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TEN YEARS AGO THIS MONTH.



*Signal Corps Photo.*

115TH F. A. OF THE 30TH DIV., WHILE ADVANCING PASSED GROUPS OF GERMAN PRISONERS UNDER GUARD OF THE 9TH INF. LARONVILLE, FRANCE,  
SEPT. 12, 1918.

# THE FIELD ARTILLERY JOURNAL

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## PACK ARTILLERY PROGRESS

BY 1ST LIEUT. R. R. RAYMOND, JR., 4TH F. A. BN.

PACK Artillery in our army undoubtedly possesses the unique distinction of having been permitted to exist for a number of years largely on the grounds of sentiment and faith. The sentiment was that of a great number of now senior officers, who had served with either the Fourth or the old Second; the faith was that of many officers who believed that Pack Artillery could be so armed and equipped that it would have a place in a modern army.

The first problem in the rehabilitation of the Pack Artillery was to get a gun comparable to those of the other classes of Field Artillery. The solution of this problem resulted in the 75-mm. pack howitzer M-1923, which is acknowledged by both the faithful and the unbelievers to be a truly remarkable weapon. In 1927 Battery "B" of the Fourth conducted firing tests and a 500-mile march with the new gun. As a result of these tests the gun has been adopted and, when funds are available, will be used to rearm the Pack Artillery. It is anticipated that rearmament of the 4th Field Artillery Battalion will be completed in 1929. The Marine Corps has also adopted the new howitzer and is having twelve of them built for their artillery.

Having secured a modern weapon, the next problem was to devise a reasonably reliable pack saddle to carry it. The new howitzer did not of itself necessitate a new pack saddle; it can be, and has been, transported on the old aparejo. But there did exist a real need for a satisfactory pack saddle, a need felt throughout the Army. That the aparejo was not satisfactory can hardly be denied. It was used primarily because it was, until recently, the best pack saddle known to our Army. Since the World War much time and thought has been spent on developing something that would be more satisfactory. Colonel A. E. Phillips of the Cavalry has been one of the leaders in the good cause, and it is his pack saddle that has been adopted by all branches of the service except the Field Artillery. However, it has been in use in Battery "C" of the Fourth since 1923 and in its latest form is now, in conjunction with the new gun, being given a 500-mile test march by Battery "B," 4th Field Artillery.

Before passing on to the details of the test march, it might be well to review briefly the characteristics of the aparejo and of the Phillips pack saddle.

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The aparejo is essentially a pair of large leather bags stiffened inside by vertical sticks or ribs and stuffed with hay to provide a cushion effect on the animal's back and sides. This contrivance is held in place by means of a wide canvas cincha passing entirely around the saddle and the barrel of the animal. The cincha, when properly placed, prevents any rearward movement of the aparejo. To prevent any forward movement a wide crupper passes from the sides of the aparejo around the animal's quarters, the greatest part of the holding effect being in a dock piece fitting snugly under the animal's tail.

Even assuming that the aparejo was designed on correct principles, it possesses three distinct disadvantages that alone preclude its use in an emergency: after being issued it must be stuffed and fitted to the animal; it can be used only on the animal to which it is fitted; and it requires an expert to fit and maintain it properly fitted. Only those who have served with the packs can realize the tremendous amount of time and skill required to fit and care for aparejos or the difficulty of training men for that purpose; expert handling is not merely a desideratum but a vital necessity if a pack outfit is to remain operative in the field. In general, a pack battery is lucky to be able to boast a good packmaster and a promising understudy, as there will be no other men possessed of the requisite expertness and long years of experience.

In discussing the merits of the Phillips saddle it must be borne in mind that definite conclusions as to the virtue of some of the claims made in its behalf must await completion of the test march. However, it possesses six advantages over the aparejo: it is issued ready for use; by simple attachments to the frame it can be used for a wide variety of loads now requiring special frames; it will stand much rougher usage without losing its shape; the cinchas can be adjusted without removing the load; it is lighter; and it is cheaper. From the above list, it will be noted that this saddle incorporates several characteristics that are prime requisites in any article of equipment to be issued to hastily raised troops in an emergency. The important unproved advantages claimed are that it does not cause injuries; that it does not hinder the natural movements of the animal; that it may be changed from one animal to another without refitting; and that it does not require anything like the same degree of expertness and experience in its handling as the aparejo. All these claims have been substantiated in other branches of the service and, were it not for the great weight and peculiar nature of the loads in the Pack Artillery, the present exhaustive test would not be needed to warrant the stamp of our approval.

The Phillips pack saddle consists of two large hair-stuffed felt pads held together by a light detachable frame. In lieu of a crupper, a breeching somewhat similar, at least in appearance, to

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that of the artillery harness, limits forward movement of the saddle. The wide overall cincha of the aparejo is replaced by two hair cinchas attached on either side to the bottom of the saddle. In addition a light breast collar is provided but has not been found necessary for pack artillery animals moving at a walk.

