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JULY-AUGUST, 1936

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EDITED BY
DEAN HUDNUTT

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Patron Saint of Artillery

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FORT BRAGG, N. C.—TROOPS AT REVIEW

THE FIELD ARTILLERY JOURNAL

VOLUME XXVI JULY-AUGUST, 1936 NUMBER 4

THE POCHAVIAN RECORD

BY "GUNO"

DEAR EDITOR:

May I express through your columns my admiration for the excellent report of your observer with the Doranian army in the late war with Pochavia?* Without attempting to settle the question as to who really won the war and why. I feel that it might be enlightening to your readers to examine the records of the Pochavians. I regret that our side cannot be presented by an impartial observer as was the Doranian's but your country apparently considered us too backward to warrant the expense of sending an observer, hence I will attempt to present as fair a picture as possible.

The charming informality and camaraderie of the Doranian officers in their mess appears to me to be the long-sought-for Arcadia. I note that this informality is not carried into official relations, but that, on the contrary, the Doranian officer is very formal and excessively the soldier when outside the mess. I regret to say that we have never tried to draw this sharp distinction between social and official relations in our regular army. The officers of our home guard in some instances have adopted this camaraderie when off duty, but they have not been very successful in limiting it to the mess, and a regrettable lack of discipline seems to be the result. Perhaps this is due to their lack of experience and training.

It is true, as pointed out by your observer, that the Doranians had a decided advantage over us in that their program of motorization was complete when the war broke out, but may I point out that our situation was more the result of lack of funds (for

*The March-April number of the JOURNAL carried (as the 1936 Prize Essay Contest winning entrant) the account of a military observer attached to Doranian GHQ during the recent Doranio-Pochavian War. This article explains the system and organization of the Pochavians, who, despite their defeat, which they explain on other grounds, believe their methods, tried in battle, were, and are sound.

our country is a poor one), than to a lack of plans for utilizing motors to the maximum. Our plans called for a somewhat different scheme of organization which, had we been permitted to put it into execution, we believe might have proved successful. Briefly, our plans provided for the organization of three types of divisions, which we designate by the names, tactical, strategic, and pursuit, in accordance with their principal functions. The tactical divisions are equipped for slow movement, the infantry marching on foot and the artillery being part tractor- and part horse-drawn, thus utilizing available tractive power and consequently leaving the faster type prime movers available for the other uses. This is very essential, for, in spite of our great motor industry, we cannot turn out sufficient trucks for a major effort as fast as we will need them. These tactical divisions are made up largely of reserves, plus a few of the home-guard divisions.

Our second type division, called strategic because of its greater mobility, is completely motorized with high-speed vehicles. The artillery is truck-drawn and the infantry transported in trucks. Our Regular Army, except for a few Pursuit Divisions, and some of the guard divisions, are thus organized. A Corps is made up normally of one strategic and two tactical divisions, although the number varies with the conditions. A field army comprises three or more Corps, one of which consists wholly of strategic divisions. It is thus apparent that our plan calls for approximately an equal number of tactical and strategic divisions. Since our strategic divisions are to come from those forces that are organized and equipped at least partially in peace-time, it is believed that this plan will not overload our motor industry at the outbreak of another war.

While the tactical and strategical principles of the employment of an army so organized have not been worked out in detail, I think it is apparent that the tactical divisions will constitute the holding forces while the strategic divisions will be utilized as the shock troops for the sudden descent upon the enemy's flank or rear. The third type of division is completely mechanized and is a part of the GHQ strategic reserve, although not necessarily held in reserve before contact with the enemy is gained, for it is very useful on reconnaissance and in seizing defiles, although rather vulnerable when on such missions. We envisage a tactical

employment of these divisions somewhat similar to that of cavalry. In passing perhaps I should mention that our GHQ artillery reserve is also truck-drawn for greater strategic mobility.

I have gone into the organization of our larger units to show why all of our artillery is not truck-drawn.

There is one other detail of the composition of our divisions to which I would like to call your attention; namely, its reduced size. We believe that the World War division is entirely too bulky and cumbersome for the high speed required in modern combat, and so our division is composed of three infantry regiments and a brigade of three artillery regiments. The infantry regiment has been reduced considerably in personnel but increased in automatic fire power. Indeed, the individual rifleman is almost eliminated from our calculations, for we believe in the principle that the artillery conquers, and that the infantry's role is to occupy and hold the ground conquered. We are convinced that the only answer to the automatic weapons well emplaced on the defense is overwhelming artillery fire. As will be explained later, we do not hold to the theory advanced by some that the tank can overcome and penetrate a defensive position.

With reference to our artillery organization, we believe that the greater economy in both value and weight of ammunition of the 75-mm. required to accomplish a given neutralization mission compels the retention of this as the basic direct-support weapon. For example, FA Book 224, Paragraph 90, gives the requirements for neutralization of an area 200 yards in diameter as 120 rds, of 75-mm., or 80 rds. of 105-mm. (Transfer of fire). The relative weights for these amounts are 2,040 to 3,360, and relative costs $1,315.20 to $2,157.60. both in favor of the 75-mm. Hence we retain two regiments of the 75-mm. guns and one regiment of 105-mm. howitzers in our artillery brigade. The question of finding positions from which the guns can clear the crest has not been an insuperable obstacle in past wars and we believe it can be met in future. With our reduced charge this problem is made easier, and in addition the dead spaces, even in rough country, are so limited that our own howitzer regiment can easily take care of them. We use a 75-mm. howitzer in place of the 75-mm. gun in our pursuit divisions and in a few of our

strategic divisions intended for mountain fighting, principally because of the reduction in weight and consequent increase in mobility.

You will note that I have used the term "regiment" of artillery. We believe that the reinforcement of the divisional artillery and the formations of battalions into groupments will be common practice in future warfare. This being the case it seems logical to retain a command echelon with staff and communication personnel organized and ready to function, rather than to have to improvise on the battlefield a headquarters for these groupments. Consequently, it is our practice to attach reinforcing light and medium battalions from the GHQ reserve to our regular regiments.

I note with a good deal of interest the concentration of all administration, supply and service functions in the "Komando" (battalion) of the Doranian army. Believing as we do that the battalion is our principal tactical unit, we purposely have left it free from distracting administrative and supply functions in order to permit its commander to concentrate on the tactical problems in battle. We did try the idea of concentrating our mess in the battalion but when the mess was poor, as was frequently the case in combat, there was much growling on the part of the batteries. The men finally rose up and demanded that their "old man" (familiar title for our B.C.) be given charge of their mess for they knew he would do his best to see that they got good chow.

Anti-tank and accompanying artillery have been the subject of a great deal of study and discussion in our army since the World War. Many solutions have been proposed, among them that of designing a special weapon of approximately 55-mm. caliber, such as the Doranians have adopted. Obviously the correct solution must be based on experiment and test, not on opinion alone, however well founded.

A rather comprehensive test was conducted by our Artillery Board a few years ago of all types of artillery as accompanying guns. The conclusion was that the most suitable, if not the only suitable weapon for accompanying purposes, is the Stokes-Brandt mortar. Flat-trajectory weapons, including our 75-mm. howitzer,

were found to be unsuitable on account of the difficulty of finding concealed positions close to the front, from which they could clear the crest. Since a mortar thus appears to be the only satisfactory accompanying weapon, and since it is wholly unsuitable as an anti-tank piece, a separate-type weapon for each purpose seems necessary.

I must confess that there is considerable difference of opinion in our army as to the amount of accompanying artillery desirable, and as to its organization and control. Some of our artillerymen contend that no accompanying artillery is necessary, that forward and liaison observation with radio communication will assure prompt delivery of artillery fire on any target desired by the infantry. They point out that artillery can hit just at hard and surely at four or five thousand yards as at one thousand if it has observation and communication, and that the problem of supplying ammunition to the artillery in normal positions is much simpler than the supply to positions close to the enemy's line. The opposition will admit the force of this argument, but they doubt the reliability of the radio communication in combat conditions, notwithstanding the great improvement of radio equipment in recent years. Until this difference of opinion is settled by actual test it seems advisable to compromise by allowing the infantry to retain the Stokes-Brandt mortar as a last resort for artillery support, while the artillery is trained to exploit to the limit the possibilities of forward and liaison observation of fire with radio communication.

This leaves the burning question of anti-tank defense yet unsettled, and here again I admit considerable difference of opinion among our officers. There are two fundamental principles, however, upon which we can all agree. First, that the regular supporting artillery should not be dissipated as anti-tank guns, and second, that inasmuch as anti-tank guns cannot be employed for general support of an attack or defense, we should utilize no more power either in number of guns or caliber than is necessary for this purpose. Based upon these principles and further tests, the best solution must yet be determined. The new caliber .50 machine gun with its armor-piercing bullet may be the answer. If a larger gun is required, then a 37-mm. semi-automatic gun

should suffice to pierce the thickest armor that tanks are likely to carry. I doubt the necessity for a piece as large as caliber 55mm. The greater facility with which a smaller weapon can be transported, emplaced, concealed, and supplied with ammunition should not be overlooked.

I have stated that we Pochavians do not believe that tanks or armored cars alone will be able to break through a defensive position. I do not mean that if one hundred tanks attack a front defended by only a dozen anti-tank guns that none of the tanks will get through, but I do believe that this method of penetrating a defensive position will prove too costly in the long run to be adopted as sound tactics. In a fight between an equal number of anti-tank guns and tanks all the advantage is with the former. In the first place the guns cost much less than the tanks. Moreover, in combat the tank presents a much larger and more conspicuous target than the gun which can be concealed and protected by an emplacement. Although the movement of the tank will afford it some protection, this will not offset the advantages that rest with the gun. Regardless of speed, when a tank at short range moves toward a gun a hit is easily scored. Certainly it is easier to hit the large moving target with a stationary gun than it is for the gunner in the tank to hit the inconspicuous anti-tank gun. The situation is so closely analogous to a fight between battleships and land-defense guns that we might well take the lesson that has been learned by navies over and over again. History contains many examples of costly attempts by battle fleets to reduce land defenses. Such attacks have invariably been failures where the two sides were employing equally modern methods of warfare. Thus, we cannot escape the conclusion that tanks will not be able to justify their employment against a prepared defense properly equipped with modern anti-tank guns, at least not until the artillery has destroyed or neutralized the latter. To assure the accomplishment of this the artillery will have to cover the entire defensive position with a systematic bombardment, and hence will neutralize the infantry and its automatic weapons as well as the anti-tank guns. The employment of the tanks then will be in the nature of an exploitation or pursuit, which we believe to be a sound tactical use of these weapons.

Your correspondent's interesting observation with reference to the handling of recruit training prior to forwarding them to the combat zone was very instructive. We had somewhat similar plans for handling our recruits, training them first as cannoneers and then as some class of specialist, but our plans did not work out so well. Generally, before their training as cannoneers was perfected they were needed at the front. The result was that during the early part of the war we received as replacements only poorly trained cannoneers and no specialists at all. We then changed our plan and trained a proper proportion of our recruits primarily as specialists, utilizing civilian specialists of similar occupations as far as available, and then gave them some training as cannoneers if time permitted, and trained others as cannoneers first and as specialists second. While we usually did not reach the second phase of training, we at least got some specialist replacements under this system, which was a big improvement over the former situation.

Now I come to a point in which I believe we had a distinct advantage over our enemy and since there were so few such points you will pardon my dwelling on this one.

I have pointed out above that we look upon our artillery battalion as the primary tactical unit. I believe that the principal reason for the unusual effectiveness of our fire, which was kindly admitted by your correspondent, was the way we handled this unit in combat. Our doctrine not only looks upon the battalion as the primary tactical unit but also as the firing unit in most situations in modern combat. We believe in the doctrine of the "hammer blow," one heavy, quick punch rather than a series of jabs—in other words, a battalion concentration rather than three battery concentrations. To accomplish this, we employ largely the centralized control of fire in our battalion. In order to make this effective we found it necessary to recognize certain facts and make some rather fundamental changes in our battery and battalion staffs. I might say that these changes were vigorously opposed at first by the older officers but when they saw how well the new setup worked in a few battalions that adopted the changes they acquiesced at first and then became the champions of the new methods.

The first fact that had to be accepted was that the technique of gunnery had increased so greatly during the past two decades that it is entirely out of the question to expect every officer, more particularly our reserve and guard officers, to be gunnery experts and at the same time to be proficient in administration and transportation. Indeed this technique has so increased that the gunnery regulations have more than quadrupled in size since the halcyon days before the World War when axial, time and percussion bracket adjustments were the artilleryman's chief concern. In those days, even in his wildest nightmares, the artilleryman did not dream of forward and lateral observations, map data, weather corrections, *K, VE*, and high-burst transfers, air observation, forward and liaison observation, resections, traverses, orienting lines, compass data, normal and rolling barrages, anti-tank firing, use of air photos, and finally, battalion centralized control of fire. Just to name these many developments during the past two decades should be sufficient to convince one of the impossibility of our temporary officers in time of war being able to master them all in addition to the many other things that must be learned. Thus, we recognize the necessity of specialists in gunnery just as we do in communication. The battery and battalion reconnaissance officers, now called Gunnery Officers and abbreviated to "Gunos," are given this special training in gunnery.

We find that we can reach a fairly satisfactory degree of proficiency in the training of these "Gunos" in a concentrated three-month course, two thirds of which is devoted exclusively to gunnery, and one third to a smattering of the other duties of officers, so that they may function in an emergency as battery commander or executive. Graduates of R.O.T.C.'s at technical schools, after taking this course make excellent Battery "Gunos," with a little practical experience. Although some of our officers believe that this specialization should be adopted in our Regular Army in peace-time, the majority opinion is that since our regular officers will be required as instructors and to command the larger units in war, a well-rounded training for them is preferable.

I do not wish to leave the impression that none of our officers except the "Gunos" receive instruction in gunnery. On the contrary,

all officers are trained in the fundamentals of rapid preparation of fire and axial adjustments, but that vast field of technical development which originated during and since the World War is left for the specialist.

The best method of utilizing these gunnery specialists has received careful study in our service. Our conclusion is that greater efficiency in fire control is attained by placing them on the staff of the battalion commander. The Gunos, together with a number of enlisted specialists in the battalion detail are organized into a Fire Control Section (FCS). Where decentralized fire control is necessary we attach one Guno to each battery but these situations are rare, usually occurring only when a battery is detached or the battalion is greatly dispersed. Time and space do not permit of a detailed description at this time of the operation of our FCS, but if your officers are interested, perhaps at a later date I may be permitted to explain just how this most important part of our battalion staff operates. Although we had some difficulty, as I have indicated, in convincing the older officers whose personal contacts with the technique of gunnery date back to the simple days before the World War, they were thoroughly convinced after seeing the big improvement in our artillery firing when the new procedure was put into operation in the late Doranian war. So thoroughly convinced now are those in authority of the merit and economy of this move that they are considering a further step of applying the principle in time of peace to our guard and reserve officers, encouraging some of the young officers to specialize in gunnery during their inactive and active duty training, so as to be better prepared to function efficiently at the outbreak of another war. There is talk even of going a step further and of having others specialize in transportation, particularly motor transport. And so we may find in the next war in each battery a B.C., an executive, a "Moto" and a "Guno." I must confess that there are some very thoughtful officers who bemoan this tendency toward what they term excessive specialization, and argue that we will pay a dear price for not developing all officers into well-rounded executives in order to prepare them for higher commands. The advocates of the new plan, however, maintain that the more capable officers will, through their own

interest and effort, round out their training by actual experience and will be prepared to fill the bigger jobs when needed. A comparison with the methods of industry is one of the most potent arguments of these proponents of specialization. At any rate they believe that we cannot sacrifice a positive gain in efficiency, particularly in the first year of a war, for an imaginary loss later on. The war may be ended by then in favor of the enemy.

These differences between our army organization and the Doranian organization are perhaps mostly a matter of individual preferment. We believe, however, that in the two major points wherein we differ; namely in division organization, and the matter of specialization of the Gunos and perhaps Motos, our system effects a real economy of effort, national resources, and time in training, and results moreover in a real gain in efficiency on the battlefield. We only regret that we adopted these improvements too late in our war with Dorania.

BURLAP AND FISH NET

BY CAPT. S. Y. McGIFFERT, Field Artillery

"A Battery Seen is a Battery Lost"

FOR twenty years the Field Artillery's positions have been disclosed from the air, rather than from terrestrial observation. Within this time air photography has greatly developed, as to accuracy, clarity, color and speed of transmission to the interested enemy service. The greatest danger the Battery Commander must consider from the air is the disclosure of his presence to the enemy, for this will permit his being neutralized, or destroyed at the time that his battery's fire is most needed. The delivered fire is still the sole reason for the existence of all Field Artillery. Concealment from the air, next to observation, and the technical characteristics of fire delivery, must constantly prod the mind of the Battery Commander when selecting a position—or even approaching the position. The greatest factor in the camouflage of a position is in the choice of a suitable position. We go to battle to fire, not to hide: the Battery Commander must do both. But with texts and the primary supplies and functions in the hands of another branch, our technique of concealment seems to be still a matter of defilades. Officers may read, but no training is accomplished *until camouflage is the practice of all troops*. "An army in which vigilance is not perpetual is sick, until the enemy demonstrates it to be dead" said old du Picq.

After seventeen years it is not easy to keep in mind the atmosphere of war. We try to weigh our training from the memory of our own experience. We hope to train our batteries with what we know they will need in battle—and how discouraging it sometimes seems. Who has not been told "you must understand—peacetime soldiering is an entirely different thing from wartime soldiering"? I am often reminded of two training principles of the Reichswehr, "The soldier can only do in war what he learns in peace," and "Do not teach a soldier anything he must forget the first day he is subjected to battle conditions." Among the most important war training subjects—which can be applied in peace—is camouflage.

The constant reading of war experiences in our own FIELD ARTILLERY JOURNAL, as well as foreign publications, serves to keep our memories vivid as to the atmosphere of war. It is noteworthy that the most valuable articles, particularly on the technique of camouflage, appeared within the period shortly following the war. These articles recall another reference to du Picq, who said, "the smallest detail taken from an actual incident in war, is more instructive to me, a soldier, than all the Thiers and Jominies in the world. They speak, no doubt, for the heads of states and armies, but they never show me what I wish to know—a battalion, a company, a squad." These articles contain much of value to all of us. Their authors were eye witnesses who saw their subjects as no one since has had the opportunity.

In 1918 our Army, having passed through a period of extensive preparation for combat, finally went into battle.

"A German aerial observer stated that the Americans do not seem to have yet learned the importance of taking cover, that they had plainly seen without the aid of field glasses, American batteries firing in the open with no attempt at camouflage, or hiding in natural cover. Kitchen fires were disclosed by smoke in the immediate vicinity, and every kind of material was scattered around. Ammunition was plainly visible by being piled up high and arranged in rectangular shapes. Vast camps consisting of pup tents were visible all over the country and amazingly near the front lines. These were invariably open at one end and showed the interior shadow as black triangular spots."

"It was also stated that they supposed that such matters were due to inexperience, but they were astonished that the high command should have profited so little from the experience of other belligerents, and should have appeared to be so indifferent to sacrificing life, valuable materiel, and disclosure of strategic movements by allowing this state of affairs to continue. It was noticed that troops constantly ran out from cover to observe enemy planes."

"Trucks and big guns were covered with brush but were allowed to stand in plain view on roads. This was of course useless if they moved in day time, as they will always show to the naked eye on a white road as a dark spot, and still more on the aerial photo."

"A German artillery officer stated that he noticed our guns were frequently placed in a straight line and equally spaced; this method leads to easy discovery and gives a splendid target."

"He also said that some of our positions which were admirably hidden by elaborate system of camouflage were given away by lack of discipline, showing new paths, smoke and general activity around them."—This in 1918, from a report made by Major Evarts Tracy to the Chief of Engineers.

In 1923 Col. Homer Saint-Gaudens says, "For the first time since our troops went into the line in France, in 1917, aeroplane photographs have been taken of camouflage activities over firing batteries and the prints promptly delivered to those in charge of batteries." He then quoted Major Tracy's report, and further stated, "In the hope of anticipating these vital difficulties when we are faced with our next emergency, three courses of instruction have been given at the R.O.T.C. camps. The importance of this work is emphasized by our knowledge that in the next war air photographs will be far more detailed than in the last, and we will probably be unable to save ourselves from the results of our errors through the past experiences of strong allies."—This from Vol. XV, *The Military Engineer* on the subject of Field Artillery Training in Camouflage.

