La Palisse and serve as a rallying-point for Freundsberg's men. Half del Vasto's force were arquebusiers; they were recalled from the castle and ordered in on the left flank and rear of the King's division, which had now lost its impetus and was engaged in a sword-fight. The landsknechts were ordered back a little to avoid the artillery fire in the center and Pescara extended his front to cover them and meet the advancing Swiss with a hail of small-arms fire.

And just at this moment Lorraine and Suffolk raised their

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banners and brought the Black Bands down in a frontal attack on the Imperial center.

Their proper business was with Freundsberg's wing, but it was worse than ill-judged; it was fatal. The movement forced the Swiss to halt and completely blanketed Armagnac's guns, which were doing such good service; worse, it drew the gendarmerie on the flanks of the Swiss along with it. The artillery ceased fire instantly. Freundsberg rallied on the Imperial left while La Palisse was brought to a standstill by a fiery countercharge. He reformed, but he was outnumbered, and without the help of the artillery, his effort went to pieces on Freundsberg's pikes. His wrecked formations were riddled by the arquebusiers; their leader was killed, and what was left of them turned to flight, with the landsknechts in hot pursuit.

The Black Bands, their onset slowed by the brush, were caught in the trap of Pescara's mobile defense in depth. It was like charging into a jelly; there was no solid objective, nothing to deliver a charge against. The active Spaniards hopped all over the landscape, shooting from cover and bringing down a horse and rider at every shot. Suffolk was killed, Lorraine was killed, the Black Band cavalry shot down or dissolved. In a torrent of riderless horses and flying men, they carried panic through their own infantry; Freundsberg and Pescara followed hard, stormed up the height along with the fugitives, smothered the few battalions protecting Armagnac's guns and captured both that leader and all his cannon.

Over on the other wing there was a wild, complicated melee. Del Vasto turned toward the center but missed the French cavalry; he was too far behind it. But he struck the rear of the Swiss formation, now once more advancing "ceaselessly but with small steps." The fire of his arquebusiers was both galling and dangerous. The clumsy phalanx of pikemen had no way of answering it, and the cavalry that should have protected them were all forward with the King or running with the Black Bands. On the right flank of the phalanx the boiling tumult of the shattered Black Bands, hotly pursued by Freundsberg, burst in on them at the same moment. In front they had now clashed with Bourbon's landsknechts, and a terrific struggle of pikes was going on,

punctuated by the shots of the arquebusiers, who skirmished all round the Swiss, shooting them down from every angle. It was too much; the Swiss were gallant soldiers, but the men in front of them were just as good and they were being cut up on both sides by missile-weapon men against whom they were absolutely defenceless. They tried to form square, but it was no good, they could not get away from the arquebusiers. Their tight formation began to relax, then to feather away at the rear. Friendsberg's cavalry came down on them, and the whole great phalanx, the heart and soul of the French army, threw down their weapons and turned to flight.

Somewhere up ahead the King was engaged with the rear division of Bourbon's corps and what was left of Lannoy's. He had arquebusiers on hand too, but was getting the upper hand of them and the nobles around him were shouting for victory, when he suddenly became aware that the Swiss were leaving. "Mon Dieu! Qu'est ce?" he cried in a stricken voice, and turning the command over to Bonnivet, hurried back to bring up Montmorenci and the Black Bands, who, he imagined, were still in position.

It was too late; the last reserves had been put in while the general was playing at cavalry-captain. De Leyva had sallied from the gate and was giving Montmorenci as much as he could handle; the Black Bands were disappeared. Armagnac's guns taken. Francis, in one last desperate effort, got his bodyguard out and flung them on the front of Bourbon's advancing corps in a self-sacrificing charge to give the Swiss time to rally. It failed; the Swiss did not rally, the bodyguard were cut down to the last man; the gendarmerie, surrounded by landsknechts and pikemen were all killed, and just before the cold February sun reached the zenith, the King of France became a prisoner.

It was one of the worst national disasters in French history. The army was annihilated, and with it a whole generation of the French noblesse which at that time was a genuine noblesse, the intellectual and spiritual leaders of the nation as well as its military strength. When one meets French lords in the next reign they no longer bear the old names; they are lawyers, clerks and magnates raised to the peerage; all that was best and finest

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in old France, in the France of Joan of Arc, perished on that field.

