

THE FIELD ARTILLERY JOURNAL

JULY-AUGUST, 1934

**PUBLISHED BI-MONTHLY BY
THE UNITED STATES FIELD ARTILLERY
ASSOCIATION**

July-August, 1934

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THE FIELD ARTILLERY JOURNAL

EDITED BY
DEAN HUDNUTT

MAJOR, FIELD ARTILLERY, UNITED STATES ARMY



Patron Saint of Artillery

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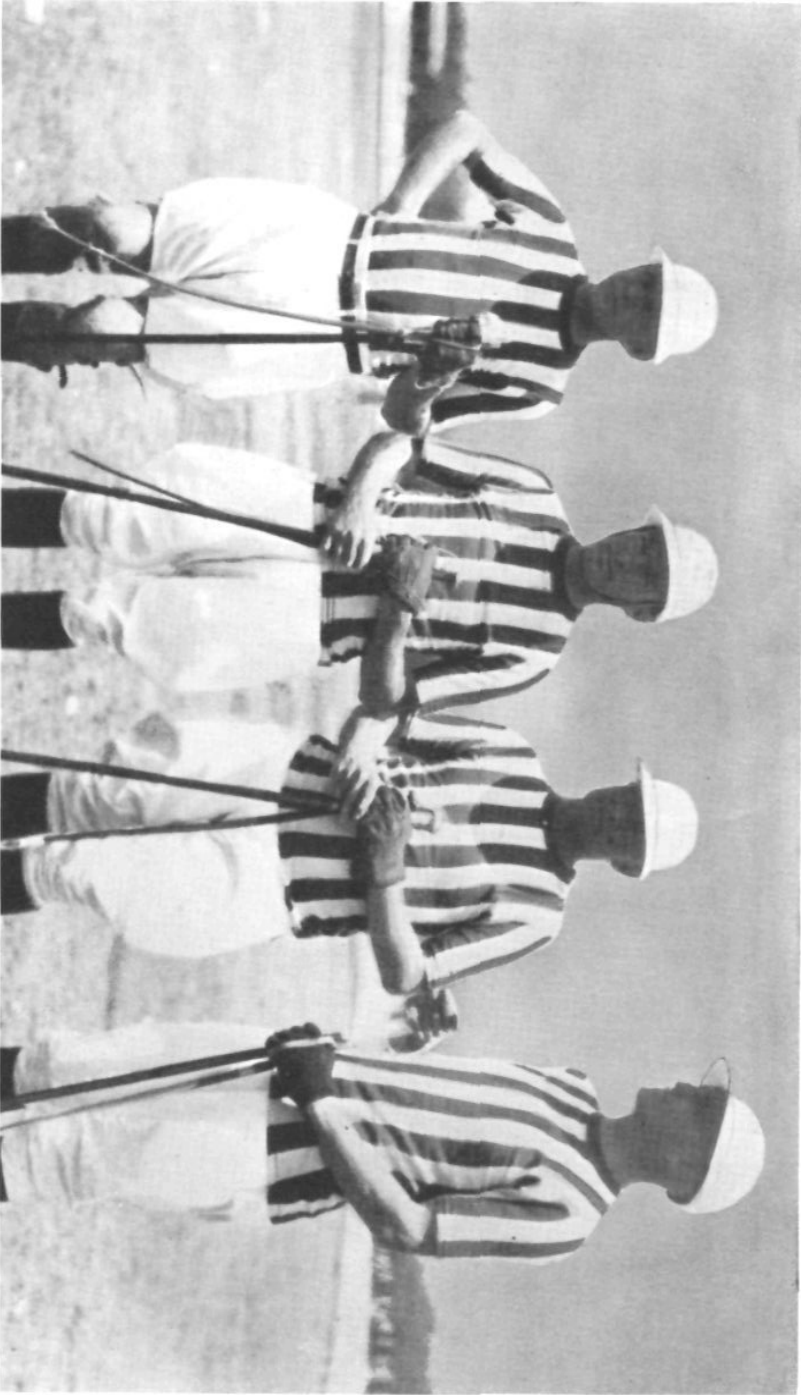
from

to

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(Signature)

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CAPT. C. E. DAVIS

THE AMERICAN ARMY POLO TEAM

MAJ. C. C. SMITH

CAPT. L. K. TRUSCOTT

MAJ. J. M. SWING

THE FIELD ARTILLERY JOURNAL

VOLUME XXIV

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AN INTERNATIONAL POLO MATCH

The U. S. Army vs. The Mexican Army

THE Mexican Government formally invited the United States Army, in December, 1933, to send an All-Army Team to Mexico City in the spring of 1934 to play a series of match games with a selected Mexican Army Team, a trophy to be given by President Rodriguez to the winner of two out of three games. This event proved to be the climax of a series of tournaments which have been taking place during the past several years between Mexican Teams and representatives from our border stations and civilian teams from Texas and California.

The attention of most Americans having been captured by the publicity incident to Argentine Polo and the activities of visiting English and Indian Teams, they have not been aware of the fine brand of polo which has been developed south of the border. It was only when, during the past Christmas Holidays, a 25 goal team from Texas was worsted two out of three by a team composed chiefly from the Mexican Army that the polo world realized that it was not "dub" polo which was being played in the Mexican Capital. To the doubting few who may have believed that this reversal of a team captained by the 10-goal star. Cecil Smith, and strong enough to enter our own open championship was simply one of those accidents of sport, a knowledge of the circumstances leading up to that and the later tournament with the American Army Team will soon dispel any such illusion.

When the facts are stated it could not be otherwise than that the Mexican Army should now possess a group of strong young players and a host of promising ones following closely behind. For the past ten years or more their polo has been sponsored by the Mexican Polo Federation, which, in turn, is a responsible government activity. Beginning with General Amaro, who as Secretary of War was also President of the Federation and still

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is a playing member, down to the present incumbent, General Limon, whose governmental position is Chief of all Supply Services, there has always been some high official personally interested in furthering the sport and organizing its support. At this writing the Executive, or Assistant Secretary of War, General Camacho, enters his own team on which he plays in all tournaments.

Added to this official backing is the unbounded enthusiasm of all ranks, officers and men. That the latter were so inclined was evidenced by the appearance of an organized cheering section in the bleachers during the playing of the series, an innovation at a polo match so far as the Americans were concerned.

However, the enthusiasm of the officers alone could not account for their remarkable progress were it not for two distinct qualifications the lack of which have handicapped so many beginners. First, it can be said without equivocation that of the numerous riders viewed in Mexico City on and off the polo fields there was not a poor one in the group. The ability of the polo players to handle their mounts was especially marked. Not even in the "dubbiest" of practice games did any instances occur when the players were more occupied in riding than in playing, as so frequently happens. Of course this can be accounted for when it is remembered what an important part the horse still plays, and will for sometime to come, in the transportation of that country. With this admitted advantage over the majority of beginners it is but natural that they should progress rapidly and soon learn to strike the ball at speed. Even so, the uncanniness with which even some of the lower rated players would meet the ball on their rough practice fields was amazing to the writer in the light of what has been his experience in similar circumstances at home. However, it was not long before a reasonable explanation could be offered for this skill in hitting.

Probably the first thought which enters the mind of an American when and if one should think of Mexican sport would be something in connection with Bull Fighting. It is true that this sport does arouse intense national interest, but it is closely seconded by another sport for which public enthusiasm runs almost as high. That is *Fronton*, the handball of the Basques, and admittedly

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the fastest ball game in existence. Every residence of moderate size, schoolyard, public park, and in the Army every barrack has one or more of these courts. It is no wonder that officers, playing from youth this game in which the ball travels almost as fast as a rifle bullet, should soon be adept at meeting a bounding polo ball.

These brief observations on the Mexican polo players in general are offered in advance of a description of the American invasion because the writer himself was at a loss to account for the apparent sudden rise in the polo world of the Mexican Team. Moreover, he was very dubious as to the ability of the American Army Team to win in a series of match games and consequently anxious to clear up the situation before hostilities, so to speak, began. Indeed, when about Christmas time of last winter the Mexican challenge was first received and at the same time a Mexican Team of three Army officers and one civilian (incidentally a Reserve officer) was joyfully engaged in taking two out of three games from the 25-goal Texas Team, the Army Polo Committee was extremely doubtful if an American Team could be organized in time. Nevertheless on January 15th the Committee recommended that, should the Chief of Staff decide that the officers could be spared from their official duties, a team should be sent not later than the first of March to play about the first week in April. In the meantime the officers slated to go to be informed so that they might get themselves and mounts in shape. This plan was approved and accordingly the following officers were notified:

Major J. M. Swing, F. A. (Captain)
Major C. C. Smith, Cav.
Captain C. E. Davis, Cav.
Captain L. K. Truscott, Jr., Cav.
Lieut. C. N. McFarland, F. A.
Lieut. Gordon Rogers, Cav.

These officers began training at once. Fortunately two of the officers, Captain Truscott and Lieut. Rogers, were stationed at Fort Myer, at which point it was possible to draw on not only the Army Polo String, but also have the use of the War Department, Third Cavalry, and 16th Field Artillery ponies.

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As a result, these two officers were able during the time intervening between the tentative acceptance of the invitation and final departure of the squad to pick out twenty-four* outstanding ponies from the four strings. The remaining six, making the thirty finally taken to Mexico, were obtained four from the 14th Cavalry at Fort Sheridan and two private mounts belonging to Major Smith.

Officers were required to place themselves in rigid training immediately as, from both newspaper accounts and military attaché reports, the effects of the altitude of Mexico City, some 8,000 feet, had been very serious on all previous visiting teams. From this time on, fitness of officers and their mounts for eight periods of fast polo was the goal so that a failure to win could not be said to be from lack of condition. The results of this early conditioning could be seen when the team was finally assembled at San Antonio on March 11th. The horses, all from almost zero weather in Chicago and Washington, were shipped from those two places by express on March 8th, arriving in San Antonio March 10th, in warm spring weather. The team stayed there six days and played three practice games. This was the first occasion that it had played as a team and that the horses had been in a period since the preceding season. None of the animals showed any signs of distress and all appeared as hard as the mounts of players then engaged in the Mid-winter Tournament.

As a result of the showing of both players and animals it was decided to ship at once to Mexico City so that there would be at least three weeks available for acclimation prior to the match games. The entire squad left San Antonio, therefore, on March 16th and arrived in Mexico City on Sunday, March 18th.

Upon arrival at Neuvo Laredo, on the border, the team was met by the Secretary of the Polo Federation, Captain Alfonso Del Rosal, and an interpreter, who accompanied them to Mexico City. There a welcoming committee led by General Limon, President of the Federation, Major H. E. Marshburn, Military Attaché, and representatives from the United States Embassy and the American contingent in the Capital accorded a most royal welcome,

*One Army pony sick with pneumonia replaced at San Antonio by private mount belonging to Colonel I. P. Swift.

AN INTERNATIONAL POLO MATCH

escorting the squad to the St. Regis Hotel with music and flowers. After arrangements for the various official visits had been made it immediately became apparent that a rigid schedule of conduct must be set up and followed if social duties and entertainments were not to interfere with the preparation for the matches.

After advice from an American physician, Dr. A. R. Goodman, long a resident of Mexico City, certain customs of the country were adopted and adhered to religiously. In the first place, for the better part of the first week, players confined their activities to short walks about the city. The heavy meal of the day was eaten at noontime. After this meal all players were required to repair to their rooms. After a few days it was apparent that all were spending the early afternoon hours in the manner contemplated by the team captain. This custom continued to the end of the visit and appeared to be the most appealing to all. Although no curfew was sounded, no evening parties or entertainments were accepted by the captain in behalf of the team. Acquiescence to this plan was but one of the ways in which the Mexicans showed such fine sportsmanship. The most hospitable of people, a round of evening entertainments had been contemplated by our hosts and there is no doubt that they were foregoing their own pleasures in this instance. All official and semi-official calls were made during the noon hour; such functions as were attended, cocktail parties, light suppers, etc., took place in the early evening.

In this connection, it is probably needless to say that no prohibition on the use of intoxicants was issued nor was one needed. All players were duly considerate of their training requirements without neglecting the amenities demanded by the situation.

As the matches were to be called at 11:00 A. M., all practice was scheduled in the morning and practice games at that hour. The first practice game was played on the first Thursday, four days after arrival, and consisted of six short five-minute periods on borrowed horses. Our own horses in the meantime were being settled down and toned up by walking one hour a day for the first three days.

The stable accommodations furnished were excellent, in fact, ideal for the climate. They consisted of a quadrangle of separated

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box-stalls, constructed of thick concrete and brick walls and ceilings, very roomy, airy and cool in the heat of the day. At this point, it is interesting to note the mutual ignorance of conditions on the part of horsemen in both countries. The normal ration for horses in Mexico is barley for the grain portion and alfalfa for the bulk, the latter when too green mixed with chopped straw. This was unknown to the Americans and similarly the fact that we depended generally on oats and grass hay was not realized by the Mexicans. Fortunately for the U. S. string a month's supply of oats had been shipped with the ponies. As for grass hay, there was not a bale in Mexico and so a wire was dispatched for some by express from Laredo. In the meantime, as several horses had slight touches of colic, the bulky part of the ration consisted mainly of straw. Once the hay arrived no further illness occurred and all animals gained weight. Of course the result of the tournament depended largely on their condition and great credit is due to Lieut. Gordon Rogers, 10th Cavalry, for the manner in which he and the orderlies selected by him from the Machine Gun Troop, 10th Cavalry, were able to bring these horses 3,000 miles from sea level to an elevation of 8,000 feet and have them in condition to play fast polo within the month. Some of Lieut. Rogers' observations on methods pursued are quoted herewith:

"The horses were shipped by express to Mexico City on March 16th, arriving on Sunday, March 18th. On the journey they were fed a dry mixture of $\frac{1}{4}$ oats and $\frac{3}{4}$ bran, three times a day. Fresh water in buckets was kept constantly in front of each animal. After arrival, for the first three days, they were led out one hour at a walk daily. The next three days they were cantered one period of five minutes each by the players. On Sunday, March 25th, one week from date of arrival, they were each played one period of $4\frac{1}{2}$ minutes and showed no signs of distress from the altitude.

"From then on it was believed that short frequent gallops would bring them to better playing condition than more extended work. The problem appeared to be one of expanding their lungs to full capacity. Accordingly they were all given light gallops by the players on the days that they did not play and played one 5-minute period each on Tuesday, the 27th, and a six-minute period each on Thursday, the 29th.

"In the first week in April they were played one $7\frac{1}{2}$ -minute period each on Sunday, Tuesday, and Thursday.

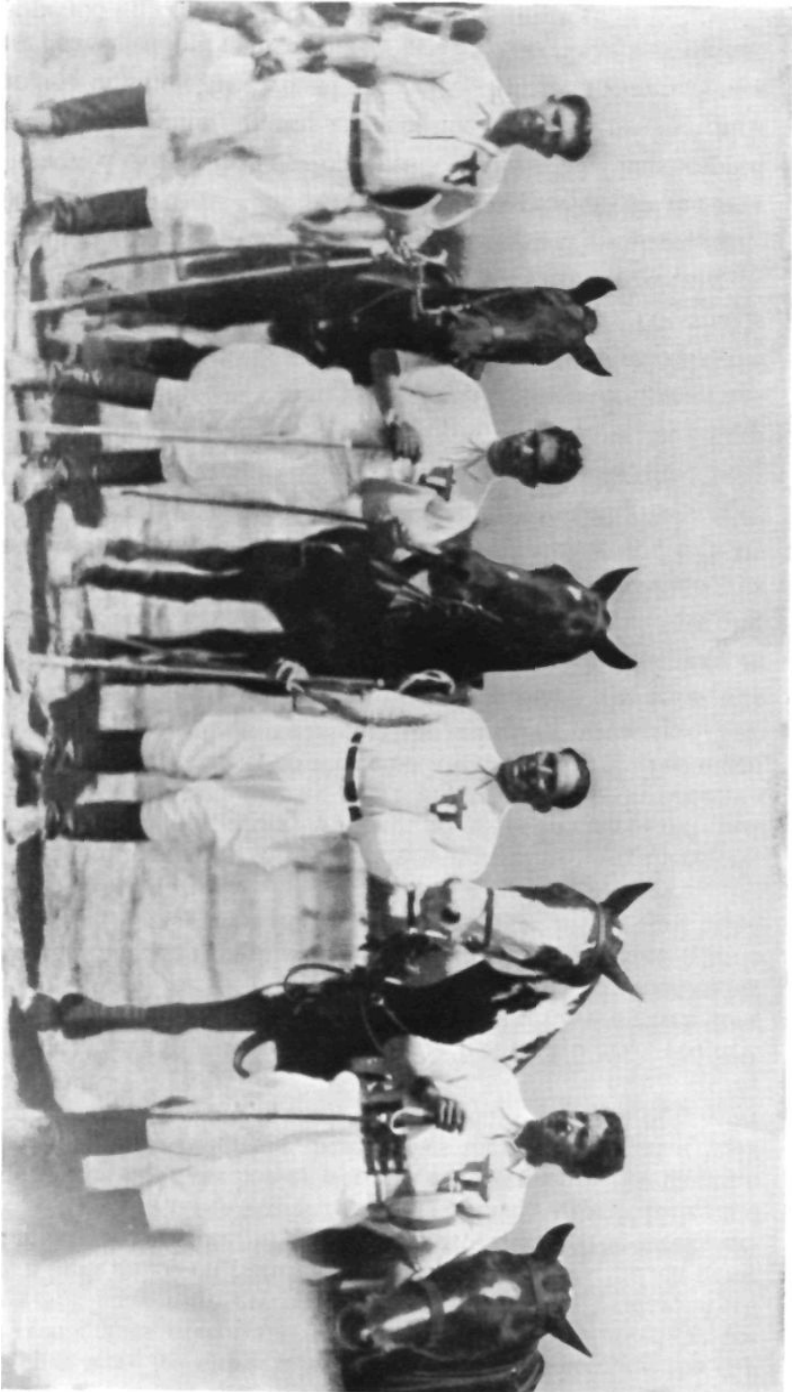
AN INTERNATIONAL POLO MATCH

"They were led out at a walk and grazed an hour on the day between games except special cases which were worked by the players. They were given a short walk only on Friday, April 6th, a light gallop on Saturday and played their first match game on Sunday, April 8th, in fine condition. During the weeks between the two other match games (Sunday, April 15th, and Sunday, the 22d) the horses were played in two practice games a week. On days following these games they were led at a walk for thirty minutes and grazed, on other days galloped lightly by the players.

"The grain ration was composed of 4/5 oats, 1/5 bran, fed dry. With the exception of a few good keepers, they were given four feeds daily. After polo games they were cooled out thoroughly and fed a hot bran mash which contained a few oats and a little salt. Each horse had a bucket of fresh water in his stall at all times.

"In conditioning horses at this altitude it seems wise, therefore, after three or four days' walking, to give frequent and fast periods of work and to play short practice periods in order to expand the lung capacity to accommodate the thin air. Too much stress cannot be laid on continuing the animals' normal feed."

And so with men and horses in excellent shape, the team was driven to El Campo del Marte (Field of Mars) in Chapultepec Park for the opening game on Sunday, April 8th. The playing field was smooth and soft and in fine condition. Although this was the end of the dry season, continuous sprinkling and irrigating had kept the ground soft and the turf smooth and green. For the past month a group (it appeared like a regiment) had been busy grooming the field and erecting a row of pavilions the length of the side boards on either side. By the time the game was called, these stands were crowded with government officials, the members of the diplomatic corps and their families. The stands were arrayed in bunting and flags and in the beautiful setting of Chapultepec Park, in the shadow of the President's Palace, made quite a gala picture. The parade of ponies previous to the first bell showed clearly that our opponents would not be handicapped for lack of mounts. It was an imposing array of ponies which marched in single file around the field. Finally the ceremonies were completed and approximately at 12:00 noon the bell for the first period was rung. The line-ups were as follows:



CAPT. J. GRACIA

CAPT. A. NAVA

CAPT. A. PEREZ

GEN. J. J. QUINONES

THE MEXICAN ARMY POLO TEAM

AN INTERNATIONAL POLO MATCH

<i>Mexican Army</i>	<i>Mexican Rating</i>	<i>U. S. Army</i>	<i>U. S. Rating</i>
No. 1 Capt. Jesus Gracia	4	Capt. C. E. Davis	5
No. 2 Capt. Antonio Nava	5	Maj. C. C. Smith	6
No. 3 Capt. Antonio Perez	5	Capt. L. K. Truscott*	3
Back Gen. J. J. Quinones	6	Maj. J. M. Swing	3

Referee: Senor J. Parada

Umpire: Senor J. Estrada

Senor A. Pliego

The opening play gave the American Team the ball, but the goal shot went wide. Immediately after the resulting knock-in the American Team was again on the offensive. At this point occurred the most serious accident of the series. Truscott, riding on the ball, was ridden off by Nava, coming in from the off side. Truscott's pony tripped and somersaulted once, landing solidly on his flank, and with a broken neck. Truscott was knocked unconscious but resumed play after ten minutes' delay. The American Team scored twice before the end of the period. During the second period it developed that Truscott was more seriously injured than at first seemed apparent. He was unable to swing his mallet beyond a half-stroke, and so was replaced at the end of the period by McFarland, who went in at No. 2, while Smith moved back to No. 3. The Mexican Team scored once during that period, as did the American Team. This was the last earned Mexican goal until the eighth period, when they scored twice. The second Mexican goal was made by Swing's pony in the fifth period. From the second period on the superiority of the American Team was apparent. McFarland and Davis were constantly on the ball and made one brilliant run after the other, keeping the Mexican Nos. 3 and 4 with their backs to the play at all times. The score at the end of the half was 6-1 and the final score was 12-4. The American horses, in the majority of cases, were superior to those of the Mexicans in both speed and handiness; although at times they were outrun, never were they outturned. Evidence of their good condition was shown in the ability of all of the top ponies to play two periods. The Mexican ponies were somewhat handicapped on the soft field due to the fact that all were smooth shod in front and some in rear.

*Replaced by Lieut. C. N. McFarland in 2d period.

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Evidently the overwhelming success of the American Team was considered somewhat of an upset. Many jubilant Americans testified to the long odds that they had received and their consequent good fortune. One retired Army officer confided that his vacation trip could be prolonged indefinitely inasmuch as the manager of his hotel had been sanguine enough to bet the equivalent of a month's lodging in one of the better caravansaries of the city. To one who has not visited Mexico City it is hard to convey the intense feeling which now prevailed. Signs appeared in all the public places similar to the copy below:

POLO

MEXICO NO HA PERDIDO

Ninguna de las 7 Series Internacionales Que

HA JUGADO

Assista Ud. El Proxima Domingo Al

CAMPO MARTE

y aliente a nuestros jugadores que montarán los mejores
caballos que hay en la capital

Players were called on for statements in the papers and broadcasts from their national station.

By the following Sunday enthusiasm was high and at game time the stands and side boards were even more crowded than they had been for the first game.

The second game was scheduled for 11:00 A. M., Sunday, April 15th. As on the previous Sunday, unavoidable delays in seating the crowds, parade of ponies, etc., postponed the actual starting to 12:00 noon. Weather again clear and hot with very hot breeze which was particularly obnoxious. Field very hard, dusty and quite rough.