In 1923 Lt. Col. Aymar Embury, Engineer Reserve Corps, wrote two articles, the first being. "The Choice of a Battery Position," in which he states that the Battery Commander himself should be the camouflage specialist rather than the officer of another corps, inasmuch as it is he who is charged with the selection of his position, the technical execution of his mission, as well as the preservation of the lives and matériel of his battery. Please mark well that this opinion is not that of a Field Artilleryman, who must construct his cover, prepare his position, and enforce the essential camouflage discipline: but from a camouflage specialist of another corps, who had extensive combat experience.

In Col. Embury's second article, appearing the same year, we find the following: "It seemed to the officers of the camouflage section that Artillery should have automatically appreciated the necessity of concealment, but this was not invariably the case, and as a matter of fact, concealment of gun positions was very

often regarded by the Artillery as a sort of extra fatigue, and performed perfuntorily, if at all. However, the Artillery which operated in an active sector soon perceived the necessity for camouflage, even for temporary positions." Camouflage is always work, but its absence can destroy the battery's usefulness, and a clever Battery Commander reduces this work by the skillful selection of the battery position.

In the same article appears a paragraph, which I cannot resist quoting. "The rules are very simple: Do not space the guns equally. Pick broken ground for the battery position. Pick a position which can be reached without leaving trails, either by men going to the guns or by ammunition supply. Pick positions which are not subject to enemy fire for other reasons. Keep spoil covered. Get rid of blast marks. Do not erect camouflage which will cast shadows, thereby revealing the fact that there is something important enough to be hidden. The Field Artillery has the most interesting job in the whole Army and their importance is daily increasing, and were I an Artillery officer, one of the most interesting parts of that interesting job would be to outguess the intelligence service of the enemy."

Lt. Burton Harrison, Spec. Res., in 1926 wrote an article entitled, "Recollections of Camouflage." He emphasized the fact that the majority of artillery positions are temporary, estimating from experience that only one out of five could be considered permanent. This called for skillful selection of natural cover, followed by camouflage in the obvious way. "Cannoneers in action caught the idea quickly enough, and it needed only a reminder most of the time for them to camouflage the position correctly and quickly." Here we see the veteran soldier to whom camouflage is not fatigue, but protection. He said that the cannoneers profoundly respected camouflage discipline; they damned the drivers who came up and carelessly made tracks. Harrison believed that camouflage was of sufficient importance to include a specialist in each battery, and in this I agree, and add that he must be an Artilleryman.

In recent conversation with an officer of a foreign army, I was informed that they regarded the possibility of detection from the air with the greatest concern. During the war they used little

camouflage equipment, however since the war, concealment and protection against air observation has not remained purely a textbook subject. The Field Artillery battery, in common with all its units down to the machine-gun squad, carries nets. Their procedure in approaching the new position is here described by him. "The time of development is the most dangerous for Artillery, because it will be exposed while moving, not only to enemy fire, but especially to enemy air observation. The formation of a BC party and of a battery in section column is very characteristic, and it is easy for hostile observers from the ground and from a plane to recognize artillery on open ground and to watch them going into position—while *it is comparably easy to camouflage a battery in the firing position*, as everybody will agree. And it is not always possible to avoid open ground."

"This is the time that any open order formation practicable, on which the subordinate leader may decide, is permitted. The members of the detail move across the country, followed by other groups in bounds, from cover to cover, crossing open ground in the most irregular formations possible. The same thing applies to the other portions of the battery, the guns and the caissons, when they arrive. Each Chief of Section is authorized to use any means or ruse, in order to avoid the well known caterpillar formations, which can be recognized so easily. These open order movements, dispersed in width and breadth, serve also as a means of passive protection against attack aviation."

"In the battery position we stagger our guns both in width as well as in depth and spread them out as far as it is possible for the executive to still control the guns. Irregularity is the rule. Terrain and cover are naturally of first importance and natural or artificial camouflage is essential. For this purpose each gun carries a camouflage net in the field. Likewise caissons are unloaded and sent to the rear with all other vehicles in order to diminish the number of objects near the position."

The First Army Maneuvers were held this past summer. Col. Lanza's article in THE FIELD ARTILLERY JOURNAL on these maneuvers is of particular interest to all battery commanders. May I quote. "OP's reported only a few targets. Observation planes found a considerable number, *due largely to absence of*

camouflage, which was practicable, but not done, but which would have been *probable* in war." He further said, "Weather was good, visibility excellent, and *with troops paying little attention to camouflage*, the planes picked up many targets."

Colonel Lanza's remarks are indicative of present day training. The practice of camouflage is so rare that on a recent maneuver one battery completed its camouflage nets with burlap and occupied a position, the personnel bivouacking as would be done in battle. This battery used no camouflage equipment other than nets; its position was selected after a reconnaissance of only twenty minutes. The occupation of position represented the work of only a single night, and no feature was employed which was not specified in the existing Training Regulations. This position was regarded as temporary, however, shelters and circulation were improved throughout the occupation of the position.

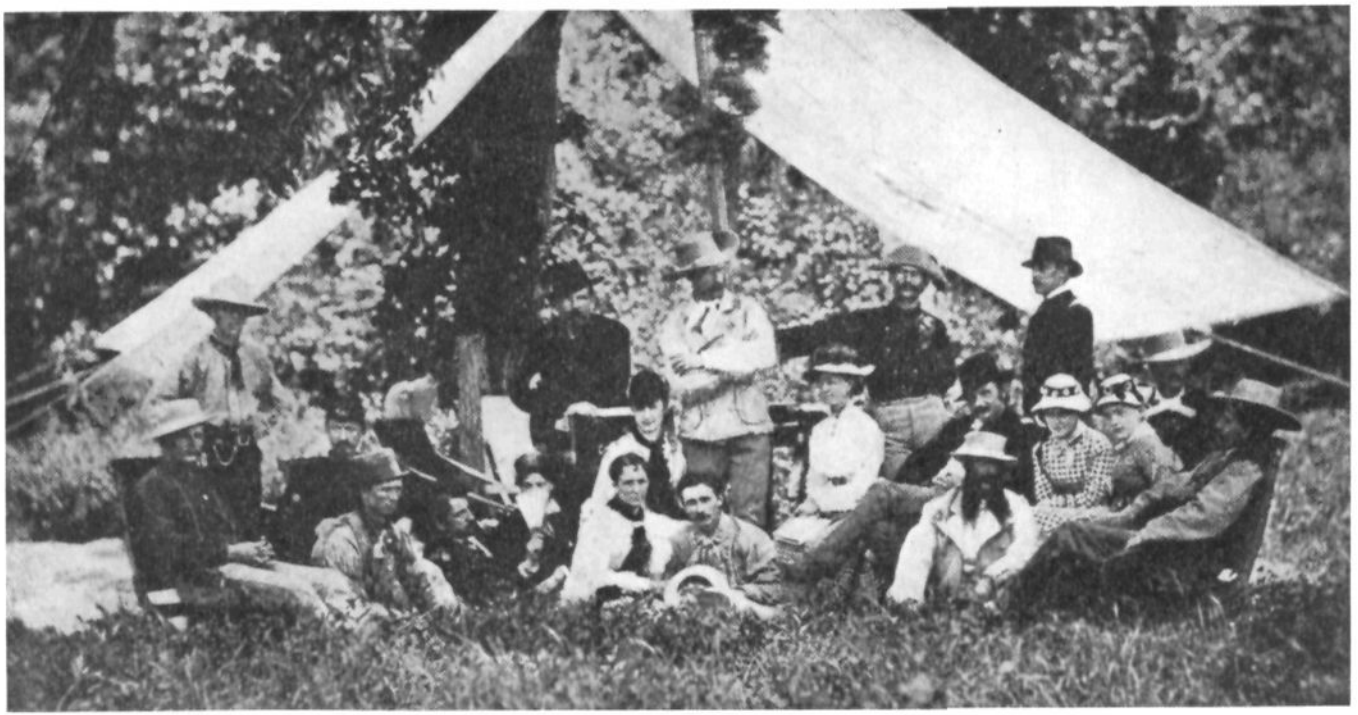
The surprising feature of this battery's performance was not the failure of the Air Corps to locate the battery after a week's occupation of the position, as the Air Corps was sent to do. It was remarkable because the battery's performance was regarded as unique, and all officers of every arm taking part in the maneuver were ordered to visit this battery. The most frequent comment made by visiting officers was that it must have been a lot of work. Actually it was not, for in the battery were thirteen war veterans. The battery had trained to camouflage just as it had also practiced hauling and storing its own ammunition, as well as emplacing and firing its antiaircraft machine guns. The work of camouflage was performed by the men who understood their jobs and appreciated the necessity of camouflage discipline.

It is of interest to note that Colonel Lanza used no stronger reference to future war camouflage than the word *probable*. Under war conditions the most forceful word we may hope to apply to any accomplished phase of training is the same word—*probable*.

There have been abundant texts, and now and then a single gun is covered up in the nature of a demonstration. But all of this is still instruction and not training. It is all theory and no practice. Camouflage is still regarded as a form of magic performed by the Corps of Engineers. Camouflage nets, about

which Saint-Gaudens says ". . . can be erected with great facility and will wear for months"; are not of general issue; they are seldom completed with burlap and practically never painted. A true picture of camouflage can not be gained by a single gun in a single afternoon.

We can select one position for the sole purpose of "gunnery," a second position for "tactical purposes," which may or may not include a position selected for purposes of camouflage. Until we camouflage all firing positions or fire from all camouflage position and learn to live in them, in wind and rain, haul ammunition, showing no lights by night nor tracks by day, only then may we be justified in selecting the word *probable*, rather than the word *improbable*, when referring to our practice in tomorrow's warfare.



A SEVENTH CAVALRY GROUP, TAKEN DURING A HUNTING PARTY IN 1875, LEFT TO RIGHT: LT. JAMES CALHOUN; LEONARD SWEET OF CHICAGO (CIVILIAN); CAPT, BAKER, 6TH INF.; BOSTON CUSTER; LT. W. S. EDGERLY; MISS WATSON; CAPT. MYLES W. KEOGH; MRS. CALHOUN; MRS. CUSTER; GENERAL CUSTER (AND, SEATED AT THE LATTER'S FEET, DR. H. O. PAULDING); MRS. ALGERNON SMITH; DR. E. G. LORD; CAPT. T. B. WEIR; LT. W. W. COOKE; LT. THOMPSON, 6TH INF.; THE MISSES WADSWORTH, OF CHICAGO; CAPT. THOMAS W. CUSTER; LT. ALGERNON SMITH. OF THESE, CALHOUN, BOSTON CUSTER, KEOGH, GENERAL CUSTER, DR. LORD, LT. COOK, "TOM" CUSTER, AND LT. SMITH WERE KILLED AT THE LITTLE BIG HORN.

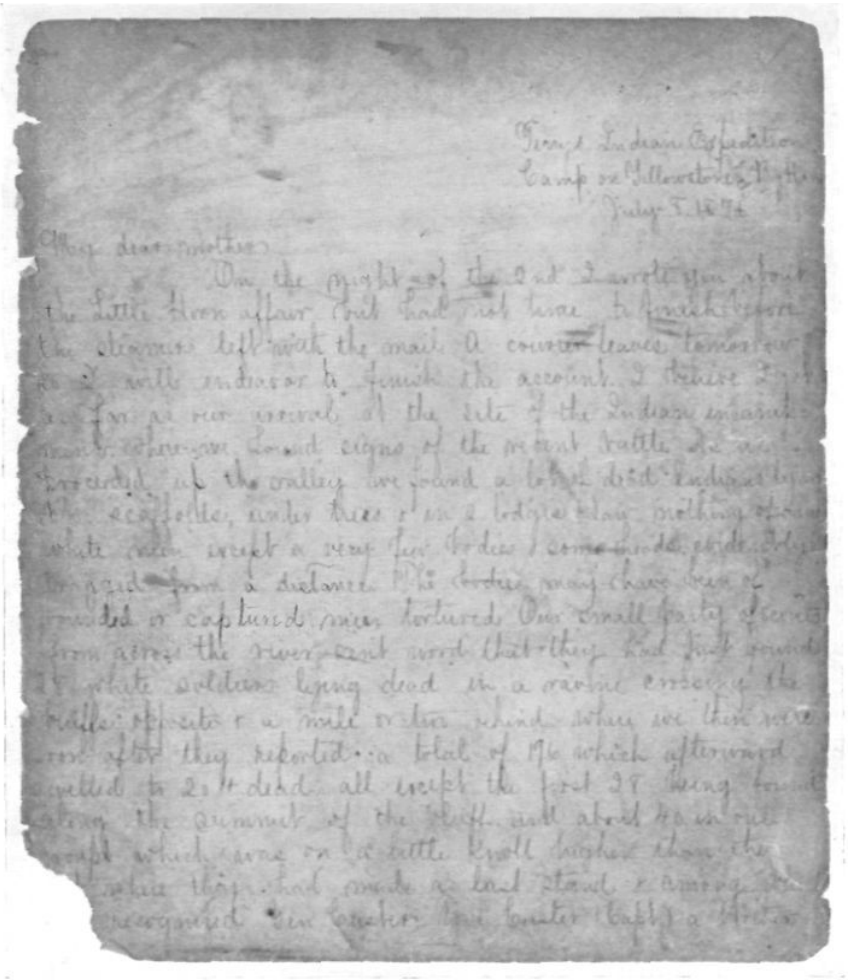
NEW LIGHT ON THE LITTLE BIG HORN

Hitherto Unpublished Letters of a Soldier Describing the Stricken Field of the Little Big Horn

THE Battle of Little Big Horn, better known as the Custer Massacre, occurred sixty years ago, on June 25, 1876. The question of the responsibility for that disaster is still being fought—by the pen. There have recently been presented to the editor of the JOURNAL by friends in historic Alexandria, Virginia, two letters written by Holmes Offley Paulding, Lieutenant, Medical Corps, and a member of General Gibbon's column, which may throw some additional light on that stirring event.

The following quotation from The Army and Navy Gazette, presumably of May, 1883, gives a brief resumé of Lieutenant Paulding's life and service:

"Captain Holmes Offley Paulding, assistant surgeon, U. S. Army, died at Fort Sidney, Neb., Tuesday evening, May 1, of rheumatism of the heart. He was a son of the late Commander Leonard Paulding, U. S. Navy, who died at Panama in command of the *U. S. S. Wateree*, a great-grandson of Paulding, one of the three captors of Andre; and a grandnephew of the late Rear Admiral Hiram Paulding, U. S. Navy. On his mother's side he was a grandson of the late John Holmes Offley, a well-known citizen of Georgetown, and a great-grandson of David Offley, of Philadelphia, who negotiated the first treaty between the Sublime Porte and this country. He leaves a wife and two children. His wife was with him when he died. His children were with his wife's mother, Mrs. French, in Alexandria. Captain Paulding was born in Washington and graduated in medicine here. He was appointed first lieutenant and assistant surgeon November 10, 1874, and promoted captain and assistant surgeon November 10, 1879. He was thirty years old. Although so young he had seen much service and had achieved an enviable reputation. He was with the command of General Gibbon at the Custer massacre; was afterward at Fort McHenry, Baltimore, and subsequently in the Department of Dakota. His service in the Department of Dakota, under unfavorable conditions, enfeebled him. When he was ordered recently to Fort Douglas, Utah, and en route ordered to stop at Fort Sidney, his friends



FACSIMILE OF A LETTER WRITTEN BY LIEUT. PAULDING AS COPIED AND PRESERVED BY HIS SISTER

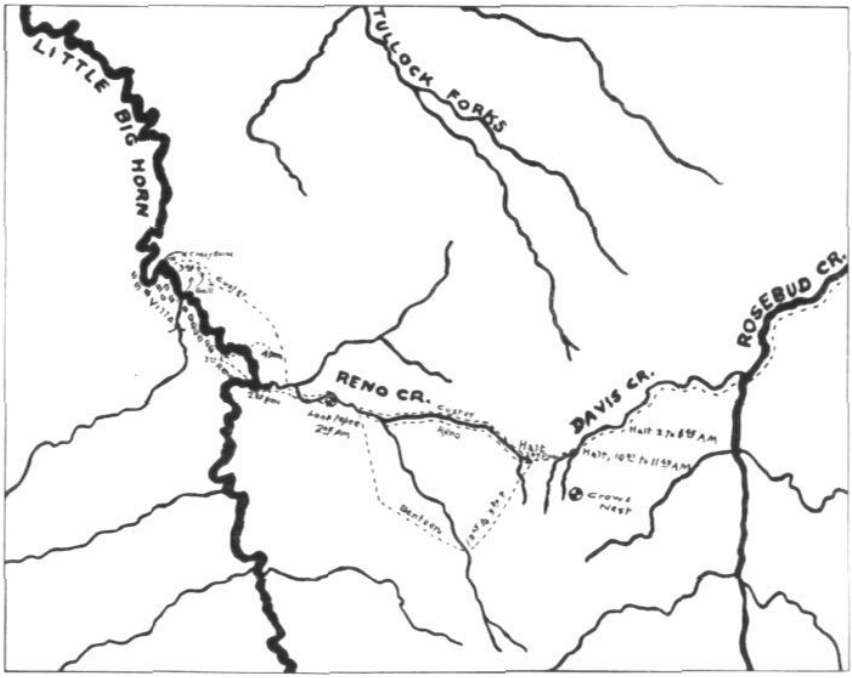
here urged him to ask for orders which would bring him near Washington. He declined characteristically to ask any indulgence. Captain Paulding was an able, accomplished, modest, faithful, hard-working officer, whose death involves a public loss."

When it is recalled that Custer's command was split into three main groups (or four groups if the pack train miles to the rear of the other three can be counted as a group) and that Lieutenant

Paulding assisted in caring for the wounded from whom he obtained much of his information, it is quite remarkable that his letters, written soon after the battle, so nearly portray the events as recorded by authorities of later date, with more leisure and data at their disposal.

The expedition was under the command of Brigadier General Alfred H. Terry. On 21 June, 1876, the whole command was camped near the mouth of the Rosebud, on the Yellowstone River. On board the supply-steamer, *Far West*, General Terry held a conference with his two subordinates, Colonel (Bvt. Maj. Gen.) John Gibbon and Lieutenant Colonel (Bvt. Maj. Gen.) George A. Custer, 7th Cavalry. His plan was to send all troops, less 7th Cavalry, by boat and marching, up the Yellowstone and then up the Big Horn River, which was about fifty miles west of the Rosebud. The 7th Cavalry, under Lieutenant Colonel Custer, was to ride south up the Rosebud, scout the Indian trail discovered a few days previously by Major Marcus A. Reno, 7th Cavalry, and if this trail led to the valley of the Little Big Horn, to continue south to the headwaters of the Tongue, then swing west and north, so that both columns might reach the vicinity of the Little Big Horn on 26 June in order to cooperate with each other if necessary.

In compliance with the above plan, Custer and the 7th Cavalry departed at noon 22 June. The regiment was made up of twelve troops, total strength about 600 officers and men, and in addition about forty Indian scouts. About 12 miles were covered during the afternoon, and on 23 June about 35 more. On 24 June about 45 miles were covered between 5:00 A.M. and 8:00 P.M. The regiment bivouacked near the present location of Busby. About 9:00 P.M. Custer learned that the Indian trail led across the divide into the Little Big Horn valley. The regiment again took up the march and covered about 10 miles when at 2:00 A.M. 25 June it was halted in order to permit observation from a high point on the divide known as Crow Nest. Lieutenant Varnum and some Indian scouts reached Crow Nest before daybreak and a little later the scouts saw, in the Little Big Horn valley and about 15 miles away, immense pony herds and the village of the Sioux. The regiment moved forward, with great caution, shortly



MAP COMPILED BY COLONEL W. A. GRAHAM, J. A., SHOWING THE MOVEMENTS OF THE SEVERAL DETACHMENTS OF THE SEVENTH CAVALRY, JUNE 25, 1876.

after 8:00 A.M. and continued to within a short distance of the divide when it halted from about 10:07 A.M. to 11:43 A.M.

Custer called together the officers and told them what had been seen earlier by the scouts. He, Custer, had preceded the command shortly after 8:00 A.M. in order to confer with Lieutenant Varnum near Crow Nest, but had not been able to see the Indian village.

At about this time Custer knew that he was being observed by the Sioux. During the night march a box of hard bread had been lost off a pack. A sergeant who was sent back to find it discovered the box in the possession of a party of Sioux. The Indians immediately rode toward the Little Big Horn Valley. About this same time two more Indians were discovered watching the soldiers. All chance of surprise was now gone. Likewise all chance of pinching the Indian village between the jaws of the Gibbon and Custer columns sometime on 26 June as was planned by General Terry. For it was estimated, even to a certainty, that the Sioux would pull stakes and vanish upon the approach

of the troops. But this time "Old Man Probability" tossed a different coin.

Disregarding any contingency except that the Sioux would run away, Custer led the regiment across the divide, halted at 12:07 P.M., divided his command into three squadrons, and prepared for action.