But in a military sense it was more than this. It definitely marked the end of the tremendous charges of cavalry with which the French had won the hegemony of Europe. In fact, for the time being, it marked the end of all cavalry charges pushed *a l'outrance*. The arm passed under a cloud; it was felt that cavalry attacks were attended with a danger beyond their value, and not for another hundred years did a leader dare to send his horsemen in on infantry with loose reins.

In the place of the French chevalier stood the Spanish arquebusman, with his match and powder-horn, his phenomenal activity and the pikemen who gave him steadiness, and he ruled Europe and the world until the King of the Swedes brought against him an artillery equally mobile and with greater striking power.

For it can hardly have escaped the attention of any military man that Pescara's arquebusiers had acted as light artillery in this battle. The distances are greater today, of course, and the infantry is armed with rifles that strike as many miles as the Swiss pikes did feet, but the Spaniards of Pavia poured into them just such a destructive and irritating fire without the possibility of a reply that front line artillery can deliver against infantry today.

As for the French artillery service and its intelligent leadership, they also passed under the cloud that settles round every arm or tactical conception that forms a part of a great defeat. The battle of Pavia may be said to have set artillery science back by three centuries. The tacticians of that day, in a manner not unknown to modern times, looked at the details instead of the whole and pointed out that had some of Armagnac's guns been on the other flank the Swiss would have had the support they needed. After Pavia nobody dared to concentrate artillery till Napoleon revived Armagnac's idea of using his guns at one point to beat a hole in the enemy's line through which the other arms could advance to victory.

The idea, then, was not such a bad one; the whole of the subsequent history of war attests it. Nor was Francis' battle plan as a whole bad. The Black Bands were poorly placed; they

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should have been farther out to the right. But not so very poorly placed; Francis had every right to believe that they would advance at the decisive moment and win him a resounding triumph. If Lorraine could have restrained his impatience for twenty minutes more; if Francis had not forgotten the duties of a general in the pleasures of a battle-captain; if he had encountered adversaries only a trifle less alert, less determined and less ingenious at improvising combinations on the spur of the moment, the history of the battle, of war and of the world might have been very different. But that is what one always says of the might-have-beens.



A RAPID METHOD OF COMPUTING K

BY LIEUTENANT R. M. MONTAGUE, INSTRUCTOR, DEPARTMENT OF GUNNERY,
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THE following method of computing a K for the light gun, after a check adjustment, has been evolved at the Field Artillery School, as being simpler and more accurate in the long run than the method described in T.R. 430-85, due to less involved computation and interpolation.

Take the difference between the adjusted quadrant elevation to the check point and the computed initial quadrant elevation to the check point. Convert this to yards by multiplying this result by the change in range for 1 mil change in elevation, taken to the nearest yard, at the map range to the check point. The result, divided by the map range to the check point in thousands of yards, is the K in yards per thousand. For example: map range to check point 3,750 yards; site to check point + 6.2 mils; adjusted quadrant elevation 131.3 mils; French 75mm gun firing Shell Mark I, Fuze Long. Initial quadrant elevation to check point = $119.6 + 6.2 = 125.8$ mils. $(131.3 - 125.8) \times 19 = 105$ yards. $K = 105/3.8 = +28$ yards per thousand.

Under the method set forth in T.R. 430-85, and F.A.F.M., K would be computed as follows:

$$131.3 - 6.2 = 125.5 \text{ mils, equivalent to } 3,856 \text{ yards.}$$

$$K = \frac{3,856}{3,750} = 1.028 \text{ or } +28 \text{ yards per thousand.}$$

It is believed that the new method of computing K will take much less time and be subject to fewer errors, in that the site does not have to be stripped from the adjusted quadrant elevation and the result converted to range in yards, by interpolation. Under the new method, the Battery Commander would have the change in range for 1 mil change in elevation, to the nearest yard, at the check point map range, entered before firing. After the adjustment was completed, all that it would be necessary to do would be to take the difference between the adjusted quadrant elevation and the initial quadrant elevation, convert this to yards by a multiplication, and obtain a K by the methods above, K being positive when the adjusted quadrant elevation is greater than the initial quadrant elevation and vice versa.