Line Up

	<i>Mexican Army</i>	<i>U. S. Army</i>
No. 1	Capt. Jesus Gracia	Capt. C. E. Davis
No. 2	Capt. Antonio Nava	Lieut. C. N. McFarland
No. 3	Gen. J. J. Quinones	Maj. C. C. Smith
Back	Capt. Antonio Perez	Maj. J. M. Swing

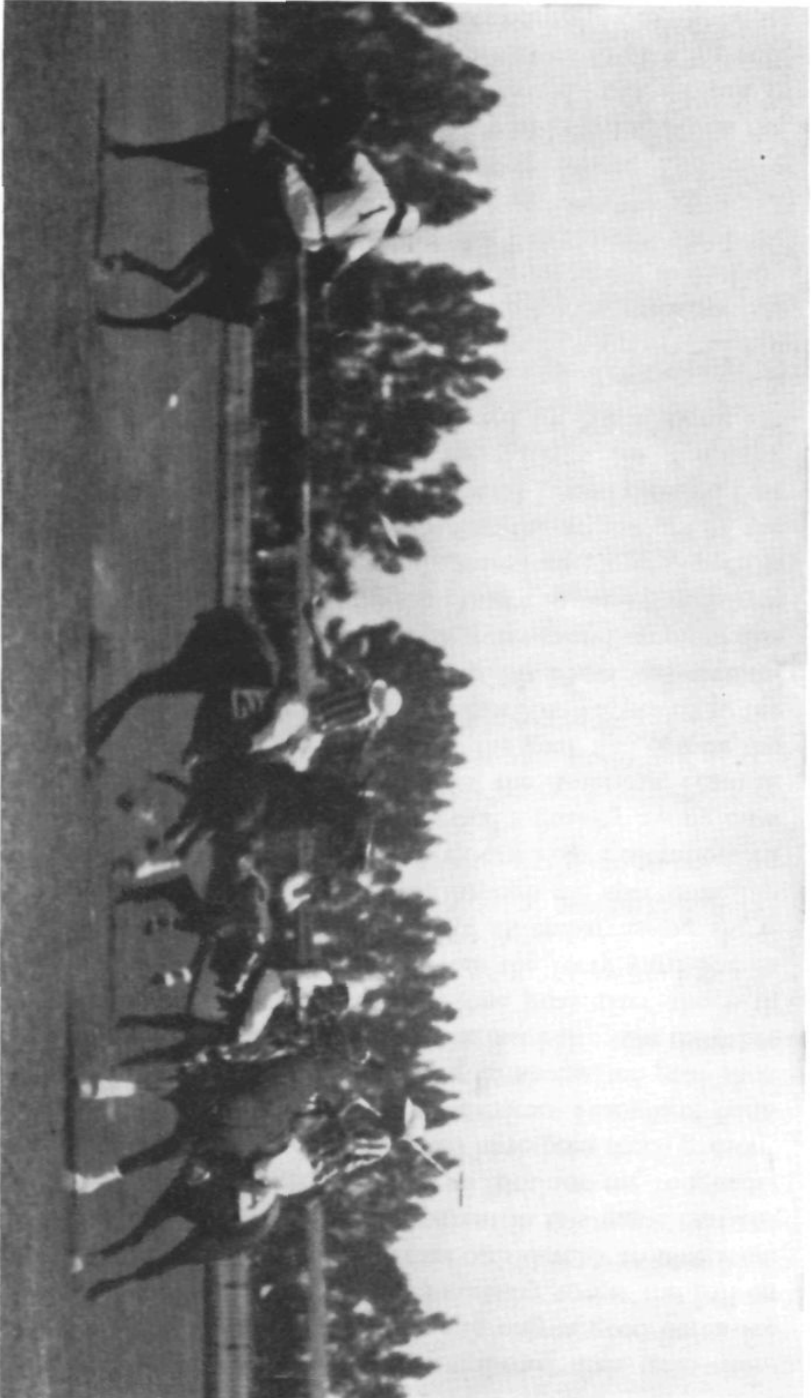
Officials: Same as first game.

AN INTERNATIONAL POLO MATCH

The Mexican change in line-up strengthened their team enormously. Perez at back proved to be not only a good defensive player but a power on the attack. His ability to get the ball on the throw-in caused the American Team considerable trouble from the outset. However, it was still apparent in this game that the American Team had the greater power. But for the roughness of the field, the difference in score would have been much greater. Beginning with the fifth period, the American Team kept hammering at the Mexican goal, missing goal shot after goal shot, but finally scoring six earned goals in the last half. On the other hand, the Mexican Team scored only one goal after the fifth period and that was on a free shot from the forty yard line in the eighth period. What promised to be an embarrassing situation in the eighth period was avoided through the sportsmanship of General Limon, President of the Mexican Polo Federation. In the first few minutes of play in that period a goal by Swing on a long shot from the middle of the field put the American Team in front. Although not in position to stop the goal, and despite the fact the whistle had not blown, the Mexican No. 3 appealed to the referee that the goal should not count as his horse was unmanageable due to broken equipment. The referee and umpires disagreed—time was taken out and the American Team withdrew to its horse line, as did three of the Mexican players, until a decision could be reached. After hearing the arguments of the one Mexican player and the officials, General Limon directed that the goal should count. Immediately thereafter a No. 2 penalty was called on Swing which was converted by Nava, tying the score 8 to 8.

In the extra period the Mexicans had the first opportunity to score, a goal shot hitting a goal post and bouncing back several feet into the field. From that point a pass from Swing to McFarland to Smith resulted in a run by the latter from which he scored. Final score 9 to 8.

The American horses had been gaining weight and were stronger than in the previous game. They had need to be, as the Mexican pony strength had also been increased. As a result it was necessary for each of the American players to play his best pony three periods, in order not to be outmounted.



A BIT OF ACTION IN THE INTERNATIONAL SERIES

AN INTERNATIONAL POLO MATCH

The third game of the series was called at 11:00 A. M., on Sunday, April 22d. The game was played at the request of the Mexican Polo Federation to enable that organization to obtain additional gate receipts. (In this connection, the Secretary of the Federation stated that the receipts were sufficient to cover all expenses of the tournament, also that this was most unusual.)

Weather again clear and hot. Field harder, dustier, and rougher than previous game.

Line Up

	<i>Mexican Army</i>	<i>U. S. Army</i>
No. 1	Capt. Jesus Gracia	Capt. C. E. Davis
No. 2	Capt. Antonio Nava	Lt. C. N. McFarland
No. 3	Capt. Quintin Reyes	Maj. C. C. Smith
Back	Capt. Antonio Perez	Capt. L. K. Truscott

Officials: Same as previous games.

The change in the Mexican line-up, i. e., substitution of Captain Reyes at No. 3 position for General Quinones was not made, it is believed, solely for the purpose of strengthening their team. As a matter of fact, it was the opinion of the American Team that their opponents were considerably weakened by the substitution.

From the outset of the game it was evident that the American Nos. 1 and 4 (Davis and Truscott) would be less than fifty per cent efficient, due to their injuries. However, despite this the game progressed evenly until the fifth period, when Smith's mallet hand received a blow, breaking it and forcing him from the game. Rogers replaced Smith, going in at No. 1, while Davis moved back to No. 2. The Mexican Team increased their margin to the score of 7 to 2 in the next two periods. However, the American Team staged a brilliant rally to score 3 goals to the opponents' zero in the last period, making the final score 7 to 5 in favor of the Mexican Team.

The presentation of the cups was made after the third game by the Honorable Josephus Daniels acting at the request of President Rodriguez in his stead as the latter was called from the city on official business. The Ambassador, in his talk, voiced the sentiments

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of many, both Americans and Mexicans met during the five weeks in Mexico, that this series had done much to further the understanding and friendly relations between the two countries.

Unfortunately, due to the length of the time necessary to play the series, the team was not able to remain over and accept the numerous invitations and courtesies which had been planned at the conclusion. At that, every moment until the departure on Tuesday following the last game was occupied in a round of entertainment, winding up with a farewell escort to the train on which the team was carried in the special car of the Secretary of War to the border.

The matter of expense on an expedition such as described is always a great problem to any Army Team. In this instance after crossing the border all expenses were borne by the Mexican Polo Federation. All transportation expenses to Laredo and back to home stations and the cost of all the team's equipment was financed through funds appropriated by the U. S. Polo Association. Without the support of the latter organization the U. S. Army could not have accepted the Mexican challenge.

Upon receipt of the report of the team captain, the executive committee further realized that some attempt to reciprocate the courtesies and good sportsmanship of the Mexican Federation should be made. And so at a special meeting of that body on June 8th, 1934, it was decided to underwrite the expenses necessary to bring a Mexican Team to the United States, for a return series. As a result, the Army Central Polo Committee has invited the Mexican Army to send its team to participate in a series in Washington to be played on three successive Sundays, beginning Sunday, September 23rd, 1934.

It is hoped that this competition will continue and help to foster the cordial relations between the two countries.

ARTILLERY AND INFANTRY COMBINATION

BY COLONEL ALLEN J. GREER, FIELD ARTILLERY

NOT very long ago the dividing lines between the various branches of the Service were sharply drawn and it was easy to classify certain weapons as belonging strictly to one arm. The infantryman with his rifle and bayonet was far removed from the artilleryman and his three-inch or larger cannon. Yet today, the infantry is equipped with the magazine rifle, the automatic rifle, the machine gun, the one-pounder cannon, and the three-inch trench mortar.

While the first two are still essentially the infantryman's weapons, what about the last three? The machine gun, then known as the mitrailleuse, made its first appearance on the battlefield in the Franco Prussian War with the French Army as an artillery weapon. Yet Von Ludendorf in his "Own Story" says: "In the infantry company the light machine gun had to become a thoroughly familiar weapon. It was, however, still regarded as an auxiliary weapon. The fact that the light machine gun was now the true "infantryman," while the "infantryman" of yesterday was nothing more than a "rifle carrier" had not yet sunk deep into the mind and conscience of the infantry, let alone the rest of the army. Owing to its power compared with that of a rifle, the light machine gun as its introduction became more general, was bound to become the main infantry weapon."

In our own army we have been reluctant to admit that the individual rifleman and his bayonet are gradually falling into a secondary role and that the machine gun with us, as with the Germans, is becoming the main weapon of our infantry. As for the one-pounder or 37 mm gun, it is essentially artillery, although smaller in caliber than other weapons used by the field artillery.

During the war, we had a peculiar distinction in the trench mortar organization. The six-inch mortar battery belonged to the Artillery Brigade and the three-inch mortars were in the Infantry Regiments, as they now are. Except in caliber there were no great differences in the two weapons, or their tactical and technical uses.

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We thus find the infantry, so far as the so-called auxiliary weapons are concerned, blending almost imperceptibly with the artillery, and an infantry regiment, or for that matter a battalion in combat, is in reality a combination of infantry and field artillery.

While other arms have exceedingly important roles in war, the ultimate decision rests upon the infantry and artillery. The latter furnishes the fire power and inflicts the great majority of casualties, but the infantry remains the arm of maneuver and shock, and ultimately decides the battle. To obtain victory there must be cooperation and team work which only comes from a thorough understanding of the problems confronting not only one's own arm, but the other's also.

It has been rare in the past for an artilleryman to estimate a situation from the standpoint of an infantryman and vice-versa. Mere casual liaison between the two can never give perfect results; the two must be one in general thought, purpose and training, differing only where specialization requires. Each must be brought to realize it is merely part of one team and by combined effort alone is success assured.

Common training, association and understanding have produced desired results within the infantry regiment. Cooperation between riflemen, machine guns and the auxiliary weapons has been secured. Liaison, so often talked about and so rarely obtained, actually exists within the unit. It is not essentially different between artillery proper and infantry, but merely easier because on a smaller scale. The question then arises, will not a similar result follow when a brigade contains within itself the essential elements of fire and mobility, that is, artillery and infantry?

Every battlefield is a scene not only of violence, but also of confusion. The army which has the least of this becomes the victor. To avoid this confusion there must be that cooperation between the infantry and artillery before mentioned. It can result only from discipline and that feeling of confidence and mutual understanding so much desired and so seldom found.

Due to changes in modern weapons and the absorption into the infantry of artillery weapons, technical and tactical methods, it occurs to the writer that perhaps our organization should be radically changed for the purpose of more closely tying the two arms

ARTILLERY AND INFANTRY COMBINATION

together and thus acquiring greater harmony and common interest. It has been mentioned that the infantry regiment has absorbed a certain amount of light artillery to acquire the necessary fire power. Why then is it not logical to proceed further in the same direction in the organization of higher units?

That there was a trend in this direction in the German Army in the last year of the war is evident. Again quoting from Von Ludendorf: "In each division therefore, field guns were withdrawn from their units for short range work and were attached to battalions or regiments as infantry guns. The formation of special batteries of infantry guns had been started in the meantime, but little progress had been made." The Germans had better results with these accompanying guns and batteries than did the Allies, but it is believed neither obtained the success that would have followed, had they possessed a weapon with the fire power, mobility and ease of concealment, such as we actually now have in our 75 mm pack howitzer.

Without discussing at length the manner in which our division is organized, it can be stated that practically every other first class military power has discarded the square division, (which we adopted during the war) and has gone to the triangular one, possessing relatively greater mobility and fire power.

This article deals with the triangular division only and proceeding logically from the arguments already given, proposes to develop further the trend already mentioned, namely the blending of artillery and infantry in units higher than a regiment.

Assuming the infantry regiment will be organized substantially as at present, then why should not the brigade consist of one regiment of infantry and one of light artillery, with three battalions equipped with a light howitzer, capable of high angle fire from defiladed positions near the front, thus giving close and powerful support to the infantry?

It may be argued that this is giving a proportionate strength to the artillery that is excessive and unreasonable. However, one of the lessons most clearly demonstrated during the War was that infantry could not make progress on the offensive unless it was supported by a great superiority of artillery fire. To obtain this artillery superiority we saw divisions supported by not only their

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own artillery, but by the artillery of one or sometimes two divisions, the infantry units of which were recuperating in rest areas. In fact, in a few instances the organic artillery of a division actually never served with its own organization but at times supported one or more different divisions.

The very nature of this arrangement prevented a common feeling, understanding and esprit such as is necessary if perfect coordination is to result. In other words, to supply a deficiency in the artillery strength of the divisions as organized, we resorted to a temporary make-shift that was bound to result in lack of cooperation.

As mobility is so highly essential for first line troops, the cannon for the artillery should be similar to our present 75mm howitzer, weighing less than 1,500 pounds, with some important modifications, including wheels with large balloon tires and fixed ammunition, representing not more than two zones of fire. It should of course be motorized but, on account of its light weight, it could be run into position very easily by the gun crew and its lack of height would materially assist in concealment. Its range of 9,200 yards, although not so great as the 75mm gun, is ample for close support of the infantry, and it would be forced to keep reasonably close to the front, thus insuring liaison by proximity. Its high angle of fire would permit not only the occupation of positions behind masks inaccessible to the gun, but it would also cover dead spaces that the gun cannot. This would mean in some instances drawing fire from the enemy, but after all this would not at times disappoint the infantry, as fire on the artillery means that much less on themselves and infantrymen are apt to recall at times that their losses were about fifteen times as great as those suffered by artillery during the War.

Let us assume that the so-called infantry division consists of three brigades, and each of these brigades consists of a regiment of infantry and one of artillery. A natural battle formation would be two brigades in front line, which would mean two infantry regiments. The third brigade in reserve should naturally have all artillery in action under direction of the division commander.

The two front line regiments would probably have two infantry battalions on the line, and one in reserve. The battalion of artillery

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in reserve should supplement the fire of the others until the battalion it normally supports goes on the line, when it would support that unit. It may be argued that the division artillery has really become infantry and their weapons "infantry guns" as Ludendorf calls them, but after all, "what's in a name?" Moreover, for all practical purposes are not the divisional light batteries far closer to the infantry in thought, training and action than are batteries of 240mm howitzers and railway guns, both of which are classified as field artillery?

An infantry division in attack would then present about the following picture. The first wave would consist of tanks and individual riflemen. Closely following these would be the machine guns, 37mm guns and trench mortars, giving the fire power necessary to closely support the assaulting line and carry it forward. Back further would be the infantry reserves and not far from them the light artillery battalions, protecting and supporting the infantry advance elements.

The corps would consist of two or more divisions on the line and one or more in reserve: so, backing up the division artillery, and slightly further to the rear, would be the brigade of corps artillery with its medium and heavy caliber cannon. Their principal missions would be counter battery, deepening and supplementing the fire of the divisional artillery and fires of destruction.

Next would come the Army, which would consist of several corps and would have its great mass of artillery, never inactive, but a tactical reserve of enormous power. Its great range gives it a capacity for shifts of fire, concentrations and surprise effects such as never existed in the past. For an attack, divisions would be massed near the critical point, but long range artillery need only shift its fire and concentrate at the decisive hour to obtain fire superiority where desired. It could be said truly of the Army Artillery, as Napoleon said of his Guard Artillery which was a general reserve under the immediate command of the Emperor: "It is the artillery of my Guard which decides most of the battles, because having it always in hand, I am able to use it wherever it is necessary."



THE THIRD BATTLE OF ROMAGNE

BY COLONEL CONRAD H. LANZA, Field Artillery

THE ALLIES

ON October 11, 1918, Marshal Foch issued an order for a continuation of the Allied offensive in France, in part as follows:

"The advance of the British and French forces between the valleys of the Sensée and Oise has, since October 8th, developed to such an extent as to make it possible to combine *in a single maneuver* the thrust of the left wing of the Group of Armies of the Reserve and the Franco-American offensive of the Champagne-Meuse.

"This maneuver has as its mission, the turning of the defenses of the Serre and the Aisne on the west by the French First Army, and on the east by the American First Army and French Fourth Army. Between these two wings of maneuvers, liaison will be maintained by the interior French Tenth and Fifth Armies.

* * * *

"The general objective of the Champagne-Meuse offensive is the area Mézières-Sedan. The American First Army will continue its attacks on both banks of the Meuse with primary missions:

on the left bank: break the Kriemhild position and reach the vicinity of Buzancy,

on the right bank: capture the high ground extending from Damvillers to Dun-sur-Meuse.

While advancing along the wooded heights of the Argonne, it will maintain constant liaison with the French Fourth Army, to be established successively, via the defiles of Grandpré, Croix-aux-Bois and Quatre Champs."

The Kriemhild position was the German line through Romagnesous-Montfaucon.

On the same day, the foregoing order was supplemented by another, issued by General Petain, commanding the French Armies (American First Army attached), who wired General Pershing:

"1. The retreat of the enemy increases in front of the Group of Armies of the Center, where our advance guards have reached Vouziers, passed beyond La Nettune and continue to advance in the direction of Rethel and Attigny.

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"2. In order to realize all results possible from this situation, it is necessary for the American Army to continue its effort to break the enemy's resistance in the direction of Buzancy-Mézières, while maintaining liaison on its left with the French Fourth Army, as prescribed in my letter of October 11th.

"3. Please advise me as to the orders which you will issue with this mission in view."

Simultaneously General Petain telegraphed to the French Fourth Army:

"1. On account of the retreat of the enemy in front of the (French) Fourth Army, I have ordered the American First Army to continue its effort to break the enemy resistance and push forward without delay in the direction of Buzancy-Mézières.

"2. Under these circumstances the Fourth Army should, on its part, operate on the right bank of the Aisne.

"3. As long as the American Army remains in rear of the line of the Fourth Army, the Fourth Army should not limit its maneuver to the right bank of the Aisne strictly within its prescribed zone of action. . . The Fourth Army should act with its right through the defiles of Grandpré, la Croix-aux-Bois. Quatre Champs and Le Chesne, to cause these places to fall, if necessary on account of successive resistances opposed to the left of the American First Army.

"4. Arrange immediate liaison with General Pershing to assure coordination of the Fourth Army with the American First Army."

In compliance with the foregoing instructions, the American First Army, at 11.00 A. M., October 12th, issued the following Field Order:

"1-A. The enemy is resisting our advance between the Meuse and the Aisne by the skillful use of machine guns and artillery.

* * * *

"2. The First American Army (less XVII French Corps) . . . will attack on October 14th at H hour. The XVII French Corps will attack as indicated below.

* * * *

"3-B. The XVII French Corps will continue its attack on October 13th and 14th at an hour to be designated by the Corps Commander.

C. The III Corps will seize by a direct drive to the northwest, the hill Les Grandes Carrés northwest of Bantheville, and will assist the V Corps in reducing the Bois de Bantheville. It will

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continue its advance to the line: northeast edge Bois de Foret-Aincreville-Fme de Chassogne-hill 300 (1½ km southwest of Andevanne).

D. The V Corps will seize by a direct drive to the north La Bergerie Fme, and Cote 253, flanking the Bois de Hazois. It will 'mopyup' the Bois de Bantheville. It will advance to the following line: ridge running southwest from hill 300 in Bois d'Andevanne-La Bergerie Fme-cote 253-ridge 1 km northwest of St. Georges.

E. The I Corps will protect the left flank of the attack of the V Corps. It will hold the line of the Aire west of Marcq, pushing strong reconnaissance to the front. It will advance its front to the general line: ridge south of Ravin-aux-Plerres--cote 182, north of St. Juvin. It will maintain contact with the Fourth French Army.

F. The Army Artillery will assist in the attack. It will neutralize hostile artillery east of the Meuse, north of Sivry, east of Dun-sur-Meuse. Mustard gas will be employed in the area north of the line: Liny-devant-Dun--Haraumont-Réville. The Chief of Artillery will designate units to accompany the advance.

* * * *

X. Corps and division commanders will utilize to the fullest extent possible the advantages of lethal gas in preparing for and assisting the infantry attack and in causing casualties in the rear areas and along lines of communications.

Y. Where artillery barrages are employed on the boundaries between corps, the rate of advance will be regulated at the rate of 100 meters in six minutes. At other points the rate will be prescribed by corps commanders."

In preparation for the attack, the 1st and 91st Division were withdrawn from line and replaced by the 42nd Division; similarly the 5th Division replaced the 80th Division. The order of battle for the attack was:

Divisions	77	82	X	42	32	X	5	3	4	X	33	29	Fr. 18	Fr. 26	Fr. 10 Col.
			X			X				X					
			X			X				X					
			I			I				I					
		Alexander					McMahon								
		Duncan					Buck		Cameron		Bell	Morton			
Corps		I		V			III							Fr. XVII	
		Dickman		Summerall			Hines							Claudel	

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After issuing his order General Pershing telegraphed to Marshal Foch:

"First American Army continues to press the enemy on the front east and west of the Meuse. A specially strong attack with fresh divisions having the object of breaking the hostile front between the Argonne and the Meuse has been ordered for the 14th instant. This attack will be pushed with utmost vigor. The situation is fully appreciated and all efforts are being and will be exerted for decisive results."

General Pershing having advised Marshal Foch that he had reorganized the American forces into two Armies, the First and the Second, the Marshal took the opportunity to write him personally on the 12th:

My dear General:

I have just received your letter of the 11th. I fully share the ideas that have prompted your new organization. I again ask you to make all your dispositions to support *without delay*, by at least resolutely advancing the left of your forces, the right of the French Fourth Army, which, following the course of the Aisne, today reaches the outskirts of Attigny.

Very sincerely yours,

F. FOCH.

The heading, salutation at end, and italics in this letter are in the Marshal's handwriting.

The arrangement of the artillery into Groups and Groupings was broken up and in its place, the American organization of brigades, regiments and battalions substituted. Organization of artillery into temporary units, designated as Groups (corresponding to battalions or regiments), and Groupings (corresponding to regiments or brigades), had been borrowed from the French Army, which employed these organizations extensively. The French did this because their artillery had no brigade organizations and their regimental and battalion staffs were so small, that when in line, these were generally supplemented by details from other units. The number of French staff organizations was less than in our Army. Their artillery battalions generally had three or four batteries (instead of two or three as with us) and regiments three, four, or more, battalions (instead of two or three). Instead of a regimental headquarters with complete staff

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for each six batteries, they had a regimental headquarters with a small staff for every nine, twelve, or more batteries (a trench mortar regiment had forty batteries organized into ten battalions). The disadvantage of temporary organizations was that they had to be equipped with commanders, staffs and material, which could only be provided by taking them from regular organizations. It had been difficult, when handling around a thousand batteries, to keep track of these details. The permanent organizations naturally objected to furnishing officers, men and material for provisional units, while the latter were constantly complaining that they had not been sufficiently provided for. Except in isolated cases, this change was not thereafter departed from and the American Tables of Organizations were followed as superior to temporary measures. An immense amount of correspondence and soreness was abolished by this change.

At 10.00 P. M., October 12th, an Army Artillery order was issued, directing the French 86th Artillery (10 batteries of 155 mm GPFs under Colonel Tessier), to start immediately gassing with mustard the area beyond the line: Liny-devant-Dun--Réville and to continue this without interruption until the attack scheduled for the 14th commenced. The area to be gassed flanked the left of the French XVII Corps, located south of this area; and the right of the III Corps, which was west of the area. It was for this reason undertaken as an army mission, as being outside of the zones of action of both corps. The same order directed a general artillery preparation of two hours preceding H hour, as per graphs attached to that order. Each of three brigades of 155mm GPFs was ordered to have one battalion on wheels on D day, in time to displace forward shortly after the infantry advance. This requirement prevented the use of the battalions during the preliminary firing.

The V Corps issued its attack order at 9.00 P. M. October 12th. It directed the artillery of the Corps to start the artillery preparation immediately upon receipt of the order, the intensity to be particularly increased at H minus two hours. The mission was the destruction of enemy works and counter-battery. The division artillery was ordered to furnish two accompanying guns "to actually accompany the infantry where the terrain permits."

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The infantry of the V Corps was ordered to attack by successive echelons in four phases. Romagne was to be heavily gassed and shelled during the first two phases lasting eight hours; the infantry was to assault at the commencement of the third phase at H plus 8 hours. The 42nd Division, which was the left division, was to attack by brigades as follows:

the right brigade	at phase	1	scheduled to commence at H hour,
		2	at H plus 3 hours,
		3	at H plus 8 hours,
		4	immediately after phase 3.
the left brigade	at phase	1	no attack,
		2	at H plus 5 hours,
		3	at H plus 6½ hours,
		4	after phase 3 was completed.