Squadron under Major Reno

Troop A—Captain Moylan
Troop G—Lieutenant McIntosh
Troop M—Captain French

Squadron under Captain Frederick W. Benteen

Troop H—Captain Benteen
Troop K—Lieutenant Godfrey
Troop D—Captain Weir

Squadron retained under command of Lieutentant Colonel Custer

Troop C—Captain Tom Custer (brother of commanding officer)
Troop E—Lieutenant Algernon Smith
Troop F—Captain Yates
Troop I—Captain Myles Keogh
Troop L—Lieutenant Calhoun (brother-in-law of commanding officer)

Troop B, under command of Captain McDougall, was assigned to guard the pack train. Each of the other troops also detailed one non-commissioned officer and six privates for the same purpose.

About ten minutes later the squadron under Captain Benteen departed with orders to proceed to the left front and to scout the bluffs several miles away and to pitch into anything it might find. Later two more messages were sent directing Benteen to continue in the same direction to the valley beyond the bluffs and to the next valley. Thus departed one-fourth of the command on a futile valley hunt. Next, Reno and his squadron moved to the left bank of the small creek down which the command was marching. Custer, with five troops, continued along the right bank. The pack train followed Custer's squadron. At this time the Indian village was nearly 15 miles away.

About 2:00 P.M. Reno's squadron was ordered back to the right bank. About 2:15 P.M. a heavy dust cloud was seen about 5 miles away, down the valley of the Little Big Horn.

To Reno, now rode Lieutenant W. W. Cooke, Regimental Adjutant, with the following verbal order, "General Custer directs that you take as fast a gait as you deem prudent, and charge afterward, and you will be supported by the whole outfit." Reno took up the trot, covered the three miles to the Little Big Horn river and crossed it about 2:30 P.M. Forming his squadron on the left-hand bank he charged down on the village two miles away. He never reached it. There were warriors by the hundreds in his front. Space does not permit a detailed description of this fight in the valley, but in less than an hour, a somewhat bewildered Reno was dashing upstream at the head of such of his men as had heard the command, "Mount." He made for the ford where he had previously crossed, but the Indians were too thick. He turned left and struck the Little Big Horn river, not at a ford, but with a six-foot drop in his front. His column was now a charge at the front, a rout at the center, and a panic at the rear. Horses and men were pushed into the river and scrambled up the steep bank on the far (east) side.

He had now lost in killed, wounded, and missing, nearly half of his 112 men. Fortunately, the greater part of the Indians immediately withdrew to another part of the field and left Reno to form a defense.

As the last of Reno's men gained the hill on the east side of the river, Benteen, providentially, arrived with his squadron. It was now about 4:30 P.M. and no one knew of Custer's location. His last message had been delivered to Benteen some miles back and was carried by Trumpeter John Martin. It read, "Benteen—Come on—Big village—Be quick—Bring packs" signed by Cooke and followed by, "P. S. Bring pacs." Heavy firing had been heard downstream. There was a fight, and a hot one going on. Who was it?

Now came a wait for the pack train with its precious ammunition. The wounded could not be left behind, so it was about 6:00 P.M. when the command reached the position held by Captain Weir with Troop D, which was about a mile downstream.

The Sioux now swarmed to attack. It soon became necessary to withdraw to the same hill they had so recently left. With some difficulty this was effected.

Here the remainder of the 7th Cavalry was besieged. Repeated assaults were made by the Indians late that evening and until shortly after midday 26 June. About this time there was much commotion in the Indian village; tepees were taken down; pony herds were held ready. By groups the warriors left the fight and returned to the village so that by late afternoon Reno's men were free of danger. The Indians moved off toward Big Horn mountain. The soldiers buried their dead and moved their position so as to be near water. In the new position they waited throughout the night for the next move on the part of the Sioux.

But where was Custer?

These letters of Lieutenant Paulding describe in detail what Gibbon's column found on 27 June. 1876:

Terry's Indian Expedition
Camp on Yellowstone mouth Big Horn
July 8. 1876.

My dear Mother:

On the night of the 2nd I wrote you about the Little Horn affair but had not time to finish before the steamer left with the mail. A courier leaves tomorrow so I will endeavor to finish the account. I believe I got as far as our arrival at the site of the Indian encampment, where we found signs of the recent battle. As we proceeded up the valley we found a lot of dead Indians lying on scaffolds, under trees & in 2 lodges, saw nothing of any white man except a very few bodies & some heads, evidently dragged from a distance. The bodies may have been of wounded or captured men tortured. Our small party of scouts from across the river sent word that they had just found 28 white soldiers lying dead in a ravine crossing the bluffs opposite & a mile or two behind where we then were. Soon after they reported a total of 196 which afterward swelled to 204 dead, all except the first 28 being found along the summit of the bluff and about 40 in one group which was on a little knoll higher than the rest where they had made a last stand & among which were recognized Gen. Custer, Tom Custer (Capt.), a brother of Gen.

Custer who had accompanied him on the trip named Boston Custer, Calhoun* his adjutant & brother-in-law, Capt. Cooke (reg't adj.) & Capt. A. E. Smith. We were shortly after met by Lts. Hare & Wallace of the 7th Cav. who rode down to us & shook hands and from them learned the particulars of the affairs. or such as they themselves knew at that time. Major Reno to whose battalion they belonged was at the time we arrived corralled on the summit of the bluffs across the river about 3 miles or more from where Custer had fought having been driven there on the first day of the fight, and had with him his 7 companies or what was left of them. The particulars in brief as we learned them from these officers & from one of our Crow scouts named "Curly" who had been with Custer until the fight was over or nearly so (and who had escaped by mixing with Sioux after all the whites were killed but 5. one of whom was then wounded) were about as follows:

Custer with his entire regiment had been marching, with a pack train up the Yellowstone but 20 or 30 miles back near the mountains where he could cross all the streams near their head & scout them. He was to meet our column at the mouth of the Little Horn on the 27th but on the 23rd struck a fresh trail of Indians moving and lit out after them instead of waiting as he should have done to strike when we should be near enough to help if it should be necessary. I dare say he thought his regiment capable of whipping any number of Indians (a common error) & wanted it all to himself. Anyhow he marched his regiment 75 miles in 36 hours, resting about 5 hours, so for 31 hours his men were in the saddle with but one interval. They were then, about 8 A. M. of the 25th, where they could see the smoke of a big Indian camp on the Little Horn and very soon after Custer, becoming satisfied that he was discovered, determined to attack at once so as to give them no chance to leave. He ordered Capt. Benteen with 4 companies to guard the pack train and proceed toward the bluffs, while he with 5 companies attacked from one end of the village, & Reno with I believe 3 companies was to charge down toward Custer from the other. Before making his final disposition he sent a scout ahead to find out where the tepees (lodges) were the thickest, as there was where he would charge.

*Calhoun was a brother-in-law of Custer; Cooke was the adjutant.

The scout returned and it is said that when he reported told Custer with perfect terror that there were lodges as thick as the grass and begged him not to fight so many. Custer merely said with a laugh that he was glad they were all there. Then giving his orders to Reno & Benteen he left them.

Where he charged from was very bad ground. From the summit of the bluff to the river was a slope of about 2 miles the village lying in the valley across the stream, in plain sight of the whole length of the slope.

Custer & his men gave their yell & charged down for a ford. They did not strike it exactly, but had to move along a cut bank for some distance, under heavy fire from the timber opposite. Finally on reaching the ford they were met by an immense body of Indians fighting on foot. They crossed in the face of this terrible fire but were driven back, dismounted & put in one or two volleys, remounted & retreated alternately, until what was left of them reached the summit of the bluff. At this point they were met by another large body of Indians who had swept around behind them & here surrounded by about 2,500 or more warriors they fought to the death.

Our Indian "Curly" says they began to fight before the sun was yet in the middle of the sky & when he got away it was nearly half behind the bluffs about 8 o'clock. They must have fought with desperation & it is thought they must have killed right there more than the entire number of soldiers in the outfit. Indeed they must have been so thick & in such short range that it must have been almost impossible to shoot without hitting some one. There was not a white man escaped out of about 250 with Custer. Some 20 or so cannot be accounted for except by the fear that they were carried off, alive or dead. Among those whose bodies were not *positively* identified were Dr. Lord & Lt. Sturgis. Their underclothing found in the camp, Sturgis' with 2 bullet holes through the undershirt, show that they are gone. The dead were when found almost entirely stripped, slashed up & mutilated so as to be hardly recognizable. The officers were Gen. Custer, Capts. Keogh, Cooke, Smith, Yates & Custer, Boston Custer, Lts. Porter, Sturgis, Riley, Harrington, Crittenden & Calhoun, Dr. Lord, a friend of General Custer, Mr. Reed & the

Herald reporter, Mr. Kellogg. I did not see any of these as they were buried where they fell & during the 2 or 3 days we were there I was too busy with the wounded from Reno's party. While Custer was fighting, Reno with his 3 companies went up the river & crossed in the timber & then charged down the valley toward the upper end of the village one or two miles away. As they galloped over the plain they heard several volleys from where Custer was and soon after engaged themselves. They were met by 1000 or 1800 warriors who began to pour in a fire through which these 3 co's (about 150) charged a mile or so. The Indians were mostly on foot, a great advantage, as cavalry has to dismount to do any fighting. Reno was driven back, dismounted & fired, charged a second time until met by a large body who had come from where Custer was fighting & driven back again this time blindly making for the river & by a provident accident making the water at a fordable place, the only place where they could have got over within a mile either way. Opposite were bluffs several hundred feet high with a "cut bank," the river running close beneath. At this point there was a small shelf for a landing & from there they went up an almost perpendicular ascent to the top through loose sliding "bad land" earth. The Indians stood on the opposite bank firing at them as they toiled up here (protected however partially by ravines) and also some firing from their flanks on the same bank. They were not met by Indians on top. the idea probably not having occurred to them of Reno's making for such a place. Benteen was also near this place with his 4 cos. & pack train & that night they joined. They dug out small holes with their tin cups on the best place they could find & made barricades of their packs, cracker boxes & dead animals. Dr. DeWolf was shot going up the hill but it left one surgeon, an Acting Assistant Surgeon from Bismarck, a Dr. Porter whom I knew very well at Lincoln. The mules were put in a circle with the "hospital" in the middle & every now & then a mule would drop into the ring, shot. They found it impossible to get water for 2 days. All day of the 26 they kept up a fight from different spots where the Indians had taken positions. The Indians charged their works but were repulsed & Benteen made a counter-charge. This fight kept up all day of the 26th letting

up about noon as they think—from the Indians running short of ammunition. A party of men undertook to crawl down a ravine hoping to reach water under the concealment by the bluffs on each side the ravine & the smoke from the burning timber on the opposite bank set fire to drive out some of our men who had taken refuge there. They got some water although some were killed & some badly shot in the effort owing to their having to run the gauntlet of 20 or 30 feet to the river & back into the ravine. The Indians hauled off on the evening of the 26 & then they got water—all they wanted. We (Gen. Gibbon's column) were lying quietly in camp about 8 miles off when the Indians left. Dr. Williams & myself were ordered ahead to Reno's position as soon as it was discovered & when we got there they did not know where Custer was. Varnum (whom I thought dead & who was with me last year on the White River) came up & shook hands. He said "Where is Custer, is he coming up with your column?" & when I told him he turned around, broken down & crying like a baby. All the men were—when I got there—in spite of their hardships & sufferings, cheerful & apparently as cool & nonchalant as though nothing much had happened & though the announcement of Custer's fate fell on them like an unexpected shock, they soon rallied. The fact is that now we are lying quietly in camp. They appear to be just beginning to realize what it all means.

For the next day or two we were busy enough caring for the wounded of whom there were 50 left. Lt. Hodgson died that morning. Lt. MacIntosh was killed in the 2nd charge and the total loss of this part of the regiment was then 41 killed in the charges & during the fights of the 25 & 26th: several of the wounded, 2 or 3, have since died. The rest were sent down the river in the *Str. Far West* with my last letter of the 2nd. We had a hard job carrying off the wounded, marched during the late afternoon & nearly all night of the 28th carrying them in hand litters. This was slow and exhausting and next day (we hadn't marched over 6 miles the night before) Doane of the 2nd went to work and made mule litters from timber frames with thongs of rawhide cut from some of the wounded horses we found in the camp & among the timber & which we killed and skinned for

the purpose. These were wound over the frames making a sort of bed, on which blankets & such canvas & tents as we had were laid. These were suspended with the projecting ends lashed over pack saddles & a mule at each end and proved as easy travelling as a boat would have been; also very rapid & the night of the 29th, we marched clear to the mouth of the rivers. It was very dark & raining & our guide got lost for about 2 hours, but at last found the steamer and we got our wounded aboard just before the sun rose on the morning of the 30th. I was nearly dead with the fatigue of the past 3 days & nights on top of our hard march up there from the 24th with packs & when all was fixed & the men attended to you bet I didn't make much bones about going to sleep for 3 hours.

The next day the steamer came down here and I followed with the command including Reno's 7 cos. all that's left of the regiment. The 7th lost 16 officers, more than half, and about 329 men killed and wounded, also more than half.

Varnum was shot in the leg slightly but don't show it at all. I don't know the exact figures yet. In addition they lost the regimental colors & 8 guidons, about 400 head of horses killed, mules killed, wounded and captured, with all their equipment & the arms of all the men killed.

What we know of Custer depends of course on the signs discovered and the statement of "Curly" who is a good, brave & truthful young warrior of the Crow tribe. He says they fought well and were not afraid to die.

After the boat left the Little Horn and as we were marching over the high bluffs at its mouth, we could see the smoke from a big camp off the base of the Big Horn mountains where the Little Big Horn river emerges from its cañon, 40 miles away or over that. The same day about noon there went up two big signal smokes—their mode of calling together their warriors and the next day the entire country was covered with a pall of heavy smoke nearly rendering invisible the mountains, which are usually clearly and beautifully defined in this pure atmosphere. Our interpretation, and the interpretation of such scouts as we had along was that they were having another fight the first day—that they had set fire to the grass on the 2nd day in order to scatter

under the smoke and escape—and we only hope Crook* has at last found them. He should have been there before this and if he struck them—short of ammunition, and suffering severely from the fight with Custer in which they are believed to have lost much more than ourselves—he must have whipped them completely. If he has *not* we are in for a long tedious campaign.

On returning here we found information in the papers of which we knew nothing before starting & *they* knew what we did not, that there were between 3000 & 4000 warriors in the band & also pretty definitely their whereabouts. It came too late for us. We are now waiting here for news from the East and from Crook, and for orders as to what is to be done. Some Crows came down from the upper Yellowstone today & with them one who says Crook had a fight with a band of Sioux over 2 weeks ago in Tongue River, whipping the Sioux but losing 18 men & that he had told them (the Crows—of whom there were 140 with him) that he was going to have one more big fight and then go home. Some of the Sioux have had a fight with the Crows about 60 miles from here above on the Yellowstone, at Pryors fork the Crows whipping and getting away with 6 scalps. One of these fellows who came in today was shot by a glancing ball on the kneecap but don't appear to care much. I have been writing so disconnectedly and hurriedly that my little yarn must be hard to untangle, but then I suppose you will have heard so many stories that it may be of interest to know the truth or as much of it as an eye witness could discover no matter how mixed his account is from having to scribble away so fast in order to get through by the time the mail goes.

The steamer *Josephine* came up yesterday to take the place of the *Far West* gone down with the wounded and it was a great pleasure to find they had on board clothing to replenish our rags at any price. By a chance the ladies from Ft. Lincoln who were to have come up on the *Josephine* this trip put off the excursion until the next, otherwise the Mrs. Custer, Yates, Calhoun, Porter, Smith & Moylan would have been here a day or two after we got

*General George Crook who with the 3d Cavalry, a squadron of the 2d Cavalry and a composite regiment made up from the 4th, 9th and 14th Infantry regiments, had, but a week before the Little Big Horn battle, met these same Sioux under Crazy Horse and Sitting Bull, and after an hour of fighting had been forced to fall back to his entrenched camp. All this was unknown to Custer and his command.

back & found out the horrible news. I believe all the ladies of the Cavalry living at Ft. Lincoln excepting only Mrs. Moylan, have lost their husbands in this fight.

I understand that Col. Reno has made a report of the affair in which he reflects strongly on Col. Gibbon who was in command of our column for having gone into camp on the evening of the 26th "in the face of the enemy & without attempting to satisfy himself as to the character of a large body of men who crossed his front" or something to that effect, referring to the Indians Reno's Co. saw while scouting or flanking the column on the march up to which I referred in my last letter.

My messmate & tent mate Roe got orders by last mail detailing him as reg't adjt 2nd Cav. Hdqrs. Ft. Sanders. It will be a splendid thing for him but a loss to Ellis. He won't go until our return from the field.

Before this reaches you, I dare say the whole affair will be settled. Whether we are to go "home" or find ourselves just beginning a big Sioux War is just now a conundrum. If we are to have a winter's campaign they ought to let us go somewhere to refit & rest a little for a month or so. I am getting rather weary having been in the field since Feb'y. 22 excepting just two weeks between March 17 & April 1 after the Fort Pease trip. If I could only work it to get some other fellow ordered back with my outfit to Montana so I might accompany the other column East I might even afford a leave as I haven't drawn pay since March. To be sure it costs nearly as much to live here as at a post, but I started with over $150 which I hadn't a chance to send away before leaving.

Please let at least the family know how I am getting along & send such little news as I send you for it is impossible for me to do any more than write to you alone. Write as often & as much as you can since a share if not all your letters must reach me eventually through Ft. Ellis. My last letters have been sent June 27 from the Little Big Horn, July 2 & the present from here. They all go together, & take the place of a diary more than anything else and as I haven't been able to keep up my diary you might keep them if you care to as a sort of memoranda to look over in future—& I hope more peaceful years. Love to all the Sisters and yourself.

Camp on the Yellowstone near
Ft. Pease, July 15th 1876

My dear Mother.

Your letter of June 29 has within a few minutes reached me after making a very unusually rapid trip due to the fact that an idea has at last penetrated the official cranium & lighted up things so as to effect a change in our mail facilities much for the better, i.e., that instead of keeping up our line of communication with Ellis by means of couriers (cavalrymen who as a general thing are about as well fitted to travel through a hostile country as puling infants & go mooning around at the mercy of any Indian who happens to catch sight & takes the trouble to lay for them behind the first convenient ridge)—who with relays at odd intervals must travel at night & travel hard to make 50 miles a day—they now use small boats which cost very little compared with the wear & tear on horseflesh. These boats are started in the river within 28 miles of Ellis and traveling by daylight alone make nearly 100 miles a day, floating down the current. . . . You mention having sent a letter June 19. It must have been mislaid or lost en route. I am very glad to get a longer & more cheering letter than usual. I can only do all I can to keep you posted up to as late a date as possible & so try to avail myself of every chance to write, apropos of this I do hope the scratchy scrawl I sent you from that horrible field on the Little Big Horn reached you soon after the telegraphic news of Custer's fight. Although rather busy at the time I remembered that you would get the news and of course imagine my precious corporosity as among those of so many of my friends whom (some at least) I must have mentioned in my letters of last year. Indeed that might have proved the melancholy case but for circumstances chief of them being the rashness if nothing worse of Custer who pushed his command ahead, notwithstanding unmistakable directions that he was to await our co-operation & that we could not be near that spot before the 27th. He wanted it to be *"Custer's* Victory" not Terry's nor Gibbon's, so on striking the trail drove ahead making 78 miles on a continuous march with but 2 short halts necessarily made on account of the darkness, both amounting in all to 7 hours. Besides this we were kept out of a fight which we should have had & very easily could on the afternoon

of the 26 too late to save Custer but in time to avenge him as we must have whipped after a more or less hard fight, the Indians being out of ammunition and running away when we stopped within 4 or 5 miles & in plain sight of them. Well my dear there's very little use of this grumbling. You must only remember in my history of this affair although I have inserted doubtless many of own opinions which no doubt reflect rather muchly on prominent & ranking officials, still the facts are indisputable & will undoubtedly come out if anything ever does come out of this affair. . . .

Since our arrival here at the mouth of the Big Horn we have done nothing except to lie in camp and await further orders & instructions from higher powers as they might send, thinking naturally that this affair would effect a change in the programme & that we should perhaps pass from under the disposition of an old poppycock into that of the younger but slightly more capable General Sheridan.

I am getting so accustomed to bumming around that a return to civilized modes of life would be a strange change. As you may imagine our present way of living is slightly different to anything to which one has been brought up and with all the little inconveniences there are so many pleasant features as to almost compensate.