A RAPID METHOD OF COMPUTING K

To determine the accuracy of this method of computing K compared to the present method, K's were computed in 220 cases, using French 75mm Range Tables for Shell Mark I, Short and Long Fuzes, for map ranges between 2,000 and 8,000 yards and with sites of plus 1, plus 5, plus 10 and minus 5 mils. The results are tabulated below:

Number of times K's were identical	94	or 42.7%
Number of times K's differed by 1 yard per thousand	72	or 32.7%
Number of times K's differed by 2 yards per thousand	27	or 12.3%
Number of times K's differed by 3 yards per thousand	13	} or 12.3%
Number of times K's differed by 4 yards per thousand	6	
Number of times K's differed by 5 yards per thousand	4	
Number of times K's differed by more than 5 yards per thousand	4	

Total 220

In taking K to the nearest 5 yards per thousand, the K's would have differed in 41 cases or 19% (in 40 cases the K's would have differed by 5 yards per thousand and once by 10 yards per thousand).

Where the K's differ, the method discussed herein always gives the greater numerical value in the case of a plus K and the smaller numerical value in the case of a negative K.





GENERAL JACKSON'S STATUE AT VIRGINIA MILITARY INSTITUTE THE GUN IS ONE OF JACKSON'S ORIGINAL BATTERY

A PROFESSOR OF ARTILLERY TACTICS

BY KENNETH C. JONES

HE WAS a strange combination of relentless Puritan and grim, stark warrior who had, even before death claimed him, become something of a legendary figure. Awkward, taciturn, peculiar in many ways, there was little about him suggestive of Martial Glory. He was a college professor and he looked the part. Far from being a congenial companion, his form of address was somewhat stiff and stilted. He was the type of man who never permitted the slightest deviation from the path of duty, either in himself or in a subordinate. A rigid drill-master, without apparent imagination, he lacked a saving sense of humor and governed his own manner of living according to a formula of unfailing and monotonous regularity. Fate had given him a brief hour of glory in Mexico, then, abruptly, had proceeded to forget him and until the commencement of hostilities in 1861 had left him a solitary, austere, cold, forbidding personage—professor of natural philosophy and of artillery tactics at the famous Virginia Military Institute.

At Harper's Ferry, as Colonel of Infantry, there fell to his lot as wild and ungovernable a rabble of volunteer soldiery as ever graced this continent. Out of the chaos they emerged a well disciplined organization and, after Falling Waters, their leader was duly recognized and advanced to a brigadier.

Until after the first Bull Run engagement he remained a figure of suspicion in the eyes of his own brigade, a brigade composed largely of men who, regardless of their former station in life, had, each one of them, his own positive ideas on the proper methods of conducting a war. He came out of Bull Run a general of unquestioned ability, conspicuous for personal gallantry, for it was upon that battlefield that he earned a *nom-de-plume* destined to endure beyond the grave. General Bee, tall South Carolinian, rallying his battered brigade under the shadow of death, is reputed to have voiced an undying phrase, "Look! There is Jackson standing like a stone wall," and, instantly, the silent professor of tactics was transformed into another being in the eyes of the world, destined to become immortal as "Stonewall" Jackson.

Breathless and almost exhausted by the effort of their initial trial by fire, the belligerents, impelled by necessity, postponed continuance

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of the contest until they could better organize their resources for the long struggle of attrition which was to follow. Bull Run occurred in July, 1861, and December of the same year found Jackson, now a Major General, in command of the Department of the Valley. Here, perhaps, he achieved his greatest laurels. At Winchester, the headquarters of the Department, there were endless days of drill. Again, the calm professor rated in the eyes of his men, who had forgotten Manassas, as a petty martinet, incapable of feeling, as immovable as the walls of the buildings at the Institute.

Here, Jackson devoted fourteen hours a day to the further development of his command, spending his few leisure hours in the company of maps and three books—the Bible, a dictionary and the "Maxims of Napoleon."

On January 3, 1862, the entire command departed from Winchester in a long column containing the "Stonewall" Brigade, General Loring's brigade, five batteries of artillery and several troops of cavalry—in all about 9,000 men. Prior to the march Stonewall Jackson issued characteristic orders: "Officers will be held responsible for any destruction of property. We are here to protect and defend, not to destroy." On this march occurred an incident well calculated to reveal Jackson in a characteristic pose. An officer, a native of the region, informed the men that they were camping on land belonging to him and extended to them the invitation to use his fence rails as firewood for their protection against the bitter winds of January. Naturally, the thoroughly chilled soldiers were quick to take advantage of this well intentioned order. Unfortunately for the kind hearted officer, Jackson soon learned of the incident and immediately suspended him from duty. This and similar incidents in the military career of Stonewall Jackson bring up the much mooted question of whether or not so strict a disciplinarian is more effective than the officer who permits sensible deviations from the established rule to go unpunished.