The 32nd Division, less the battalion in front of Romagne, was to advance in one echelon on the same schedule as the right brigade of the 42nd Division and jointly with it. The corps artillery with the 42nd Division artillery, was to alternately support the right and left echelons. Rolling barrages, fired by the light artillery, using as much smoke shell as could be obtained, were provided for all attacks; the 155mm division howitzers were to strengthen the barrage in depth. The order did not provide for a plan of control of artillery fire, other than the rolling barrage and subordinate artillery commanders had therefore considerable freedom as to fire direction.

The foregoing plan of the V Corps for attacking alternately by echelons was disapproved by the Army. Consequently the Corps at 9.00 P. M., October 13th, ordered the right brigade of the left division, which was in rear of the remainder of the line to attack at H hour. It was allowed phase 1, or three hours, to advance as far as the line of the rest of the Corps. At the end of phase 1, the entire corps was to attack simultaneously; this included the battalion opposite Romagne. The rate of advance was to be 100 meters in 4 minutes in open terrain and in 6 minutes through woods. The artillery preparation was then two hours for one brigade and five hours for other units.

The III Corps attack order issued at 3.00 A. M., October 13th, directed a single advance diagonally towards the northwest,

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along the axis: Cunel-Bantheville-les Grands Carrés, the latter place to be seized and organized for defense. The attack was to be behind a deep rolling barrage, at the rate of 100 meters in 5 minutes and was to continue in one phase without halts. As the distance to be covered was over five kilometers this required 4½ hours for the attack. The right flank was to be protected by one regiment of infantry detailed to proceed from the south and west through the Bois de la Pultière and the Bois des Rappes. Provision was made for clearing the east part of the Bois de Bantheville, to protect the left flank. After these detachments had been made only one brigade was left for the main attack. This order was approved by the Army.

The I Corps issued its attack order at 11.00 A. M., October 12th, on informal advice as to the contents of the Army order. Its mission was to protect the left of the V Corps by advancing on St. Juvin. The corps ordered its artillery to support the attack with a preparation starting at H minus 2 hours. The Army disapproved this order and a new one had to be issued at 2.00 P. M. on the 13th. The change ordered was to attack by pivoting on the left, advancing successively to the lines:

- (a) Marcq-Gué Dehambey-St. Georges (excl);
- (b) Chevières-hill 182-halfway between St. Georges and Alliepont.

The original order for the artillery was changed by adding:

"Lethal gas will be used to the fullest extent possible in preparing for and assisting the infantry attack and in causing casualties in rear areas and along lines of communications."

The Army doubted whether the several attacks by corps would be coordinated. It decided to insure this by ordering H hour to be 5.30 A. M. for the right brigade of the 42nd division which was in rear of the general line and at 8.30 A. M. for all other units. As large a number of OPs as the terrain would permit were established, lines of communication were overhauled and repaired and arrangements made to insure good liaison between infantry and artillery and to have artillery fire fall promptly where and when needed during the battle. The Air Service ordered its units to take the air at daylight on the 14th, with instructions to destroy the enemy's air service, harass and attack

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his ground troops and protect our own air and ground forces. An air barrage was ordered for the area west of the Meuse to be in position at daylight and to extend five kilometers into hostile territory at both medium and high altitudes, in order to clear the air of enemy aircraft and protect our observation balloons and planes.

On the morning of the 14th, the battle started with an artillery preparation west of the Meuse commencing at 3.30 A. M., two hours before the earliest of the H hours. East of the Meuse, the French XVII Corps, on request of our III Corps postponed the artillery preparation to 8.30 A. M., but on a later decision of the corps commander it was postponed to still later. Nevertheless woods east of the Meuse suspected of being likely to conceal hostile batteries were gassed by 75s from the beginning of the battle. Visibility was poor until about 8.00 A. M., and fair to good thereafter.

Notwithstanding the arrangements which had been made for improved liaison between the infantry and the artillery, information was slow in arriving on the artillery telephone net. It was about as follows. Nothing important was received from 3.30 A. M., until:

7.20 A. M.: OPs in 32nd Division territory reported visibility so bad that they were unable to see any targets and could not determine where our infantry was. Enemy artillery fire, which had been vigorous, appeared to be diminishing. Hostile gas shells were coming over.

7.50 A. M.: OPs in 42nd Division territory reported enemy shelling on both sides of Sommerance. No targets were visible.

8.00 A. M.: OPs (42nd Division) reported visibility better; they could now see friendly infantry advancing south of wire on hill 288. In other places our infantry was supposed to be in woods and consequently they could not determine their position. Enemy fire was very heavy from hill 288; also on right sector of the Division.

9.00 A. M.: OPs (III Corps) reported no targets visible. Enemy artillery actively shelling our rear areas, as well as the Bois du Fays and the Bois de Malaumont at rate of 5 rounds per minute per target.

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- 9.10 A. M.: III Corps reported that the enemy artillery fire was very feeble. The 3rd and 4th Divisions had jumped off on time but no reports had arrived from them yet.
- 9.27 A. M.: 5th Division reported that liaison reports indicated that everything was progressing favorably; no details available yet.
- 10.30 A. M.: Liaison reports from the 42nd Division stated that their left brigade had reached its objective; there was no information as to the right brigade.
- 10.50 A. M.: OPs (42nd Division) reported our infantry observed on coordinate 87.
- 11.00 A. M.: At this hour enemy artillery was heavily shelling the area north of Nantillois, where many of our batteries were located. Large shells, about 9-inch calibre, were falling in Montfaucon where we had numerous CPs. Our OPs were unable to locate the enemy batteries engaged in this firing. At this hour the formal artillery preparation expired. The corps and army artillery lifted fire to enemy rear areas. The division artillery fired on targets of opportunity.
- 11.10 A. M.: Liaison reports from the 32nd Division stated that the enemy still held Romagne, our troops being stopped south of there.

The division and corps artillery were ordered to fire a rolling barrage to start our troops forward.

- 11.30 A. M.: Liaison reports from the 3rd Division stated that the 30th Infantry had advanced to the right of the Bois de la Pultière for about one kilometer; that the 7th Infantry was at the north edge of the Bois de Malaumont (4 kms east of Romagne). The 3rd Division OPs reported they were unable to locate any hostile machine guns in the Bois de la Pultière.
- 11.35 A. M.: Liaison reports from the 5th Division stated that that Division was advancing satisfactorily. Prisoners taken had surrendered readily, declaring that there would be peace within a few days.
- 11.50 A. M.: Liaison report from the 7th Infantry, 3rd Division, stated that their leading battalion had reached the ridge just south of Cunel (hour not given) and was going well.

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- 11.56 A. M. Liaison reports from the 4th Infantry, 3rd Division, stated that everything was going fine; over 100 prisoners had been taken in the Bois de la Pultière.
- 12.00 Noon: Liaison reports from the 82nd Division, stated that at 9.10 A. M., they had reached the line: Marcq-Gué Dehambey-St. Georges and that they had liaison on both flanks.
OPs of the 42nd Division reported that they observed friendly infantry at the northwest corner of the Bois de Chatillon. No targets seen. Liaison reports from the 42nd Division stated that their left brigade had reached the line ordered for the 2nd phase.
- 12.15 P. M.: OPs of the 32nd Division reported that the rolling barrage south of Romagne had started and that our infantry could be seen following it. The 42nd Division reported that it had reached the 2nd Objective and was advancing on the 3rd Objective; except that Landres-et-St. Georges had not been taken.
- 12.20 P. M.: OPs of the 32nd Division reported numerous enemy planes could be seen flying low over the 42nd Division zone of action.
- 12.36 P. M.: The 5th Division reported that severe machine gun and artillery fire had held up their advance. Impossible to advance through Bantheville on account of enfilade fire from the Bois de Bantheville. The 9th Brigade was held up in the Bois de Rappes. Enemy enfilade fire was coming from the east; presumably from across the Meuse River. Probably impossible to cross the Andon; troops digging in.
- 12.40 P. M.: The 32nd Division reported that about noon its troops had followed the barrage into and had occupied Romagne-sous-Montfaucon.

Artillery action decreased about 1.00 P. M., and forward displacement of batteries was commenced. The artillery fire during the afternoon was in general limited to firing at reported positions supposed to be enemy batteries, enemy OPs and interdiction. Visibility was now poor and no air observation was available; consequently except in rare instances the fire was not adjusted.

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After having indicated how the battle appeared at the time, we will now review briefly the infantry action as later reports show it to have been.

The right of the 42nd Division jumped off at 5.30 A. M., and had success from the start. Notwithstanding very severe opposition it reached the Cote de Chatillon and hill 288 and had these places partly occupied around 9.00 A. M. They were unable to advance any considerable distance further.

The left of the 42nd Division advanced at 8.30 A. M., after a five-hour artillery preparation. Two enemy planes, flying low, apparently observed the jump off, which immediately came under severe artillery fire. As the line went forward this fire became steadily heavier and more accurate. Visibility was fair. In spite of the shell fire, the infantry pushed forward; it succeeded in reaching a line just outside of the enemy wire south of Landres-et-St. Georges and extending diagonally southeast therefrom. The wire was uncut and defended by machine gun and trench mortar fire in addition to the constant artillery shelling. The line stopped. No friendly planes could be seen, our artillery had no air observation and could not determine the situation from their OPs. It was found impossible to notify the artillery of what was occurring as all men moving were shot down. Infantry and engineers, by crawling, reached the hostile wire and started to cut it, but without success; every man was killed or wounded and none returned. This fighting continued savagely until 9.00 P. M. that evening without advancing the line.

The situation of the 42nd Division front line did not become known to the artillery until 4.15 P. M., when a report dated 1.46 P. M., was received stating that our troops were held up in front of the barbed wire south of Landres-et-St. Georges. At about the same time another report, dated 1.30 P. M. came in, stating that our troops had not yet taken the Bois de Chatillon nor the Tuilerie Farm (3½Kms. east southeast of Landres et St. Georges). So much time had elapsed between the sending and receipt of these messages there was no certainty that there might not have been a material change in the situation during this interval. No action was taken on this late information.

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The 32nd Division advance started at 8.30 A. M. The left of their line, which was in woods, made progress; but the troops opposite Romagne were early held up by artillery fire. After considerable delay arrangements were made with the artillery for a new rolling barrage starting south of Romagne and for the corps artillery to shell Romagne with large caliber ammunition. Shortly before noon the new rolling barrage started as requested and the infantry following it closely entered Romagnesous-Montfaucon soon after and held it. A slight advance beyond was made later and the left of the Division came up into line with it.

The 5th Division from the start, also at 8.30 A. M., made progress as far as the woods just beyond Cunel. Here they were stopped by severe machine gun and artillery fire. Elements of the Division reached positions in the Bois des Rappes, but none were able to there maintain themselves. Enemy artillery was very active. It was not until 3.20 P. M. that the III Corps reported that all division and corps artillery were engaged and that the assistance of army artillery was desired, as no advance seemed possible unless the enemy artillery could be silenced. This artillery assistance was given without delay and at 4.00 P. M. the advance was renewed from Cunel. It immediately met strong resistance and broke down under severe artillery and machine gun fire. At 4.50 P. M., the air service reported having observed large hostile infantry concentrations in the vicinity of Clery-le-Grand, which place was not visible from our OPs. The area about that village was heavily shelled by us but nothing availed in pushing the infantry forward. By night those elements of the Division which had gone beyond the Bois de la Pultière were back in that wood.

The 3rd Division made a small advance this day, coming into line with the troops to their right and left; while the 4th Division made no advance. East of the Meuse the 29th Division advanced to slightly beyond Molleville Fme.

The results of the battle were to advance our line to St. Juvin (in part)-Landres et St. Georges (excl)-la Tuilerie Fme (excl)-Romagne-sous-Montfaucon (incl)-Cunel (incl)-Bois de Peut de Faux (incl)-Bois de Malaumont (incl). At 7.00 P. M. the First

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Army ordered the battle continued on the following day, with missions same as before, except that the I Corps was directed to advance to the line: Bois des Loges-Alliepont-Imécourt (all incl). The order provided for corps and division artillery displacing forward and directed the artillery to protect the left of the I Corps and the right of the III Corps, that is both flanks, by neutralizing fire on the Bois de Bourgogne and north thereof and the high ground east of Dun-sur-Meuse. This neutralization was started at once by Army artillery using mustard gas.

On October 15th there was no artillery preparation and divisions attacked independently towards their indicated objectives. The 42nd Division continued its efforts to pierce the wire in its front. A counter-attack about 7.00 A. M., which threatened to turn the left of the division, caused a concentration of artillery fire in this direction. After stopping this danger, the division artillery started a rolling barrage, which the infantry followed for the short distance to the wire, which was still uncut. No man succeeded in crossing and the barrage rolled on alone. Patrols were sent out by the infantry to locate tanks which had been ordered to assist in this attack. After two hours, at about 10.00 A. M., during which time the line was under continuous heavy fire, the tanks were found near Sommerance and directed toward Landres-et-St. Georges, with the mission of breaking the wire and letting the infantry through. At this hour the infantry was being heavily shelled by artillery and trench mortars. Messages were sent to the artillery for assistance but these were received two to three hours late and were not then acted on, due to uncertainty as to what had happened in the meantime. Requests to the OPs for information were replied to, stating that they could see no targets and did not know where our line was, it being indistinguishable.

The tanks had been in a depression defiladed from the enemy OPs. They advanced slowly toward Landres et St. Georges following the road to that place. As they came over the ridge line they received shell fire, which caused casualties. The tanks hesitated, then turned and retired. This was their last appearance in the campaign. The tanks were to have participated in a new infantry attack scheduled for 11.15 A. M., and to be

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launched by the last reserve battalions. For this a new rolling barrage had been arranged. On representation from infantry regimental headquarters that the necessary orders could not be distributed in time, the attack was postponed until 12.00 noon, at which hour the division artillery once more started a rolling barrage. Nobody followed it. It rolled over enemy territory all alone. The reserve battalions did not receive the order to attack until long after noon, while the front line never received any orders and knew nothing about the proposed attack. During the afternoon, the battle here died down.

The 82nd Division advanced at 8.30 A. M. Almost at once it met a counter-attack opposite its right which resulted in stopping the movement forward. A second counter-attack at 9.30 A. M. resulted in preventing any advance this day.

The 5th Division followed their barrage forward at 8.30 A. M., but meeting a counter-attack a few minutes later, lost the barrage. The visibility was good at this time and the OPs observed the situation. The barrage was halted and the artillery fire diverted to the enemy infantry. A second attempt, made at 9.30 A. M., succeeded in that the infantry and the rolling barrage started together but the infantry met such strong resistance that they lost the barrage and stopped. This was again observed by the OPs and the artillery fire once more diverted to enemy objectives. As it was evident that the division artillery could not handle the situation, calls for assistance were made to the corps and army artillery and by 10.00 A. M. a regular artillery preparation was under way, heavily shelling the entire territory in front of the 5th Division. At 1.00 P. M. a third attempt to advance was made and this attack succeeded in reaching the Bois de Bantheville. This latter position could not be held, but the line was moved up to it. The 32nd Division participated in the afternoon battle in this sector. The gains made by these two divisions were the only important ones made this day. They definitely secured for us the position of Romagne-sous-Montfaucon.

The 3rd Division also started its advance at 8.30 A. M. It met considerable opposition and promptly lost its barrage. The OPs in this sector were unable to follow the infantry and for

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a long time nobody knew where they were. No liaison reports came in to clear the situation and it was impossible to do anything for them.

The First Army, at 3.00 P. M., October 15th, ordered the attack suspended for the V and III Corps for the next day but the I Corps was ordered to continue on. Little infantry action developed on the 16th but the artillery action was severe on both sides, the front lines being heavily shelled and gassed. The I Corps seized a part of the town of Grandpré on their extreme left but had no other successes. This ended the battle which resulted in our Army firmly holding Romagne-sous-Montfaucon, a mission which had been assigned for the initial battle of the campaign on September 26th, but which took eighteen days to accomplish instead of one. Our losses in the third battle of Romagne, west of the Meuse only, were:

October 14	4,963
October 15	4,331
October 16	3,515
	12,809
Total	12,809

THE GERMANS

On the morning of October 14th there were thirteen divisions in line west of the Meuse opposite the American First Army, with none in reserve, compared with five in line and two in reserve on September 26th when the campaign opened. The order of battle, from west to east, was:

76th Reserve	x Grandpré
53rd Reserve (part only)	
2nd Landwehr	
45th Reserve	x St. Juvin
15th Bavarian	
41st	x Landres et St. Georges
52nd (relieved during the 14th by the 115th Division)	
3rd Guard	
123rd	x Romagne-sous-Montfaucon
236th	x Cunel
107th	
28th	
5th Bavarian Reserve	

---xxx Meuse River xxx---

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It was known that the Americans were on the strategic offensive and probably would attack on or about this date. The opening of fire by the American artillery at 3.30 A. M. was at once noted and by 4.00 A. M. it was observed that this fire was more severe in the vicinity of Romagne-sous-Montfaucon and Cunel. Low flying planes were detailed to take the air at daylight, about 6.00 A. M., to determine the hour of the jump off.

The initial attack, made by a fraction of the American forces in the sector west of Romagne, was not observed, as it occurred at 5.30 A. M., while still night. This attack was not seriously opposed by artillery fire, because of darkness, and the wooded nature of the terrain. The artillery could neither see any targets, nor obtain information as to the situation. The 3rd Guard Division, after an initial slight success around 6.00 A. M., was forced back. The American artillery fire at this hour was very severe in back areas, especially in the vicinity of Thénorgues and Sivry-et-Buzancy, at which places it completely stopped circulation.

The main attack delivered at 8.30 A. M. was observed by the OPs and by planes who radioed the location of the attacking infantry. Strong artillery support was ready. The three right divisions, whose front was protected by the Aire River, reported at 9.00 A. M. that the barrage laid down by their artillery, together with machine gun fire, had prevented the enemy from making any start.

Up to 10.30 A. M. the lines, except as noted, held. At this hour the American artillery fire was very severe and in addition to points already mentioned, has disrupted all communications and had stopped circulation around Montigny, north of Barricourt. Saulmaury, Sassez and Dun-sur-Meuse. The 3rd Guard Division was slowly being forced back from Romagne and the high ground west thereof. During the morning, the 41st Division stopped three attacks against Landres et St. Georges by artillery, trench mortar and machine gun fire. About 11.00 A. M. a fourth attack broke through the wire and entered Landres et St. Georges but it was thrown out promptly by a counter-attack and by noon the line here had been reestablished.

Just about noon, a strong attack, heavily supported by artillery

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fire enabled the enemy to enter Romagne-sous-Montfaucon. There being no reserves at hand for a counter-attack, the left of the 3rd Guard Division and the right of the 123rd Division were, by order, withdrawn to connect at a point 800 meters north of Romagne. From this position, a counter-attack was delivered about 3.30 P. M. by elements of the 3rd Guard Division, with the mission of seizing the north edge of Romagne, but this movement failed to make any substantial gains.

About 4.00 P. M. a strong attack was delivered against the 123rd Division between Romagne and Cunel. The left of the Division held in the cemetery of Cunel but the remainder of the Division was forced slightly back. Further east the 28th Division was driven back. Its reserve counter-attacked and stopped the enemy advance along the line: hill 300 (1500 meters northeast of Cunel)-hill 294.

Returning to the west sector, afternoon assaults against St. Juvin resulted in the loss of most of this village by dark. A new attack, at night, made against Landres et St. Georges, by what appeared to be about two companies of infantry, was broken by artillery fire at 8.45 P. M. During the night all divisions were continued in line, reorganized and provided some reserves for possible use for counter-attacks and generally prepared for another day of severe fighting.

For the morning of the 15th a counter-attack was ordered to be made by the 15th Bavarian Division together with the 41st Division, to regain territory lost the day before. Neither of these divisions had suffered severe losses. This started at 7.00 A. M., but soon after met an enemy advance. After making minor gains between St. Juvin, exclusive, and Landres et St. Georges, the counter-attack stopped. The 3rd Guard Division was forced back early in the morning. At 8.00 A. M. its division reserve counter-attacked and assisted by one regiment of the 123rd Division on its left moved forward. About 8.30 A. M. these forces encountered a strong assault from the enemy. Visibility being good, the OPs successfully directed the artillery fire and stopped the enemy advance almost at once, but the counter-attack failed to progress thereafter. It had however recovered the ground lost that morning.

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At 9.30 A. M. a very severe American artillery preparation was noted along the entire front from Landres et St. Georges to east of Cunel. This preparation ended at 12.30 P. M., when an infantry attack came from east of Romagne. It was immediately taken under artillery fire and was so slowed down that it lost its barrage, but it was not entirely stopped and some Americans reached the Bois de Bantheville during the afternoon. From prisoners it was ascertained that this attack had been delivered by the American 5th Division. These were the only important infantry actions of the day.

On the 16th nothing developed except continuous artillery firing of a very severe nature.

COMMENTS

The third battle of Romagne saw the adoption by American artillery of American Tables of Organization. Prior to this time, artillery units had been assembled for tactical purposes, generally into Groups, Groupings, Groupements, etc. Experience had shown that there was no advantage in such an arrangement while there were many disadvantages caused by the necessity of organizing new headquarters and furnishing them with officers, men and material which could only be done by taking them from regular organizations.

Difficulty was experienced in this battle in coordinating and arranging rolling barrages in time for the infantry attack. In two divisions, where the attack hour had been fixed for 5.30 A. M. the artillery brigades received the attack order at 10.00 P. M., and 11.45 P. M., the night before. Artillery CPs were in dugouts, ruins or inside of vehicles. Tables and lamps were not to be had. Under the circumstances it took over an hour to study the orders, determine the details of the rolling barrage, make the required graphs and reduce the brigade order to writing. One to two hours were required to transmit these orders down through regimental and battalion command posts to the battery commanders. Under battle conditions, with heavy programs of fire every night and constant interruptions from enemy fire, telephones, etc., the calculations for a rolling barrage and the preparation of a time table for each gun had to be made. This

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work demanded great care and accuracy and frequently several hours' work, because the terrain being broken and wooded, the barrage was valueless unless it was fitted to the ground. After all this, the ammunition had to be fuzed and properly stacked alongside the guns.

In other cases, batteries which had occupied their positions only during the night were ordered to fire a barrage early the ensuing morning. It was impossible under these conditions to accurately orient the batteries and such barrages were more or less inaccurate. In some cases it was impossible to fire any barrage.

No adjustments of artillery fire were obtainable from air observation. It was arranged for daily. It never succeeded. Air fields averaged around thirty miles in rear of artillery positions. This was necessary to avoid loss of planes from enemy artillery fire or air raids. Some heavy regiments of artillery had French air flights attached and subject to their direct orders. Due to lack of wire and insufficient power to operate such long lines, telephone connection was made through brigade, division, corps and army centrals. As there was a congestion of telephone traffic, it was not easy to obtain connections and with field conditions of wire and local battery circuits, conversations were not always intelligible. Visits by automobile were unsatisfactory. Motor cars were few; battery commanders seldom had any available for long trips. Travel by day was generally forbidden in front areas, and by night the roads were fearfully crowded with unlighted vehicles of every description crawling along over and around shell holes, broken bridges and other obstacles. It took anywhere up to seven or eight hours to cover the distance between batteries and the attached air flight command post. The best that could be done was to arrange for an observation plane to be in the air at a fixed hour the next day to act according to panel signals from the ground and radio messages from the air.

Aviators were aware that as soon as they crossed the line, a message would be sent to the enemy's nearest air field and air forces in the air, notifying them of the type of plane, their number if more than one, time they appeared and direction of their flight. A superior force of planes could be expected over our plane within a short interval, provided it remained in the same

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vicinity. Planes found it difficult to identify the proper panel station, due to the number of these in the same locality. This led to reading the wrong station. The same trouble existed on the ground. Artillery stations read messages from the wrong plane. Planes were unable to identify rounds or salvos fired, on account of several being visible at the same time. To avoid having hostile planes reach a position above them, and because of anti-aircraft artillery fire, planes flew at an altitude of around 5,000 meters, from where observation of the ground was not easy. They reported many rounds lost. Air observers during a battle had a tendency to become absorbed by the occurrence of interesting events rather than in watching a particular target. Particularly were they concerned in noting other planes in the air, with a view of early determination as to whether they were friendly or hostile. These were matters of life and death to the air men. The combined result of these factors resulted in that our planes looped enemy territory a few times and then withdrew into our lines. The artillery was lucky to obtain two sensings from the air in the same problem.