While we are with our train and in Camp, Roe and myself live together and get along very comfortably indeed. He is a 2nd Lieut. but commands a company (F. 2nd Cav.) and as there are no other officers of his company present, has a very nice wall tent to himself. I also have a wall tent, so Roe & I live together in one tent and use the other as a cook tent and dining room. Our cook is an Alsatian by the name of Keyser & a regular first rate old French cuisiner (when he has anything in the way of grub worthy of his steel). At present and for some time past we haven't had any meat except bacon and ham because our beef cattle ran away & I haven't been able to leave camp for some time lately to get any game. Game is scarce near camp & one has to go 10 or 15 miles away for any. It isn't safe to go hunting without a large escort so the only opportunities we have had are when one or two co's go off on a scout. Last week Roe's company crossed the Yellowstone on the str. and we improved the

time running a buffalo which we got just before dark. Low of the 20 (Ft. Snelling) Sergt. Anderson & I got the brute and butchered it but the men had to pack the meat on their saddles and during a 15-mile gallop and trot that night they lost most of the meat.

The boats up the Yellowstone (*Josephine & Far West*) brought us a fresh supply of canned things on which we principally live and though it's rather expensive I think the expense in that line justifiable, anyhow we won't get scurvy. I am only afraid that disease may break out in part of our command which has been out for over 4 months with very hard work & no variety of diet.

The instructions we were awaiting came down this morning and knocked our hopes that we would go home and refit for a winter campaign. Our force which started out from Montana 4 co's of the 2nd Cav. & 6 of the 7th Inf. was you know reinforced after Custer's fight by the remainder of the 7th Cav. parts of 7 co's badly cut up over 200 men.

Then on the *Josephine* there was a co of the 17th under Capt. Langers, on the *Far West*, Baker's co of the 6th Inf. Low with his battery of 3 Gattlings joined us at the Rosebud and we now hear that 12 cos. of Infantry from the Dept's of the Lakes & the Platte are en route to join us. Crook is also ordered to report to Gen. Terry who is now in command of the whole outfit. From this you see that instead of the 10 co's with which we have been roaming about for 3 months & over, not above 400 men, our force is increased to at least 30 cos. besides the Gattling battery & Crook's outfit & our force from 400 to nearly or quite 1500. Crook must have as many more (1500) and with this force if kept together we can cope with anything we meet. All feel much easier now that Terry is in command. We will wait until our column concentrates and then follow instructions to "push things" I suppose. I doubt however if we find anything to push before winter. I think the large body of Indians which got together to give Custer a fight has divided all up into small bands & war parties & that they cached their lodges in the inaccessible fastnesses of the Big Horn Mountains. A great number have also no doubt gone back to their agencies for fresh supplies of clothing, food & ammunition, as no very large body can keep together and support themselves in this country.

If we would only just *quit* issuing munitions of wars, take possession of the agencies & burn the confounded holes, take the families left by the warriors & remove them to a safe place as hostages and hang every white man found selling arms & ammunition, it would settle the question in a month or two without bloodshed & very effectively. I dare say we shall be kept hunting around for little parties until winter then go in for a time at least and perhaps afterwards go on a winter campaign, which will finish the question. Well until it gets cold there is a good deal of fun to be got out of scouting over this country. The weather is delightful & we get an order some morning to make a scout with so many companies to such & such a point, put an extra blanket under our saddles—rubber coat strapped behind, saddle bags filled with hardtack, tobacco, matches, salt, pepper & other small trifles, a week's supply of hardtack & bacon in a nosebag, rifle, revolvers & ammunition—perhaps a few extra pack mules to be driven along & with this rig start out & roam over the country, travelling on almost impassible game trails over rivers, valleys & mountains & after sleeping on the ground some days & other nights depending upon whether we travel at night or by day, come in after a week or so & report observations.

This sort of thing is liable to either toughen one tremendously or knock him up. It has had the effect of toughening me so that I never felt better in my life. It's fun in summer but less so in winter. After a day's march of 30 or 40 miles, one sleeps soundly (though on what Mark Twain calls a "hair trigger") as he would in bed in a civilized place where there wouldn't be the chance of waking to grab a rifle & stand off a pack of yelling savages till morning.

The *Josephine* which has been lying off camp since the 3rd or 4th unloaded last night & goes down today (16th) for supplies & men from the depot at Powder river & will take mail so this ought to make quick time down. Write and send me the papers especially those concerning the Battle of the Little Big Horn.

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EDITOR'S NOTE: The historical data, together with the map and picture, have been largely drawn from an article. The Story of the Little Big Horn, by Lieutenant Colonel W. A. Graham, Judge Advocate, published by *The Cavalry Journal* in the July, 1926, number. *The Cavalry Journal* has, very kindly, extended this courtesy to the Editor of the FIELD ARTILLERY JOURNAL.

ARTILLERY NOTES ON THE MARFA MANEUVERS

THE following extracts from a letter to the Editor contain news of the Marfa Maneuvers from the viewpoint of a horse artilleryman. It is understood that the participating troops are still thrilling to the excitement of some unusual and spectacular cavalry movements which featured the exercises. The writer's account of the enthusiasm with which the cavalrymen adopted the liaison method of adjusting fire, even to acting as their own liaison officers, will interest, it is thought, all those to whom the problem of close fire support has given anxiety.

"This letter to you is being written in my tent at night. The typewriter is on my Gold Medal cot and I am sitting on the field typewriter box, writing by the light of a Coleman lantern. The typewriter has been through about twenty or more dust storms since leaving Fort Bliss a month ago and it surely needs cleaning and oiling. Please excuse, therefore, any deficiencies in the typewriting.

"Our maneuvers with the 1st Cavalry Division are over and we are now started home. You may remember that I said that I would tell you about the maneuvers so that you could, if you choose, put something in the JOURNAL. This is my second tour with this horse artillery regiment; for that reason I feel pretty well qualified to comment on what the horse artillery can do and is doing. There are a lot of people who think that the days of the horse are past. But as long as the cavalry have horses, and need artillery, it is gratifying to know that the horse artillery can do all that is expected of it, and more too.

"Two years ago General Hawkins commanded the 1st Cavalry Brigade with headquarters at Fort Clark, Texas. For the past two years he has commanded the whole 1st Cavalry Division with headquarters at Fort Bliss, Texas. At Fort Bliss he has had the 2d Cavalry Brigade, the 82d Field Artillery, and the Special Troops, and he has closely supervised our training. We have had frequent tactical exercises in which the artillery has taken an active part. We have learned how to support the cavalry in all types of offensive and defensive action, in delaying action, and

in the breakthrough. One important thing which General Hawkins has emphasized is rapid transmission of commands or orders.

"To culminate the training of the Division, the general decided to hold the Marfa Maneuvers. The 12th Cavalry went by rail from Fort Brown to Fort Clark, and thus concentrated the 1st Cavalry Brigade, which came to Marfa by marching about 280 miles. The rest of the Division, including this regiment, marched from Fort Bliss to Marfa, in the Big Bend, a distance of about 200 miles. We have had two weeks of interesting maneuvers in the area south of Marfa and now we are on the march back to Fort Bliss.

"The commanding general had many obstacles to overcome in preparation for the maneuvers. There were not sufficient funds; water was difficult to obtain; the ranch owners were reluctant to have the army spoil the grazing lands; and so forth. But these troubles were overcome and the maneuvers were held.

"Perhaps you are familiar with our organization and equipment. We have headquarters battery, two battalions and service battery. Headquarters Battery has three sections; regimental, 1st battalion, and 2d battalion. The 1st Battalion has Batteries A and B (C inactive); the 2d Battalion has Batteries D and E (F inactive). Our Service Battery is motorized. We are, of course, horse artillery and we are equipped with the French 75mm gun except in one battery (Battery D) which is using the new modified pack howitzer with pneumatic tires, horse-drawn. In Headquarters battery we use both motors and horses and we have all kinds of communication, so that we can do almost anything in a hurry.

"Colonel Tyner has had command of the regiment for two years and he had command during most of the maneuvers but had to leave to go to Washington and now Colonel Booker is in command.

"In preparation for the maneuvers we weeded out some of our worst horses. They are all pretty old. Also, we carefully planned the load for each of the three escort wagons in each battery. They form the maintenance section in each. When we started the 200-mile march to Marfa our horses were hard, for we had just finished our march back from the Dona Ana Target Range.

"In moving to the maneuver area we followed the normal march procedure, making the 200 miles in nine days, and marching at the rate of 5 miles per hour. As I have said, water is the big factor down here and so we obtained six water wagons, which were sent out ahead so that we could water by buckets on the march. This was done about the middle of each day's march. We habitually leave camp early without watering.

"During the whole six weeks' period of the maneuvers, including the marches to and from Marfa, the Cavalry Division has been required to make a test of a new type of forage. It is not really new but simply new for our horses. It consists of compressed hay cubes, used in place of hay, weight for weight. It is made by mixing ground-up alfalfa with certain types of chaff, such as oat or wheat, and adding a binder of sugar. There are many formulas. It is compressed into dry, green cubes about the size of a walnut, and then sacked like grain. There is a saving in bulk but not in weight, and it is more expensive than hay. We have found that it gives the horses colic, especially if it is fed near watering time, within an hour. Also, it does not give the horse the necessary amount of roughage and we have had to supplement the hay cubes with one-quarter of the long hay ration.

"In camp our watering is done from round canvas collapsible troughs. We have 15 in the regiment and these are filled by the Service Battery, either from railroad tank cars or by pumping out of a rancher's steel or dirt tank. We can water a whole battery at a time.

"Our motorized Service Battery has been a comfort to us. It takes the kitchens ahead to the next camp and also a certain number of dismounted men, who have our tents and food ready for us when we arrive. It is not like the old days when everything had to be done when we marched into camp. But it saves the mounted men a lot because they are busy now putting on and taking off the feed bags, because we feed the hay cubes as well as the grain in the same manner. We tried feeding the grain and the hay cubes at the same time, mixed, but it did not work because the grain would not be properly chewed.

"When we arrived at Fort D. A. Russell, which is the post at Marfa, we were entertained as a regiment by the 77th Field

Artillery which is regularly stationed there. About half of the officers and noncoms of the 77th came from this regiment. They did everything for us that they could and we appreciated it after our hot and dusty hike. We rested for three days and the men were paid, so that there was a gay time. With the whole cavalry division in camp and with many officers' wives from all the posts, it was pretty lively.

"The maneuvers were divided into three phases of three days each. In the first phase it was brigade against brigade, each with a battalion of artillery attached. Starting from bivouacs about twenty miles apart, each brigade was given a mission which would bring about a battle with the other brigade. The only thing that we were doubtful about was whether or not we could keep up with the cavalry. We found that we could, even though they marched for two or three hours at about 7 miles per hour. Our horses, though old, are pretty tough. We take good care of them too.

"I am not going to explain the tactical situation and movements of the maneuvers. Only those who know the terrain well would be interested; the maps are old and inadequate. The action was characterized by rapid movement over wide terrain, which is typical of cavalry. Our initial fire was usually by a dropped battery, the fire being conducted by radio, using the liaison method, with the observer either a staff officer or a cavalryman in a scout or armored car. We have taught the cavalry to use our liaison method from scout and armored cars. They request artillery fire and do the sensing; it works well and they like to do it. In the early part of a battle we often took under fire by direct laying such targets as enemy scout cars and bodies of cavalry as large as a squadron in approach formation.

"The two-sided maneuvers were controlled by umpires who radioed back and forth to indicate what units were under fire. They made mistakes, naturally, and it slowed up the operations at times. We all fired blanks but it is difficult to know at whom the fire is directed. But, considering the maneuvers more as a drill than as a battle, there were some excellent movements of troops, orders were clear and concise, and all troops showed that

they had mastered the principles that General Hawkins has been striving to impress.

"In the second phase of the maneuvers. General Hawkins took command of the whole division and operated it against a simulated force, to illustrate, according to the terrain, the different methods of offensive action and combined attack. It was really very thrilling and it pleased him and all the rest of us to see everything click. The first of the one-sided attacks we call the "Battle of the Windmills" because the division attacked an enemy force on a ridge having two windmills. It reminded me of Don Quijote. In this phase there was also a combined attack of mounted and dismounted troops, supported by our artillery. General Hawkins has definite ideas about the dismounted as well as the mounted attack and the men all demonstrated that they understood the proper modes of attack.

"In the third phase of the maneuvers the general handled the division himself against an inferior force consisting of motorized infantry and mechanized forces such as armored cars. This phase culminated in our celebrated breakthrough, a maneuver designed to enable the division to get out of a trap, as it were. This was very spectacular. The brigades, each in column of regiments, galloped through the gap following an intense artillery preparation. Then we limbered quickly and followed also at a gallop, with raised pistols and with flank guards, prepared at any time to drop a gun or battery and fire in any direction.

"These are some of my impressions of the Marfa Maneuvers. We have enjoyed, and are still enjoying, this period. It is really a thrill to be with this regiment. There is a certain romance connected with the horse artillery and the spirit of the men and officers is fine. We think that we are mighty efficient, too.

"I must stop now. My Coleman lantern is dying down, and some birds in the next tent are complaining about the noise of the typewriter."

WAGONSOLDIERS IN THE OLYMPICS

AS this issue goes to press, it is known that the Field Artillery will have four* representatives on the American Olympic Team: Captains Isaac L. Kitts and John M. Willems in the equestrian events; Captain Richard W. Mayo in the modern pentathlon; and 1st Lieutenant Thomas J. Sands on the fencing team.

The Army contingent will suffer by reason of the absence of Captain Edward Y. Argo, who, on Honolulu Tom Boy, was an outstanding entry in the Three Day event at Los Angeles in the 1932 Games, placing first in the stadium phase and second in the training phase. This year Captain Argo renounced equestrian training for the pleasures of map-staking-out at the Command and General Staff School, where he was a student.

In the illustrations Captain Mayo is shown drawing a bead in what should be one of the quieter and more restful phases of the modern pentathlon. As captain and manager of the American pentathlonists, he will do more than shoot: he will swim 300 meters in a heat, against time; he will run 4,000 meters cross-country, over a course new to him, which will include obstacles up to high-hurdle height; that is, three

*With this, his 25th number of the FIELD ARTILLERY JOURNAL, Major Dean Hudnutt, FA, bids farewell to his duties, as Editor, as Secretary-Treasurer of the United States Field Artillery Association, and as Chief of the Intelligence Section in the Office of the Chief of Field Artillery. He has been appointed Captain of the United States Pistol Team for the 1936 Olympics, and sailed for Berlin July 15th. His staff, who pen this note, and know him as a straight-shooter, wish for him a place on the Victory Stand.

CAPTAIN JOHN M. WILLEMS AND "JINMAC."

feet six inches; and he will ride a strange horse (drawn by lot) over a course (which he has never seen before) of 5,000 meters, including about fourteen obstacles up to 3′ 7″ in height and 14 feet in width. And the ride, to escape penalty, must be made within 10 minutes, 54 1/5 seconds. As Captain Mayo participated in these events in 1928, taking 19th place, and again in 1932, when he was third, he has experienced the exhaustion and strain attendant upon competing for five consecutive days in a different event, not the least trying of which is the fencing, which may require a period of six or seven hours, depending upon the number of competitors.

It is regretted that we have no photo available of Lieutenant Sands, who is making his first appearance in an Olympic arena.

Captain Willems, who also enters an Olympiad for the first time, is shown in practice jumping Jinmac. The reader's attention is invited to the hands. These are holding the reins in such manner that the horse is permitted full freedom of the head.

Captain Kitts is shown on that fine mare, American Lady, on which he contested in the dressage at Los Angeles in 1932. The maneuver being executed is the *piaffer;* that is, "An air or movement in which the horse lifts together one fore foot and the hind foot of the opposite side without advancing or receding."

CAPTAIN I. L. KITTS AND "AMERICAN LADY."

The April, 1936, number of Horse and Horseman (formerly Polo) discussed the American chances in its "Notes on Horses and Horsemen," of which, by their kind permission, we print the following extracts:

"We like to think that the Los Angeles games brought most of the great horsemen of the world into competition before our eyes. But we had only four nations—Sweden, France, Mexico, and the United States—competing in the Concours Individuel de Dressage at Los Angeles, and at Berlin will be the horses and riders of 25 nations! We had five countries—Japan having been added to the above four—competing in the three-day event—and Germany will have five times that many. We had four nations with three riders each competing in the Prix des Nations, and at Berlin there will be nearly a hundred and fifty riders and horses!

"We say this not in disparagement of the Los Angeles games, which were nothing short of wonderful. We simply point out how utterly beyond the imagination these competitions can be. . . .

"Frankly, we do not expect any Americans to win at Berlin. We happen to have before us a number of judges' reports from past Olympiads.

"There were three dressage judges at Los Angeles. The French judge, General Lafont, placed the French horses first, second, and third. Lt-Col. Sloan Doak, the American judge, placed an American horse first, a French horse second, a Swedish horse third, and another American fourth. The Swedish judge, Count Carl Bonde, had Swedish horses first and second, a French horse third, another Frenchman fourth—and his first American horse was sixth!

"At the Olympic games held in Amsterdam in 1928 there were five judges. The Dutch judge placed Dutch horses first and second, a Swedish horse third, and a Czecho-slovak fourth. The Belgian judge placed French horses first, third and fourth, with a Czech in the second position. The German judge placed a German horse first, a Swede second, a French horse third, and another French horse fourth.

"We give you one guess as to what the French judge did. Right. He placed French horses first, second, and third. Well, what the hell! The Swedish judge placed Swedes, first, second and third."

The foregoing is by way of reminder that even umpires do not call balls and strikes alike, and that events such as the dressage, demanding the utmost in technical knowledge, and perhaps an accuracy of advantageous position when movements of great delicacy are observed, may not determine a definite superior where all are excellent.

DIESEL MOTORS AS POWER PLANTS IN ARMY VEHICLES

BY 1ST LIEUTENANT R. W. TIMOTHY, Field Artillery

DIESEL engines have long been important sources of power, but only within the past few years has any interest been shown in adapting them for use in motor vehicles. Their development has forged ahead so rapidly, however, that numerous truck operators have found it advantageous to accept them for replacement of gasoline motors in their work. With the tremendous army motorization program still being carried on, and the use of motor vehicles increasing severalfold, it is timely that an investigation into the facts of automotive Diesel power be made.

So that the reader may understand the principle of a Diesel engine, it is fitting that an explanation of the simplified operation be brought to his attention. Every Diesel engine employs the heat of compression for ignition. When a relatively large volume of air is compressed rapidly into a small enough space, its temperature becomes higher than the ignition temperature of the fuel. While the air is still in this state, fuel oil sprayed into it combines with the oxygen, ignition takes place, and the fuel burns.

The vast majority of intricate engineering problems resulting from the attempt to develop this type of power plant for automotive vehicles will not be discussed herein, but rather the concrete results achieved as a reward for the efforts of those who are applying their technical skill and knowledge to push the Diesel a step further in the automobile industry.

The general history of the power plant is relatively unimportant to us in this analysis, inasmuch as the knowledge sought is the present-day practicability of its use in Army automotive vehicles. It must be remembered, however, that what is current today, is history tomorrow, and that before the ink was dry on the writings and texts from which the following facts were gathered, the development of the Diesel had gone beyond the point concerning which the authors had written.

Further, this paper will limit its scope to the facts concerning

"high-speed" Diesels, for it is recognized, by engineers familiar with its use, that this is the only type that can find a place in the motor car field.

As regards the immediate future military use of Diesels in place of gasoline engines, the following questions arise: Do its characteristics fit it for Army use? Has the Diesel engine reached a state of development for practical use in the Army? Has it become popular enough so that we can expect the civilian population, the potential Army, intelligently to operate and maintain it?

At the present the use of automotive Diesels is restricted principally in its application to larger trucks, of 2½ tons and over. Data gathered from the records of large fleets of trucks and busses indicate that while substantial savings are encountered through the use of Diesel power, its application is confined to a type of work involving continuous operation under heavy load. Experience of the engine manufacturers and large users has indicated that its practicability is limited to the larger truck, because the smaller trucks do not make enough ton-miles in a given period, and because the Diesel engine is economical only when high ton-mileage exists. Further, the installation of a Diesel in a smaller chassis to operate the truck would cost approximately as much as the entire chassis and gasoline engine combined. Another way of stating the same idea comes from the field engineer of one of America's prominent automotive Diesel engine manufacturers, who maintains that, "under present conditions, no operator should even consider the use of a Diesel engine for a vehicle that will be operated less than 200 or 250 miles per day; otherwise the economies will not be great enough to amortize the extra first cost of the Diesel engine."