It was also a pronounced trait of this famous soldier to maintain strictly his own counsel, perhaps on the theory that his military secrets would be better kept if they remained securely locked in his own mind. Few occasions have been revealed where he departed from this practice, and there is no doubt that, in those early days of the war, while his reputation remained one of an efficient drillmaster

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and little else, that certain general officers of the command resented his—to them—high handed methods. No army, least of all a volunteer army, is immune from a certain amount of discontent and, undoubtedly, the Army of the Valley was no exception on those wintry days. Very likely, they even came to strongly resent the treatment handed out to them by this pedagogue, whose proper place—to their manner of thinking—was in the professorial chair and not at the head of an army.

That icy march to Romney caused its share of open dissension and so great was the pressure exerted against him that the professor felt impelled to submit his resignation to the Confederate Government. Fortunately for that government, in the light of following events, his resignation was not accepted and Stonewall Jackson remained at the head of the Army of the Valley.

At Kernstown, in March, he suffered a defeat on a hotly contested field and General Garnett, a brave and capable officer, fell under his displeasure on account of having withdrawn his brigade from the battle without orders, although there appears to have been ample reason for the withdrawal. Severe charges were preferred against this officer and Stonewall Jackson once more clearly exhibited the fact that he, and he alone, intended to be supreme commander.

After Kernstown, the Army of the Valley went into camp at Rude's Hill, selected as a permanent camp site in compliance with the explicit instructions of the general commanding to "see that a camp is chosen where there are wood, water and a *drill ground*." With him discipline was of supreme importance and to secure it to the highest degree he drilled and drilled while the army wondered.

At last, the tardy Banks at the head of an army of 19,000 marched up the Valley and seized New Market. Simultaneously, the explorer, Fremont, pressed southward from Moorefield, while Milroy lead his division from the East. It was a dark hour for the Confederacy. Albert Sidney Johnston had fallen at Shiloh and his brilliant genius was forever lost. Ft. Pulaski had been taken and Farragut had appeared before New Orleans to practically paralyze the "Father of Waters." McClellan was before Richmond with his tremendous hosts and the Southern Capital seemed doomed. With three armies converging on Jackson in the



GENERAL JACKSON'S COMMISSION AS A FIRST LIEUTENANT IN THE FIRST REGIMENT OF THE ARTILLERY

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Valley his escape seemed highly improbable and the end appeared to be in sight with a glorious victory for the Union.

But the Union generals had failed to take into consideration the silent soldier at the head of the Army of the Valley.

At McDowell, he succeeded in repulsing a vigorous attack by Schenck and drove him back to Franklin. On May 22nd he surprised Kenly at Front Royal and all but demolished him. So skillful was his generalship at Winchester that it was only with extreme difficulty that Banks managed to escape across the Potomac to the safety of Williamsport. Only the fatigued condition of the "foot cavalry" prevented the total rout of Banks. Evading Shields and Fremont, both of whom might have joined hands to crush him, he skirmished, marched and counter-marched, completely bewildering the enemy by the amazing swiftness and sparkling boldness of his movements. One of his skirmishes cost him dearly, however, when Ashby, as fine a cavalryman as ever lived, fell with a bullet in his heart.

On June 8th at Cross Keys he scored a signal triumph over Fremont and on the following day routed Tyler of Shields' army at Port Republic. Thus ended the Valley Campaign, a campaign which fully established the military genius of the solemn professor from the "West Point of Virginia."

The Valley Campaign was, of course, more a diversion calculated to restrain McDowell's 40,000 troops from joining those of McClellan before Richmond. Undoubtedly, Robert E. Lee must be credited with an important share in the success of the campaign. The Valley offensive was a part of his carefully conceived plan and it was at his suggestion that Banks was driven across the Potomac and an invasion of the North threatened. Then, too, he reinforced Jackson on two separate occasions, although he sorely needed the reinforcements for the defense of Richmond, by sending Ewell with 8,000 and later Whiting with 7,000 into the Valley. But the execution of Lee's plans, executed as they were with matchless skill, must be credited to Stonewall Jackson.