Difficulty was had in locating sufficient observation posts. The artillery had about twenty batteries per kilometer of front. Battery, battalion, regimental and brigade commanders all wanted individual OPs. This made about thirty OPs per kilometer of front desired solely by the artillery. The infantry also wanted OPs for every machine gun company and for every command post. Divisions, corps and army wanted separate systems of OPs to enable their respective commanders to have independent means of observing events at the front. Of course, all G-2s and S-2s thought it absolutely essential that they have OPs. In all we needed over 50 OPs per kilometer of front.

Only a small part of the front, or areas sufficiently close to the front, were suitable for OPs. Woods, low ground, villages, rivers, swamps, etc., rendered a large part of the terrain impracticable for this purpose. Some terrain, which was naturally excellent for observation, was made impracticable by enemy shelling and gassing with mustard gas. Tops of hills, which afforded excellent views, were regularly so severely shelled as to make it impossible to maintain lines of communication thereto. Perhaps

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20 to 30 per cent of the front gave opportunities for installing OPs, but some of these had only limited fields of view.

It was necessary to control the installation of OPs and to allot them according to circumstances. The best positions were allotted to the most important units; units of lesser importance had to get along with OPs of minor value. The allotment started with the Army, which had the best facilities for determining fields of view and which published maps at intervals showing these. For a large part of the front the French had relief maps to scale, which they placed at our disposition. On these a small electric light, placed at the point desired for an OP, illuminated the entire area visible therefrom. The lighted area could be photographed or transcribed to a map. From these studies the Army indicated positions reserved for itself and its own artillery and allotted the remaining positions to the corps. The same system was followed down. A fair selection was made and usually every battalion of artillery had its own OP. An effort was made to assign to a regiment of artillery two OPs so situated as to give extended fields of view and possibilities for bilateral observation.

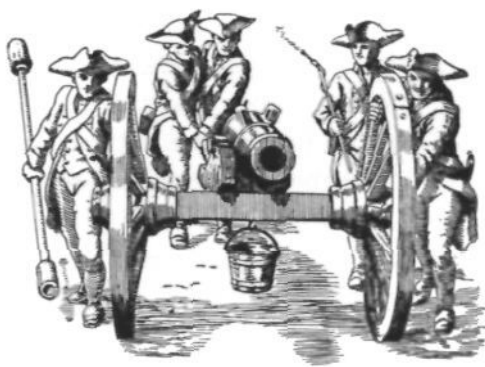
With only one OP per battalion, it was generally impracticable to conduct fire by observation. This was the case whether or not the OPs saw any targets. It was not often that the OPs saw any targets on which to adjust fire. In general this was due to fog, mist, rain, smoke, numerous woods and towns. Observation was further complicated by the fact that most battles started before daylight and extended into the night. There seemed to be enough OPs for this.

At the commencement of the campaign the corps and army artillery had one or two observation balloons per brigade. Their number decreased rather rapidly, as the balloons were easily shot down by hostile aircraft. When visibility was good, the balloons gave good oblique views, but they were so far back from the front that they could not distinguish small objects. They were useful in reporting explosions, fires, movements of trains in back areas, number of shells falling in a given area and other similar information. All heavy artillery brigades and the French heavy regiments had attached observation planes. We have already discussed the difficulty of using these.

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Notwithstanding strenuous efforts to maintain an efficient observation system, only mediocre results were obtained. The same was true of the liaison system. There were plenty of good liaison officers at the front in position to see anything if there was anything to be seen. There were two difficulties with them. They seldom saw anything and when they did it usually took hours to transmit a report from the front line to a telephone. By this time the information, while not valueless, could not be used for fire direction. It was considered too dangerous to fire close to our troops when they could not be seen and when we had no recent information as to their location.

In all, the artillery fire was directed primarily by the plan of battle and only secondarily by observation. This was never the ideal but the best possible solution obtainable.



THE AUTOGIRO AND ITS VALUE TO THE FIELD ARTILLERY

BY MAJOR EDWIN P. PARKER, JR., FIELD ARTILLERY

THE Army, and the Field Artillery in particular, should be pleased over the announcement that three autogiros are to be purchased for experimental purposes; one is to go to The Field Artillery School, one to The Infantry School, and the third to The Cavalry School.

The United States Army has been very slow about purchasing autogiros for experimental purposes, as none have been bought previous to this writing. On the other hand, the following foreign governments have made purchases of them for the army or navy, or both: England, Sweden, France, Spain, Germany, Japan, and Czechoslovakia. Furthermore, the Italian, Spanish, several South American governments, and other governments are expressing keen interest in acquiring autogiros.

The development of the autogiro in this country has been seriously retarded because it has been forced to rely entirely on the private means of its sponsors. Nevertheless, it has adequately proved by its accomplishments in the last three years that it is the safest aircraft ever devised; that it has a field of utility which can never be approached by the airplane, and that its possibilities are many.

The autogiro has certain advantages over the airplane owing to its exceptional wide speed range, which extends from 15 to over 100 miles per hour; its ability to hover; its short distance take-off and its landing capabilities. This type of aircraft can come down almost vertically, and, on landing, the "run" is nil. The take-off is equally remarkable. When fully loaded and taking off in a dead calm, the machine only takes a run of 100 feet, and when lightly loaded, with only 5 miles per hour breeze, the machine has taken off in 15 feet.

The autogiro has a very high factor of safety, and, even with the engine shut off, can glide to earth. The pilot has perfect control at the lowest speed.

It must be borne in mind that the autogiro is in its infancy, and great development thereof is to be expected. It has proved its

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safety, its ability to operate in restricted areas, its ability to fly without wings, without rudder, without ordinary controls. Given opportunity for development, its speed and performance should constantly improve.

The Kellett Direct Control Wingless Autogiro KD-1, which is a new type to be constructed in the United States, will be similar to the British Cierva type C-30 machine, which has been ordered by the British Army and is now being offered to other foreign governments by British manufacturers. Its all-round performance, however, is expected to be distinctly superior. It will contain refinements which should likewise improve its flying characteristics.

This model will have a gross weight of 2,050 pounds and will be powered by a Jacobs model L-4 engine, developing 225 B.H.P. at 2,000 rpm. It will be of the wingless type, being directly controlled by a three-bladed cantilever rotor. The advantages of this method of control for autogiros has been thoroughly proven by its success on the British C-30 autogiro, where the control is equally and amply effective at all speeds of flights.

Several structural and design improvements are to be incorporated in the Model KD-1. The plywood covered blades will be provided with improved self-centering oil dampers which are so designed as to allow the blades to be readily folded over the tail for the purpose of conserving stowage space. This folding feature is of the automatic type, requiring a minimum of time and effort. The ship will occupy a space 10 feet wide by 25½ feet long when the blades are folded.

The rotor starter units are so designed as to reduce the takeoff run. The pylon consists of a single cantilever to be located just forward of the cockpit which will make a considerable improvement. Not only is access to the cockpits improved, but the parasite resistance and visibility are also improved.

The front landing chassis is provided with vertically deflecting wheels operating on the cantilever shock leg principle. A steerable tail wheel, operated by the rudder pedals, is also provided.

Some data on this model are given in tabular form below:

THE AUTOGIRO

Kellett Direct Control Wingless Autogiro KD-1

Gross Weight	2,050 lbs.
Weight Empty	1,343 lbs.
Power Plant	225 H. P.
Top Speed	125 m.p.h.
Cruising Speed	103 m.p.h.
Minimum Speed (level flight)	20 m.p.h.
Rate of Climb at S. L.	1,000 ft./min.
Cruising Range	360 miles
Endurance at Cruising Speed	3½ hours
Take-off (Full load-no wind)	100 feet
Landing Run	Nil

The above performance figures are conservatively based on the actual performances of existing autogiros.

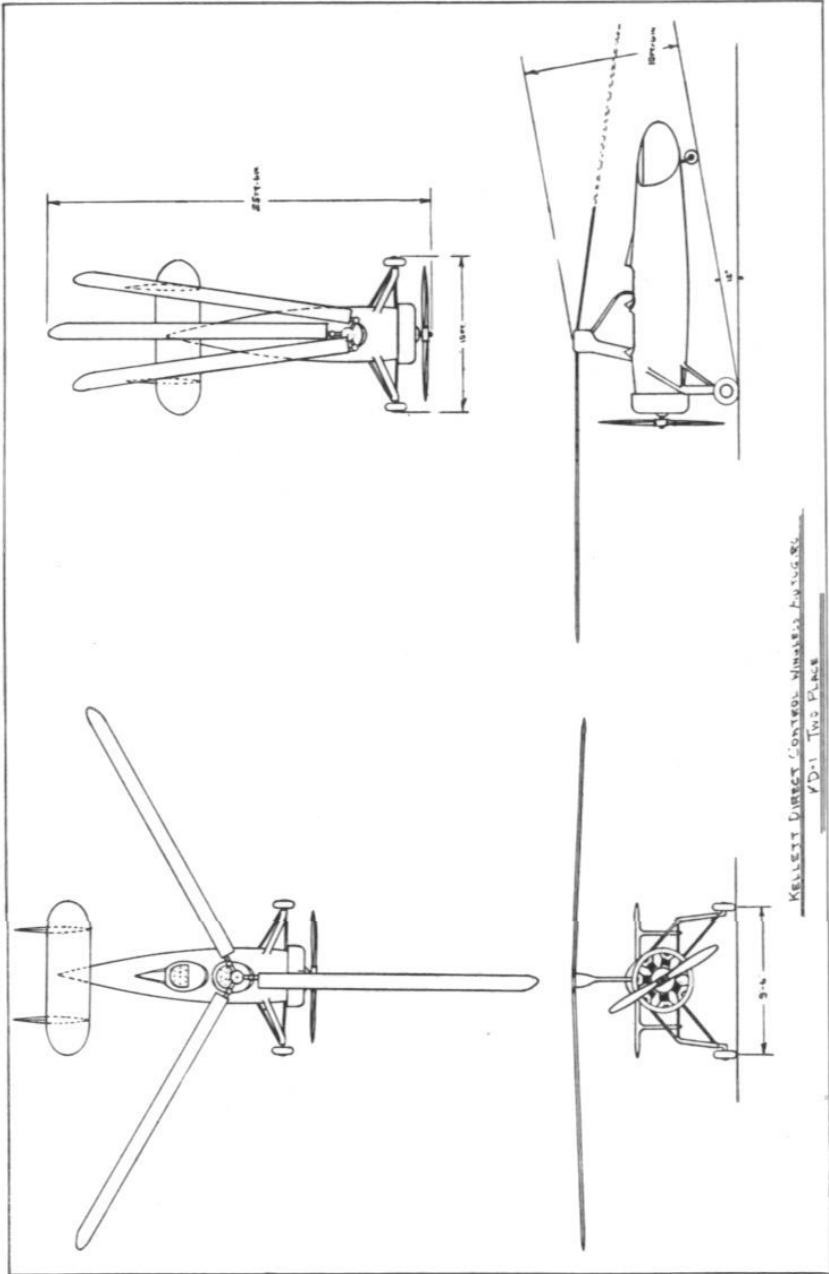
Dimensions and Areas

Rotor Diameter	40 feet
Length	25½ feet
Height	10 feet 6 inches
Overall Width—folded	10 feet
Rotor area	1,260 square feet
Solidity	.045
Horizontal tail area	25 square feet
Vertical tail area	14 square feet

Some of the many purposes for which the autogiro may be used in the Army are enumerated below:

- Replacing the balloon for observation
- Reconnaissance—Transportation of officers
- Dropping and picking up of messages, food, etc.
- Relief of isolated personnel—Liaison with the Infantry
- Control of mobile units, such as mechanized cavalry
- Ambulance service for evacuation of wounded
- Control of communications
- Rapid transit of secret military dispatches
- Bombing—particularly in foggy weather
- Blind flying operations

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THE AUTOGIRO

It is believed that this machine will be of inestimable value to the Field Artillery in connection with reconnaissance, communication and liaison with the Infantry, and last, but not least, observation of artillery fire.

Due to the fact that it can be flown very slowly and only a few feet off the ground with safety, it adapts itself to making a reconnaissance of an area without actually going over the ground on foot. This may be of great advantage in the selection of artillery positions when the time element is a factor. It would also be useful in the selection of routes of march, particularly distant ones.

Where telephonic and radio communications between the front line infantry and its supporting artillery are out, the autogiro may be of great assistance in maintaining liaison with the Infantry by supplanting the runner or mounted messenger in carrying written messages. In some instances it may land to deliver the messages. But, in case the terrain or other conditions be such as to make this impossible, or the time factor such as to make this impracticable, a bag may be lowered from a rope.

The ship may be flown so near to the ground that a man can remove the bag, and, if desired, fasten another bag on with return messages. It has been demonstrated that a man can outrun an autogiro when it is being flown at reduced speed.

During an attack, when communication from the front lines to the rear are out, an observer in one of these machines, hovering over or near the front lines, may be able to make prompt reports on machine guns, strong points, etc., which are holding up the advance of the infantry. This could be done in considerable less time than by a runner, thereby obtaining prompt support for the infantry from the artillery, thus minimizing the delays in the attack.

Another possible use for the autogiro is in quickly laying telephone lines for the artillery. A reel can be carried in the ship which can fly very low and reel out the wire as it flies. This may be of material advantage where long telephone lines have to be laid in heavily wooded or rough terrain.

It is in the realm of observation of artillery fire that the autogiro will be of most use to the Field Artillery. It is believed

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that this machine will replace the captive balloon entirely, and the regular type (fixed-wing) airplane partially, for use in such observation. As a result of such replacement, the Field Artillery will profit by having much more efficient observation from the air, which is sorely needed.

In this connection, it must be realized that, although the artillery can fire without observation by the use of maps, air-photographs, surveying, etc., nevertheless, such firing is considerably less accurate than observed fire. In order to accomplish the same end, a very much larger amount of ammunition must be expended with unobserved fire than with observed fire. This extra expenditure of ammunition cannot be ignored since in battle the supply of artillery ammunition is a serious problem. Every effort must be made by the artilleryman to make each round of ammunition count.

One cannot expect to obtain observation of artillery fire from the ground as a general thing. The artillery may have to fight in many places where, due to the conditions of the terrain, no ground observation will be obtainable. In fact, it will be rare when there will be sufficient ground observation for all artillery engaged in a battle of any size.

This should impress on all concerned the absolute necessity for sufficient and efficient observation of artillery fire from the air.

The autogiro has many advantages over the captive balloon for artillery observation. It is more mobile, can attain higher altitudes, is less vulnerable, requires fewer men and is less costly to maintain, is more readily concealed when not in use and will ride better in bad weather.

Anyone who has worked with captive balloons is impressed with the difficulties encountered in moving it. With the winch it takes considerable time to either raise or lower the balloon. To move it from one locality to another while inflated is a slow process, as care must be taken to prevent the cable connecting the winch and balloon from being interfered with by telephone lines, trees and other obstacles. On the other hand, the autogiro can move under its own power without difficulty, and, therefore, in an attack can readily be advanced as the lines move forward.

THE AUTOGIRO

Also, it can ascend and descend more quickly than the balloon.

The autogiro can attain a greater height than the balloon, as the latter is handicapped by its low ceiling and the length and weight of the cable to which it is attached. This would allow observations from an autogiro over defilade immediately in front of a target which would shield the target from balloon observation.

The high degree of vulnerability of the balloon decreases its value to the Army; so much so that it is doubted that it will be used to any great extent in the next war. It is a large target which can be seen a great distance. Balloon after balloon was shot down in the World War without being able to defend itself. In case of attack the only thing possible is to haul the balloon down, which is a slow process. On the other hand, the autogiro is a small target, highly mobile, and should be able to get out of the way of the attacking plane.

The captive balloon is a very expensive piece of equipment to maintain, both from the standpoint of men and money. A balloon company which keeps one balloon in the air, and a spare balloon on the ground, consists of eight officers and one hundred seventy enlisted men. It must be supplied with helium, which is costly and presents difficulties of supply, and numerous cylinders of this gas are needed to fill one balloon. But the autogiro presents no unusual supply problem and is comparatively inexpensive to maintain. It is estimated that fifteen men per autogiro will suffice for its maintenance.

When the balloon is not in use a serious problem presents itself in trying to conceal it. There are comparatively few places where an inflated balloon can be hidden, and it is impracticable to deflate it on every occasion when it is desired to conceal it. However, the autogiro presents little difficulty in this respect. Due to the ability to fold its blades over the tail, the machine is only ten feet wide and twenty-five feet six inches long, and, therefore, can be readily concealed under trees.

In rough air, when a balloon rolls and pitches to such an extent that it is impossible to obtain good observation from it, the autogiro would ride more smoothly and provide better observation.

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On many occasions, when a balloon is grounded due to bad weather, an autogiro would be in the air obtaining observation. During foggy weather, when no enemy installations could be seen from a balloon, this machine could go forward, close to the ground, and observe to a limited extent.

Contrary to the general belief, an autogiro, while remaining aloft over a small area in rear of our own lines, may use telephone communication with the ground to report the results of observation similar to a balloon. When it maneuvers over a large area, it will use one or two-way radio.

Observations from an autogiro, either hovering or traveling at low speeds over enemy territory, should be much more efficient than that from an airplane traveling over 100 miles an hour. Therefore, it is believed that in many cases artillery fire will be observed from an autogiro in preference to an airplane. These observations could be made from a point immediately over the battery, along the gun-target line, or over the target. Because of its wide speed range, the autogiro can be brought exactly to the same point of observation for each shot at the instant of burst, resulting in more accurate and uniform reports for adjustment of fire.

During foggy weather, it may be possible to use the autogiro for observation purposes where aeroplane observation would be impossible, as due to the high speed at which the plane must travel, the observer could not be kept close enough to the target to observe the bursts.

The short turning radius of the autogiro, and its ability to land almost anywhere, are distinct advantages over the airplane and should be of great assistance to it in avoiding enemy planes.

The test of the latest type autogiro at the Field Artillery School will be awaited with keen interest. It is predicted that, as a result of this test, recommendations will be made to replace the balloon entirely by autogiros for artillery observation, and, furthermore, to replace the aeroplane by autogiros for a large part of the observation of artillery fire.

LE CATEAU, 26 AUGUST, 1914

BY MAJOR J. J. BETHURUM WILLIAMS, Field Artillery

(Continued from the May-June Number)

ANALYSIS AND CRITICISM

INFLUENCE OF THE TERRAIN

The strong features of a position are, in general, those parts of the position in front of which the hostile approach is exposed to observation and fire over a long distance. Troops holding these features will derive full benefit from artillery and machine-gun support and do not therefore require the infantry strength necessary for the defense of weaker sections of the position.

The weak features of a defensive position are those which permit of the covered approach of the attacking forces to within close range of the position. Such features require infantry garrisons of sufficient strength immediately at hand to meet the hostile forces in close-range combat.

*The assignment of sectors to infantry units conforms to these principles; narrow sectors are assigned on the weaker portions of the front and broad sectors on the stronger portions. By adaptation of the width of sectors to their natural strength, there results an economy of force * * *. Par. 508, Field Service Regulations.*

IN the action at Le Cateau, by the contrast between the weakness of the right of the British 5th and the left of the 4th Division sectors with their dead space and covered approaches where the German attack succeeded relatively quickly, and the strength of the sector of the 3d (center) Division in the vicinity of Audencourt with its excellent field of fire where German attacks repeatedly failed, there is again illustrated the necessity for the application of the foregoing axiomatic principles, in the defensive.

The flanks of a defensive position should be secure.

Though the field of fire was good near the "Quarry," southwest of Fontaine au Pire in the sector of the British 4th Divisions, by taking advantage of the avenues of approach the Germans outflanked this Division and forced its withdrawal south of the Warnelle ravine. The right flank of the British II Corps being weak, only a complete withdrawal prevented its envelopment.

The weakness of a salient, in spite of a good field of fire, is illustrated in the eventual capture of Caudry.

The 3d Division received earlier notification of the decision to defend and was able to improve its position. Its subsequent comparatively successful defense illustrates the value of ground organization, even that which can be effected in only a few hours.

However, it must be remembered that the II Corps took up its position at Le Cateau with little or no opportunity for detailed reconnaissance or ground organization.

THE DECISION OF GENERAL SMITH-DORRIEN

General Smith-Dorrien says 'well does he remember the dead silence in that little room at Bertry, while he was estimating the situation.' Here must have been mental anguish indeed—not the synthetic variety of some service school map problem room.

Two plans were open: Plan 1—To defend; plan 2—To continue the retreat without delay. A consideration of the events of the past three days: defeat at Mons, two days of retreat, air reconnaissance reports, information that the enemy was passing troops of all arms to the south and west, night fighting of the I Corps, rear guard actions of his own Corps, information brought by General Allenby—indicated the German First Army had but one intention in its overtaking pursuit, namely, to pin down, then envelop the British. To stand and fight was just what General von Kluck was trying to make the British do, so that his infantry corps could come up and carry out the envelopment. It seems the adoption of plan 1 would tend to play directly into the hands of the enemy instead of being calculated to frustrate the accomplishment of his probable intentions. Regardless of the difficulties and dangers involved in a plan to continue the retreat as early as practicable, a plan to defend would appear to involve infinitely more potential danger and difficulties and should, therefore, have been rejected.

A summary of air reconnaissance reports compiled at British GHQ late on the 25th showed the 4 German columns of all arms, previously observed, much farther advanced. 'One column was moving on Solesmes (8th Division); one was half way between Le Quesnoy and Landrecies (7th Division); in addition, a great concentration of troops was observed in and near Valenciennes

(IV Reserve Corps and 3d Division of II Corps); further to the west, a flanking column of cavalry (Marwitz' Corps) was advancing through Orchies, with numerous detachments to the south.' This remarkably accurate later picture does not seem to have been transmitted to the Corps commanders. Although General Smith-Dorrien knew the Germans were strong, apparently he could not bring himself to believe they were in such overwhelming strength. He could see but a relatively small arc of the great circle of events, whereas Sir John French with his superior sources of information could and did see the immediate necessity for a continuation of the retreat. As only the Higher Commander is in possession of all the information on which to base a decision to pursue, likewise only the Higher Commander has the necessary information on which to base a decision to withdraw. The order of Field Marshal Sir John French to continue the retreat, beginning at 7:00 A. M., on the 26th, should have been carried out. A variation from the prescribed hour was clearly indicated. General Smith-Dorrien should have continued the march without delay—by daylight, or as soon thereafter as practicable. Such a course of action would have carried out the spirit of the order of the Higher Commander; a plan to defend in the hope of being able to continue the retreat at some later time would not.

Sir Douglas Haig appreciated the true situation and, in spite of the fact his I Corps had stood to arms all night, succeeded in resuming the retreat as ordered. According to Gordon: "There was no reason to suppose that the Second Corps, which had not been so much harassed by the enemy on its march south as the First Corps, was not equally well able to obey the order to retreat."

As General Charteris states in his biography "Field Marshal Earl Haig": "He (Haig) himself had a clear conception of what he now believed to be the immediate task of the British Army. It was the same problem which he had thrashed out in his Staff Tours in India. A retreating army could not afford to risk battle * *. Above all, in the particular problem of 1914, it had to keep in touch with the French troops retreating on the inner flank. * * On 24 August, Haig motored to GHQ to impress this conviction on Sir John French. He urged that if the British

Army halted for any unnecessary action there was the gravest risk of the whole British force being surrounded and overwhelmed. * * The problem as Haig saw it offered but one solution, and that was for the whole Allied Force, moving rapidly in retreat, to extricate itself from the threatened envelopment, and then resume the initiative * *. He believed that the highly trained long service army which formed the Expeditionary Force should, under proper leadership, always be able to shake itself clear of the pursuing German Army, with no greater losses than those involved in a series of small rear guard actions."¹

In the sources there appears much quibbling over just what General Allenby said to Sir Horace Smith-Dorrien at II Corps Headquarters in the small hours on 26 August. Whether Lord Allenby said 'the Germans are so close unless the II Corps and 4th Division can march "before" daylight the enemy will be upon them and it will be necessary to fight,' or whether he said 'unless you make up your mind to move "at" daylight the enemy probably will succeed in surrounding you'—the essential thing is that if Smith-Dorrien had continued the retreat before, at, or as soon after daylight as practicable, covered by rear guards, the II Corps and 4th Division should have been able to get away. It will be remembered the advanced elements of the Germans were still 3 to 5 miles distant, and it would be hours before they could close up their columns and make a coordinated attack.