The aparejo and the Phillips pack saddle are entirely different in principle as well as in construction. With the aparejo the weight of the load is carried not only on the back but well down the sides. In this type very tight cinching is required to keep the saddle in position against the animal's sides and to prevent overturning. The cincha is centrally placed so that pressure is exerted equally over the barrel. The animal is thus held in a corset-like grip between the aparejo body and the cincha. In the Phillips pack the weight is borne almost entirely on the back and cinching is therefore only tight enough to prevent overturning. With the double cinchas the forward one is adjusted so as to exert most of the pressure and the rear one only a negligible pressure. This method of cinching, with the cincha well forward on the saddle, is the same as that used on our riding saddles. The lighter and forward cinching naturally permits freer movement especially of the quarters.

The systems of breeching in the two saddles are also radically different. In the aparejo forward displacement is checked by the action of the crupper against the dock. In the other saddle it is prevented by a distributed force acting against the buttocks and croup.

Naturally, with the Phillips principles, sore tails, a common trouble with the aparejo, are eliminated, and side and belly injuries minimized because of the much lighter pressure exerted against those parts. Whether the increased pressure per unit of back surface will result in injuries compensating the benefits gained will not be discussed until the final results of the present test are obtainable.

The first lot of Phillips saddles issued to the Field Artillery were tested by an earlier Pack Artillery Board in 1923. In general the board found this saddle superior to the aparejo but recommended several changes which were incorporated in six new saddles. As a result of observation of these six saddles, twelve more were made up according to the specifications of the board. It is these twelve together with six each of the two types constructed according to Colonel Phillips' ideas that are now undergoing test on the 500-mile march.

The chief differences of opinion between the former board and Colonel Phillips lie in the method of cinching and in the adjustment of the breeching. The board advocated the overall cincha and construction of the breeching so that the applied force would act horizontally against the animal's buttocks. Colonel Phillips argued that his method of cinching was not only easier on the animal but

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equally efficacious and that the force of breeching should be applied from the saddle in a slightly upward direction so as to be distributed over both the croup and buttocks. That the views of the present Pack Artillery Board are in conformity with those of Colonel Phillips will be commented on below.

At first a further divergence of opinion existed as to the proper height of the saddle. The board recommended that the height of the sides be increased from 22 to 25 inches. Colonel Phillips considered the increased height unnecessary and a useless addition of weight. However, since constructing the saddles to the specifications of the board, he has come to the conclusion that the added gripping and bearing surface is advantageous with heavy loads. Twenty-five inches has therefore already been adopted as the height for cargo and artillery saddles, the smaller saddle being retained for lighter loads as in the Cavalry.

As stated above, the results of the first test inclined the board to favor the Phillips saddle with changes. However, the Chief of Field Artillery was not satisfied that it had been definitely proven superior to the aparejo for artillery use. He accordingly directed that a further comparative test be made on a 500-mile march, to be held during hot weather.

The experimental equipment was received last winter at Fort McIntosh, Texas, by the 4th Field Artillery Battalion. This consisted of twelve saddles according to the views of the earlier board with overall cinches, horizontal breeching adjustment, and 25 inches in height; six saddles according to Colonel Phillips' ideas with double hair cinchas; sloping breeching adjustment and a height of 22 inches; and six saddles identical with the other six except for being 24 inches in height. Due to the change of station of the Fourth it was impossible to conduct a test of this equipment until after arrival at Fort Robinson, Nebraska. Toward the end of June the battalion was sufficiently settled to permit breaking out the new saddles and preparing for the test.

The primary purpose of the test was to be a comparison between the aparejo and the Phillips pack saddle as to carrying qualities, ease of fitting and adjustment, and relative injuries resulting from the two types.

In addition to the general comparison of the two saddles it will be recalled that several points remained to be settled with regard to the Phillips saddle. These were roughly: the type of cinching, the method of breeching, the height of the saddle, the amount of fitting required for various animals, and the expertness required in handling.

During the conditioning of men and animals, members of the board were generally present on the daily practice marches. As a result of this observation and prior to the beginning of the 500-mile

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march two important conclusions were reached. It was found that the Phillips saddles with the overall cincha worked forward on the mules' withers, while those with Colonel Phillips' method of cinching did not. It was also found that the method of breeching advocated by the earlier board was not satisfactory. The overall cincha was therefore replaced by double cinchas and all breechings changed to conform to Colonel Phillips' ideas. As noted above, the board and Colonel Phillips were already in accord on the height of the saddle, namely, 25 inches. Having eliminated these points of difference, the board and Colonel Phillips were in entire agreement on all points as to the best type of his saddle. Therefore, there remained to be determined only the relative merits of his saddle and the aparejo.