The Valley Campaign has often been compared with the Italian Campaign of Napoleon in 1796 and there can be no doubt that the professor-general was familiar with that campaign as well as the other successes and failures of the great Bonaparte. Morally, it is said, Jackson often objected to Napoleon, but it is certain that

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no moral objection kept him from carefully studying the methods of the greatest general of all time. It has been mentioned before that a copy of Napoleon's Maxims formed a third of Jackson's traveling library.

Jackson had maxims of his own which he always endeavored to carry into practical use. Many times he succeeded in doing so, particularly in the Valley Campaign.

Always mystify, mislead and surprise the enemy, if possible.

To move swiftly, strike vigorously and secure all the fruits of victory is the secret of successful war.

I had rather lose one man in marching than five in battle.

These were a few of the maxims of Stonewall Jackson, and no one has ever proved himself a more capable medium of establishing their value.

It is not possible to go into the technical details of Jackson's campaigns. We brush them lightly in passing the better to bring out the salient points in the makeup of the man himself.

The Valley Campaign served to make Jackson a far-famed figure in the annals of war. In a month and ten days his army marched at least 400 miles, fought four pitched battles, a number of skirmishes, successfully held at bay the operations of four separate armies, relieved his own capital, probably saved it, and, in addition, threatened the territory of the enemy, then suddenly vanished into the morning mists of June to reappear at the side of Lee before Richmond.

But, for once, Jackson, the swift and mysterious, proved tardy. He had definitely agreed to reach the field of operations by June 26th. Instead, he bivouaced that evening within sound of the battle. At Gaine's Mill he was late again and throughout the entire campaign failed to exhibit any of the skill he had shown in the Valley. The reasons for his strange conduct will likely remain unknown for all time. It has been intimated that he was something of a mystic, a fanatical being with a mania for religion and a marked aversion to desecrating the Sabbath. Some writers attribute his failure to cooperate with Lee at Gaine's Mill to this latter cause. He may or may not have been personally ambitious. Perhaps he may have desired Lee to fail for personal reasons, although this seems hardly probable in view of their cordial relationship both officially and otherwise. Whatever the reason, little credit

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may be bestowed upon the hero of the Valley for his part in the Peninsular Campaign.

Against the blundering Pope, Jackson again showed himself worthy of the highest confidence. His successful flanking movement was, no doubt, due as much to Pope's incapacity and McClellan's failure to fully cooperate with his successor as to anything else, but at the same time he clearly demonstrated that he was once more the Jackson of the Valley.

The success of the second battle of Manassas induced Lee to inaugurate his first invasion of Northern soil and, in accordance with the famous Special Orders number 191, Jackson moved against Harpers Ferry, garrisoned by some 12,000 Federals. Having successfully accomplished his mission there, he rejoined Lee at Sharpsburg on September 16, 1862, after a forced night march.

The following day one of the bloodiest battles in American history took place at Antietam. In this battle Jackson's men played a significant part, and, although the Confederates failed to meet with another of their habitual successes, their failure may not be attributed to Jackson. He commanded the left wing of the Army of Northern Virginia. Before him were Hooker and Meade. Fighting Joe Hooker came out of the North Wood and descended like a thunderbolt upon the Dunkard Church. Charging into a torrent of fire, the Blue swept the Grey waves back by sheer force of numbers. Then Stonewall Jackson rode along the front unmindful of the leaden hailstorm. His voice was calm, his manner serene and confident. "Forward, men, and drive them," he said, and the grey lines obeyed. They were ragged and footsore from many a weary march, but they forgot all of that as the magnetic figure on Little Sorrel gripped them, and they fought magnificently. Starke fell, Jones fell, Lawton fell, many a field officer gave up his life heroically. On the Northern side Hooker was down with Hartsuff and Crawford, while Mansfield was dead. Now the Blue drove back the Grey, now the Grey drove the Blue.

Presently the battle faded on the left. It was noon now and since early morning these two demon armies had struggled like madmen on the left. Jackson the strategist had revealed a new ability, the ability to withstand the relentless fury of stark battle.

Stephen D. Lee was an artilleryman. Chief of Artillery of the Army of Northern Virginia. On the following day he

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visited the Confederate left by order of General Lee. Upon his technical decision rested the possible continuance of the battle. His technical decision was against further assault. Jackson seconded him and that night witnessed the withdrawal of the shattered Grey hosts to the Virginia shore of the Potomac. Through the mist of a cold chilling rain Stonewall Jackson sat his horse in the middle of the stream and watched his troops file past. To him had been given the important mission of protecting the rear guard of the retreating army.