It would seem that if General Smith-Dorrien had put into an attempt to extricate his Corps early on 26 August all the energy, resolution and courage he exhibited later in defending, he would have been able to continue the retreat.

In his book. Smith-Dorrien says one of the factors he considered in arriving at his decision was the following: "Our infantry have proved their staunchness and astounding accuracy with the rifle, our gunners are a marvel, and if Allenby and Snow will act under me, and Sordet will guard my west flank, we should be successful in giving the enemy a stopping blow, under cover of which we could retire."

¹The total losses of the British II Corps on 26 August, excluding many missing who eventually returned to their units, were heavy: 7,812 (15%) and 38 guns.

And he did do just that! But it must be admitted Fate had him by the hand as he successfully executed his famous daylight withdrawal.

General Smith-Dorrien compels one's deepest sympathy when he goes on to say: "I had no alternative but to stand and fight. I claim no credit, but on the contrary realize to the full that fortune was on my side, firstly in having such an efficient force so skillfully and devotedly handled and led, and composed of troops so well disciplined and courageous as to be second to none in the world; and secondly in having an enemy who did not rise to the occasion."

There is no intention of going into a lengthy discussion of the criminations and recriminations that have ensued as a result of the controversy over this historic decision. Having first read General Smith-Dorrien's "Memories of Forty-Eight Years Service" several years ago, the writer approached the preparation of this paper inclined to believe his decision sound and entertaining the hope he would be able to prove it. However, after an impartial examination of the sources; after viewing his decision against the broad background of the entire picture, while admiring his courage and resolution as much as ever, I am now—somewhat regretfully—of the opinion that his memorable stand in mad challenge to the onslaught of an entire army was not justified.¹

VON KLUCK ATTEMPTS A DOUBLE ENVELOPMENT

Encirclement of the retreating forces and of the separate elements thereof by double envelopment is always attempted wherever conditions permit.—Par. 490, F. S. R.

The decision of Smith-Dorrien gave to von Kluck his hoped-for opportunity. The march objectives assigned in First Army pursuit orders for the 26th should have resulted in a double envelopment of the British II Corps. It will be recalled, later in the action General von Kluck correctly issued supplementary orders specifically directing the IV Reserve Corps to "swing as far as possible in the direction of Crevecoeur," then envelop

¹The eminent compiler of Vol. I, British Official History, Brigadier General Sir J. E. Edmonds, C.B. C.M.G., (Chief of Staff, 4th Division, at Le Cateau), defends Smith-Dorrien's decision; for his views, see pp. 139-143, 192-193, BOH.

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the British left. Further, it will be remembered the Division Commander of the 7th Reserve Division, first told to attack in the direction: Haucourt, was compelled to change front and advanced as far as Crevecoeur and Esnes in meeting Sordet's attack. The strikingly terse comment of the Reichsarchiv follows: "It would have been of decisive influence upon the issue of the battle if the 7th Reserve Division, instead of being taken back in the direction of march ordered originally, had started from Crevecoeur and Esnes upon the highways in a southeasterly direction for a decisive thrust into the left flank of the English." (Sketch 4 shows this point clearly).

Thus the delay effected by Sordet might not have been sufficient for the British left to withdraw, after all, but for the fortuitous circumstance of the additional delay incident to the handling of the 7th Reserve Division.

No new orders to the III Corps seemed necessary. The leading regiment of the 5th Division, III Corps, on the 26th was the 8th Leib Grenadiers. Its history states the Division marched from Landrecies via Pommereuil. "The participation of the Regiment was limited to the 'opening out' of the 2d Battalion under enemy artillery fire, and the deployment of the Machine Gun Company against an enemy battery." The Regiment did not reach Honnechy and Maurois, where it went into billets, until toward midnight. The 52d Infantry reached St. Benin; the 48th, Bazuel; the history of the rear regiment, the 12th Grenadiers, does not mention where it halted. The advance guard of the 5th Division on the 25th was the 48th Infantry and it was this regiment that engaged Sir Douglas Haig's I Corps at the Sambre bridge north of Maroilles on the night 25-26 August. If, as the regimental history of the 8th Leib Grenadiers says, the 5th Division marched from Landrecies on the 26th, part of the Division must have been turned off southwest along the Sambre late on the 25th. (Sketch 2).

The regimental history of the 24th Infantry, the leading regiment of the 6th Division, III Corps, states that it started at 3:00 A. M., "was drawn hither and thither and with few pauses marched into the late evening, dropping a battalion to take and guard Berlaimont bridge." The 64th Regiment, which had lain

down to rest on the road at 12:30 A. M., started east again at 3:00 A. M., and at 5:00 A. M. dropped two companies to guard the Sambre bridges in the area: Landrecies-Leval. About 8:00 A. M. it turned back through the Forest of Mormal, now preceding the 24th Regiment, and marched on Robersart, but at 7:15 P. M. went into bivouac "dead-tired" around Englefontaine. The 35th Fusiliers, the rear regiment, says it started at 9:30 A. M., and, following the other regiment of its brigade, the 20th Infantry, marched straight down the Roman Road to Englefontaine, where it was told to send a battalion, with a battery attached, to Landrecies: that the brigade then took up a position in readiness near Bousies to support the IV Corps, one battalion of the 35th being sent forward as artillery escort; but "the brigade did not come into action as the enemy had in the meantime disappeared."¹

The Germans correctly took steps to guard against an attack in flank from across the Sambre, but apparently lost much time making their dispositions. The 6th Division, without going into action, billeted for the night in the area around Forest. If the 5th Division marched from Landrecies on the 26th, its head covered only some 11 miles between daylight and about midnight. In effect, therefore, one division of the III Corps "countermarched beyond the field of battle," while the other "marked time," comparatively. Thus with about one-half of the distance to march to envelop the British right that the IV Reserve was required to march to envelop the British left, the III Corps was the victim either of lack of aggressive leadership, vacillations on the part of commanders, poor staff work, or possibly all three. In his "March on Paris," General von Kluck, with admirable restraint, merely says: "The IV Reserve Corps, ordered to make an outflanking attack against the enemy left, encountered French troops near Cattenieres, and the III Corps, ordered to march on Maretz, did not get further than Honnechy on the 26th; so the attempted enveloping operation was not effective."

In view of the lack of quick and reliable communications, General von Kluck should not have remained at his headquarters during the action, but should have gone forward and personally

¹This interesting information on the action of the III Corps is extracted from the 1933 edition, British Official History, pp. 207, 208.

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supervised the execution of his orders so that his timely influence upon the combat might have been possible.

THE BRITISH II CORPS EXECUTES A DAYLIGHT WITHDRAWAL

A withdrawal by daylight involves such heavy losses and so great a degree of disorganization that it is as a rule preferable to hold out at all costs until nightfall and effect the withdrawal under the cover of night. Rearward echelons only can as a rule be withdrawn by day.—Par. 548, F. S. R.

Le Cateau is the exception. The British II Corps was compelled to attempt a daylight withdrawal to prevent complete envelopment.

When a commander is forced to withdraw during daylight hours, the withdrawal from action should be initiated before the enemy can drive home his main blow. Although a commander is not justified in holding out a reserve to meet the contingency of a probable withdrawal from action, the availability of formed bodies of troops is important to the success of the withdrawal.—Par. 6, b, Chapter XIV, Tactical Principles and Decisions, Command and General Staff School.

General Smith-Dorrien initiated the withdrawal of his Corps at the proper time, just before the Germans were about to consummate their envelopment of his right flank. He correctly held out only one brigade of four battalions initially, not too large a reserve for a corps of three divisions. Nominally his cavalry, posted to protect the flanks, was in corps reserve also.

In a daylight withdrawal, it is generally advisable first to withdraw the major unit that is least heavily engaged unless there is danger of some other major unit being cut off.—Par. 7, a, Chapter XIV, TPD, C&GSS.

The 5th Division was in danger of being completely enveloped. Therefore, in this situation, it was necessary that this unit be first withdrawn.

Thus Le Cateau is not only an illustration of that exceptional tactical maneuver, a daylight withdrawal, but it is also an illustration of the exceptional case where it is necessary, in a daylight withdrawal, first to withdraw the most heavily engaged major unit.

EMPLOYMENT OF II CORPS RESERVE

When the necessity arose for the use of a portion of the corps reserve to reinforce the 5th Division, hard pressed early in the

action, General Smith-Dorrien promptly turned over two battalions to General Fergusson, complying with the principle of giving a subordinate the means with which to accomplish his mission.

When the defensive or assembly position lies at a considerable distance from the battle front, the commander of the troops selects a covering position usually located on the flank of the line of retreat and details a covering force from any available reserves to occupy it and cover the withdrawal of the troops engaged. Artillery is attached to the covering force.—Par. 550, F. S. R.

The remainder of the Corps Reserve and the 5th Division Reserve, with artillery attached, were correctly ordered to occupy a position near the Roman Road to cover the withdrawal.

LOCAL COVERING DETACHMENTS

The elements left in contact with the enemy screen the withdrawal by simulating great activity. Par. 552, F. S. R.

It will be recalled many front line units failed to receive the order to withdraw. However unfortunate this may have been from the point of view of the individual units concerned, the Germans permitted themselves to be held up by the determined resistance of these detachments. Their action created the impression the British were still in strength and aided materially in the successful accomplishment of the withdrawal.

TIMELY PLANS AND ARRANGEMENTS FOR WITHDRAWAL

*As soon as practicable the commander of the troops makes the necessary arrangements for the occupation of the new defensive position. He assigns sectors of the position and lines of retreat to the units of the command * * * and takes the necessary steps to clear the routes for the movement of the troops. Prompt starting of field and service trains to the new areas, evacuation of the wounded, energetic measures for the maintenance of traffic control, construction of the necessary bridges, and preparations for the execution of demolitions on the lines of retreat are of the first importance.—Par. 551, F. S. R.*

Plans, including assignment of routes, had been prepared by the II Corps Staff in anticipation of a later continuation of the retreat. These plans apparently were already in the hands of Division Commanders when it became necessary to order the withdrawal. Also, General Smith-Dorrien arranged for his

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trains to start early in the afternoon. Staff officers accompanied the 5th Division Train with orders to keep it moving all night as there was fear of it being overtaken by German cavalry. As an instance of correct staff procedure, traffic control posts manned by staff officers were established along the Roman Road in an attempt to accelerate movement and effect reorganization of the badly intermingled units.

STRATEGIC DETACHMENTS

As a precautionary measure, General Joffre had stationed a few Territorial Divisions to extend the line from the left of the British to the sea (Sketch 1). 26 August, the day of Le Cateau, "marks the climax of the influence of these detachments."

By dark on 25 August the II Corps, intended by General von Kluck as his far-flung enveloping force in his pursuit of the British, arrived with the heads of its 2 divisional columns about 9 miles north of Cambrai and only a little more than that distance from the British left. Fighting a series of delaying actions, the French 84th Territorial Division held up the German II Corps on 26 August and prevented it from cutting off the retreat of the British.

It is doubtful whether Sordet's Cavalry Corps, unassisted, would have been able to delay effectively both the German IV Reserve and II Corps. In this connection the Reichsarchiv comments succinctly as follows: "If the II Army Corps, instead of allowing itself to be tied all day by weaker French cavalry and Territorial troops, had tried to throw this enemy back as quickly as possible in a resolute attack, in order to gain the highway to Le Pave (south of Cambrai—See sketch 4), with strong forces providing for its flank protection, it might have been able to block the retreat of the English."

By its presence off on the flank, the 84th Territorial Division was able to hold out of the main action superior numbers.

THE INTERVENTION OF SORDET

Cavalry attack against the flanks of pursuing columns is often an effective means of disorganizing the enemy's pursuit. When practicable, batteries or single guns occupy positions with a view to taking pursuing elements under flanking fire.—Par. 237, F. S. R.

LE CATEAU, 26 AUGUST, 1914

The writer knows of no better historical illustration of the application of that portion of Field Service Regulations just quoted than the timely intervention of General Sordet's Cavalry Corps on the British left at Le Cateau. Gaining the outside and attacking in flank the enveloping columns of the IV Reserve Corps, particularly by the fire of his horse artillery, Sordet compelled the Germans to pause in their pursuit and change front to meet a threat which could not be ignored.

The German IV Reserve Corps reached Crevecoeur on 26 August after, as von Kluck truly says, "a prodigious march" from Valenciennes. By the shortest route this distance scales about 26 miles. On a hot August day, or on any other day, this, it must be conceded, was an extraordinary performance, especially in view of the size of the units involved. It is only in the light of such mobility as was exhibited by the German First Army in this instance that we are able to evaluate properly the decisiveness of the intervention of Sordet's Cavalry Corps.

As to both the importance and the effectiveness of the intervention of these French troops, General Smith-Dorrien himself says: "The delay, and the brave front shown by these Territorials were of vital importance to us, as otherwise it is almost certain we should have had another Corps against us on the 26th.

"I had a momentary shock about 5 P. M. on getting clear of the village of Maretz, about three miles south of Maurois on the Roman Road, for I suddenly heard very heavy artillery fire away to the northwest, which I reckoned was behind the 4th Division outer flank and feared the enemy had got behind Snow; but was much relieved, on galloping to a hill about a mile in that direction, to recognize the short sharp crack of the famous 'seventy-fives,' and then I knew they were French guns and probably Sordet's, and this they turned out to be. On reaching St. Quentin I took the opportunity of sending a message to General Sordet to thank him."

VON KLUCK FAILS TO INITIATE PROMPT CONTINUATION OF THE PURSUIT

Only by means of a relentless pursuit of the beaten enemy can the full fruits of victory be obtained. Pursuit of a decisively defeated enemy must be pushed to the utmost limit of the physical endurance of the troops and no opportunity given him to reorganize

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*his forces and reconstitute his defense. * * * Direct pressure against the retreating forces is combined with outflanking maneuver designed to place our own troops across the enemy's lines of retreat.*
Par. 490, F. S. R.

Just as General Smith-Dorrien was considerably influenced by the fatigue of his Corps in arriving at his decision to suspend the retreat, General von Kluck apparently permitted the tired condition of his troops to delay continuation of the pursuit. It is not possible in an analysis such as this to say what the troops on each side could have done; it can only be pointed out what, in retrospect, the commanders should have attempted to have them do. Who but the actual commander on the ground can estimate such an intangible, yet all important, factor as that point when his troops have reached the "utmost limit of physical endurance?" Both commanders may have been right. Although the bulk had had several hours rest, General Smith-Dorrien's Corps might not have been physically able to continue the retreat early on the morning of 26 August; General von Kluck's Army might not have been able to press the pursuit in the afternoon of that same day. It is not for this writer to say both commanders were not great. Yet perhaps a greater commander than either, in the one instance, would have attempted resolutely to continue the retreat, and, in the other, would have attempted relentlessly to press the pursuit.

General Von Kluck's pursuit order was not issued until 8:13 P. M. 26 August. It provided for the movement of the II Corps and Cavalry Corps, only, at 1:00 A. M.; the remainder of the Army at 4:00 A. M., allowing a night's rest. However, as we have seen, the II Cavalry Corps did not march until 3:00 A. M., the II Corps not until 6:00 A. M., because of delay in receipt of the Army Order.

Consequently, the British II Corps was allowed a start of about 12 hours. The delay in the exploitation of success was fatal and adds but another to the already long list of historical examples of the failure to achieve decisive results when pursuit is not initiated promptly. Moreover, his order provided for pursuit of the British II Corps in a southwesterly direction, while the British actually retreated on St. Quentin, a little west of

south. In this connection, however, it is but fair to say that von Kluck's direction of pursuit was generally in accordance with the zone of advance indicated in the initial GHQ directive.

Effective pursuit requires the impulsion of leadership and the exercise of initiative in all echelons of command in the highest degree. When their troops are victorious all infantry commanders press forward to spur on their troops and clinch the advantage gained by the use of their reserves.—Par. 491, F. S. R.

The impulsion of leadership should have come from the Army Commander himself, but its absence should not have prevented the exercise of initiative on the part of Corps Commanders. General Sixt von Armin, commanding the IV Corps, did issue a pursuit order at 1:15 P. M., but apparently nothing was accomplished towards its execution. As a matter of fact, the Reichsarchiv records that after the 8th Division had made another unsuccessful assault on Audencourt later in the afternoon, 'the Division Commander, arriving at his command post at 5:30 P. M., ordered the division to stand fast and await the effect of the enveloping attack of the IV Reserve Corps next day.' In the 7th Division, after its partially successful envelopment of the British right, 'much valuable time was lost in reorganizing the mixed-up units on the road: Le Cateau-Honnechy. Later in the evening the entire division was moved west to make room for the III Army Corps.' Thus the Commanding General, 8th Division, intervened negatively, while the Commander of the 7th Division, instead of pressing forward to clinch his advantage, did nothing for several hours.

The pursuit is conducted on a broad front. Reserves sent in to exploit success do not require the depth required in the attack of an unshaken enemy.

Troops before whom the enemy is giving way attack him on the front and send in their reserves to gain his flank and rear or break through his covering troops.

Motor transportation is employed to increase rapidity in the shifting of reserves.—Par. 492, F. S. R.

It seems no real effort to exploit the success was made. If reserves were sent in they were effectively held up by weaker covering detachments.

Although advanced detachments in motor trucks were correctly

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sent forward by the German First Army on the 25th and engaged elements of the British I Corps during the night 25-26 August, apparently no attempt was made on the critical night of 26-27 August to employ motor transportation for the despatch of encircling forces around the British flanks.

The enemy's attempts to organize his retreat under the cover of darkness must be frustrated. Units which have advanced without opposition during the day continue their march during the night. Other units organize successive limited attacks against the enemy in their front.—Par. 495, F. S. R.

Having already marched 26 miles it would be unreasonable to expect more of the IV Reserve Corps on 26 August.

However, some elements of the III Corps had marched a relatively short distance and without opposition. If only the brigade of the 6th Division which did not march until 9:30 A. M., on the 26th, strongly supported by artillery, had continued straight down the Roman Road—filled as it was with transport and troops—it is not difficult to imagine what might have been the results.

Without doubt the stubborn British defense had taken a great deal out of the IV Corps; still it had marched less than any of the Corps, should have kept up the direct pressure in the afternoon, and continued the attacks after dark.

EMPLOYMENT OF GERMAN ARTILLERY

Artillery fire of pursuit and aerial attack constitute the most effective means of defeating the enemy's attempts to reorganize his forces for their movement in retreat.

The employment of artillery is based upon the maximum exploitation of the mobility and the range of lighter pieces and the long range of the heavier types. Par. 493, F. S. R.

Just as the employment of German artillery in the meeting engagements of the "Battles of the Frontiers" (8-24 August, 1914) was characterized by its prompt entry into action resulting in a concentration of fire instead of men at the heads of columns, so was the employment of the German artillery in the pursuit of the British especially noteworthy.

In the IV Corps, the 7th Divisional Artillery promptly moved forward in advance of its Division, occupied position on both sides of the Roman Road near Forest, and opened fire on the British right shortly after 6:00 A. M., on the 26th. The infantry

of the 7th Division did not arrive in this same vicinity and deploy until some two hours later. Likewise, the entry into action of the 8th Divisional Artillery was almost as prompt.

The horse artillery battalions of the II Cavalry Corps, emplaced well forward, opened fire on the British left as soon as the ground haze lifted, shortly before 6:00 A. M.

Although it appears the infantry of the III Corps took little part, the artillery of the 5th Division, III Corps, went into action about 11:00 A. M. in support of its own infantry, and sometime later a portion of the artillery of the 5th Division was sent forward to support the coordinated attack of the IV Corps, ordered by General Sixt von Armin.

The action of General of Artillery von Gronau, IV Reserve Corps, in promptly ordering forward the divisional artillery at increased gaits in advance of his Corps when told by First Army at 9:00 A. M. to cut off the retreat of the British, is a classic example of bold exploitation of the mobility and range of the lighter pieces. By 11:30 A. M., only 2½ hours after receipt of the Army Order, and about 2½ hours before the arrival of the infantry of the leading Division, *all* the light batteries of the IV Reserve Corps had been emplaced in the vicinity of Cattenieres in support of von der Marwitz' Cavalry Corps (Sketch 4). When it is remembered the IV Reserve Corps was marching in one column, the full significance of the time element in this remarkable performance becomes more apparent.

Against the British, General von Kluck managed to deploy a powerful artillery: divisional artilleries of the 5th, 7th, 8th, 7th Reserve, 22d Reserve Divisions, and the 2d, 4th and 9th Cavalry Divisions; also sixteen 150-mm howitzers of the IV Corps Foot Artillery Regiment.

Even this early in the War, airplanes observed for the Germans while the British had to depend on ground observation.

The handling of the British artillery at Le Cateau, generally exposed and emplaced with little echelonment in depth, in the face of such odds was no less than magnificent.

THE GERMAN II CAVALRY CORPS

Through these portentous events, transpiring once again on time's backward flight before our critical eyes, we see two

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Cavalry Corps, each of three divisions; each, coincidentally, hurrying by forced marches on the same two days, 24 and 25 August—the one westward, the other to the south—both to the same critical area. We look expectantly for the clash between these two forces, but we look in vain. Though each arrives, they do not meet on the 26th. Let us see why. Moreover, as a corollary of the importance of the climactic intervention of the one, let us discuss the reasons for the anti-climactic failure of the other to play the decisive role it might have played at Le Cateau.

Into the picture there comes again the Commander of the Second Army, General von Bulow, who, it will be recalled, attacked prematurely along the Sambre on 22 August. Now, upon the receipt of information of hostile cavalry in the vicinity of Courtrai, enemy detrainments at Tournai (French Territorials), and the supposed approach of the British via Lille, General von Bulow took von der Marwitz' Cavalry Corps away from the right front and flank of the First Army and despatched it northwest on Courtrai on 23 August. Courtrai was found to be free of the enemy.¹ Von Kluck finally went over von Bulow's head and succeeded in obtaining from German GHQ the passing of von der Marwitz' II Cavalry Corps to his control. He ordered it south at once in forced marches on 24 August in an endeavor to regain some of the valuable time lost. The II Cavalry Corps marched to Marchiennes on the 24th, about 43 miles, disposing of some of d'Amade's French Territorial detachments in the vicinity of Tournai enroute. On the 25th it reached the villages of Avesnes lez Aubert, St. Hilaire, and Villers (east of Cambrai), where it halted for the night, being unable to march further, as Lieutenant

¹On 17 August, German GHQ issued orders subordinating the First Army to General von Bulow for the advance. At the same time, the I and II Cavalry Corps were placed under von Bulow's command. Thus was formed the makeshift army group on the right wing. In the momentous days that followed, von Bulow apparently failed to appreciate the fact that "the mission of the First Army was primarily strategic in its nature, designed to open the way to later tactical successes." He continually featured his own Second Army at the expense of the First. To have assisted the First Army in every possible way would best have insured the success of the army group as a whole. And, in the I and II Cavalry Corps, von Bulow possessed the necessary means with which he could have furthered the mission of the First Army. However, instead of recognizing the true character of von Kluck's task, and combining the I and II Cavalry Corps on the right of the First Army, von Bulow not only ordered the II Cavalry Corps away from the zone of advance of the First Army the very day after its initial contact with the British near Mons, but kept the I Cavalry Corps close by his own army.

General von Poseck says in his "German Cavalry, 1914," on account of "the exhausted condition of men and horses."

Consequently, during the 24th and 25th when the British Expeditionary Force had only one cavalry division to assist in covering its retreat, instead of being where it should have been, namely, operating against the flank and rear of the British, von der Marwitz' Cavalry Corps was riding itself to a standstill, practically, in an attempt to offset the error of General von Bulow. (See sketch 1 for route of II Cavalry Corps).

General von Kluck possessed the means of at least neutralizing the effectiveness of Sordet's Cavalry Corps, on the 26th. Although it had fought a hard dismounted action (with, however, relatively small losses, according to von Poseck), if von der Marwitz' Cavalry Corps had operated merely to contain Sordet instead of taking no further part in the battle after withdrawing in the afternoon, the IV Reserve Corps would very probably have been able to take part decisively at Le Cateau. On the other hand, if von der Marwitz had contained Sordet with the bulk of his corps,¹ and despatched an encircling force around the British left, there is little doubt as to the probable results of this action. The Roman Road was congested for miles with British trains and troops. There was great fear of being overtaken by German Cavalry. Due to the transverse direction of the Roman Road across the routes of withdrawal, it was inevitable that it would be filled with elements of practically all units of the British II Corps, offering a magnificent opportunity for pursuing cavalry. A few shells from batteries of horse artillery would have played havoc with such a target. Therefore, it would seem that, despite its palpable fatigue, von der Marwitz' Cavalry Corps should have made a final, desperate effort to exploit the success at Le Cateau, strike the British in rear, and cut off their retreat.