The many rumors of Diesel-powered passenger vehicles have thus far turned out to be nothing more than "rumors," with a single exception. One automobile company has installed a Diesel in one of its otherwise stock cars, apparently as an experimental or advertising undertaking. Many engineers voice the opinion that the Diesel-powered passenger car is still very far off. This definitely eliminates them from their use in Army passenger vehicles, inasmuch as the policy at the present time is to use as

few specially built vehicles as possible consistent with actual needs.

On the subject of "smoke and smell," most engineers agree that properly adjusted Diesel engines will do neither. But if they are allowed to get out of adjustment, or use an improper type of fuel that will interfere with the proper injection operation, one is likely to get plenty of "smoke and smell." This is equally true, although somewhat different in characteristic, when operating an improperly adjusted gasoline engine.

However, a very important difference worth noting is in the products of combusion of the gasoline, and of the Diesel engine. The deadly carbon monoxide which is characteristically present in the exhaust gases of a gasoline engine, is *almost* absent in the Diesel exhaust because of the excess of air in the cylinder during combusion of the fuel mixture. There is sufficient extra oxygen in the cylinder to allow the carbon monoxide to combine with it and form harmless carbon dioxide. Improper adjustment can change the amount of excess air in the cylinder and consequently leave less of it to convert the carbon monoxide to carbon dioxide, but tests performed by the London General Omnibus Company show that the exhaust from the Diesel engine, although possessing a distinctive odor, is innocuous.

An interesting characteristic in the performance of Diesel engines is in regard to its typical power output, which differs from a gasoline engine in that the torque curve is "flatter." In other words, the maximum torque or pulling ability is developed at relatively few revolutions per minute and remains constant over a somewhat longer period, and does not drop down so abruptly at low or high speeds.

One operator reports that, as a result of this unique feature, his gear shifting on a run of approximately 1,000 miles between Akron and Boston was reduced 26%. This is of material interest to the Army in that such action permits a column of vehicles to be kept closed up to a greater degree than is possible with the conventional gasoline engine, and thus reduces that valuable and vital concern of all military motor columns—road space.

With the advent of the short-wave radio for column control came the necessity of shielding the receiving apparatus from the

effects of the electrical accessories inherently a part of the gasoline motor. A Diesel engine, since it requires no electric ignition system, is entirely free from radio interference. (Of course the static electricity resulting from friction of all the moving parts of the vehicle must still be given consideration.)

The distinct advantage of the high-speed Diesel engine, and one that has led to its invasion of certain fields held by the gasoline engine, is that of fuel economy. The high-speed Diesel gives higher thermal efficiency values, and therefore, for a given power output, consumes less fuel than the gasoline engine. Furthermore, instead of being restricted to the use of the more expensive fuels, such as gasoline, it employs lower-grade cheaper fuels. It enjoys then, a double gain in the matter of reduced fuel costs. If, however, Diesel fuel prices increase to a point where the pergallon cost is on a parity with gasoline, the additional mileage possible with Diesel engines would still be an economy.

One unusual feature of Diesel fuel is its comparative safety from fire hazard. Suffice it to say that gasoline ranks number one on the list of hazardous inflammable liquids being handled daily by personnel of motorized organizations. Diesel fuel will not burn unless sprayed into the air in a mistlike form. A lighted match can safely and easily be extinguished by immersion in a pool of the fuel. Not only is the fire hazard on the part of the using services reduced by the substitution of Diesel fuel, but the lessened vulnerability of supply installations to attack by long-range artillery fire and bombardment operations in the combat and communications zones is marked to a considerable degree.

While on the subject of fuels, it is interesting to note that a Diesel will not run well on coal oil, bunker oil, crankcase drainings, or crude oil. The old belief that a Diesel will operate on "any old oil that will run through a pipe" must be assigned to the pile of disproven theories.

Major oil companies have given considerable thought and time to the general supply of good Diesel fuels throughout the entire country. Most Number 2 and 3 furnace oils now being sold will meet the specifications of automotive Diesel fuels.

From the diary of Colonel Repington, an officer of the British Army during the World War, are taken the following facts:

Petrol shipments to France for five representative weeks for the maintenance of the British forces during the battle of the Somme amounted to approximately 2,500,000 gallons, a tonnage of about 8,700. Had Diesel fuel been used instead, the weight would have been approximately 9,200 tons. However, considering the fact that the average high speed Diesel uses only 2/3 as much fuel *by weight* per brake horsepower hour, the weight of Diesel fuel necessary for the above operation would have been 6,100 tons, a saving of 2,600 tons; a point worth consideration from the standpoint of logistics. These facts, of course, concern the World War, and are only indicative of a relative saving at that time, when motorization had by no means reached the state of development that it has today.

Inasmuch as supply tables for an infantry division whose artillery brigade is 2/3 motorized are not yet available, no exact calculation can be made for the estimated fuel consumption for the division. However, based upon published tables, in which the only Field Artillery motorized unit is the 155mm Howitzer Regiment (tractor-drawn), a daily saving of approximately 8 tons on fuel alone would result through the exclusive use of Diesels in the division to replace gasoline engines. This value of 8 tons is a saving of almost 7% of the total average daily estimated consumption of Class I supplies.

Because there is a necessity of using a power plant which lends itself to mass production one might ask the questions, "How is the Diesel engine made?"—"How much will it cost?"—and "Does it differ from the way we build gasoline engines?"

In answer to the foregoing questions the following observations were made by a group of editors from the staff of "Automotive Industries" magazine upon inspection of the Cummins Engine Company plant in operation in 1933:

"The general principles of design of automotive Diesels are, for the most part, the same as those of current heavy duty gasoline engines except for the combustion and fuel injection mechanisms. Wherever desirable, S.A.E. standards are incorporated into the manufacture, such as in bell housing, mounting of fan, electrical units, etc. The best current practices, modified to suit moderate volume requirements, are followed as regards factory layout,

selection of equipment, tooling and other details.

"To be sure, the fuel distributing system, the very heart of this engine, is a special element that demands great care and precision in its manufacture. So much so, that only several years back it was thought in automotive circles that only European manufacturers could produce it. However, one American Diesel builder produces his own fuel distributors and injectors in competent fashion by skilled mechanics in a department equipped with precision machines which are regularly inspected for accuracy. Some of the newer machines are certified for accuracy by their makers.

"Whether the manufacture of the precision parts may be speeded up by quantity-production methods so as to reduce costs materially may be answered only when the future sales volume exceeds the present estimated figures, so that the development of new machinery for such purposes is an economy and necessity.

"Nevertheless, the fact is that this particular engine is being produced at the rate of about 25 units per day and at a cost comparable to the production costs of gasoline engines of equivalent power and built in about the same quantities. At present, the volume of heavy-duty engines is small compared with that of the lighter units and production costs naturally are greater in proportion."

The precision methods used in the finishing of the fuel distributing system are typical of the manufacture of some of the other important units of the engine, and the use of specially designed expensive machines to accomplish the desired results necessitate a slower and more costly production than the conventional type of heavy-duty gasoline engine.

Weight of any power plant is obviously an important factor to be considered in its use in an automobile. Within reason, there is no limit to the horsepower that might be developed by either a gasoline or Diesel engine. However, when the relation of weight to horsepower is judged, one must content himself with the type of engine which develops sufficient horsepower to do the required work, and yet does not carry with it a large percentage of dead weight which is acting only to reduce the efficiency of the system.

Coming back to the types of light-weight Diesel engines suitable for mobile service, we have first to consider that the engine must be produced cheaply, at something near the cost of gasoline engines. This requirement introduces a weight limiting factor that is dependent upon foundry limitations. Truck and motor coach engines weigh from 10 to 18 lbs. per horsepower. It is possible but not economical to build them lighter. A Diesel engine for the same service should weigh not much more than a gasoline engine. A differential of about 15% is to be expected because of the higher pressures used. An average of American-manufactured Diesels show that there is an increase of about 2½ to 3 pounds of weight per horsepower over gasoline engines of approximately the same rated capacity. This, however, does not consider the increased weight of gasoline engine accessory items which may run as high as 1 pound per horsepower on motors of moderate capacity, about 75 horsepower.

While the Diesel is an internal-combustion engine, the complete knowledge of the maintenance functions so necessary to the upkeep of a gasoline motor does not qualify one as a capable "motor officer" to supervise the maintenance of a Diesel. It is imperative that the servicing personnel become fully acquainted with the characteristics of Diesel engines and their fuels.

In fact, one leading manufacturer has made it a practice to insist that any fleet operator using his make of engine should send at least one representative to the factory Diesel school to insure continuous and successful operation of the engine after it has been placed in service. The manufacturer maintains that the engine will not be operated successfully until the operator has had thorough training in the operation and care of the engine as well as the use of proper fuels and lubricating oils.

According to the best of records, there are over 1,200 Diesel-powered busses and trucks operating in the United States alone. (December, 1935). Indications are that remarkable savings are accruing to the operators, all directly traceable to the proper installation and maintenance of their Diesel power.

It has been said by officials of the London General Omnibus Company, who have been operating over 1,000 Diesels for some time, that they have purchased their "last" gasoline engine. They

report that in their gasoline-operated fleet, road failures occur at a frequency of approximately 200,000 bus miles; whereas the Diesel-powered busses are averaging 400,000 bus-miles before road failures are experienced. These figures are obtained by dividing the total number of miles operated by the number of road failures experienced.

In order to obtain such good service they maintain a corps of trained traveling inspection men who are constantly checking their engines and never allow them to operate while out of adjustment.

The Consolidated Freight Lines, Inc., of Portland, Oregon, and Seattle, Washington, whose fleet of trucks includes 54 Diesel-powered vehicles which operate in temperatures of from 40 degrees below zero to 110 degrees above, reports that in addition to a saving in fuel costs of approximately 25%, they find that the Diesels require less maintenance expense—no ignition trouble, fewer moving and wearable parts to give trouble, and those all removable. They claim their maintenance cost is cut in half which, they insist, more than compensates for the greater capital investment required to equip their vehicles with Diesel units.

Personnel of the Army whose duty it is to maintain automotive vehicles must acquire their knowledge in either or all of the following ways: First, they must have acquired a degree of proficiency before entering the service; second, they must be trained in Army schools; third, they must obtain the requisite knowledge by practical experience.

In peace, more opportunity is afforded individuals to attend schools and specialize. Generally, the schooling system in vogue at the present quite meets the requirements of the service. During wartime, quite a different aspect presents itself. While unceasing effort is made to train thoroughly every person in the military service to perform his particular duty, any previous knowledge of a subject acquired before his entrance into the service becomes invaluable in assignment of an individual to duties consistent with his natural trends.

It then behooves us to look to the civilian knowledge of Diesels to learn what potential is in store for the emergency. With the

very small percentage of Diesels in general use in the country today, we cannot hope to find sufficient personnel with a requisite knowledge to enable us to operate and maintain Diesels efficiently during wartime. The country must be educated to them before the Army is ready for them.

The Diesel engine has several features which particularly adapt it for use in the military service; and while, at the present time, it is not ready to replace the gasoline motor for use as a power plant in Army automotive vehicles, careful analysis must be made of its progress from time to time, so that the Army may, when the period arrives, accept it instantly and be abreast of the times.

ROTC DEMONSTRATION

BY CAPTAIN D. S. BABCOCK, Field Artillery

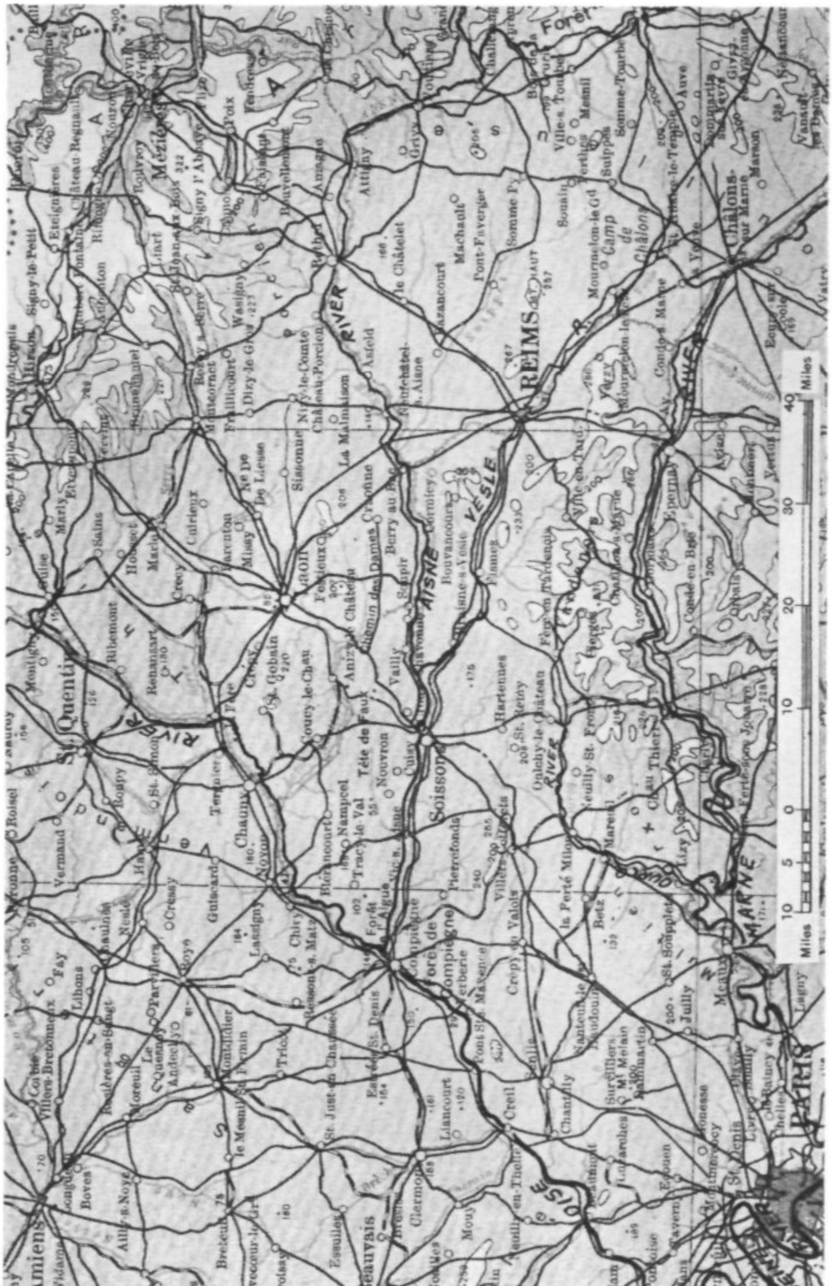
WHILE long marches with truck-drawn artillery are no longer a novelty, the recent demonstration tour to Harvard and Yale by Battery "B" 7th Field Artillery may be of interest to ROTC instructors and others in showing the capabilities of truck-drawn artillery in bringing a field artillery unit to a university during the school year for demonstration and publicity purposes.

Leaving its home station, Fort Ethan Allen, Vermont, on April 23rd, the battery marched the 240 miles to Cambridge in ten hours, putting up for the night at the Commonwealth (N. G.) Armory in Boston. On the 24th, the battery put on a demonstration near Soldiers Field for the Harvard ROTC unit. The demonstration combined maneuvers limbered, a battery inspection and an abridged RSOP, the whole lasting only 45 minutes and was well attended.

On the 25th the battery moved on to New Haven, Conn., where it pitched a pyramidal tent camp at Yale Field, putting on its demonstration there on the 27th. Owing to terrain limitations in New Haven, the demonstration consisted only of the RSOP.

On the 28th the battery marched from New Haven, Conn., to Fort Ethan Allen, Vermont, a distance of 270 miles in one jump of eleven hours arriving at its home station at 6 P. M. The entire trip of 660 miles was made in three marching days without a single accident or casualty of any kind and without a single vehicle falling out of the column for any cause.

Military authorities at both universities credit the visits with considerable instructional value to their students. Since the journey was at no expense to the government other than a small increase in gasoline consumption, there appears to be no reason why such trips cannot be made a feature of the courses at all institutions having Field Artillery ROTC units and with regular army truck-drawn organizations within 500 miles. Many an ROTC unit does not see a field artillery battery until it goes to camp and much valuable instruction could be given it in this manner during the school year.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THE TURN OF THE WORM
The Allies in the Second Marne Campaign

BY COLONEL CONRAD H. LANZA, Field Artillery

DURING the spring of 1918, the Allies in France suffered severe defeats. Commencing with the German offensive of 21 March, and to include that of 26 May, the Germans had made deep advances, which had caused great losses in personnel and matériel. But there had been no strategical defeat—no irreparable damage. The enemy had won tactical victories; the lines were dented, but they were holding.

In the first days of June, the German offensive of 26 May was nearing its end with the capture of the Chateau Thierry pocket. Soissons had been lost, and Reims was now a salient protruding into the German lines. The last reserves of the German Seventh Army were unsuccessfully launched on 3 June in a final attempt to take Reims. This marked the expiring effort in the area.

General Foch, Allied Commander-in-Chief, now made an estimate of the situation. He was anxious to stop the German advances, and was seeking a plan to drive them altogether out of France. To do this it would be necessary to abandon the defensive and pass to the offensive. At his GHQ the situation appeared to be as follows:

On 21 March, 1918, according to best information, the Germans had about 197 divisions on the west front, of which 80 were fresh and available for offensive purposes. On 26 May, the number of fresh divisions had fallen to about 60, a loss of 25% notwithstanding that some 10 divisions had been brought from the eastern theatre of operations to reenforce the total in France. After the offensive, just concluded, it was certain that the number of divisions, fresh and available for attack, had been further reduced. It was also known that the combat strength of infantry companies, which had been 120 in March, had now been reduced to below 100. There was difficulty in finding replacements for even this number, and still lower strengths could be looked for in the near future. The 1919 draft was already heavily drawn upon, and the employment of the 1920 draft was soon contemplated. The time when the enemy would have insufficient divisions for more offensives was approaching.

Coupled with decrease of strength, reports indicated a reduction of morale. The great battles of the Spring had brought gains of territory, booty and prisoners, but they had brought great losses, and did not appear to have hastened the end of the war. Economic difficulties were serious, people were war weary, enthusiasm of troops was declining. German allies seemed to be a liability rather than an asset. On the whole it seemed probable that, although the German Armies were yet formidable, with maybe some 50 fresh divisions available for attack, their zenith had passed, and was bound to weaken; rapidly so if new attacks were made.

At this time the Allies had 169 divisions in France. Of these, 4 were American. 11 Belgian, 51 British, 101 French, and 2 Italian. If we count American divisions as equivalent to 2 divisions of other nations, this gave 173 divisions against 207 German divisions. About 120 divisions were needed to hold the lines, leaving in round numbers 50 divisions in reserve, including exhausted divisions undergoing reorganization. If no more great battles occurred for a month, most of these 50 divisions would be available for a new campaign. American troops were expected to join at the rate of 4 new divisions per month; all of the Allies expected to maintain the present number of their divisions. By September, the Allies would be superior in numbers, even if the enemy was able to maintain his 207 divisions, but it was probable that this number would decrease because of expected battle losses if he undertook new offensives.

General Foch believed that by properly grouping his reserve divisions he could accumulate a force sufficient to assume a worthwhile offensive, and that within a month or so he could undertake one. It remained to be determined where this offensive could best be undertaken, and its mission.

The enemy was still very dangerous, and the possibility that he might attack first had to be considered. He had attempted in previous offensives to separate the British from the French, by a penetration of the front towards Amiens. He had failed, but he was now only 25 kilometers from Amiens, and he might try again. A hostile success in this direction might be disastrous. In his latest advance, the enemy headed for Paris. The loss of this important center might well be fatal to the Allied cause.

With about 50 German divisions loose and available for attack, the General considered it was impossible to uncover these important cities—Amiens and Paris—but that the divisions in reserve, or the majority of them, would have to be grouped so as to prevent any possiblity of the enemy succeeding in making any further advance in these directions. If these divisions were to be used for an offensive mission (assuming that the enemy allowed time to prepare for it, which seemed possible and even probable) they would have to be employed in the area between Amiens and Chateau Thierry. Were there objectives within this area suitable for an offensive?

The front in this sector was under the French Armies, General Petain commanding, and was held by:

Group of Armies of the Reserve (Fayolle)

French First Army—north of Montdidier.

French Third Army (Humbert)—from Montdidier to the Oise.

French Tenth Army (Mangin)—astride the Aisne, south to the Ourcq.

Group of Armies of the North (Maistre)

French Sixth Army (Degoutte)—from the Ourcq, around Chateau Thierry, to Dormans, on the Marne.

French Fifth Army (Berthelot)—in the Reims salient, as far as Prunay.

French Fourth Army (Gouraud)—from Prunay to the Vesle.