On the banks of the Opequon the drillmaster drilled his men and refitted them with new shoes and new clothing. The autumn months drifted past and Thomas J. Jackson, a Lieutenant-General now, had fully established his fame. His men loved him, not with flaming intimate passion, but with the deep seated affection of respect and devotion inspired by an eternal confidence in his abilities. Here, by the banks of the Opequon, Stonewall Jackson passed perhaps the happiest days of his existence, and when in November he quitted the beautiful Valley he had so ably defended earlier in the year it was for the last time. Who can tell his thoughts as he moved up the Valley Pike over the many times familiar route, through that Valley of Memories. Did he dream of past glories as he took a final glance from the heights of the Blue Ridge or was he held in rapture by the whispering angels with their tale of coming Calvary and Gethsemane?

December, 1862, marked a new advance by the Army of the Potomac, directed this time by Burnside, who had succeeded McClellan in the chief command. In a hopeless, foolish assault on the heights of Fredericksburg, on the 13th, another fine Northern Army was literally swept from the face of the earth. Stonewall Jackson was there, too, guarding the Confederate right on Prospect Hill. The result was another victory for the well nigh invincible legions of Lee, Jackson and Longstreet.

Another Northern general superseded Burnside. who was none other than Jackson's old opponent of Antietam. Fighting Joe Hooker. With characteristic energy. Hooker moved his army up the Rappahannock, crossed that river in three places and entered the Wilderness, fittingly named. For a space of twenty miles stretched the dense growth of pine and scrub oak dotted here and there with scant openings. In May, 1863, two armies entered the solemn fold of this forest. Hooker with elation, confident of crushing

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his adversary. His fine army of 122,000 easily figured to best Lee's poorly fed, poorly equipped, illy clad 60,000.

At 11.00 A. M., on May 1st. 1863, Hooker's army advanced in four columns, each column along a different route. The Confederates had taken a strong position along a low ridge, protected by trees and undergrowth with open fields in front of them, effectively blocking the Federal advance.

After a slight contact with the Confederates, Hooker ordered a withdrawal to Chancellorsville, cautiously followed by the Confederates. The following day and night were spent by both sides in disposing of their forces and preparing for the defense.

Lee soon ascertained that a frontal attack was impossible, and finding that the Northern right represented the only vulnerable point in the Union lines, decided to undertake a daring enterprise. He dispatched Jackson with his corps for the purpose of turning the Union right with 26,000 men, while he with 17,000 was to create a diversion along Hooker's front. Completely deceiving Hooker as to his purpose. Jackson marched around the Union Army and fell upon Howard's Corps at 6.00 P. M. Taking the Federals completely by surprise, the victorious Grey surged in triumph over Howard's disordered lines. At the same time Lee engaged the Federal front.

Next to the Valley Campaign, this march and assault ranks as Jackson's greatest achievement. There is a certain degree of irony in the fact that, while reconnoitering, he should have fallen prey to the bullets of his own men, a regiment of North Carolinians, which mistook his party for Federal cavalry, bringing to an end the meteoric career of the quaint professor of artillery tactics at the very height of his fame.

It is useless to conjecture what might have been the result at Gettysburg had Jackson been present in the ranks of the Confederacy. The "might have beens" stand upon speculation, and play no part in the making of history. It is only the actualities that count. Like many another personage who has achieved sudden fame, the deeds of Stonewall Jackson are crowded into a few brief years. The remainder of the period of his existence was devoted to arduous preparation for the hour when Destiny meets the fulfillment of human hopes and aspirations.

Surely, during the period of preparation, Jackson devoted a large share of his time to the study of the favorite tactics of the successful

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generals of other ages. His Valley Campaign is ample proof that he had studied Napoleon. Yet, for all his study and contemplation of the methods of others, he did not lose sight of the important fact that circumstances are subject to change and that one given set of conditions is seldom presented twice in the same manner. He never lost initiative.