The prompt launching of cavalry to strike the enemy in flank and rear and cut off his retreat are essential to decisive results.—Par. 491, F. S. R.

¹Marwitz' Corps (exclusive of 6,000 Jager) = 15,600. Includes: nine 4-gun horse batteries (36 guns). Sordet's Corps=13,500. Includes: six 4-gun horse batteries (24 guns). Relative combat strength: Marwitz 15 per cent greater strength, 50 per cent more artillery fire power; including the 5 Jager Battalions (in contact with British until dark), Marwitz 60 per cent greater rifle strength and an additional 30 machine guns.

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As von Kluck says, quoting Field Marshal Count Haeseler: "Both man and horse are capable of amazing achievements in war." Nevertheless, there is a limit to their physical endurance. It may be that von der Marwitz' Cavalry Corps had reached this limit; but Sordet's Corps also had just completed a hard, trying march across the rear of the British Army and, in spite of its fatigue, Sordet's Cavalry Corps arose to the occasion.

While General von Kluck is not to be held without blame for his failure to see to it that von der Marwitz took advantage of his opportunity, we must look to the prior action of General von Bulow in our search for the chief element in the failure of the II Cavalry Corps. If von der Marwitz had not been sent to Courtrai on a secondary undertaking—which reconnaissance, as von Kluck suggests, could well have been entrusted to a reinforced cavalry regiment—the II Cavalry Corps, being comparatively fresh, might have been the deciding factor on the 26th.

The strength of cavalry must not be so frittered away in secondary undertakings as to render it inadequate to the execution of its decisive missions.—Par. 84, F. S. R.

FAULTY EMPLOYMENT OF CAVALRY BY GERMAN GHQ

The initial error in the employment of the army cavalry must be charged to German GHQ itself. Each German infantry division contained one organic cavalry regiment. In addition, the German order of battle, 1914, included 4 cavalry corps (10 divisions) of army cavalry. In the plan of campaign, GHQ divided up the 4 cavalry corps along the front of the armies. The plan, however, did allot the I and II Cavalry Corps (5 divisions) to the zones of the First and Second Armies. It was important that sufficient cavalry be provided to screen the advance, particularly of the right wing. After the initial contact, it was essential to success that GHQ insure a strategic cavalry mass on the right flank. At least the bulk of the army cavalry should have been so disposed. Konrad Leppa, and others, go even further. Leppa says: "The entire army cavalry with its ten divisions, reinforced by the Jager battalions and cyclist companies, belonged for concentration in the area of the right wing. * * Operating against the flank and deep in the rear of the British at Mons, it would have been able to cut off their retreat. * * In the Battles of the Frontiers

this cavalry army, if only half way led, would have insured the decision and the victory."

Rittmeister Crissoli, in an article entitled "Strategic Employment of Cavalry for a Decision,"¹ appearing in the *Militar-Wochenblatt*, 4 September, 1932, says: "The study of the use of the German Army cavalry in the World War brings one to the conclusion that there was lacking an understanding of its proper employment in consonance with the Graf Schlieffen plan. Only a cavalry army on the right wing, as planned for the beginning of the War by von Bernhardt, would have been capable of decisive strategic intervention. It seems as if its proper employment and possibilities were entirely overlooked by the German leadership."

It is interesting to note that General von Kluck appreciated this conception and attempted to apply it. On 25 August he saw from a communication of the I Cavalry Corps (von Richthofen), sent from Binche at 11:30 A. M. via the IX Army Corps (First Army), that the I Cavalry Corps was "departing upon orders from the Second Army Commander for pursuit of the English via Beaumont towards Aulnoye." According to the Reichsarchiv: "When early on 26 August it became known to General von Kluck that the I Cavalry Corps was located south of Mons in the sector of the First Army and that its movements south and north of Maubeuge were hampered by the columns of the First Army, the First Army Commander deemed it correct, in view of the haste necessary and the difficulties of communication between the Armies, to intervene directly and adjust the movements of the I Cavalry Corps. General von Kluck hoped to be able to block the retreat of the British more effectively by combining the I and II Cavalry Corps on the extreme right wing and despatched a radiogram to Lieutenant General von Richthofen ordering him to march to the right flank of the First Army via Valenciennes. However, the I Cavalry Corps (2 divisions) had already marched early on 26 August—the 5th Division on Catillon (southeast of Le Cateau), and the Guard Division on Landrecies,

¹For a further discussion of this subject, including post-war historical examples of the strategic employment of cavalry in mass for a decision, see *Quarterly Review of Military Literature*, C&GSS, December, 1932, and September, 1933.

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in compliance with orders from Second Army Headquarters."

The Reichsarchiv comments on this commendable exhibition of initiative as follows: "Thus the idea, excellent as it was, to combine large cavalry masses on the right wing of the First Army unfortunately did not materialize."

Via Valenciennes, it is 49 miles from Binche to Esnes, the left of the British II Corps; via Beaumont, it is 46 miles from Binche to Le Cateau, the right of the British II Corps. But, via Beaumont, it is only 30 miles from Binche to Dompierre, the right of the British I Corps. (Distances from Sketch 2). In this particular situation, since the two cavalry corps had not been combined, were as a matter of fact widely separated, in view of time and space factors General von Bulow probably was correct in despatching the I Cavalry Corps in pursuit of the British by the shorter interior route, i. e., via Beaumont (south of Binche).

If, however, the two corps had been combined on the German right flank, *prior* to Le Cateau, it is obvious how decisively such a cavalry mass could have operated on the 26th. It would have been able to brush aside d'Amade's Territorial Division at Cambrai and defeat Sordet, thus allowing von Kluck's II Corps and IV Reserve Corps to complete their enveloping maneuver; then, without doubt, this cavalry mass would have been able to gain the rear of the British II Corps and block its retreat. Smith-Dorrien's gallant Corps would have been destroyed. "Flushed by this primary victory" the Germans might have pressed in on the flank and rear of the British I Corps and the French Fifth Army, thrown the whole Allied force off its line of retreat, and "a stupendous repetition of Sedan might well have resulted."

CONCLUSIONS

The decision of General Sir Horace Smith-Dorrien to defend at Le Cateau was not justified. Although his decision was faulty, he fought the battle splendidly; his reserves were correctly employed; he appreciated the necessity for attempting a daylight withdrawal, ordered the withdrawal at the proper time and carried it out successfully.

LE CATEAU, 26 AUGUST, 1914

The intervention of Sordet's Cavalry Corps had a decisive influence on the successful withdrawal of the British.

By assisting in holding out superior numbers, d'Amade's 84th Territorial Division played an important part in the battle, fulfilling "the requirements of strategic detachments as laid down by von der Goltz."

Le Cateau is an artillery classic, exemplifying on the one hand, bold employment of artillery fire of pursuit; on the other, the effectiveness of taking pursuing or enveloping elements under flanking artillery fire. If the employment of his other means had measured up to the noteworthy handling of his artillery, General von Kluck undoubtedly would have succeeded in his double envelopment. The Allied artillery unquestionably saved Smith-Dorrien's Corps from a disastrous defeat.

Le Cateau was the crisis of the pursuit of the British subsequent to the Battle of Mons. Although he muffed the envelopment, von Kluck might still have won decisively, if he had insured prompt continuation of the pursuit.

Due to the initial error of German GHQ in splitting up the army cavalry, and the subsequent errors of von Bulow in handling the cavalry allocated to him, it was not possible to take advantage of the unusually favorable situation created on 26 August for the decisive strategic intervention of a cavalry mass on the German right flank.

When, in retrospect, the Germans view again the first few months of the War, the lost opportunity of Le Cateau must loom large in their corroding contemplation of what might have been.



TYPE PROBLEMS

Lateral Precision, Small T

Target Description: Check point. *Mission:* To register and determine K. *Materiel:* French 75mm guns, Model 1897. *Visibility:* Excellent. *Wind Direction:* Left to right. *Initial data:* From firing chart. B. C. on the left.

T=230, r=2700, R=3840. Site of target=plus 5.4 mils. Initial elevation=124.3+5.4=129.7. s=6 (firing tables), c=5, s/c=1.2, r/R=.7. Fork=4. yards per mil=19.

Initial Commands: No. 1 Adjust, B. D. Right 130, Shell Mark I, Fuze Long, No. 1, 1 Round.

Commands	Elev.	Dev.	Sensings		Remarks
			Range	Def.	
Right 8	130	12 Left	?	?	12×.7=8.
	130	3 Right	—	?	.7×3=L 2 to get on line. Increase range 2 forks=8 mils. 8×1.2=R 10 to stay on line.
Right 8	138	1 Right	+	+	(3 R+1 R)/2×.7=L 1. (R8)/2=Left 4. L 4+L 1=L 5.
Left 5	134	Line	+	+	(3 R+0)/2×.7=L 1. (R 8+L 5)/2=L 1 or 2. L 2+L 1=L 3.
Left 3, 3 Rds.	132	2 Left	+	?	Range may be sensed by rule.
		Line	+	+	
Left 2	132	2 Right	—	?	
		2 Left	+	?	
		3 Left	+	?	
		Line	—	—	

Right 1. Cease firing.

Adjusted elevation=132-(2/12×4)=131.3. 131.3-129.7=1.6 mils, difference between initial and adjusted elevations, 1.6×19=30 yards, 30/3.8=8. K=plus 8 yards per thousand.

Lateral Percussion Bracket, Small T

Target Description: Detached combat post. Frontage about 100 yards, depth unknown. *Mission:* To neutralize. *Materiel:* French 75mm guns, Model 1897. *Visibility:* Fair. *Wind Direction:* Right to left. *Initial data:* Estimated. B. C. on the left.

T=280, R=4200, r=3100, s=28/4=7, r/R=3/4.

Initial commands: Base Deflection Right 50, Site 0, Shell Mark I, Fuze Long, No. 2, 1 Round.

Commands	Elev.	Deviation	Sensings		Remarks
			Range	Deflection	
	4200	30 Left	?	?	30×3/4=22
Right 20	4200	5 Right	+	?	L(5×3/4)+L 28
Left 30	3800	10 Left	?	?	
Right 7	3800	Line	—	—	
Right 15 B L	4000	5 Left	—	?	
		5 Right	?	?	
		3 Left	—	—	
		10 Right	?	?	
Right 5 (10) On No. 2, Open 3, Battery 1 Round 4100					Cease firing, end of problem

Remarks: Error in initial data—deflection 20 mils, range 100 yards. Time to first range—58 seconds. Average sensing and command 11 seconds. Total time of problem, 3:35. Ammunition expended, 8 rounds. Classification; satisfactory.

Comments: With the entire target visible, but of unknown depth, zone fire should not be used.

MAINTENANCE OF THE TRUCK-DRAWN BATTERY

BY W. H. KENNETT, First Lieutenant, 1st Field Artillery

INTRODUCTION

IN VIEW of the interest shown by National Guard and Reserve Officers on the system of Maintenance used by the Regular Service of maintaining a Battery of Light Truck-Drawn Artillery the following brief article is presented. The purpose of this article is merely to serve as a guide to a Motor Officer during the initial stages of setting up a shop system. Many variations from the one presented will occur as experience indicates other more suitable systems. This article presumes to be a step in the right direction of what is considered a good practical system of automotive maintenance.

The Battery in which this system is used was, prior to July 5, 1933, a Tractor-Drawn Battery. All changes in the regular system of Tractor maintenance were gradual. Major repairs were made in the usual way by the Post Ordnance Shop. As for the Quartermaster vehicles (G.M.C.'s, Class B's), etc., the echelon system applied and repairs of a major nature were made by the Quartermaster Repair Depot at Normoyle, Texas. Since July 5, 1933, this Battery has been supplied with eighteen vehicles of the following types:

Six (6) Ford 1½ Ton Trucks Model 1933 (6 × 2)

Five (5) Chevrolet 1½ Ton Trucks Model 1933 (4 × 2)

Six (6) Chevrolet Station Wagons Model 1933—½ Ton Chassis

One (1) Chevrolet Pick Up Truck Model 1933—½ Ton Capacity.

These vehicles have been maintained and repaired within the Battery and the system presented here has been applied over the above period.

The subject matter of Maintenance has been divided into three groups to simplify the method of presentation.

- I. Motor Shop Personnel Maintenance
- II. Drivers Maintenance
- III. Lubrication Maintenance

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Recommendations under Lubrication Maintenance are based on a study of commercial practice and personal observations of individual vehicles within this Battery.

The fundamental idea of the system has been to make the work of maintenance self operating. There are no "key men" around which the system is built and operation continues regardless of absences of any of the motor shop personnel.

I. MOTOR SHOP PERSONNEL MAINTENANCE

Any system of maintenance of automotive equipment has as a primary purpose the economical operation of that equipment with elimination of road failures and lost vehicle time. In addition the service rendered by the vehicle in operation is more satisfactory throughout the life of the vehicle. Commercial practice in the last few years has recognized the value of systematic maintenance and to it applies the name preventive maintenance. A practical application of the Technical Inspection AR 30-1075 has been followed in the maintenance of this Truck Drawn Battery. Reference is made briefly to commercial practice. (See Journal S.A.E., Vol. 39, Pg. 25.) Preventive maintenance is applied by a system of inspection in which corrections are made in accordance with the results of the inspection. A maintenance system is only as good as the system of correcting defects found during the inspection. Commercial experience has found that a good system thoroughly and regularly applied reduces the number of defects reported by a trained vehicle operator to a minimum, and requires few if any repairs between inspection periods.

Commercial practice, both as regards period and detail of inspection, varies over a wide range. On a periodic time basis are included weekly, biweekly, monthly, two months and three months inspections. The majority of operators inspect on a monthly basis, using from 1½ to 4 man hours for each vehicle inspected and assuming an average of 1,000 miles per month.

Periodic mileage basis includes 1,000 mile and 2,000 mile intervals, with the 1,000 mile interval used by the majority of operators. During the 2,000 mile intervals, minor inspections (check overs) are made on a daily or weekly basis.

A consideration of all these various inspection plans has developed

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one most desirable, which is to perform a major inspection every three months (2,500 to 3,000 miles), with light intermediate inspections each month (1,000 miles).

Inspection on a periodic time basis is considered more desirable than on a periodic mileage basis for the chief reason that it makes a simple schedule of operations between the Maintenance and Transportation departments.

Army Regulations 30-1075 requires a bi-weekly inspection of each motor vehicle. This regulation is complied with by the Technical Inspection and the forms devised to complete this inspection are given in the same Regulation.

The chief disadvantage with the system of inspection as usually followed lies primarily in the fact that corrections of deficiencies are not made at the time the vehicle is inspected. The results of the inspection sheets are usually consolidated and work orders or assignment of a mechanic made to each vehicle. In assigning the work, consideration is made of the more urgent corrections desired. In this way more or less haphazard elements are introduced into the maintenance system. If strictly followed the mechanic goes from one vehicle to another and corrections are made piecemeal.

The system adopted by this Battery has been with a view toward avoiding the undesirable features incident to routine inspections. In a Battery of eighteen vehicles the bi-weekly inspection has been necessarily limited in time. Essential items are checked during this inspection by the Motor Officer and an Assistant, with regard to valve tappets, spark plugs, distributor points, brake adjustments, steering gear linkage and adjustments, gasoline line, carburetor adjustment, horn, windshield wiper and general condition. Not over 40 minutes per vehicle is allowed for this check over, including a road test. No corrections are made during this inspection except such as are found urgent. On the basis of this check-over the schedule of the vehicle through the shop may be varied as given below.

In order to comply reasonably with the basic principles of the Technical Inspection, detailed inspection sheets have been developed consistent with the requirements of each type of vehicle in the Battery. The form of these sheets closely follows that

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MECHANICAL INSPECTION REPORT Fig. 1

FORD V-8-40

U. S. A. Registration Number _____ Date _____

PARTS INSPECTED

Distributor Points (0.014"-0.015") _____ Fiber Rotor (Lub.) _____ (Pits) _____
Vacuum Brake Piston (Clean) (Reset 2 turns) _____ Primary Terminal (Tight) _____
Fuel Pump (Drain) _____ (Clean Screen) _____ Carburetor (Drain) _____
Fuel Line (Leaks) _____ Tank and Connections (Tighten) _____
Air Cleaner (Oil level) _____ (Clean) _____ Oil Mesh (Heavy Oil) _____
Fan Belt (Tension) (1") _____ (Condition) _____
Generator (Tight) _____ Starter (Tight) _____
Cooling System (Pump and Connections) _____ Radiator _____ Hose (Condition) _____
Water Temp. Element (Connection) _____
Brake and Clutch Pedals (Clearance 1/2") _____ Clutch Pedal (Adjustment 1") _____
Brakes (Adjustment 2") _____ Brake Rods (Straight) _____
Storage Battery (Sp. Gr.) No. 1 _____ No. 2 _____ No. 3 _____
(Connections Tight) _____ (Water Level) _____ (Corrosion) _____
Lights (Bulbs and Lenses) _____ (Horn) _____
Body (Paint) _____ (Bumpers) _____ (Top and Bows) _____ (Tow Hooks) _____
(Door and Door Stop) _____ (Pintle support) _____ (Number plates) _____
Front Axle and Steering Gear (Adjustment) _____ (Linkage) _____ (Wheel Bearings) _____
St. Gear Housing (Nuts Tight) _____ (Frame Attach.) (Tight) _____
Shock Absorbers (Fluid level) L.F. _____ R.F. _____ (Refilled) L.F. _____ R.F. _____
Oil Pan Screws (Tighten) _____ (Leaks) _____ (Level) _____
Motor Bolts (Tighten) _____ Body Bolts (Tighten) _____
Transmission (Bolts tight) _____ (Leaks) _____ (Level) _____ (Speedometer Conn.) _____
Sub-transmission (Bolts tight) _____ (Leaks) _____ (Level) _____
Universal Joints (Bolts tight) _____ Radius Rods (Tight) _____
Rear Axle (Bolts tight) _____ (Leaks) _____ (Level) _____
Frame and Springs (Alignment) _____ (Saddle Bolts and Clips tight) _____
Zerk Fittings Missing _____ (Number Replaced) _____
Hood and Fenders (Dents) _____ (Tight) _____ (Paint) _____
Tires (Wear front) (Toe-in) _____ (Wear rear) _____ (Pressure) _____
(Valve caps) _____ (Red Dot w/Valve) _____ (Wheel Hub nuts tight) _____
Pyrene (Bracket tight) _____ (Filled) (Date) _____
Upholstery (Condition) _____ Cab Top (Condition) _____
Road Test (Remarks) _____
Windshield (Clean) _____ (Wiper Operation) _____ (Rear view Mirror) _____
Fuel Pump (Operation) (20 sec.) _____ Choke (Operation) _____
Carburetor (Idle Adjustment) _____ Coil and Condenser (1/2") _____
Carburetor Throttle Plate (5-7 M.P.H.) _____ Oil Pressure Indicator (Bulb) _____
Ammeter Charging Rate: 15 MPH _____, 25 MPH _____ 35 MPH _____
Ignition Timing (Grade) _____
Speedometer Reading _____ Fuel Gauge (Acc.) _____
Intake System (Cyl. head and Manifold nuts) _____ W. S. Wiper (Connection) _____
Compression (Pressure indicator) 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____
Spark Plugs (0.025") _____ (Connections) _____
Oil Pressure (Dial Gauge) (Idling) _____ 25 M. P. H. (Appr.) _____ (Unit) _____
Defects Uncorrected (Consolidated) _____

Rating (S) _____ (X) _____ (Y) _____ (Z) _____

(Checked by)

(Inspected by)

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MECHANICAL INSPECTION REPORT Fig. 2

CHEVROLET M-1933.

U. S. A. Registration Number _____ Date _____

PARTS INSPECTED

Distributor Points (0.018") _____ Fiber Contact (Lub.) _____ (Pits) _____
 Distributor Cap (Clean) _____ (Connections) _____
 Coil and Condenser (½") _____ Starter (Tight) _____
 Fuel Pump (Clean bowl and screen) _____ (Operation) (20 sec.)—Choke Opn. _____
 Carburetor (Idle Adjustment) _____ Vacuum Spark Control (Operation) _____
 Intake System (Cyl. head and Manifold nuts) _____ W. S. Wiper (Connection) _____
 Water Temp. Element (Connection) _____
 Tappets—(0.006"-0.008") (175°) _____ (Rocker Arm Stud Nuts) _____
 Compression (Pressure indicator) 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____
 Spark Plugs—0.032" _____ (Connections) _____
 Fuel Line (Leaks) _____ Tank and Connections (Tighten) _____
 Air Cleaner (Oil level) _____ (Clean) _____ Oil Mesh (Heavy Oil) _____
 Fan Belt (Tension) (1") _____ (Condition) _____
 Generator (Tight) _____
 Cooling System (Pump and Connections) _____ Radiator _____ Hose (Condition) _____
 Brake and Clutch Pedals (Clearance ½") _____ Clutch Pedal (Adjustment 1") _____
 Brakes (Adjustment 2") _____ Brake Rods (Straight) _____ (Emer. Brake Sector) (Tight)
 Storage Battery (Sp. Gr.) No. 1 _____ No. 2 _____ No. 3 _____
 (Connections tight) _____ (Water level) _____ (Corrosion) _____
 Lights (Bulbs and Lens) _____ (Dimmer Switch) _____ (Horn) _____
 Body (Paint) _____ (Bumpers) _____ (Top and Bows) _____ (Tow Hooks) _____
 (Door and Door Stop) _____ (Pintle support) _____ (Number Plates) _____
 Front Axle and Steering Gear (Adjustment) _____ (Linkage) _____ (Wheel Bearings) _____
 St. Gear Housing (Nuts Tight) _____ (Frame Attach.) (Tight) _____
 Shock Absorbers (Action-disconnect) _____ L. F. _____ R. F. _____ L. R. _____ R. R. _____
 Oil Pan Screws (Tighten) _____ (Leaks) _____ (Level) _____
 Motor Bolts (Tighten) _____ Body Bolts (Tighten) _____
 Transmission (Bolts tight) _____ (Leaks) _____ (Level) _____ Speedometer Conn.) _____
 Sub-transmission (Bolts tight) _____ (Leaks) _____ (Level) _____
 Universal Joints (Bolts tight) _____
 Rear Axle (Bolts tight) _____ (Leaks) _____ (Level) _____
 Frame and Springs (Alignment) _____ (Saddle Bolts and Clips tight) _____
 Alemite Fittings Missing _____ (Number Replaced) _____
 Hoods and Fenders (Dents) _____ (Tight) _____ (Paint) _____
 Tires (Wear front) (Toe-in) _____ (Wear rear) _____ (Pressure) _____
 (Valve caps) _____ (Red Dot w/Valve) _____ (Wheel Hub nuts tight) _____
 Pyrene (Bracket tight) _____ (Filled) (Date) _____
 Upholstery (Condition) _____ Cab Top (Condition) _____
 Road Test (Remarks) _____
 Windshield (Clean) _____ (Wiper Operation) _____ (Rear View Mirror) _____
 Brakes (Equalized) _____ (Operation) (20 M.P.H.—20 ft.) _____
 Carburetor Throttle Plate (5-7 M. P. H.) _____
 Ammeter Charging Rate: 15 MPH _____ . 25 MPH _____ . 35 MPH _____
 Ignition Timing (Grade) _____
 Oil Pressure Gauge (Reading) (Idling) _____ (25 M. P. H.) _____
 Speedometer Reading _____ Fuel Gauge (Acc.) _____
 Defects Uncorrected (Consolidate) _____

Rating (S) _____ (X) _____ (Y) _____ (Z) _____

 (Checked by) _____ (Inspected by) _____

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suggested in AR 30-1075, as shown in Figures 1 and 2. Adjustments given are based on Manufacturers recommendations for that particular model. One mechanic with an assistant performs the inspection, corrects deficiencies as noted and signifies the correct adjustments with a check mark. Items not corrected and found defective such as upholstery, scratched or dented fenders, excessively worn front tires (toe-in) etc. are noted at the bottom of the inspection sheets under Defects Uncorrected (Consolidated). To thoroughly cover the items listed, going over the vehicle from end to end requires from five to eight hours. Any item requiring adjustment of a major degree such as brake linkage, steering gear, etc., causes the inspection time to vary. Inspection of the vehicle is discontinued at any time the services of that particular mechanic are required elsewhere and the vehicle is always available for use, if needed, on short notice. The inspection carries on at the point left off, either on the same day or on the next available day. The schedule is run continuously on a vehicle number basis. If for any reason the scheduled vehicle is not available in turn, the next scheduled vehicle is substituted, returning to the original schedule as soon as convenient.