On 4 June, the German attack in the Chateau Thierry sector had ended. From statements of prisoners it was known that artillery was being withdrawn, and that there were no more fresh divisions in the German Seventh Army. The enemy had in the Chateau Thierry pocket about 40 divisions, which for supplies depended on one railroad line, east of Soissons at Missysur-Aisne to Fère-en-Tardenois. This railroad was only 20 kilometers from the front opposite Soissons, and 25 kilometers away opposite Fismes. Any advance of the Allies towards Soissons, or south thereof, would threaten this line of supply. Even if not reached, an advance which would bring it under effective artillery fire would give excellent results. An important advance

beyond would open up the possibility of large captures of the enemy troops and supplies within the pocket.

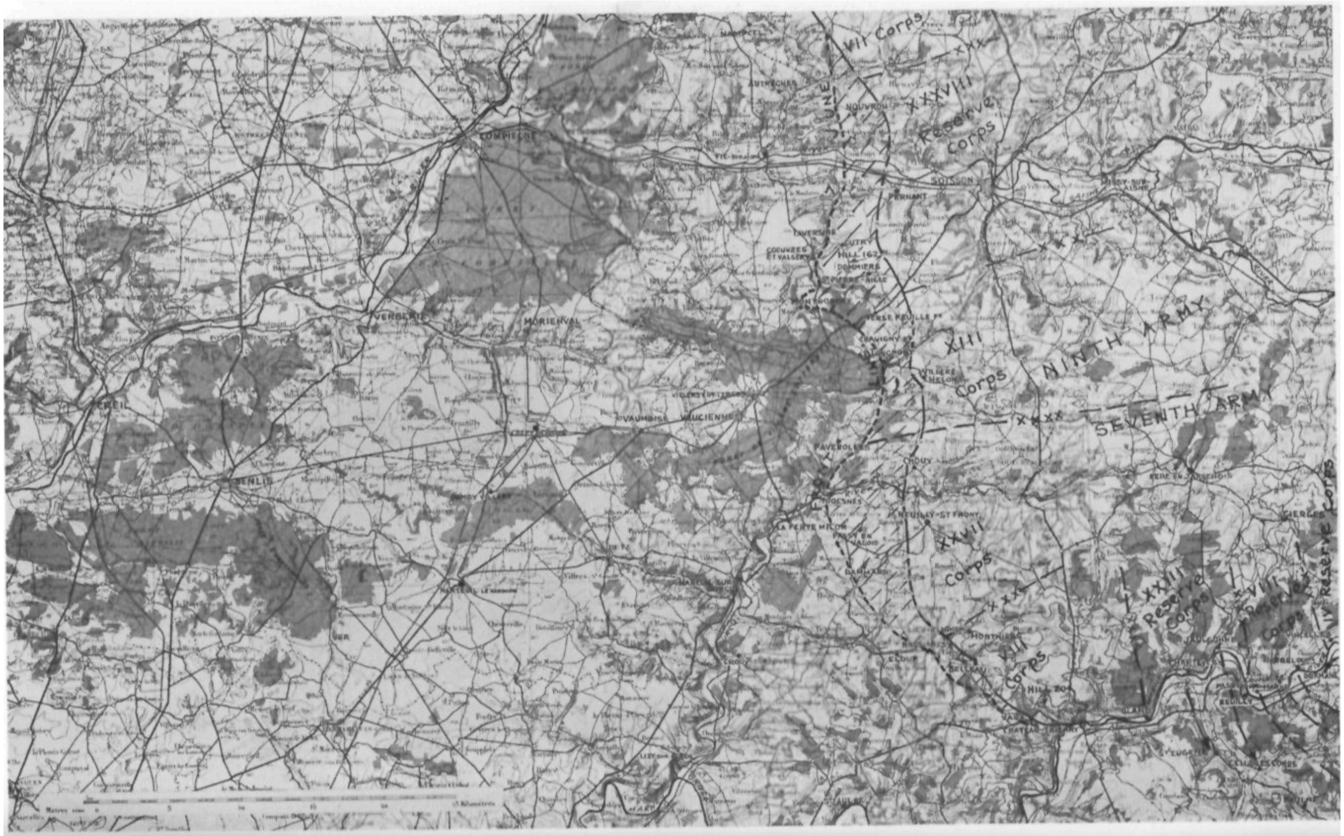
The General decided that in view of the limitations as to the part of the front in which his reserves could be engaged without great risk, that an attack on the Chateau Thierry pocket promised important results without endangering his own communications or bases, which would be amply covered should the enemy attack first and succeed in making an advance. His first consideration was for assembling troops for an offensive. He thought at once of the Americans. Without explaining that he intended to attack, he asked for American infantry and machine guns, which were appropriate classes of troops for attack purposes, as the Allies had artillery to support them. Artillery battle losses were less than infantry losses, and in an offensive could be expected to be small. He had had conferences on 1 and 2 June, with General Pershing, but the two generals failed to agree as to the disposition of American troops. General Foch did not notify General Pershing, or others present, of his plans to attack. It appeared to General Pershing, at this time, that French troops were of low morale, and their staffs ignorant of American ideals, and that they were trying to secure Americans to fight their battles. He was determined that fighting by Americans would be under their own flag and their own officers. General Foch stated that the coming battle, which he did not explain, was the only important thing. General Pershing answered that the real important thing was the organization of the American army as a going concern. The conferences brought out considerable divergence of opinion, without accomplishing much.

During conferences later in June, General Pershing agreed to allow American divisions to be sent to the Chateau Thierry front. He indicated that he would prefer this to be a temporary arrangement, his preference being for uniting all, or most, of the American divisions along the Moselle sector, for an eventual advance towards Metz. General Foch turned a deaf ear to this suggestion, which from his point of view would only be a diversion. He was unwilling to send his reserve divisions to that distant area, as long as the Germans had 50 fresh divisions. For, in this case, the strong hostile force might penetrate the front between Chateau Thierry and Amiens, and then separately start

to overwhelm the divided parts. General Pershing also thought of this possibility. He believed it might be possible that Paris would be captured by the Germans. He made inquiries as to what would happen should this occur. He took special care for maintaining his forces in the Moselle sector, through lines of communication passing far south of Paris. At the time he had not a high estimate of the current state of French morale, and thought it not improbable they would again be beaten in the next German campaign. He felt it unsafe to put all his resources in the hands of the French, but did agree from time to time to loan American divisions.

General Foch waited until 7 June to make certain that the Chateau Thierry operation had come to an end. On this day he issued the first order for initial preparations with a view to reducing the Chateau Thierry pocket by simultaneous attacks from the flanks; one by the Tenth Army, from the west side, directed eastward to south of Soissons; and the other by the Fifth Army from the west side of the pocket, directed west toward Fismes. Orders were sent, through General Petain, to the Fifth Army, to prepare for such an attack, to be delivered at a date to be announced later. No orders were issued at this time for the Tenth Army. Since 3 June, the OP's and the Air Service had reported an extraordinary activity in rear of the German Eighteenth Army, north of Compiègne. Large forces of hostile infantry and artillery had been noted concentrating here, and it was obvious that an attack in this sector was due.

It was thought best not to divert attention in the Compiègne—Villers Cotterets area from the threatened danger, but for the moment to concentrate on meeting it. Reenforcing artillery and additional divisions with ammunition and supplies were rushed to the Third Army, which was directly threatened. It was clear that an enemy advance westwards along the south bank of the Aisne would be of powerful assistance to their Eighteenth Army, attacking from north of Compiègne. To meet this possibility the Tenth Army was strongly reenforced with artillery, and alerted to stop such an offensive. This reenforcement would be left in place, for use in the future attack by the Tenth Army, and to this extent simplified subsequent concentration measures.



Aisne

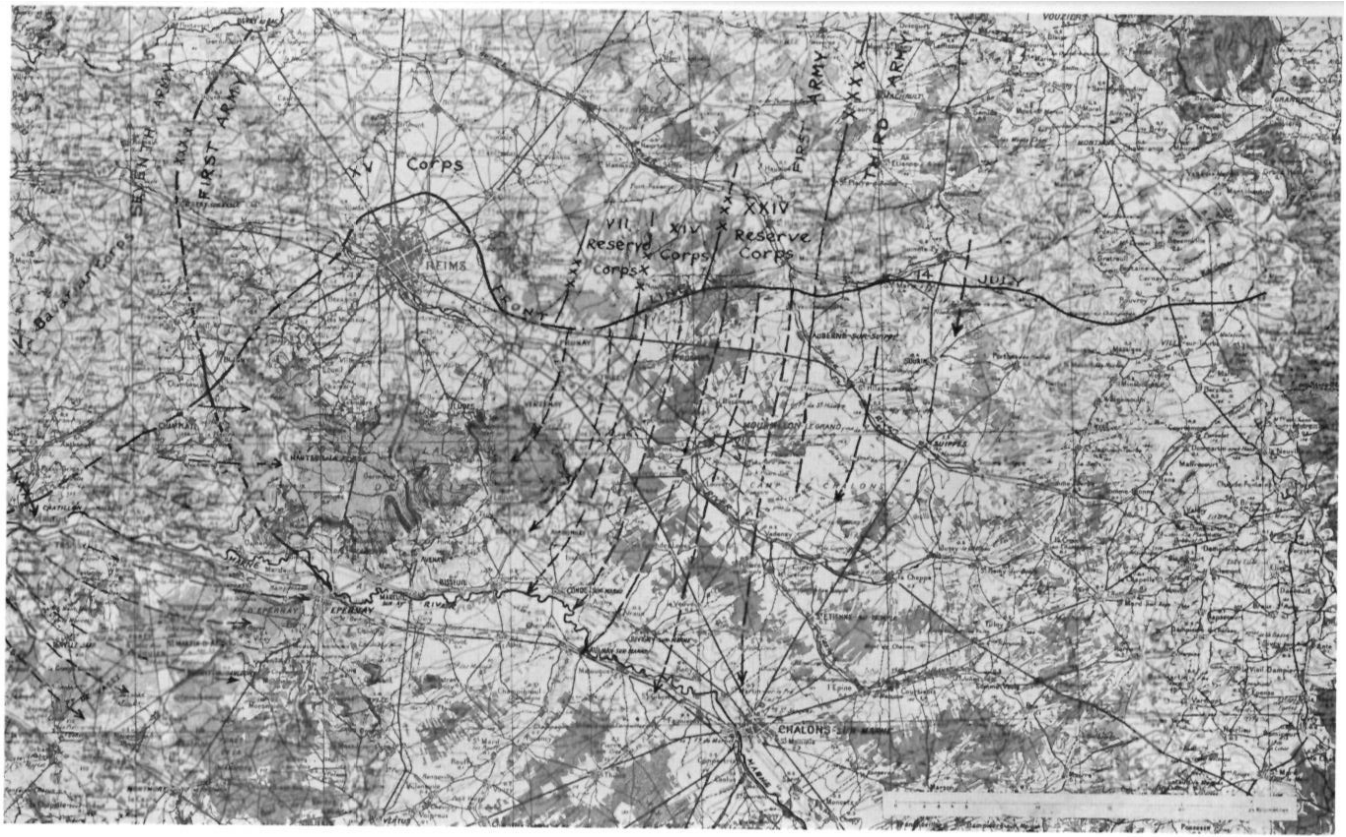
Vesle

Marne

Aisne

Vesle

Marne



On 9 June, the German Eighteenth Army, on a front of 35 kilometers, attacked the French Third Army from north of Compiègne. The assault was preceded by a terrific artillery preparation, which employed an unprecedented proportion of gas shells. In the center, 3 hostile divisions, on a front of only 6 kilometers, and supported by 3 more divisions, made a gain of nearly 8 kilometers. On the flanks, gains were less. The attack was renewed on 10 June, and the enemy reached the general line: Gournay-sur-Aronde—Tracy-le-Val—Moulin-sous-Touvent. (An east-west line, along north edge of map page 386 north of Compiègne.)*

On 10 June, General Fayolle, commanding the Group of Armies of the Reserve, decided to stop the German advance by a counterattack on their right. He ordered the concentration of 5 divisions, all he had in reserve, of 160 tanks, and all available artillery, north of Moyenneville (15 kms. northwest of Compiègne) for this mission. Through excellent staff work by General Mangin, who was placed in charge, all troop movements, all plans and orders, were issued and completed that very night, the first time such a large operation had been prepared within a few hours. It had previously taken about three days to prepare a 5-division attack, but on this occasion it was ready by next morning, and jumped off at 11.00 A.M., on a front of 11 kilometers, with 4 divisions in line, and 1 in reserve. The enemy was completely surprised as he himself was attacking south. The counterattack pushed east 2 to 3 kilometers, captured many prisoners and 4 batteries, and so disorganized the enemy that he abandoned further attacks in this sector. On 12 June, the enemy started to consolidate his net gains. Minor engagements on that day, and on 13 June, brought no results except to end the battle definitely in this area.

Satisfied that this successful counterattack was an indication that the Germans could be beaten, and that the French morale was good, General Foch determined to carry out his intention of passing to the offensive, initially by a reduction of the Chateau Thierry salient.

On 12 June, early in the morning, the enemy launched his expected

*The maps on pages 386-7 are those used to illustrate Col. Lanza's article in the May-June, 1936, number, and show a situation to which this account is a sequel.

strong attack south of the Aisne, and north of the Villers-Cotterets forest. He employed 3 fresh divisions and captured St. Pierre Aigle and the line of the Laversine valley. On 13 June, a continuation of this attack advanced the enemy's lines to take in Laversine itself, and a corner of the Villers Cotterets forest. This attack was strenuously opposed by the Tenth Army. The artillery reenforcements which they had received were most useful, and put up such a violent fire that the enemy was stopped. Additional efforts to advance, made on 13 and 14 June, were unsuccessful, and by 15 June the front was relatively quiet, with no information as to immediate further offensives.

This latest German effort was the basis of an argument which induced General Pershing to place 2 more American divisions (4th and 28th) at the disposition of Marshal Foch. They had been ordered relieved from the British front, and ordered to the tranquil Vosges front, but were now diverted, and ordered to the Villers Cotterets forest, in reserve for the Tenth Army. General Pershing states that the primary purpose of this move was for the safety of Paris, but ultimately for possible use in an offensive. These divisions had no artillery, but as the Tenth Army was strong in artillery this was a minor defect. For the same reason, the safety of Paris, General Pershing had loaned 2 divisions (2d and 3d) at the end of May, and these divisions were still in line near Chateau Thierry. One other American division (the 1st) was in line near Montdidier, from where it appeared it might be withdrawn for offensive purposes.

On 13 June, letters were sent to the commanders of the British and French Armies, directing that arrangements be made for the rapid movement of British divisions to the French front, and of French divisions to the British front, so as to permit heavy concentrations of troops to meet possible emergencies. At this date, General Foch felt that a new German offensive was bound to come. His G-2 reported 54 hostile divisions in reserve, but the enemy's intentions as to the employment of this mass of maneuver were not known. It was considered necessary to be ready to rush reserves to cover either of the critical areas in front of Amiens or Paris until better information as to the enemy's plans could be obtained.

It now appeared that there was nothing to prevent preparing for an offensive operation; General Foch. on 14 June, issued instructions for the Tenth Army to prepare to attack, at a later date, towards Soissons and south thereof. He enjoined secrecy as of paramount importance; ordered that the attacking infantry was to enter the line only during the night before D day; that there would be an artillery preparation, which should be short but of extreme violence; that the assault would be at daybreak. The high ground southwest of Soissons was the objective.

The Tenth Army had its morale heightened by the suggestion that it was to take the offensive at an early date. It had just repulsed a serious attack on its lines. Interpreting the cessation of attacks as a sign of weakness, and the order for a future attack as a sign of strength, it undertook to make counterattacks at once. The first was launched on 15 June north of the Villers Cotterets forest; another on 17 June, near Autreches, north of the Aisne; and the last, on 18 June, on both sides of the Villers Cotterets forest. These fights secured only local advantages, but they improved the morale of the French troops by showing that it was quite possible to defeat the Germans.

On 16 June, General Foch decided that as there was doubt as to whether there would be sufficient troops and matériel for attacks on both flanks of the Chateau Thierry pocket, priority would be given to the attack of the Tenth Army south of Soissons, with a view to advancing as least as far as the ravine at Missy-aux-Bois. Assignments of additional artillery, tanks, ammunition, etc., would be, first, to fill the needs of this Army. The Tenth Army was directed to push preparations under the direction of the Group of Armies of the Reserve.

In the endeavor to obtain troops for the offensive, an order was issued on 17 June, amending an earlier one of 2 June, by which 5 French divisions in the Vosges sector were ordered to the Chateau Thierry sector in reserve, effective upon relief by an equal number of American divisions. On 19 June, 6 other French divisions and a considerable amount of artillery, which were serving with the British armies in Flanders, were ordered relieved by British troops as directed by the British C-in-C, and ordered south, also into reserve in the Chateau Thierry sector.

On 20 June, as it appeared that there would be troops available for attacks on both flanks of the pocket, the Fifth Army was ordered to go ahead with its preparations for the attack towards Fismes.

The Tenth Army submitted on the 20th, for the approval of General Foch, their attack plan. It was divided into two phases:

a. Limited attacks, delivered successively before D day, with the mission of securing the high ground between Cutry and St. Pierre Aigle, and the east edge of the Villers Cotterets forest, in order to have a favorable jump-off line on D day, and avoid serious obstacles at the start of the attack.

b. A main attack, on D day, on a front from south of the Aisne, to the Ourcq, with the mission of seizing the high road from Soissons to Chateau Thierry.

The General was not sure that he would have the available means for his offensive in the near future, and waited before acting on this plan.

On 27 June, General Petain, as commander of the French Armies, submitted a memorandum to Allied GHQ, stating the results of a study made by him of German offensives in 1918, to date. His conclusions were:

a. On account of decreasing man resources, the Germans could profitably undertake only operations which promised substantial advantages. For this reason, limited attacks, which were relatively costly both in men and munitions, were not probable.

b. A new general attack was probable, but only after reconstitution of divisions partially exhausted in previous offensives.

c. The time required for such a reconstitution would be at least until 15 July. This was then the earliest date for a new offensive on a large scale.

General Foch agreed with this memorandum, and feeling that there would be time for the Tenth Army to carry out the first part of its plan before the enemy could seriously interfere, approved the plan.

The first intention of the Tenth Army was to recapture the

high ground just beyond the ravine through Laversine. Both sides of this ravine were now in possession of the enemy. It was evident that if this situation continued on the day of the main attack, it would be difficult for tanks, and even for infantry, to cross this obstacle. The initial limited attack then had, for its mission, the clearing of the enemy from this ravine, with the seizure of sufficient ground beyond, about 2 kilometers deep, which would enable the ravine to be used at the proper time as an assembly point for troops, and enable tanks to cross before H hour on D day.

The Tenth Army already had plenty of artillery, and waited only for approval of its plan to start operations. It launched its attack the very next morning, on 28 June. Supported by a powerful artillery preparation and accompanying fires, the troops secured their objective, advancing to beyond Cutry. The next day, a second limited attack was launched just south of the Villers Cotterets forest. This pushed the enemy out of the corner of the forest, and beyond, far enough to allow assembling of troops within the forest, without danger of detection by hostile OP's or minor raiding parties. Further small limited attacks, on 2 July, slightly enlarged and improved the new lines.

On 1 July, G-2, at GHQ, was certain that a new German offensive was in preparation. He was not sure where it would be, but considered the most probable locations as in the British sector near Lille, and/or in the French sector in Champagne. He based this opinion largely on the fact that these appeared to be the weakest areas in the Allied lines, and as offering to the enemy the best advantages should he succeed in breaking through, at either or both of these places. He estimated that the Germans had, on this date, 75 divisions in reserve, of which 55 were fresh and ready for battle.

Based on the foregoing estimate, General Foch directed G-3 to draw plans for rapid concentrations of French troops in the British area behind Lille, and of British troops in the French sector east of Chateau Thierry as far as Champagne. He also issued a directive. In this he stated that the enemy was only 30 kilometers from Dunkirk: 60 from Calais; 60 from Abbeville; 60 from Paris; and 25 from Chalons. A hostile advance of 40 kilometers towards Abbeville would cut the line of communications

to the north of France, and would separate the French forces from the British Armies. An even smaller advance towards Paris might have no decisive result on operations, but it would seriously inconvenience the government. Therefore, Abbeville and Paris were the two places which must be covered. He directed that on the front from Flanders to Chateau Thierry, a foot-to-foot defense be prepared, and that in addition to the usual reserves in Flanders and in Champagne, arrangements would at once be made to concentrate in the minimum of time all other Allied reserves before Paris and Abbeville. These reserves were to be organized into corps and armies, and to be ready on short notice to proceed as such, in large bodies, for decisive entry into line, wherever their services might be needed. The foot-to-foot defense was to include preparation of battery positions, registration of fire, and particularly complete plans for all units likely to be involved should the enemy attack.