Again, his knowledge was thorough and painstaking, acquired by constant application. He was thoroughly familiar with the functions and possibilities of each of the combatant arms of the service—a knowledge essential to the success of any commander. Under his direction Ashby developed the proper methods of the employment of cavalry in the warfare of the era, and he became more than a merely instinctive cavalryman. Jackson's success in the movement and in the direction of infantry in actual combat need no added testimony. His knowledge of the employment of artillery was comprehensive and complete. History records, time and again, occasions when he personally placed the guns of his artillery with telling and effective results. Moreover, he could successfully combine the operation of the main arms with a consummate skill.

His stern disciplinary measures which refused to accept excuses, while often harsh on the offender, reacted to secure the highest type of battle efficiency. His insistence on the thorough mastery of the innumerable details in connection with the performance of duty brought forth glowing results. His own attention to duty and to the minor details of duty require no delineation. The one blot on his military escutcheon, already mentioned, is insoluble insofar as any plausible explanation is concerned.

He presents a stern contrast to what one might normally expect from a leader of his type. His daring resembled Stuart's without the latter's joyousness, his fighting ability that of D. H. Hill without the latter's boisterous courage; his treatment of subordinates that of Lee without the latter's gentleness. He has been termed by some a religious fanatic who deemed himself another Cromwell; he has been called a martinet who loved authority for authority's sake; he has been accused of ambition, but who is not ambitious? It is a far cry perhaps from professor of artillery tactics at a small university to a rank as one of the great Captains of his time.

No wonder Stonewall Jackson became a legend.

FIELD ARTILLERY NOTES

The Bishop Miniature Gun

Batteries of Field Artillery Trainers have been issued to the Field Artillery Unit at the United States Military Academy and to all Field Artillery ROTC units. It is expected that all posts at which Field Artillery troops are located and a number of Field Artillery organizations of the National Guard will receive one or more batteries by the first of April. Tentative Training Regulations No. 430-100 entitled Field Artillery Trainer have been issued, giving instructions for operation and use of this training device.

Changes in Classification of Signal Corps Equipment

Reel, type RL-9, a breast reel originally designed for the use of a very lightly insulated wire (outpost) by troops in forward areas and the spool, type RL-9 only usable with this reel was declared obsolete by the War Department on January 20, 1933.

Axle, type RL-27, a wire laying device used in conjunction with Reel, type DR-4 (reel carrying $\frac{1}{2}$ mile standard twisted pair) has been designed to replace the Reel, type RL-9 and was standardized by the War Department January 30, 1933. This axle fits into the DR-4 Reel and carried by two men is excellent in laying short lines over terrain inaccessible to vehicles.

These new axles have been issued to the service and are giving excellent results. The basis of issue as recommended by the Chief of Field Artillery is the replacement of the obsolete Reel, type RL-9, item for item, and to include one Reel, type DR-4, per axle, Type RL-27, viz:

2 each: field artillery brigade headquarters; battery and battalion headquarters, Sound and Flash; firing battery, battalion and regimental headquarters, pack artillery.

4 each: firing battery, battalion and regimental headquarters all other field artillery units.

Upon approval of this basis of issue. Tables of Basic Allowances for Field Artillery will be changed accordingly.

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Regular Course at the Field Artillery School

The end of the present school year will see the passing of the Advanced and Battery Officers' Courses at the Field Artillery School. Commencing next school year, a course called the Regular Course will be given. This course will be a combination of parts of the instruction previously given in the Battery Officers' Course and the Advanced Course. This course was originally scheduled to open on September 3, 1934, and close on June 29, 1935, but the opening date has been postponed until October 8. This change of date has been made on account of the new construction project now being carried on at Fort Sill. It is believed that by October 8 there will be sufficient new quarters completed to provide for all students at the School.

Decision of Executive Council

In order to start a drive for new members it was directed that from this date until April 30, 1934, any regimental or separate battalion commander of any Field Artillery unit of the Regular Army, National Guard or Reserve Corps who will secure ten or more *new* members to the Association, for each of these new members, the membership dues will be \$2.00 for the first year.



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MILITARY BOOKS

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

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THE GUNNERS' MANUAL— <i>Capt. Arthur M. Sheets, F. A.</i>	1.50
FOCH: THE MAN OF ORLEANS— <i>Capt. Liddell-Hart</i>	4.00
SQUADS WRITE!—A selection of the best things in prose, verse and cartoons from <i>The Stars and Stripes</i> . Edited by <i>John T. Winterich</i>	4.00
LEE OF VIRGINIA— <i>Brooks</i>	3.50
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