One month to six weeks is necessary to complete the inspection of a Battery of 18 vehicles. The average mileage per month under normal conditions of each vehicle will vary from 200 to 700 miles. Since much of this travel is over rough terrain it corresponds to perhaps double that amount of good road mileage with incident wear and tear and the inspection is completed on a comparative commercial mileage basis of 1000-1500 miles.

As an assistant working with the mechanic on this inspection, selected non-commissioner officers and drivers are used. One week with a mechanic is allowed each assistant. On completion of the roster which carries all possible driver material, an additional week is given so that each driver and assistant driver will have at least two weeks' experience in the shop.

The order of the items on the inspection sheet have been worked out by practical application in such a way that the operations follow consecutively. The order for the Ford and Chevrolet varies somewhat due to construction features. There is

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no adjustment provided for valves in the Ford engine for instance, so cylinder head bolts are tightened after the motor has been heated during the road test.

A small dial indicator is used to check the engine compression. Much information regarding condition of piston rings and valves is obtained from the relative readings. A small amount of oil isolates the rings from the valves. As each plug is removed for inserting the indicator, the plug is cleaned and the points set. It may be that this check follows the adjustment of the valve tappets (if adjustable), and with the motor hot.

The ammeter charging rate is adjusted on the basis of the readings obtained in checking the electrolyte of the storage battery. Comparing the readings month by month indicates the required ammeter reading.

Electric units of oil pressure indicator systems (Ford) are removed and the actual oil pressure reading recorded by means of a dial indicator.

At the end of each month a consolidated list is made of all shock absorbers (Chevrolet) which have been noted on the inspection sheets as requiring fluid. Those so noted are removed as a group and refilled at one time. Other type shock absorbers are refilled on the vehicle in a similar manner.

Every three months the front wheels are checked for alignment. Front tire wear indicating incorrect toe-in is checked immediately.

At six months intervals or at any time when disturbed, headlights are checked for alignment. If standard bulbs are used with correctly placed filament the focus will be correct. No adjustment for focus is provided for Ford and Chevrolet headlights.

Seasonal changes of lubricants are made by the motor shop personnel on the vehicles as a group, including transmission, subtransmission and differential.

Radiator anti-freeze solutions are checked by the driver on recommendation of motor sergeant at intervals consistent with the temperature. All vehicles carrying water only, in the radiator, are equipped with suitable "drained" signs, permanently attached, and exposed to view on the windshield when the

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radiator is drained. At the end of freezing weather the antifreeze solution, (excepting alcohol) is placed in suitable containers and stored until needed again. At this time the upper and lower hose connections are removed and the radiator and motor block are thoroughly cleaned. (Aluminum cylinder heads require care in the use of cleaning solutions).

Front wheel bearings and gun wheel bearings are cleaned and packed with grease by the motor shop personnel on a mileage basis. Front wheel ball bearings (Chevrolet) are cleaned and packed each 2000 miles. Front wheel tapered roller bearings (Ford and 75 mm. gun) are cleaned and packed each 5000 miles.

Records of the longer periodic maintenance requirements are kept by the motor office (Miscellaneous files). The above lubrication requirements are kept in individual vehicle "lubrication and oil" books. (See below). Lubricants expended are entered in the Vehicle Record Book, by monthly consolidations of the individual vehicle books. A wall chart is maintained for the mechanics information:

Vehicle	Front Wheel Bear. 2000 & 5000 Mi. Mileage Due	Front Wheel Align. 3 Mo. Date Due	Headlight Adj. 6 Mo. Date Due	Brake Cables & Acc. Pump Shaft Chevrolet 5000 Mi. Date Due
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A valuable addition to the maintenance system could be supplied with two items of equipment not now available. One, an air-fuel ratio analyzer, the other a good electrical test stand. Most modern up to date garages are so equipped. This equipment should be maintained by a motor battalion, one each being sufficient to service all the vehicles of a battalion.

II. DRIVER AND ASSISTANT DRIVER MAINTENANCE

Training of the vehicle driver is fundamental in satisfactory and economical operation of motor equipment. Elimination of emergency repairs, the purpose of preventive maintenance, begins with the individual driver. It is probable that most drivers fail to realize the important place they assume in the schedule of maintenance, and it is essential that instruction be given with this in view.

There is some conflict of opinion as to how much a driver

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should be required to know regarding the maintenance of a motor vehicle, but it is believed that a driver should be taught all that he can absorb and it has been found that the more information he acquires concerning the details of proper maintenance, the less inclined he will be to "tamper" with adjustments. In this way orders forbidding tampering with carburetors, for instance, will not be necessary and respect rather than disregard for adjustments will be shown. Defects noted on drivers trip tickets are of value commensurate with the training of the driver.

WALL CHART Fig. 3

Vehicle Number	Change Oil	Lubricate	Tire Pressure	Battery Water
3910				
Jones	4500	4100	2/3	2/3
3911				
Smith	4000	3800	2/3	2/3
Before Entry by Driver				
Vehicle Number	Change Oil	Lubricate	Tire Pressure	Battery Water
3910	4490	4050		
Jones	4500	4100	2/3—2/3	2/3—2/3
3911	4025	3765	2/3—2/5	2/3—2/5
Smith	4000	3800		
Entry by Driver				
Vehicle Number	Change Oil	Lubricate	Tire Pressure	Battery Water
3910			2/10	2/10
Jones	5000	4600	2/10	2/10
3911				
Smith	4500	4300		
After Entry by Driver				

Systematic care by the driver is insured by a wall chart (Fig. 3) on which are recorded mileages or dates for the particular item requiring attention. Column headings and vehicle numbers are painted on the chart. All entries are made with chalk. The name of the vehicle driver appears below the vehicle number. The chart is maintained by the Motor Sergeant. Under "Lubrication" and "Change Oil" the mileage at which a vehicle is due for lubrication or oil change appears in the lower half of the division in colored chalk. The driver signifies accomplishment by entering the actual vehicle mileage at which the operation

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was performed in the upper half of the division in white chalk. Adding the grease or oil change interval to the white figure gives another colored figure. The oil change interval may be varied at will suitable to the season of the year. Tire pressure and storage battery water are checked weekly.

At the time of entry on the chart of oil change and lubrication mileages, an entry is made in an individual book maintained by the driver and kept with the vehicle. This book is similar to those issued by commercial service stations (Alemite) and contains such items as oil change, chassis, wheel bearings, universal joints, etc. A check mark is made under item serviced, with the mileage and date entered in the proper columns. The driver signs on the line serviced to facilitate a check on questionable entries and to place responsibility of failure to properly comply with drivers maintenance requirements. (Drivers assignments, of necessity, vary considerably). The oil and lubrication book is maintained to serve several purposes. When the vehicle goes in the field the book goes with it, serving the purpose of lubrication and oil records independent of the shop office records. At the end of each month the books are collected and items are consolidated for entry in the Vehicle Service Record Book.

In addition to the oil and lubrication book each vehicle carries a gasoline book. This book carries entries of all gasoline added to the vehicle and is arranged on a monthly basis. Speedometer readings are entered in the book for the beginning and end of the month. Miles per gallon of gasoline is thus carried in each vehicle on a monthly basis.

The importance of proper entries in, and regular use of Trip Tickets is continually impressed on the driver. No vehicle regularly assigned, leaves the motor park without one. The trip ticket is issued to the driver by the Motor Sergeant and under "Mileage-Out" on each individual ticket is entered the "Mileage-In" as reported on the last trip ticket submitted for that vehicle. In this way monthly speedometer mileages and consolidated trip ticket mileages as appearing on the Operations Sheet (F.A.S. Form No. 8) will agree very closely. By issuing trip tickets to drivers the motor office is informed at all times as to the location of all vehicles. Sample completed forms of trip tickets are posted

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outside the motor office to assist the more inexperienced drivers in accomplishment.

All items on the trip ticket are explained to the driver especially regarding "defects noted" and "tire change" entries. When a defect is reported an Unserviceable Vehicle Tag (F.A.S. Form No. 7) is made out. If the defect requires correction before the vehicle can safely operate, this card is attached to the windshield, holding the vehicle in the park until a mechanic corrects the defect. Repair parts supply often prevents a mechanic being assigned immediately. If the defect is of minor nature the repair operation is assigned to a mechanic by posting on a wall clip outside the motor office. Each mechanic has an individual labelled wall clip. The motor sergeant assigns the tag. Labor hours, parts used, etc., appear on the tag with the mechanic's name and is submitted to the office on completion where entry is made in the Operation Sheet (F.A.S. Form No. 8). The Unserviceable Vehicle Tag serves the purpose of a Battery work order, and one is clipped to the vehicle inspection sheet when assigned to a mechanic. Entries under "tire change" are immediately entered in the office Tire Book. The Tire Book contains an individual sheet for each tire showing the make, size, number and position on the vehicle. Tire mileage is kept as a running total and is based on speedometer readings at the time of tire changes. This reading is required for all tire changes. Drivers report for instance Left Spare (L.S.) to Right Rear Inner (R.R.I.) or to Right Middle Outer (R.M.O.) as might be the case for six wheel vehicles.

It has been found that much maintenance work which might be considered the responsibility of the driver is best performed by the mechanic. Chiefly may be mentioned such items as tightening nuts and screws. Until the driver has spent at least one week working with the mechanic in the shop on the corrective inspection system, he is not qualified to tighten nuts and screws. Even after this instruction period it has been found that this part of drivers maintenance should be delegated with caution. Certain nuts and screws which serve as adjustments, occur side by side with nuts and screws requiring tightening such for instance as steering gears. If cotter pins are removed replacement

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is required with pins of proper size. Drivers tools are most inadequate except for minor tightening in the more accessible places. For the above brief reasons most work of that nature is performed by the mechanic during the scheduled trip of the vehicle through the shop as by forms, (Fig. 1 and Fig. 2). The driver is considered to have fulfilled this portion of the maintenance schedule when he reports accurately and intelligently all defects which occur from day to day. The driver accompanies his vehicle during the scheduled trip through the shop giving the mechanic every possible suggestion as to defects that in his judgment should receive attention. After the instruction roster of mechanic assistant has been completed, the driver serves as the regular mechanic assistant during the corrective inspection of the vehicle. It is essential that the vehicle be driven by the regularly assigned driver only. Change of drivers should be made as infrequently as possible. Assistant driver assignments help to make the above requirement practical.

There is a further conflict of opinion regarding the individual vehicle books kept by the driver, it being maintained that the average driver is not sufficiently schooled to record accurately the servicing operations required in drivers maintenance. However it has been found during eight months of operation that the requirement is not impossible for the average driver to accomplish. Naturally, certain individuals require more instruction than others, and considerable patience is required in obtaining results. Drivers ratings would assist materially.

III. LUBRICATION MAINTENANCE

The importance of satisfactory lubrication in the maintenance of automotive equipment can not be overstressed. Several different kinds of lubricants are required for correct and effective lubrication of modern equipment and it is essential that manufacturers specifications be followed carefully. Expensive research concerning grades and kinds of lubricants has been conducted in experimental laboratories of manufacturers and research organizations and it would seem quite logical to make use of the results attained. Regarding this there is some conflict of opinion, it being maintained that in time of war it will be necessary

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to service vehicles with the materials at hand and proper lubricants will not always be available; accordingly we should now function with the available supply even though the supply does not meet the essential requirements. However, it may be pointed out that in an emergency although certain kitchen supplies could be converted to serve as substitute lubricants, it would seem rather useless to go to that extreme for our present training. It is perhaps possible that future development will reduce the number of necessary lubricants as now required.

Fig. 4

CHEVROLET LUBRICATION SCHEDULE—STATION WAGON AND PICK UP TRUCK MODEL, 1933

CHASSIS—Periodic mileage as indicated on Wall Chart.

Part	Places	Lubricant	Applied
Front spring bolts	2	Heavy Oil (S.A.E. 160)	Grease Gun
Front spring shackles	4	" "	"
Steering knuckles	4	" "	"
Steering connecting rod	2	" "	"
Tie rod	2	" "	"
Steering gear	1	" "	"
Rear spring bolts	2	" "	"
Rear spring shackles	4	" "	"
Rear spring saddles	2	" "	"
Universal joint	1	Universal Joint Grease	"
Water pump oil cup	1	Heavy Oil (S.A.E. 160)	Fill oil cup
Clutch release bearing	1	" "	"

NOTE: Use light oil (S.A.E. 20) on clutch linkage.

CAUTION: No oil on clutch facings.

Generator	1	Light Oil (2-3 drops)	Oil can
Starting motor	1	" "	"
Brake rod pins	2	" "	"
Water pump	1	No. 2½ cup grease	Turn down grease cup and refill
Distributor shaft	1	" "	"
Transmission	} 3	Heavy Oil (S.A.E. 110 W.-160	Check Level
Differential			
Sub Transmission		S.) Engine Oil	Check Level
AIR CLEANER	1	(Heavy)	(Clean)

ENGINE LUBRICATION SERVICE

CRANKCASE: Drain and refill crankcase at mileage indicated on Wall Chart.

SUMMER—S.A.E. No. 30

WINTER—S.A.E. No. 20

Capacity—5 Qts.

Drivers are required to perform all the details of lubrication maintenance. Detailed lubrication schedules, Figures 4, 5, and 6, are carried in each vehicle, consistent with the lubrication requirements of each individual vehicle. Initial training for drivers was

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given by performing the lubrication operation by detail, utilizing all available drivers during this period. Corresponding vehicles are grouped together and the operations conducted by a mechanic or well qualified non-commissioned officer. The drivers are required to use hand grease guns until such time as power operated lubrication guns become available. For instruction and training purposes hand grease guns will always serve a useful purpose.

The following parts require specialized lubrication, some of which require in addition, summer and winter grades. Engine, Chassis, Front Wheel Bearings, Water Pump, Universal Joints, Transmissions (including Sub-Transmission and Rear Axle) Steering Gear and Shock Absorbers.

Lubricants Recommended by Manufacturer:

FORD

Chassis (Other than listed below)		—Pressure Gun Lubricant		
Front Wheels		—Short Fiber Sodium Soap Grease		
Universal Joint		—Universal Joint Grease		
Transmission	}	—Gear Lubricant S. A. E.	}	
Sub-Transmission				160 S.
Rear End				110 W.
Steering Gear	}	—Gear Lubricant S. A. E.	}	
Engine Oil				160 S.
		—Winter—S. A. E. No. 20		
		—Summer—S. A. E. No. 40		

CHEVROLET

Chassis (Other than listed below)				
Alemite Fittings		—Heavy Oil S. A. E. 160		
Grease Cups		—No. 2½ Cup Grease		
Front Wheels		—No. 2½ Cup Grease		
Water Pump		—Special Water Pump Lubricant		
Transmission	}	—Heavy Oil S. A. E.	}	
Sub-Transmission				160 S.
Rear End				90 W.
Engine Oil		—Winter—S. A. E. No. 20—zero	pour test.	
		—Summer—S. A. E. No. 30		

The lubrication schedules Fig. 4, 5 and 6, are based on the above recommendations. Practical consideration regarding the available supply of lubricants has required some variation from the noted schedules. The Chevrolet Repair Manual denotes the chassis lubrication requirements as Heavy or S.A.E. 160 oil. This same oil is recommended for transmissions, sub-transmissions and differentials, in winter properly thinned for low temperature operation. A detailed specification of this oil will not apply, because different oil companies make different products

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Fig. 5

LUBRICATION SCHEDULE—CHEVROLET 1½ TON TRUCK MODEL 1933

CHASSIS—Periodic mileage as indicated on Wall Chart.

Part	Places	Lubricant	Applied
Front spring bolts	2	Heavy Oil (S.A.E. 160)	Grease Gun
Front spring shackles	4	" "	"
Steering knuckles	4	" "	"
" connecting rods	2	" "	"
Tie rods	2	" "	"
Steering gear	1	" "	"
Rear spring bolts	2	" "	"
" " shackles	4	" "	"
" " spring saddles	2	" "	"
Propeller shaft bearing	1	Universal Joint Grease	"
Universal joint	2	" "	"
Shock absorbers (rear)	2	Heavy Oil (S.A.E. 160)	"
Water pump oil cup	1	" "	Fill oil cup
Clutch release bearing	1	" "	"

NOTE: Use light oil (S.A.E. 20) on clutch linkage.

CAUTION: No oil on clutch facings.

Generator	1	Light Oil (2-3 drops)	Oil can
Starting motor	1	" "	"
Brake rod pins	2	" "	"
Water pump	1	No. 2½ cup grease	Turn down grease cup and refill
Distributor shaft	1	" "	"
Axle shaft bearing	2	" "	"
Transmission	} 3	Heavy Oil (S.A.E. 90 W.-160 S.)	Check Level
Differential			
Sub Transmission			
AIR CLEANER	1	Engine Oil (Heavy)	Check Level (Clean)

ENGINE LUBRICATION SERVICE

CRANKCASE: Drain and refill crankcase at mileage indicated on Wall Chart.

SUMMER—S.A.E. No. 30

WINTER—S.A.E. No. 20

Capacity—5 Qts.

suitably marked for the item serviced and dependence is placed on the Company for quality. Viscosity numbers are of no value merely serving as a partial identification. The 1933 S. A. E. Handbook lists S. A. E. 160 oil as not less than 300 seconds nor more than 600 seconds. One Commercial Service Station checked uses for Chevrolet transmissions and differentials a Special Gear Lubricant (Summer) with an S. A. E. number between 110 and 160. For winter, special gear lubricant No. 2 is used with an S. A. E. No. 90. The same is used with or without free wheeling units. Pressure Gun Grease is used in the Chevrolet Chassis (general) by this Service Station which is the same as that recommended for the Ford chassis by the Ford Company. No. S. A. E. number applies to Pressure Gun Lubricant.

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Fig. 6

LUBRICATION SCHEDULE FORD 6 WHEEL—2 WHEEL DRIVE—V-8
MODEL 1933

CHASSIS—Periodic mileage as indicated on Wall Chart.

Part	Places	Lubricant		Applied
Front spring shackles	4	Pressure Gun	Lubricant	Grease Gun
Steering knuckles	4	"	"	"
Steering connecting rod	2	"	"	"
Tie rod	2	"	"	"
Brake shaft front	2	"	"	"
Rear spring shackles	4	"	"	"
Rear shackle saddle (front)	2	"	"	"
Rear spring saddles	2	"	"	"
Dead axle shaft saddle	2	"	"	"
Brake shaft rear	4	"	"	"
Brake cable rear	2	"	"	"
Rear wheel bearing	2	"	"	"
Rear spring bolts	2	"	"	"
Brake pedal	1	"	"	"
Clutch pedal	1	"	"	"
Water pump	2	"	"	"
Shock absorber	4	"	"	"
Fan	1	Engine Oil		Fill Oil Cup
Distributor shaft	1	"		"
Generator	1	"		"
Propeller shaft bearing	1	Universal Joint Grease		Grease Gun
Universal joint	2	"	"	"
Clutch release bearing	1	Pressure Gun	Lubricant	Turn down grease cup and refill
Steering gear	1	Gear Lubricant (S.A.E. 160 S.-110 W.)		Fill to level of filler plug
Accelerator	1	Engine Oil		Oil Can
Brake clevis pins	8	"		"
Spring tie bolt (front center)	4	"		"
Door hinges	4	"		"
Tail gate	2	"		"
Transmission	} 3	Gear Lubricant (S.A.E. 160 S.-110 W.) Engine Oil (Heavy)		Check Level
Differential				
Sub-Transmission				
AIR CLEANER	1	Oil (Heavy)		Check Level (Clean)

ENGINE LUBRICATION SERVICE

CRANKCASE: Drain and refill crankcase at mileage indicated on Wall Chart.

SUMMER—S.A.E. No. 40

Capacity—5 qts.

WINTER—S.A.E. No. 20

MODIFIED FRENCH 75MM GUN (FOUR GUN SECTION)
(ALEMITE FITTINGS)

Brake shaft bearings	3	Pressure Gun	Lubricant	Grease Gun
Radius rod	4	"	"	"
Brake rocker shaft	2	"	"	"
Axle shaft bearing	2	"	"	"
Trunnion bar bearing	2	"	"	"

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Spring bolts and shackles bolts have served as the most convenient unit on which to check effects of lubrication. It has been found that 600-W. (S.A.E. 155) will not properly lubricate these parts in that inspection, after some few miles of operation, has shown the bolt as completely dry. Spring saddles around the Ford driving axle show similar results. Mixing cup grease with 600-W does not help any and in addition cakes inside the lubricator fitting and other places to make hand servicing extremely difficult. Extreme pressure lubricant (S.A.E. 110) gives about the same results as 600-W, though perhaps not to such an extreme.

The Ford V-8 transmission and differential are serviced by the Commercial Service Station above referred to with Gear Lubricant S. A. E. 160 in summer and Extreme Pressure Lubricant (Sulphur or Lead base) S. A. E. 110 in winter. (Note: Worm or Hypoid final drives use Extreme Pressure Lubricant summer and winter).

The Ford steering gear requires Gear Lubricant S. A. E. 160 in summer and the same with S. A. E. 110 in winter. However, no drain plug is provided on the housing and to remove the old oil for the change requires a complete disassembly of the unit. The Commercial Service Station very sensibly uses Gear Lubricant S. A. E. 160 summer and winter. Many commercial operators use extreme pressure lubricant summer and winter.

The Chevrolet water pump is serviced with a special water pump grease. The Ford Service Bulletin cautions against the use of any special water pump grease and recommends the use of Pressure Gun Lubricant, to prevent fouling the radiator passages.

Ford front wheel bearings and 75 mm. Gun wheel bearings (tapered roller) are serviced with a special short fiber sodium soap grease. For Chevrolet front wheel (ball) bearings the service schedule requires No. 2½ cup grease. However there is now on the market a special sodium soap grease for front wheel ball bearings which has similar characteristics as that recommended for tapered roller bearings. (Alemite No. 2 Wheel Bearing grease as an example).

Universal joint grease (cylinder oil and sodium soap) is recommended

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and used for lubrication of the Universal joints of both the Ford and Chevrolet. The Chevrolet universal joint was not originally equipped with lubricator fittings but these have been installed on authority of Chevrolet Factory Representatives.

The following consolidated list of lubricants is suggested based on the above discussion:

1. *Pressure Gun Lubricant*

- A. Ford Chassis (exceptions as below).
- B. Chevrolet Chassis (exceptions as below).

2. *Gear Lubricant S. A. E. 160*

- A. Ford (Summer)—Transmission, Sub-Transmission and Differential.
- B. Chevrolet—Clutch Throw-out Bearing.
(Summer)—Transmission, Sub-Transmission and Differential.

3. *Gear Lubricant S.A.E. 90 (See Note Below).*

- A. Chevrolet (Winter)—Transmission, Sub-Transmission and Differential.

Note—(The summer lubricant S.A.E. 160 may be removed, thinned with kerosene, and the same oil replaced. See Chevrolet Repair Manual 1933—Pg. 253).

4. *Extreme Pressure Lubricant.*

- A. Ford—Steering Gear.
(Winter)—Transmission, Sub-Transmission and Differential.
- B. Chevrolet—Steering Gear.

5. *Short Fiber Sodium Soap Grease.*

- A. Ford—Front Wheel Bearings.
- B. 75 mm. Gun-Wheel Bearings.

6. *Sodium Soap Grease (Ball Bearing type)*

- A. Chevrolet—Front Wheel Bearings.

7. *Universal Joint Grease*

- A. Ford—Universal joints and Propeller Shaft Bearings.
- B. Chevrolet—Universal joints and Propeller Shaft Bearings.

8. *Water Pump Grease (Special)*

- A. Chevrolet—Water Pump Bearing (Grease Cup)

9. *No. 2½ Cup Grease*

- A. Chevrolet—All grease cups except No. 8 above.

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10. *Shock Absorber Fluid (Ford)*
Ford—Shock Absorbers.
11. *Shock Absorber Fluid (Chevrolet)*
Chevrolet—Shock Absorbers.
12. *Engine Oil S.A.E. 20 Zero pour test*
 - A. Ford—(Winter)—Crankcase.
 - B. Chevrolet (Winter)—Crankcase.
13. *Engine Oil S.A.E. 30*
 - A. Chevrolet—(Summer)—Crankcase.
14. *Engine Oil, S.A.E. 40*
 - A. Ford (Summer)—Crankcase.

Note: (In extremely hot climates use S. A. E. 50). A small amount of graphite grease is needed for the accelerator pump shaft on the Chevrolet carburetor.