On 3 July, G-2 advised General Foch that it now seemed that the forthcoming offensive of the Germans would be in Champagne. He based this opinion on the study of air photographs which showed that the enemy was methodically proceeding with preparations for an attack between Reims and the Argonne. New battery positions had been noted, but as no munition dumps near them had been discovered, as no new air fields had yet been occupied, and as traffic was not much more than normal, he was of the opinion that the attack was not imminent, but only in the state of preparation. GHQ instructed General Petain to take measures for resisting the predicted offensive, by assembling air forces, artillery, and reserves, and issuing precise orders for defense, as already ordered in the directive. These instructions were practically repeated on the 5th.

On 8 July, the Group of Armies of the Center (called *North* prior to 6 July) was authorized by GHQ, in case of enemy attacks (now considered as almost certain), to abandon forward positions anywhere from the Marne to the Argonne, wherever this appeared advisable in order to avoid unnecessary losses. This Group of Armies was heavily reenforced with artillery, and additional reserves. The Ninth Army, with CP at Fère Champenoise (22 kms, southwest of Chalons-sur-Marne), was placed

in charge of divisions in reserve back of the front, and directed to organize them into corps, and be prepared to enter line as an Army, in one detachment, either to stop a hostile penetration should one occur, or to counterattack. It was to do this as a unit, either to the right or to the left of the Fifth Army, which held Reims, and the sectors on each side of that city, as events might determine.

General Foch further directed that the Fourth Army, in Champagne, which was in flat, open country, prepare to meet the coming attack on its intermediate position, between the 1st and 2d main lines of defense. All of the forward zone, and the 1st main line of defense was to be evacuated at the commencement of an attack, and the personnel withdrawn to the rear. In this way, it was expected that most of the troops would be out of range of the great quantity of trench mortars which it was known the enemy had, and from a large part of the artillery preparation. These were the two great sources of casualties. The defending artillery was also to draw back so as to avoid the enemy's counterbattery fire. The Fifth Army was ordered, on the contrary, to hold its positions, which were on wooded hills, but to take position in great depth, and strenuously to defend its lines, which would be needed as lines of departure for its own offensive towards Fismes.

On the same day, the Tenth Army delivered another limited attack to improve its prospective jump-off line for D day. It was directed against the east edge of the Villers Cotterets forest, in order to disengage the last occupied elements of that forest from hostile possession, and to push the enemy completely away from it. This attack met a hard resistance, but it cleared the forest, although it failed to push the enemy as far back as had been expected.

The Group of Armies of the Reserve, after noting the results of the limited attacks by their Tenth Army, and after consultation with the army commanders, came to the conclusion that the proposed offensive south of Soissons could not only be made to endanger the German communications into the Chateau Thierry pocket, but if made in sufficient strength, could accomplish the complete reduction of the pocket. They therefore submitted for

approval a recommendation originating from their Sixth Army, that the latter, even if not reenforced, be allowed to extend the attack of the Tenth Army to the south, from the Ourcq to the vicinity of Chateau Thierry. General Foch approved this recommendation immediately, and as it appeared that there would be a considerable number of divisions in reserve, he undertook to strengthen the Sixth Army, to enable it better to intervene in the coming battle. He further approved of a suggestion from the Tenth Army that, in view of the present strengths of the Allies, the proposed attack south of Soissons be made independent of any enemy offensive. If there were such an offensive, as now seemed certain, a counterattack south of Soissons would be the best possible means to stop any initial German success. General Foch directed that, from then on, preparations for the counterattack be pushed actively but secretly.

On 10 July, G-2, at GHQ, anounced that as a result of all available information:

a. The next German offensive would consist of two attacks; one southwest of Reims, and the other east of Reims.
b. Reims would not be directly attacked.
c. The attack southwest of Reims would extend from Jaulgonne, on the Marne, east to the Vesle; and would be directed towards Epernay, via both banks of the Marne.
d. The attack east of Reims would extend from La Pompelle (just east of Reims) to Massiges, and would be directed towards Chalons.
e. These attacks would be launched about 15 July.

G-2 added that from best information the enemy had about 207 divisions on the west front, of which 126 had been identified in line. Of the remaining 81, 40 had had more than the necessary time for rest and reorganization, and 30 other divisions could be considered as having had just about sufficient time to rest and reorganize. This gave a total of around 70 divisions fit for attack. Of this number about 40 divisions were in rear of the front opposite the Chateau Thierry and Reims sectors, in the Army Group of the Crown Prince; and about 30 divisions were farther north opposite the British front. Statements of prisoners indicated that the strength of German infantry companies had

fallen to 80 men, or one third less than at the commencement of the Spring campaigns. It was reasonably certain that the enemy would be unable to maintain existing strengths, and after this new offensive a further reduction would have to occur. G-2 noted that press reports quoted the German chancellor as having stated in a speech delivered on 21 June that a decision of the war could not be obtained on the battlefield. He considered this as meaning that the German High Command understood that they no longer had sufficient forces to win a decision. German morale was believed to be falling fast. It must now be clear to all in Germany, that their Allies could not continue to fight for any great length of time in the future. Their principal ally, Austria-Hungary, on 15 June had engaged 52 out of 79 divisions on the Italian front, and had been most decisively beaten at the battle of the Piave in a 10-day campaign ending on 25 June.

G-3 reported that in addition to divisions holding the line there were now ready, concealed in rear of the Allied front. 16 fresh divisions, ready for attack. Of this number, 11 divisions were in the Villers Cotterets forest, or woods south thereof, available for the contemplated counterattack south of Soissons; and 5 divisions were south of the Marne, or in Champagne, ready to intervene, under the direction of the Ninth Army, should the enemy's expected attack break through any part of the front.

On this day General Foch had a conversation with General Pershing in which he stated that he expected an attack in the Soissons—Chateau Thierry area sometime between 20 and 31 July. He thought it possible that by September the Chateau Thierry pocket could be completely wiped out by an offensive which he would undertake when the necessary numerical superiority had been obtained. Until that time, he requested that General Pershing allow the American divisions now in the Chateau Thierry sector to stay there, and not insist on transferring them to the Moselle area to further the American plan of an eventual march, towards Metz, into Germany. General Pershing left feeling that his plan for a great American army near the Moselle was in course of preparation. On the other hand, General Foch kept the American divisions, and did not reveal his intentions as to their employment.

On 12 July, G-2, at Allied GHQ, believed that the enemy would attack on 15 July, both along the Marne and in Champagne, as already announced, but that there would be no attack immediately around Reims. The front of these attacks would be approximately 90 kilometers. He contrasted this with a front of 70 kilometers in the attack of 21 March, and of 60 kilometers in the attack of 27 May. He was of the opinion that the coming attack would be very formidable.

In view of this estimate of the situation General Foch decided that the enemy would be unable to attack elsewhere at the same time, and that other localities were temporarily safe from danger of a serious attack. He at once asked the British C-in-C to release 4 divisions, and send them south, to remain at his disposition in rear of the Soissons front, to strengthen his reserves in this area.

G-3 reported that on 10 July the Fourth Army in Champagne had completed, in accordance with instructions received, the evacuation of the forward areas, except for outposts, extending in front of a position 3 kilometers in rear of their 1st main line of defense. The artillery had also been withdrawn, and the Army was ready to meet the enemy's expected attack. It was believed that the enemy had not noticed the withdrawal, and would expend most of his ammunition and energy in assaulting the evacuated territory. The Fifth Army had reorganized its lines, by increasing the depth, but it intended to defend its present lines, and would be ready, on order, to attack towards Fismes. The Sixth Army reported that its lines along the Marne had been ordered withdrawn, except for outposts, and that it intended to meet the enemy's attack, south of the Marne, on positions about 5 kilometers to the south of that stream. It would counterattack the enemy while he was astride the river, in accordance with plans prepared. That part of the Sixth Army north of the Marne, between Chateau Thierry and the Ourcq, did not expect an attack, but was itself prepared to join in the proposed counterattack south of Soissons. Reserves were concealed, and could be brought into line on short notice. The Tenth Army made a similar report. Its reenforcing artillery was already in line, dumps and reserve supplies had been accumulated, and plans

were complete. The attack divisions were concealed in woods, and could be brought up in a few hours.

Feeling certain that time was now short. General Foch, this day (12 July), sent out two letters. The first letter, sent to the Group of Armies of the Center, discussed the forthcoming *German* offensive. The latter would occur wholly within the zone of this Group; and its mission would be to maintain the continuity of the front, and then, as soon as the enemy had been brought to a halt, to counterattack. If the enemy should manage to make another deep pocket in the lines, the Ninth Army would be made available to the Group, and was to be employed in this case as a unit, to reduce the pocket without delay.

The second letter was addressed to both the Group of Armies of the Center, and the Group of Armies of the Reserve, and discussed the forthcoming *Allied* offensive. The mission of this operation was to reduce the Chateau Thierry pocket by two lateral attacks directed to the high ground north of Fère-en-Tardenois. The Tenth Army, assisted by the Sixth Army, was to attack on the front betwen Soissons and Chateau Thierry; while the Fifth Army, from southwest of Reims, would attack, astride of the Ardre, in a northwest direction. (The Ardre is a small stream rising in the wooded hills south of Reims and flows northwest to the Vesle at Fismes.) As a minimum, the enemy was to be deprived of his communications through Soissons, while the situation around Reims was to be improved by pushing back the enemy southwest of that city. Four days' notice of D day would be given by GHQ; and this notice might be given on 14 July, or any later day.

Transmitting to lower units the letter from General Foch, General Petain, by indorsement, directed attention to the fact that the coming battle had two phases; first, a defensive; and then, a counteroffensive. To best accomplish the latter mission, the Tenth and Sixth Armies were to reserve, fresh for the second phase, the maximum possible number of their troops. General Foch expressly approved this indorsement on the following day.

On 13 July, G-2 reported that on the entire front from Soissons to the east limit of the contemplated German attack, which

he was sure would occur on 15 July, there were.

in line	24	German divisions
reserve	40	German divisions
in all	64	German divisions

which represented the total expected weight of the German attack.

G-3 reported that to meet the foregoing hostile forces the following Allied divisions would be available for contemplated defence and counterattack:

With the Tenth Army	18	(2 American, 2 British, 14 French)
Sixth Army	15	(5 American, 10 French)
Fifth Army	14	(all French)
Fourth Army	18	(1 American, 17 French)
En route to join	5	(2 British, 3 French)
Total	70	Divisions

Counting American divisions as equivalent to 2 divisions of other nations, this gave a relative strength of 78 Allied divisions to meet the oncoming 64 German divisions. G-3 further stated that for the contemplated counterattack south of Soissons the Tenth Army, on a front of 20 kilometers, would have 1,880 guns, 375 tanks, and 40 squadrons of planes; while the Sixth Army, for a front of 14 kilometers, would have 1,320 guns, 170 tanks, and 28 squadrons of planes. The density of artillery was 99 guns per kilometer for the Tenth Army, and 94 guns for the Sixth Army. For the Sixth Army, 9 of its 15 divisions, including 3 American divisions, were to be on the attack front; the remainder of the Army had only a defensive mission south of the Marne, with possible counterattacks later of a more local character. The artillery available was considered ample for a very powerful fire support, and the necessary ammunition was on hand.

Confident that the enemy would attack on 15 July, and that he had now accumulated a superior force not only to defeat the attack, but to pass to the offensive and end the long trying period of the spring defensives, General Foch, on 13 July, wired the

Group of Armies of the Reserve that D day for the counterattack would be 18 July. He directed that H hour be at daybreak for the Tenth Army, which was to attack simultaneously with the commencement of the artillery preparation, while the Sixth Army would attack 1½ hours after the start of the artillery preparation.

On the afternoon of 14 July General Foch personally visited the CP of General Petain. He restated his determination to abandon the long series of defensive actions of the past months, and to pass to the offensive. He believed that the Allies had now sufficient forces to seize the initiative, and he proposed to do it by attacking south of Soissons on 18 July, as a reply to the German attacks across the Marne and in Champagne. He had accumulated superior forces in the present theater of operations, and believed that with the constant stream of American divisions arriving in France he would continually increase in strength, whereas the enemy was bound to decline in strength and in morale. He foresaw that in a continuation of the proposed offensive the Germans could be driven out of France and much of Belgium. He was ready for the battle.

Everything was now prepared for the moment when the Allies, who had been nearly four months on the defensive, and who had been repeatedly defeated, would turn, fight back, and wrest the initiative from their enemy. Success would require:

a. That the enemy engage large forces in his attacks across the Marne, and in Champagne.

b. That the lines along the Marne, and in Champagne, despite small hostile advances, hold.

c. That the counterattack to be delivered on the Soissons—Chateau Thierry front surprise the enemy, and accomplish its mission before any rearrangement, or reenforcing of the enemy in this area, could be made.

THE WORM WAS READY TO TURN.

REMARKS TO AN EX-HORSEMAN

BY LUCY McREYNOLDS

THE July-August issue of THE FIELD ARTILLERY JOURNAL carried an article in praise of the motorization of the Army and congratulation for the Field Artillery on the rapid disappearance of the army horse. This was a remarkable article, not for what it said, but for its omissions.

What it said, from a professional point of view sounds reasonable—I shan't attempt to argue with even an anonymous officer about increased mobility, reduction of police duty, and so on. From a more social angle, I don't even dispute that horse shows are often overdone, and the Army cult of the horse frequently has a High Society value that has nothing to do with military horsemanship. We all know people who talk horse and drink horse, play polo and show jumpers chiefly because those are fashionable occupations.

All these valid criticisms our ex-horseman brought out clearly; but not once did he sound as if riding horses were fun. I wouldn't play polo if I could, and I don't like jumping (though I learned to ride a hunter over four feet as a precaution in cross-country riding); but still, in my sedate and restricted way, I find riding a saddle-horse far more exhilarating than driving an automobile. I know enough schooling to get a cynical amusement out of snagging ribbons from the judges in hack classes, but the fun there comes from outguessing my fellow-equestriennes as to what each group of judges think a hack should do. That's a sort of mounted poker game. I've ridden to hounds in two hunts too, and got a real thrill out of sailing cross-country with the wind blowing the hair off my head. Neither of these was an expensive hunt, or in a fashionable fox-hunting district; yet large fields turned out smiling at seven o'clock on cold Sunday mornings.

But horseshows and the polo and hunting seasons are sporadic—and the real fun of riding (which your author apparently never discovered) is the daily workout. I learned to ride before I went to school, racking through the back fields on a fat, retired saddle horse. Jack had a kindly disposition—when the saddle turned with me once, he stopped dead till I could scramble out from amongst his feet. I liked him. He also had a mouth of leather

and a horror of motors. When I was allowed out on the highway, our rides would be interrupted by violent dashes back side roads to escape from autos. I never could stop him, no matter how hard I sawed on his mouth, but old age and the heaves soon made him wheeze and he'd stop of his own accord. But, as I say, I liked him. He was a distinct, irritating, and amusing personality. Riding Jack is my pleasantest childhood memory. I was brokenhearted when he died in my tenth year. Yet there was surely nothing country club about this; just a little farm girl in a gingham dress, doing errands on a broken-down nag. Now I've been an Army man's wife for ten years, and had many chances to ride good horses. Each, good or bad, has been a definite individual. Each, from day to day, has been as varied in his reactions as any husband—and not so apt to talk back. As one Cavalry wife said, "You just can't ride a horse two hours every day without thinking different thoughts. You forget your own worries and get absorbed in him." Just moving along on a horse is an enjoyable exercise; trying to improve his gaits and his schooling a little every day is a fascinating problem, an end in itself. Nothing a horse show could offer was, to me, as exciting as exercising a nifty mare who'd just come off a month's sick report. Her injured ankle was ready for use at a walk—and she was ready for the Grand National. I kept her at a walk for an hour, with only one outburst of fireworks. The orderly, I noticed, discreetly avoided the saddle and led her back to the stables. Every day for weeks was a test of my tact and nerve—did your author never get any unspectacular fun out of his horses, like this?

If not, I think perhaps he should have taken up golf in the first place. That's reasonably fashionable.

EXTENSION OF FIELD ARTILLERY ROTC UNITS

BY LIEUT. COL. A. C. McBRIDE, FA

ABOUT a year ago an article by Lieut. Col. Edwin P. Parker, Jr., FA, appeared in THE FIELD ARTILLERY JOURNAL, giving the history and the development of the Field Artillery ROTC from its inception to the date upon which the article was written. In view of the many changes which have taken place in the Field Artillery ROTC during the past year, it is believed that it will be of interest to the Field Artillery to learn of the extent of these changes.

Since 1919 the Field Artillery ROTC comprised a total of twenty units, nineteen of which were horse-drawn and one of which was motorized. Although this number of units was insufficient to meet the requirements of the Field Artillery in reserve officers and the various Chiefs of Field Artillery from time to time had recommended an increase in the number of units, practically no changes were made in them during that period except the loss of one unit in 1928, namely, the University of Wisconsin, and the addition of one unit in the same year, namely, the University of Florida. During that period, however, there was a steady growth in the output of practically all these units, the total number of graduates increasing annually from 311 in 1922, the first full year of operation for all the units, to 1,106 in 1935.

Any plan for the enlargement of the ROTC of any arm should be based primarily upon the requirements of that arm in reserve officers for general mobilization. In 1935, the Field Artillery had a total of 10,870 assignable reserve officers. While this number represents an increase of 2,895 during the preceding five years, or an annual average increase of 579, it is far below the number it is estimated the Field Artillery would require under the Four-Army General Mobilization Plan. To provide the required number within a reasonable period of time and to make up for the annual loss in assignable reserve officers (approximately 8 percent), it was estimated that the Field Artillery ROTC should produce annually around 1,500 graduates. Assuming that the annual growth will continue to a certain extent (which assumption appears to be reasonable in the light of the general increase in student enrollment at colleges and universities), there will remain between 300 and 400 reserve officers who should be provided annually

by new Field Artillery units. Or, in other words, the Field Artillery ROTC set-up should be expanded to assure the production of this number of additional reserve officers.

In 1935, the 74th Congress appropriated one million dollars for FY 1936, for the establishment of new ROTC units in order to meet the many applications which had been submitted by educational institutions, including colleges, universities, and even high schools. There were around seventy-five applications for units of record in The Adjutant General's office when the question of additional funds for the establishment of new units was under consideration. Of this number, about fifty were for units of the junior division and the remainder for units of the senior division; many of them specifically requested Field Artillery units. The Field Artillery, as an arm, was relatively much shorter in reserve officers than were the other arms. The Infantry and the Cavalry had sufficient reserve officers to meet their requirements and an ROTC set-up sufficient to maintain those numbers. Consequently it was the good fortune of the Field Artillery to receive the lion's share of the institutions requesting units which could provide the necessary facilities and which were thought to be suitable from the standpoint of enrollment and ability to maintain a profitable unit.

The following table shows the new units which have been authorized during the past year and the number of reserve officers it is estimated they will produce:

Institution:	Locality:	Estimated number of ROTC graduates:
St. Bonaventure College	St. Bonaventure, N. Y.	30
Duquesne University	Pittsburgh, Penna.	35
Louisiana State University and A. & M. College	Baton Rouge, La.	40
Eastern Kentucky State Teachers College	Richmond, Ky.	35
Xavier University	Cincinnati, Ohio	35
Michigan State College of A. & Apld. Science	East Lansing, Mich.	40
Arkansas State College	Jonesboro, Ark.	35
University of Nebraska	Lincoln, Nebraska	50
University of Santa Clara	Santa Clara. Calif.	30

All of the foregoing units will be truck-drawn in character. It is of interest to note that the Field Artillery is prohibited by law from establishing any additional mounted ROTC units.

Inasmuch as the Field Artillery of the Regular Army is about forty percent horse-drawn to sixty percent motorized, virtually all of the National Guard of the Field Artillery is motorized, and the large proportion of the Organized Reserve Field Artillery units would be motorized upon mobilization, the Chief of Field Artillery felt that it was time to introduce instruction in motorized artillery in the existing horse-drawn units at least to the extent desired by the institutional authorities and the corps-area commanders. He felt that it would not be going too far to bring instruction in motorized artillery in the ROTC in the near future to the same proportion as that obtaining in the Regular Army, as indicated above. As a consequence, the institutions having horse-drawn units were called upon last spring to express their views in regard to a partial or complete conversion of their horse-drawn units to motorized units. This step was taken for the purpose of estimating the amount of motor equipment which would be required and of including provisions for funds for this purpose in the budget for 1938.

In the procurement of equipment for the new Field Artillery units which were authorized to be established the past year, sufficient equipment was purchased to meet the requirements of those units when they should reach their maximum strength and come into full operation, three or four years hence. This created a surplus over their estimated requirements for the first two or three years. Upon the receipt of the replies of the various institutions having horse-drawn units upon the question of motorization, it was found to be practicable to loan the surplus motor equipment set-up for the new units to the old units until such time as permanent equipment for them could be made available. The institutions requesting partial or complete conversion to motorized units and which were approved by the corps-area commander concerned are as follows:

Complete conversion to motorized units

University of Florida
A. & M. College of Texas
Oregon State Agricultural College

Partial conversion to motorized units

Yale University	Ohio State University
Cornell University	University of Illinois
Princeton University	University of Oklahoma
Alabama Polytechnic Institute	University of Utah

Electing to remain horse-drawn

Harvard University	University of Missouri*
Virginia Military Institute	Colorado State College of A. & M. Arts
Culver Military Academy	Stanford University
Iowa State College of A. & M. Arts	

The Purdue University ROTC unit, having been motorized from its inception, remains as such, with the exception that its old tractor equipment will be replaced by truck equipment. The University of Chicago is not included in any of the foregoing considerations, since the withdrawal of its Field Artillery ROTC unit at the end of the present school year has been agreed upon by the institution and the War Department.

This readjustment of the Field Artillery ROTC means that approximately thirty-nine percent of the units will be horse-drawn and sixty-one percent motorized; or, in numbers, seven will remain horse-drawn, eight will be mixed, and thirteen will be motorized.

The estimated output in reserve officers of the Field Artillery ROTC, as readjusted and when the new units come into full operation, is around 1,500, or about the number the Chief of Field Artillery estimated he would require annually to meet a reasonable mobilization-procurement objective within a reasonable time. It is probable that this number of graduates will be further increased by the authorization of more new units for the Field Artillery this coming year. In 1936, the Congress included in the Army Appropriation Bill for FY 1937, over one-half million dollars primarily for the establishment of additional new units. Several institutions are under consideration at present and approval of their applications is dependent upon the ability of the institutions to meet the requirements of the law regarding the establishment

*The University of Missouri has approved partial motorization of its unit, in principle.

of new units. Unquestionably, applications will be received from time to time during the coming year and, inasmuch as the intent of Congress in appropriating funds for this purpose was clearly defined in the law, the applications of institutions which are able to meet the legal requirements and prove to be otherwise suitable will unquestionably be approved, thus providing a further increase in the number of the Field Artillery ROTC units. While any further increase is not urgently required, as stated before, the Chief of Field Artillery is fully in accord with the idea that the ROTC is one of the most important activities in our scheme of national defense and is entirely favorable to the establishment of those additional units for the Field Artillery whose prospects are favorable and the future growth of which appears to be assured.

Much is heard nowadays of the defection of college students and their opposition to preparedness for national defense. Unless one investigates the extent of such activities, one is inclined to lay too much emphasis upon their importance and the effect they have upon the general mass of students and upon the institutions themselves. It should be gratifying to those who favor reasonable preparedness at a small cost to learn of the large number of educational institutions desiring to introduce military training into their curricula and of the relatively large increase in the number of students enrolling in ROTC units, particularly during the last few years. In the school year 1935-1936, the total enrollment in the Field Artillery ROTC was over twenty percent greater than in the preceding year. While it is often said that you can prove most anything you want with figures, nevertheless the increased enthusiasm for the ROTC movement on the part of both school authorities and the students themselves indicates that this vital element in our scheme of national defense is not in danger.

SPECIAL NOTICE

U. S. Field Artillery Association Prize Essay, 1937

AN annual prize of $300.00 is offered by the United States Field Artillery Association for the best essay submitted by any Field Artillery officer of the Regular Army, National Guard or Reserve Corps on any subject of current interest pertaining to the Field Artillery.

The following rules will govern this competition:

(1) The award of prize to be made by a committee of three members to be nominated by the President of the Field Artillery Association voting by ballot and without knowledge of the competitors or of each other's vote.

(2) Each competitor shall send his essay to the Secretary-Treasurer of the Association in a sealed envelope marked "Prize Essay Contest." The name of the writer shall not appear on the essay, but instead thereof a motto. Accompanying the essay a separate sealed envelope will be sent to the Secretary-Treasurer, with the motto on the outside and the writer's name and motto inside. This envelope will not be opened until after the decision of the Committee.

(3) Essays must be received on or before January 1, 1937. Announcement of award will be made as soon as practicable after that date.

(4) The essay awarded the "United States Field Artillery Association Prize" will be published in the FIELD ARTILLERY JOURNAL as soon as practicable. Essays not awarded the prize may be accepted for publication in the FIELD ARTILLERY JOURNAL at the discretion of the editor and the writers of such articles shall be compensated at the established rate for articles not submitted in competition.

(5) Essays should be limited to 8,000 words, but shorter articles will receive equal consideration.

(6) All essays must be typewritten, double spaced, and submitted in triplicate.

FIELD ARTILLERY NOTES

Recent Trip of the Chief of Field Artillery

Major General Upton Birnie, Jr., Chief of Field Artillery, visited The Field Artillery School, Fort Sill, Oklahoma, during the week of the five-day General Field Exercise and the graduation of the Regular Class. Upon his return from Fort Sill, General Birnie stated that he was very much pleased with the manner in which the students and the troop units carried out their respective rôles in the problem, which was conducted as nearly on a war basis as conditions permitted.

While a certain amount of artificiality must necessarily obtain in peacetime military operations. General Birnie noted a marked improvement over previous years in some of the minor aspects of the exercise which are often overlooked or disregarded through the failure of the personnel to visualize the actualities of war and to realize the importance of training to meet them effectively.

Greater attention was paid this year to concealment, particularly from the air, both while in movement and in position. General Birnie feels, however, that much yet remains to be accomplished in the matter of concealment against air observation, not only in the perfection of training of field artillery units in the means and methods now available, but also in the development of more effective measures for the concealment of artillery in position and artificial camouflage. Truck-drawn artillery, with the large silhouettes formed by the trucks, and the tracks made in the occupation of firing positions, presents new problems for which solutions must be found.

General Birnie was also highly pleased with the general improvement in housing conditions at The Field Artillery School during the past year, and what has been accomplished with the relatively small amount of general repair funds allotted Fort Sill for the F. Y. 1936. The Field Artillery School, however, is still an unfinished project. General Birnie estimates that about one-third of the original approved layout remains unfinished because of the lack of funds. The most pressing needs in construction at Fort Sill are two additional barracks, the completion of the Academic Building, and motor housing for troop units and the School.

Field Artillery ROTC Annual Pistol Competition
Purdue Successfully Defends Championship

For the second consecutive year, the winner of the annual Field Artillery ROTC .22 Caliber Pistol Competition is Purdue University. For 1936 their score was 1370.

The four teams next in order of scores are as follows:

2. Colorado State College..... 1347
3. University of Illinois..... 1347
4. University of Missouri..... 1335
5. University of Florida 1327

For this year, the University of Illinois and the Colorado State College of A. & M. Arts tied scores for second place, both having scores of 1347. According to the National Rifle Association's "Official Rules" manual for 1936, "Ties in Pistol Team Matches will be decided—

"By the highest team aggregate at the rapid fire stage;"* * * *

Since Illinois' aggregate score at rapid fire was only 447 whereas Colorado's was 454, second place goes to Colorado State and third place to Illinois.

The scores of each member of the teams having the three highest scores follow:

PURDUE UNIVERSITY—SILVER MEDALS

NAME	SLOW	TIMED	RAPID	TOTAL
Newhall, J. N.....	83	98	94	275
Grannis, C. O.	88	94	96	278
Greiner, J. W.	87	98	94	279
Baker, J. M.	82	91	93	266
Cissell, R. J.	86	95	91	272
			Total.....	1370

COLORADO STATE COLLEGE—BRONZE MEDALS

NAME	SLOW	TIMED	RAPID	TOTAL
Orr, Robert L.....	83	94	95	272
Stephenson, John E.	85	94	93	272
Markham, Wendell.....	89	91	89	269
Dawson, Merle	88	94	87	269
Congdon, Albert L.	91	84	90	265
			Total.....	1347

UNIVERSITY OF ILLINOIS—BRONZE MEDALS

NAME	SLOW	TIMED	RAPID	TOTAL
Sprengling, G.	89	94	93	276
Strieter, R. M.	85	98	90	273
Baker, B. O.	88	90	92	270
Dunn, A. L.	84	97	85	266
Kingman, D. S.	84	91	87	262
			Total	1347

The three highest individual scores in the match were made by the following:

Greiner, J. W., Purdue University	279
Grannis, C. O., Purdue University	278
Sprengling, G., University of Illinois	276

Since the inauguration of the Field Artillery ROTC .22 Caliber Pistol Competition, it has been won by the following institutions:

1930—Purdue University
1931—Princeton University
1932—University of Missouri
1933—University of Oklahoma
1934—University of Oklahoma
1935—Purdue University

The P.M.S. & T., Purdue University, will have the Challenge Cup suitably engraved. Individual medals for members of the teams winning places in the competition will be forwarded by the office of the Chief of Field Artillery as soon as received from the National Rifle Association.

Field Artillery Polo Team Circuit Champions

The Field Artillery Polo Team walked off with an easy victory in the Rocky Mountain Intra-Circuit Tournament, held at Fort Sill June 28th to July 5th, and as circuit champion is eligible for the Inter-Circuit Tournament to be held at Cleveland in August. The Rocky Mountain assembly was the first held in that circuit for five years. But six teams entered the tournament, however; two from Oklahoma City (Jack Shaffer's Cowboys, and the Army and Navy team), one from Anadarko, another from Duncan; and two from the post (the Field Artillery Team and one hastily put together under the name of "Fort Sill").

The Field Artillery Team (Capt. Hugh Cort, Capt. C. N. McFarland,

Lt. E. A. Walker, and Capt. H. W. Kiefer) won successively as follows:

Over the Cowboys, 12 to 5 (1 by handicap). These had in their lineup Jack Shaffer, Luther Weeks, Cecil Childers, Roy Barry and J. Perry (sub).

Over Anadarko, 14 to 8 (4 by handicap). The Anadarkans played Eli Phillips, Joe Cox, Tony Brabant, Red Loomis, and Messrs. Hermes and Howard (subs).

And, over Army-Navy, 12 to 7 (4 by handicap). The redoubtable Clyde Watts, Cliff Frates, Tom Walsh, and Joe Barnhill succumbed to superior strength in a game that saw team captain "Packy" McFarland at the top of his game with 5 goals.

Army-Navy were runners-up in defeating "Fort Sill" 12 to 6 on the flat. Fort Sill played Maj. H. L. Watson, Capt. C. E. Berg, Maj. C. A. Beaucond (who, at Number Three, scored half his team's points) and Lt. V. B. Barnes.

Fort Sill had previously defeated Duncan (Alton Wagnon, Ben Sayre, Harold Wagnon, and Boyd Rogers) 14 to 6 on the flat, featuring Captain Chester Sargent, playing Number Two for Fort Sill, who celebrated his final game at the post by scoring eight goals.

Graduates U. S. M. A., 1936, Assigned to the Field Artillery

The appointment as second lieutenants in the Regular Army of the United States, with rank from June 12, 1936, and the assignment to arms of the following-named cadets, graduates of the United States Military Academy, class of 1936, are announced. Class rank is shown by the number in front of each officer's name:

FIELD ARTILLERY

26. Connor, William Mellard, Jr.
33. Milne, William David
34. Neff, John Keeler
36. Lampert, James Benjamin
37. Duin. Gerald Herman
47. Goodwin, James Emmett
49. Oswald, Paul Francis
50. Austin, Gordon Harrison
53. Rutledge, Jay Dean, Jr.
57. Crockett, Clement Wirt
59. McElheny, John Daniel
63. Lipscomb, Thea Lewis
64. Gapen, Robert Dean
66. McCoach, David, 3d
68. Mikkelsen, Harry Edgar
73. Gnuschke, Ralph Richard
74. Hahney, Everett George
76. Burnett, Robert Matthew
78. Vincent, Clinton Dermott
80. Hiester, David Woodrow

81. Hartman, Charles Dudley, Jr.
83. Smith, Selwyn Dyson, Jr.
84. Cato, Raymond Lemuel
85. Rogers, Irwin Walton
87. Davis, William Aldrich
89. Grove, Edward Alexander
91. Hulse, Seward William, Jr.
92. Carmichael, Richard Henry
93. Partridge, Robert Bruce
100. Robbins, Eldred George, Jr.
101. Duell, Napoleon Robertson
103. Bowen, Carl Kenneth, Jr.
104. Stokes, Orville Newton
106. Torrey, John Davis, Jr.
110. Grothaus, Donald Gilbert
112. Westmoreland, William Childs
113. Barlow, John Earl
115. Dawalt, Kenneth Francis
116. Wolf, Harold William
117. Spencer, Norman Calvert, Jr.
119. Terrell, Frederick Reynolds
120. Shea, Leonard Copeland
121. Tyler, Charles Bernard, Jr.
124. Bothwell, Frederick Charles, Jr.
126. Bowell, Beverley Evans
127. Bodine, Donald Read
128. McCorkle, Charles Milton
133. Safford, Robert Hall
135. Clifton, Chester Victor, Jr.
136. Cairnes, William Denton
137. Brimmer, John Godfrey
139. Griffith, Wilbur Maben

FIELD ARTILLERY GRADUATES—ARMY WAR COLLEGE, NAVY WAR COLLEGE, ARMY INDUSTRIAL COLLEGE—AND THEIR FUTURE ASSIGNMENTS

ARMY WAR COLLEGE

Name	*Future Assignment*
Lt. Col. W. E. Burr	Instructor, C&GSS, Ft. Leavenworth, Kans.
Lt. Col. H. Eager	Bureau of Insular Affairs, Washington, D. C.
Lt. Col. J. N. Greely	War Dept. General Staff, Washington, D. C.
Lt. Col. H. J. Maloney	F. A. Board, Ft. Bragg, N. C.
Lt. Col. F. C. Wallace	ROTC, Alabama Polytechnic Inst., Auburn, Ala.
Lt. Col. O. Ward	83rd F. A., Ft. Benning, Ga.
Major L. J. Fortier	1st F. A. Brigade, Ft. Hoyle, Md.
Major H. D. Jay	11th F. A. Brig., Schofield Barracks, T. H.
Major J. W. MacKelvie	83rd F. A., Ft. Benning, Ga.
Major H. L. McBride	Instructor, C&GSS, Ft. Leavenworth, Kans.
Major B. H. Perry	68th F. A. (Mech.), Ft. Knox, Ky.
Major S. E. Reinhart	USMA, West Point, N. Y.

NAVAL WAR COLLEGE

Lt. Col. W. R. Gruber	17th F. A., Fort Bragg, N. C.
Lt. Col. T. T. Handy	War Dept. General Staff, Washington, D. C.

ARMY INDUSTRIAL COLLEGE

Major C. C. Alexander	10th F. A., Ft. Lewis, Wash.

Field Artillery Graduates—Command and General Staff School Class of 1934-36

Name	*Future Assignment*
Major L. H. Hanley	Instructor, The F. A. School, Ft. Sill, Okla.
Major A. M. Harper	ROTC, Xavier University, Cincinnati, Ohio

Major G. O. Kurtz.....ROTC, Purdue University, Lafayette, Ind.
Major O. F. Marston .....1st F. A., Ft. Sill, Okla.
Major M. Ross .....Air Corps Tactical School, Maxwell Field
Major D. S. Rumbough.....G. S. Troops, Manila, P. I.
Major G. D. Shea.....Instructor, The F. A. School, Ft. Sill, Okla.
Major J. J. Waters, Jr. .....11th F. A. Brig., Schofield Barracks, T. H.
Capt. E. Y. Argo .....Instructor, Ill. National Guard, Chicago, Ill.
Capt. G. B. Barth .....Instructor, N. Y. National Guard, New York, N. Y.
Capt. M. A. Cowles .....11th F. A. Brig., Schofield Barracks, T. H.
Capt. L. R. Garrison.....A&M College of Texas, College Sta., Texas
Capt. D. O. Hickey .....10th F. A., Ft. Lewis, Wash.
Capt. J. M. Lewis.....19th F. A., Ft. Benjamin Harrison, Ind.
Capt. J. M. Lentz .....F. A. Board, Ft. Bragg, N. C.
Capt. E. J. McGaw.....USMA, West Point, N. Y.
Capt. O. C. McIntyre .....5th F. A., Madison Barracks, N. Y.
Capt. L. T. McMahon .....Instructor, Pa. National Guard, Harrisburg, Pa.
Capt. P. P. Rodes .....Instructor, The F. A. School, Ft. Sill, Okla.

Class of 1935-1936

Major R. G. Barkalow .....ROTC, University of Nebraska, Lincoln, Nebr.
Major H. W. Blakeley.....Instructor, The F. A. School, Ft. Sill, Okla.
Major B. A. Day .....Instructor, The F. A. School, Ft. Sill, Okla.
Major A. C. Fitzhugh.....Instructor, The F. A. School, Ft. Sill, Okla.
Major H. J. Gaffey .....68th F. A., Ft. Knox, Ky.
Major Z. E. Lawhon.....ROTC, Princeton University. Princeton, N. J.
Major M. M. Montgomery.....Gen. Staff with Troops. 5th C. A., Ft. Hayes, Ohio
Capt. S. A. Beckley.....ROTC, Purdue University, Lafayette, Ind.
Capt. C. C. Blanchard.....17th F. A., Ft. Bragg, N. C.
Capt. B. M. Bryan, Jr. .....Instructor, The F. A. School, Ft. Sill, Okla.
Capt. B. Campbell .....ROTC, Arkansas State College, Jonesboro, Ark.
Capt. H. A. Cooney.....Liaison Officer, Ft. Monmouth, N. J.
Capt. I. L. Foster.....ROTC, University of Florida, Gainesville, Fla.
Capt. A. E. Fox .....11th F. A. Brig., Schofield Barracks, T. H.
Capt. A. J. Hastings .....82d F. A., Ft. Bliss, Texas
Capt. H. M. Jones .....4th F. A. Brig., Ft. Sill, Okla.
Capt. C. B. Leinbach.....76th F. A., Presidio of Monterey, Calif.
Capt. J. R. Sheetz.....Office of The Chief of Field Artillery, Washington, D. C.

Graduates—The Field Artillery School, 1935-36 Class

ADVANCED COURSE IN COMMUNICATION (REGULAR ARMY)

Capt. S. Edwards	1st Lieut. J. F. Fiske
Capt. H. C. Fowler	1st Lieut. A. R. Fitch
Capt. D. Larr	1st Lieut. H. S. Whitely
1st Lieut. R. E. Chandler	1st Lieut. H. W. Wilkinson

Capt. V. Z. Gomez (P. S.)

ADVANCED COURSE IN HORSEMANSHIP (REGULAR ARMY)

Capt. W. A. Samouce

1st Lieut. A. G. Stone	1st Lieut. A. Watson. II

ADVANCED COURSE IN MOTORS (REGULAR ARMY)

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1st Lieut. J. M. Burdge, Jr.	1st Lieut. G. M. Wertz, Jr.

Capt. V. Z. Gomez (P. S.)

REGULAR COURSE (REGULAR ARMY)

Capt. C. P. Nicholas

1st Lieut. W. H. Allen, Jr.	1st Lieut. V. B. Barnes
1st Lieut. J. L. Beynon	1st Lieut. R. H. Booth
1st Lieut. H. E. Brooks	1st Lieut. J. K. Bryan
1st Lieut. R. L. Brunzell	1st Lieut. P. Clark, Jr.
1st Lieut. W. P. Connally, Jr.	1st Lieut. T. J. Counihan
1st Lieut. A. V. Dishman	1st Lieut. G. C. Duehring
1st Lieut. E. H. Eddy	1st Lieut. K. H. Ewbank
1st Lieut. R. W. Goldsmith	1st Lieut. A. C. Goodwin, Jr.
1st Lieut. J. G. Harding	1st Lieut. J. P. Hannigan
1st Lieut. R. E. Hatton	1st Lieut. W. H. Hoover
1st Lieut. J. C. Hayden	1st Lieut. W. E. Johns
1st Lieut. C. J. Hatton	1st Lieut. P. H. Lash, Jr.
1st Lieut. C. R. McBride	1st Lieut. C. W. McConnell
1st Lieut. E. H. McLemore	1st Lieut. F. P. Miller
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1st Lieut. R. J. West, Jr.	1st Lieut. J. K. Wilson, Jr.

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1st Lieut. S. T. Clark, U. S. M. C.	1st Lieut. D. McP. Weller. U. S. M. C.
1st Lieut. J. S. Letcher, U. S. M. C.	2d Lieut. J. Chang, Chinese Army

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