As regards engine oil the following may be noted. With an engine equipped with a thermostat, an oil filter, an efficient type oil bath air cleaner on the carburetor, and using engine oil of the best quality, oil changes are made by certain commercial operators every 2500 to 3000 miles. This assumes, naturally, tight piston rings and accurate adjustments on carburetion and ignition systems. Some commercial operators even suggest that if to the above requirements is added an air cleaner around the breather pipe it would be sufficient to change oil seasonably, along with other lubricant changes. At the present time the latter suggestion is quite radical, but by no means impossible.

For a complete discussion of motor oils and the greater economy incident to the use of the more expensive oils reference is made to a recent publication 1933 edition "What We Learned About Motor Oils—in 2,540,575 Bus Miles," published by the Transportation Research Department, E. F. Houghton & Co. Fine quality engine oils cost more initially than cheaper, poorly refined oils, the operating expense being decreased by the fewer oil changes required and the maintenance expense being decreased by the fewer repair costs. It may be noted that S. A. E. viscosity numbers apply to oil in the same way they apply to other lubricants previously mentioned, the S. A. E. number having absolutely no relation to the oil quality. In fact the S. A. E. number system has been fairly overworked in this respect. The

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1933 S. A. E. Handbook quotes the following heading under crankcase Lubricating—Oil Viscosity numbers. "The S. A. E. Viscosity Numbers constitute a classification of crankcase lubricating oils in terms of viscosity only. Other factors of oil or character are not considered." A similar heading applies to Transmission and Rear Axle Lubricant Viscosity Numbers.

The Quartermaster Chemist this Post has supplied data on the S. A. E. numbers of lubricating oils furnished this Battery. It is not possible to obtain quality or character tests of any lubricant. The following analysis is based on a graph obtained by plotting viscosity numbers (Saybolt Seconds, Universal) over a range of varying temperatures. (S. A. E. Handbook 1933).

Classification as S. A. E. 20

2110

2135

2190

Classification as S. A. E. 30

2190

2250

Classification as S. A. E. 40

2250

Classification as S. A. E. 50

3080

3100

An oil of good quality is one which supplies the best lubrication possible over all temperatures of operation. The best argument supplied by parafine base oil advocates over the asphalt or mixed based oil advocates is the fact that the parafine oil stands up better and longer at higher temperatures.

Winter requirements of various lubricants require low cold test (zero pour test) characteristics. Certain oils with these refined requirements are labelled with a "W" following the S. A. E. number. For instance an S. A. E. 20 with a zero pour test is labelled S. A. E. 20 W.

As regards lubrication in general it may be stated that instruction school schedules could well devote a major portion of time to instruction in lubrication and service adjustment requirements of the various types of vehicles. Repair maintenance is of

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secondary importance to lubrication maintenance. If lubrication and general adjustment requirements are of sufficiently high standard, emergency repairs will be a minor requirement. (See Manufacturers Handbook 1933 Chevrolet, Page No. 250—Large Type and Ford Service Bulletin, Page 14—Large Type.)



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Second Field Artillery Marches Across the Isthmus of Panama

The 2nd Field Artillery, under the command of Lt. Col. E. L. Gruber, recently completed a march across the Isthmus of Panama without the loss of a single man, animal or pack. This is the first time in history that a complete tactical unit of the U. S. Army has crossed from ocean to ocean.

Traversing tropical jungles through which it was necessary to cut most of the trail; hampered by difficult slopes and treacherous bog lands; assailed by mosquitoes, redbugs and other jungle pests, the battalion covered these arduous sixty-five miles in four days. The success of this venture can be attributed to wise planning, advance reconnaissance, strict discipline and the ability of the pack artillery to carry on in spite of great obstacles.

The spirit of the organization is probably best shown by an extract from a report on this march by Colonel Gruber. It should be remembered that the battalion had already covered twelve miles during daylight hours prior to the culmination of the trek by a forced night march of twenty-two miles.

"A splendid night march marked the last leg of our trip across the Isthmus. The night was cool and the moon full. Men and animals seemed refreshed by the six hours' halt at the Madden Dam bivouac. As the head of the column swung into the road at 10:30 p. m. and settled down into the long march of twenty-two miles home I felt confident that this final effort of the command would definitely crown the achievement of our task. I suspected that many men in the long column were weary and heavy with sleep, but the column moved and halted with precision. At the 2:30 a. m. halt the battalion truck carrying coffee and doughnuts arrived. The refreshment stimulated and revived the weary ones and when we continued the march at 3:15 a. m. snatches of familiar songs rose up and down the column. At daybreak the head of the column entered Fort Clayton. Beside the road in the dim light stood the two bands, the 33rd Infantry and the 11th Engineers. As the column approached the bands broke into 'When Johnny Comes Marching Home.' When ears caught the strains

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of music down the column, as though prompted by some unheard command, the men took formation, fell in step to the music and marched by with chins up, swinging with a military stride which I knew taxed their weary legs but demonstrated to me their invincible spirit.

"Including the long halt, the column had made twenty-two miles in seven and one-half hours, or three miles per hour. Not a man or animal fell out of the column. One driver who fell ill was taken to the ambulance, where he was given a stimulant. A few minutes later he escaped from the ambulance and rejoined his mule. A number of men refused a mount throughout the hike, determined to make the entire march on foot."

Fort Myer Horse Show

One of the most successful Horse Shows presented in or near Washington, D. C., in many years was the annual Fort Myer, Virginia, Horse Show held Wednesday, May 30th, 1934, in the attractive Horse Show grounds west of the Arlington Memorial Bridge.

The Horse Show grounds at Fort Myer are located beyond the Arlington Cemetery wall in a sylvan bowl setting, providing a natural amphitheater that afforded sufficient seating capacity for the thousands who attended the Horse Show.

The Show opened at ten o'clock in the morning and continued, save for the luncheon intermission, until six o'clock in the evening, when the last of the sixteen classes were concluded and the trophies and ribbons awarded the winners.

Colonel Kenyon Joyce, Commanding Officer at Fort Myer, and President of the Horse Show, stated that the proceeds of the show and of the luncheon would be donated to the Army Relief Society. The luncheon served at the Horse Show grounds was arranged by Mrs. Kenyon Joyce, who was assisted by the ladies of Fort Myer in serving and selling food and drinks.

Among the distinguished guests who participated in the various classes was Mrs. Curtis Dall, daughter of President Roosevelt, who rode "True Love" in the road hack class and was awarded the blue ribbon and cup for her expert showing and handling of her mount in this class. The award of the trophy to Mrs. Dall in this class met with enthusiastic approval of all the spectators

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and she was heartily cheered for her expert horsemanship and excellent showing.

The Horse Show attracted a great many distinguished guests from Washington and vicinity, and among the group present who presented trophies to the winners of the various classes were Mrs. Nicholas Longworth, who attended with her attractive young daughter, Paulina, an enthusiastic young horsewoman; Mrs. Hugh A. Drum, wife of the Deputy Chief of Staff, U. S. Army, Mrs. Warren Barbour, wife of Senator Barbour, whose daughter showed in the children's saddle class; Mrs. Close, wife of the minister from South Africa; Mrs. Kenyon Joyce, wife of the Commanding Officer at Fort Myer; Mrs. Marshall Exnicios, Mrs. Cary Langhorne, of Upperville, Virginia, and Mrs. Paul R. Davison, wife of Major Davison, U. S. Army.

Judges for the Horse Show were Major General Leon B. Kromer, Chief of Cavalry, U. S. Army, and Major Henry Leonard, U. S. Marine Corps, Retired.

Transportation and Horse Show, First Battalion, Eighty-third Field Artillery

On Saturday, May 5, 1934, the 1st Battalion, 83rd F. A., of Ft. Benning, Ga., held its annual Transportation and Horse Show. What was originally intended to be a rather informal show has grown until this year it had all the aspects of a real horse show.

The ribbons were fairly well divided in the organization classes, although "C" Battery had slightly the best of it, winning the Escort Wagon Class, the Horseshoeing, Enlisted Men's Mounts, and Enlisted Men's Schooling. "A" Battery won the Section Competition with their Fourth Section. Corporal Pike, of Hq. Battery, won the Enlisted Men's Jumping with a clean score on Dick Turpin, a rather doubtful starter.

In the Officers and Ladies' classes, the competition was very keen. The Officers and Ladies jumping went to Mrs. A. V. Arnold riding Ruth Hamilton; Mrs. Studebaker was second and Lt. Studebaker was third.

A feature of the show was the final phase of the three-day competition for the Officers of the Battalion. This event consisted

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of a cross country phase, a schooling phase and a jumping phase, first two of which were held several weeks ago and were won by Lt. Harris and Maj. C. A. Selleck, respectively. On Saturday the jumping phase went to Lt. L. B. Ely, but the combined event was won by Major Selleck. His score was some nine points above the next rider, Lt. Ely. Lt. Lucas took third for the competition.

In the polo ponies teams of three a team consisting of Major Bevan, Lt. Lucas and Lt. Chapman, took out the Blue. Another feature of the show was the hunt team Invitation, open to the entire post. A rather sporting course was set up and a team from the 29th Infantry won (Lts. Stewart, Eddleman and Bache).

The outstanding exhibition of the day, however, was a drill put on in the ring by "C" Battery, Lt. L. B. Ely in command. A very involved set of maneuvers was worked out at a trot and gallop and the entire battery is entitled to a great deal of credit.

The committee in charge of the shows consisted of Lt. Studebaker, Lt. Griffing and Mrs. Bevan.

Regional R. O. T. C. Conference

Purdue University's Field Artillery unit played host on May 18th and 19th to the delegates attending the Regional R. O. T. C. Conference at Lafayette, Indiana. A review of the entire cadet corps was staged for the visitors. The Purdue corps is the largest Field Artillery R. O. T. C. unit in the United States, consisting of eighteen dismounted and three motorized batteries.

The conference was the second of a series, which will be held annually in different sections of the country. It was attended by twenty-two professors of Military Science and Tactics and an equal number of educators from institutions adjacent to Purdue in the Fifth, Sixth and Seventh Corps Areas. Its purpose was to provide an opportunity for free and open discussions between military and institutional personnel on R. O. T. C. matters of mutual interest. The Field Artillery was represented by Lt. Col. John E. Mort, Lt. Col. Phillip W. Booker, Major Edwin P. Parker, Jr., and Major Carlos Brewer.

THE FIELD ARTILLERY JOURNAL

Bound copies of the entire proceedings will be available after August 1st and may be obtained gratis by addressing the Civilian Military Education Fund, Washington, D. C., which sponsored the gathering.

Graduates U. S. M. A., 1934, Assigned to the Field Artillery

The appointment as second lieutenants in the Regular Army of the United States, with rank from June 12, 1934, and the assignment to arms of the following-named cadets, graduates of the United States Military Academy, Class of 1934, are announced. Class rank is shown by the number in front of each officer's name.

FIELD ARTILLERY

- | | |
|---------------------------------|------------------------------------|
| 20. Charles Rea Revie | 101. Percy Thomas Hennigar |
| 26. Paul Henry Berkowitz | 104. Richard Lee McKee |
| 32. Thompson Brooke Maury, 3d | 106. Stacy William Gooch |
| 35. William Sebastian Stone | 107. Clark Lynn, Jr. |
| 36. Jonathan Owen Seaman | 108. Edward Flanick |
| 37. Kermit LeVelle Davis | 110. Harry Jenkins Hubbard |
| 42. Urquhart Pullen Williams | 111. Samuel Knox Yarbrough, Jr. |
| 46. Jean Paul Craig | 112. Joe Free Surratt |
| 51. Thomas Leslie Crystal, Jr. | 114. William Milton Gross |
| 55. Miles Birkett Chatfield | 117. Gordon Graham Warner |
| 56. Howard Marshall Batson, Jr. | 119. Edward French Benson |
| 58. Charles Henry White, Jr. | 121. Robert Carl Bahr |
| 59. Arthur B. Proctor, 3d | 122. Frank Carter Norvell |
| 60. William Jack Holzapfel, Jr. | 125. Robert Hawkins Adams |
| 61. Mathew Valois Pothier | 126. Donald Glover McLennan |
| 63. George Edward Adams | 128. Theodore Gilmore Bilbo, Jr. |
| 67. John Farnsworth Smoller | 130. Berton Everett Spivy, Jr. |
| 68. Craig Smyser | 132. Kenneth Alonzo Cunin |
| 72. Richard Edward Weber, Jr. | 133. Lawrence Kent Meade |
| 74. James Alexander Costain | 134. Thomas Eugene Wood |
| 78. Robert Gardner Baker | 139. Thomas Clary Foote |
| 79. Ronald LeVerne Martin | 140. John Huber Squier |
| 91. Peter James Kopcsak | 141. Charles Bernadou Elliott, Jr. |
| 93. William Scott Penn, Jr. | 142. James Richards Winn |
| 96. Horace Lake Sanders | 144. Daniel Henry Heyne |
| 100. William Dowdell Denson | 147. Wilson Hawkes Neal |

FIELD ARTILLERY NOTES

**Graduates—Army War College, Army Industrial College—and
Their Future Assignments**

ARMY WAR COLLEGE

NAME	FUTURE ASSIGNMENT
Major E. J. Dawley	Instructor, Infantry School, Ft. Benning, Ga.
Major T. J. J. Christian.....	Office Chief of F. A., Washington, D. C.
Major I. T. Wyche.....	8th F. A., Fort Riley, Kans.
Major C. Andrus	Naval War College.
Major G. H. McCoy.....	National Guard, Biloxi, Mississippi.
Major J. E. McMahan, Jr.	Office Asst. Secretary of War.
Major L. E. Hibbs	Artillery 1st Division, Ft. Hoyle, Md.
Major C. E. Hurdis.....	Instr., C. & G. S. S., Ft. Leavenworth, Kans.
Major R. W. Beasley.....	1st F. A., Fort Sill, Okla.
Captain L. B. Hershey.....	Field Artillery, Hawaiian Department.

ARMY INDUSTRIAL COLLEGE

NAME	FUTURE ASSIGNMENT
Major H. C. Vandever.....	Army War College, Student.
Major J. O. Daly	76th F. A., Presidio of Monterey, Calif.
Major C. L. Clark	17th F. A., Fort Bragg, N. C.

Graduates—The Field Artillery School

ADVANCED COURSE (REGULAR ARMY)

Donnovin, Joseph P., Capt., F. A.	McMahon, Norman J., Capt., F. A.
Fisher, George J. B., Capt., C. W. S.	Nye, Wilbur S., 1st Lt., F. A.
Guernsey, Harold J., Capt., F. A.	O'Reilly, Walter T., 1st Lt., F. A.
Jones, Daniel F., Capt., F. A.	Roberts, Thos. A., Jr., 1st Lt., F. A.
Langevin, Joseph L., 1st Lt., F. A.	Russey, John W., Capt., F. A.

(OTHER OFFICERS)

Shannon, Harold D., Capt., U. S. M. C.	Yu, Teh Yan, 2nd Lt., Chinese Army.
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ADVANCED COURSE IN HORSEMANSHIP (REGULAR ARMY)

Coverdale, Garrison B., 1st Lt., F. A.	Isacson, Harold S., 1st Lt., F. A.
	Solem, Arthur E., 1st Lt., F. A.
Ganahl, Joseph, 1st Lt., F. A.	

ADVANCED COURSE IN MOTORS (REGULAR ARMY)

Barton, Oliver M., 1st Lt., F. A.	Massaro, Joseph, 1st Lt., F. A.
Jark, Carl H., 2nd Lt., F. A.	Masters, Meredith D., 1st Lt., F. A.

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BATTERY OFFICERS' COURSE (REGULAR ARMY)

Billingsley, Claude A., 1st Lt., F. A.	Mace, Ralph R., 2nd Lt., F. A.
Brewster, Myles W., 2nd Lt., F. A.	Murphy, Earl J., 1st Lt., F. A.
Brown, Percy H., Jr., 2nd Lt., F. A.	Murphy, Hobart A., 1st Lt., Inf.
Cole, George M., 1st Lt., F. A.	Nesbitt, John S., 2nd Lt., F. A.
Coyle, Harold J., 1st Lt., F. A.	Peake, George W., 2nd Lt., F. A.
Crawford, Stuart F., 2nd Lt., F. A.	Phillips, John D. F., 2nd Lt., F. A.
Daly, John B., 2nd Lt., F. A.	Sherburne, Thos. L., Jr., 2nd Lt., F. A.
Davis, Leroy C., 1st Lt., F. A.	Somerville, Duncan S., 1st Lt., F. A.
Dunn, Thomas W., 2nd Lt., F. A.	Theimer, John E., 2nd Lt., F. A.
Dwyre, Douglas G., 2nd Lt., F. A.	Thompson, Paul S., 2nd Lt., F. A.
Evans, James B., 2nd Lt., F. A.	Treacy, Kenneth W., 1st Lt., F. A.
Foster, Francis C., 1st Lt., F. A.	Vickrey, Luster A., 2nd Lt., F. A.
Gavan, Paul A., 1st Lt., F. A.	Walker, John S., 2nd Lt., F. A.
Gibbs, George W., 2nd Lt., F. A.	Walter, Mercer C., 1st Lt., F. A.
Haskell, Louis W., 1st Lt., F. A.	Wehle, Philip C., 2nd Lt., F. A.
Holland, Jeremiah P., 1st Lt., F. A.	Wesner, Charlie, 1st Lt., F. A.
Holley, James E., 2nd Lt., F. A.	Whiteley, Harold S., 2nd Lt., F. A.
Kirn, William T., 2nd Lt., F. A.	Wilkinson, Harvey W., 1st Lt., F. A.
Kraus, Walter E., 2nd Lt., F. A.	Wood, Stuart, 1st Lt., F. A.
Leakey, Frank N., 1st Lt., F. A.	
Lillard, Gerald F., 1st Lt., F. A.	
Lynch, George E., 2nd Lt., F. A.	

OTHER OFFICERS

Curry, Manly L., 2nd Lt., U. S. M. C.	Luckey, Robert B., 2nd Lt., U. S. M. C.
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Annual Military Day at the University of Illinois

The Annual Military Day Ceremony at the University of Illinois, Champaign, Illinois, was held on Thursday, May 24, 1934. This colorful ceremony is one of the outstanding events of the campus and each year attracts a large crowd of spectators gathered from all corners of the State. Military Day is the day set aside by the University each year on which the entire R. O. T. C. Brigade is assembled for a general review and other military events.

The R. O. T. C. Brigade, which is the largest in the United States, consists of over 2600 students, made up of units of Cavalry, Field Artillery, Infantry, Engineers, Coast Artillery and Signal Corps.

Among the distinguished personages who made up the reviewing

FIELD ARTILLERY NOTES

party were Major General Preston Brown, Commanding General of the Sixth Corps Area; President Emeritus David Kinley, Acting President Arthur H. Daniels, President-elect Arthur C. Willard, Colonel Fred R. Brown, the Professor of Military Science and Tactics at the University; Colonel J. C. Dallenbach, M. C.-Res., President of the R. O. A. of Illinois, and Mrs. Julian G. Goodhue, State Regent Illinois, D. A. R.



MASTER SERGEANTS FORGEA, HOLZAPFEL AND SWETT

Familiar Faces at Fort Sill

Establishing what local officers claim to be a record, three master sergeants of the Field Artillery School with a total of 73 years, 5 months and 11 days' service in the United States Army were re-enlisted here on March 20, thus making the fifth time in the last fifteen years that the trio have re-enlisted together on the same day. These master sergeants—Karl Holzapfel, with 25 years, 5 months, 5 days; Morris Swett, with 25 years, 2 months, 27 days, and Emmett G. Forgea, with 22 years, 8 months and 11 days, all continuous service—have all served in the Field Artillery School Detachment (White) since 1914. The character notation on Forgea's seven discharges and on the eight discharges of each of the other two are all excellent.

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Results of Field Artillery ROTC Pistol Competition for 1934:

The winner of the annual Field Artillery R.O.T.C. .22 Caliber Pistol Competition for 1934 is the *University of Oklahoma* with a score of 1422.

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

2. Purdue University	1,391
3. Cornell University	1,364
4. University of Missouri	1,324
5. Colorado Agricultural College	1,322

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

UNIVERSITY OF OKLAHOMA—SILVER MEDALS

Name	Slow	Rapid	Timed	Total
Cox, Mark S.....	94	99	97	290
Whitehead, M. Clifton.....	90	98	97	285
Blake, Homer C.....	90	97	97	284
Newkumet, Phil J.....	92	96	94	282
Bray, Elmer A.....	88	96	97	281
Total.....				1,422

PURDUE UNIVERSITY—BRONZE MEDALS

Name	Slow	Rapid	Timed	Total
Reeves, W. C.....	90	98	98	286
Partlow, C. O.....	93	98	91	282
Newhall, J. N.....	83	98	95	276
Yarber, W. H.....	87	97	90	274
Conkright, D. L.....	85	94	94	273
Total.....				1,391

CORNELL UNIVERSITY—BRONZE MEDALS

Name	Slow	Time	Rapid	Total
Brill, G. D.....	86	95	97	278
Gray, G. T.....	85	99	93	277
Gray, R. C.....	90	91	90	271
Williams, W. J.....	84	92	95	271
Waring, S.....	81	95	91	267
Total.....				1,364

FIELD ARTILLERY NOTES

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

- 290 Mark S. Cox, University of Oklahoma.
- 286 W. C. Reeves, Purdue University.
- 285 M. Clifton Whitehead, University of Oklahoma.

Since the inauguration of the Field Artillery R.O.T.C. .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.

RECENT BOOKS

(A reduction of 10% will be made to FIELD ARTILLERY JOURNAL readers who purchase any of the following books through the U. S. Field Artillery Association.)

INFANTRY IN BATTLE

This is a book of the tactics of small units which combines the actual combat experiences of more than a hundred leaders of platoons, companies, battalions and regiments. It is the only substitute for first hand battle experience. A mine of historical examples and studies of leadership. Over 125 battlefield situations described and discussed. Of vital necessity to Regular Army, National Guard and Organized Reserve officers and non-commissioned officers, and to all those whose business it is to know war. 400 pages—98 maps. Price \$3.00

ITALY'S PART IN WINNING THE WORLD WAR

BY COLONEL G. L. MCENTEE, U. S. ARMY, RETIRED

The importance of Italy's contribution to the Allied effort has never been fully appreciated in the United States. In this volume Colonel McEntee, who is well known in military and naval circles for his lectures on tactical and strategical operations, gives a clear and illuminating picture of what the Italian forces accomplished in the bloody years 1915-1918. Many maps and diagrams add to the lucidity of his narrative, and there are also numerous official photographs of the war among the illustrations included in the book. Princeton University Press—\$2.00

MILITARY BOOKS

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

	<i>Price</i> <i>(Domestic postage included)</i>
THE PERSONAL MEMORIES OF JOFFRE (2 vols.).....	\$ 6.00
THE NATION AT WAR— <i>Gen. Peyton C. March</i>	3.00
THE GUNNERS' MANUAL— <i>Capt. Arthur M. Sheets, F. A.</i>	1.50
FOCH: THE MAN OF ORLEANS— <i>Capt. Liddell-Hart</i>	4.00
SQUADS WRITE!—A selection of the best things in prose, verse and cartoons from <i>The Stars and Stripes</i> . Edited by <i>John T. Winterich</i> .	4.00
LEE OF VIRGINIA— <i>Brooks</i>	3.50
PRACTICAL JUMPING— <i>Barrett</i>	5.00
MY EXPERIENCE IN THE WORLD WAR— <i>Pershing</i>	10.00
VERDUN— <i>Pétain</i>	4.00
REMINISCENCES OF A MARINE— <i>Lajeune</i>	4.00
JULY, 1914— <i>Ludwig</i>	3.50
FOCH SPEAKS— <i>Bugnet</i>	3.00
IT MIGHT HAVE BEEN LOST— <i>Lonergan</i>	3.00
THE OLD ARMY: MEMORIES— <i>Parker</i>	4.00
SHERMAN: SOLDIER-REALIST-AMERICAN— <i>Hart</i>	5.00
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AMERICAN CAMPAIGNS (2 vols.)— <i>Steele</i>	10.00
FOCH: MY CONVERSATIONS WITH THE MARSHAL— <i>Recouly</i>	3.00
PRINCIPLES OF STRATEGY— <i>Maurice</i>	2.60
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COLOSSAL BLUNDERS OF THE WAR— <i>Woods</i>	2.50
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HINTS ON HORSEMANSHIP— <i>Lt. Col. McTaggart</i>	2.50
ARTILLERY TODAY AND TOMORROW— <i>Rowan Robinson</i>	2.00
SOME ASPECTS OF MECHANIZATION— <i>Rowan Robinson</i>	1.50
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HORSE SENSE AND HORSEMANSHIP— <i>Brooke</i>	5.00
INEVITABLE WAR— <i>Lt. Col. Richard Stockton, 6th</i>	7.50

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