During the delay in holding the test several other items of experimental equipment were received.

Among these items were two types of ammunition boxes. These were shipping boxes adapted to packing, thus eliminating the necessity for transferring rounds from the shipping box to special ammunition chests as now provided in the Pack Artillery. At an early date it was found that one of the two types was of too light construction throughout. On the other type the adapters for hanging the box on the saddle frame were weak and broke after a few practice marches.

Another special item was a Cavalry pack cooking outfit. This outfit is much lighter and more compact than the present Mountain Artillery outfit. The main point in question is that of cooking capacity. Present indications are that with the addition of two more boilers the Cavalry outfit will be ample for a battery of Artillery.

A third item of equipment is a new wire pack consisting of two large spools carried as side loads. It is not desired to go into the details of the various wire packs as a full discussion would be material for a separate article. However, the final results of any wire pack test should be of interest to all field artillerymen as indications now point to the adoption of wire packs for forward communications even in the Light Artillery.

In order not to introduce too many possibly confusing details in the descriptions of the aparejo and the Phillips saddle no mention was made above of the types of blankets or pads used. It is felt that at this point some mention should be made of these accessories. With the aparejo a corona or canvas-lined pad and a regular saddle blanket are used. These articles have been replaced with the new saddle by a single pad of mohair. This pad is light and cool and shapes itself immediately to the conformation of the animal. In general it is an excellent article and apparently provides sufficient padding between the saddle and the pack.

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Throughout July the battery conducted daily practice marches to harden men and animals and to enable the board to make such observations as might be possible. During this period the board settled upon a distribution of saddles to the best advantage. The final plan was to equip two gun teams with the 25-inch Phillips saddles, with the remaining saddles distributed throughout the same two sections and the maintenance section. The other two gun sections were equipped with aparejos. Some aparejos were also used in the maintenance section. It was believed that this distribution would best permit a comparison of the two types of saddles. For the last week of preparations, Colonel Phillips was present and gave valuable assistance and instruction.

While the battery was conditioning there were a great many details to be settled. The itinerary selected was roughly a march to Fort Meade, South Dakota, of about 175 miles, a loop of 150 miles out of Meade through the Black Hills and the return march from Meade to Robinson. The country covered is ideal for hiking and quite a contrast to the country with which the Fourth was familiar after its long tour in Texas. Needless to say, because of the route selected, the hike was popular from its inception.

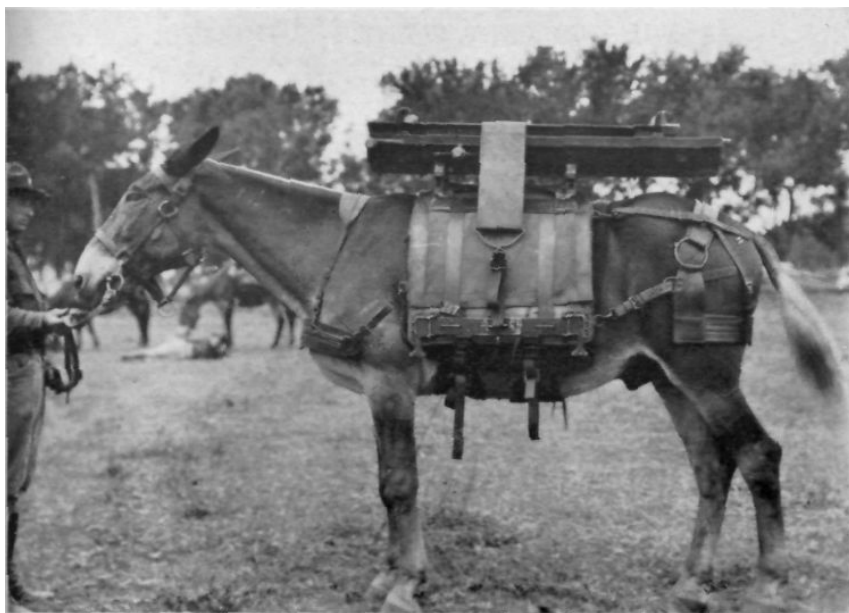
The one drawback to the route was the difficulty of supply. As no motor transportation was available, a minutely detailed plan of supply, largely by rail, was evolved and finally approved together with the necessary funds. The battery was able to carry only two day's rations and forage, so that it was impossible to go more than a day's march from a railroad except for the first few days where it was possible to supply by wagons from Fort Robinson.

After much G-4 work, the stage was finally set and the Battery moved out of Robinson on July thirty-first. With the battery went a section of the Combat Train to act as a supply train. The entire expedition consisted of six officers, one hundred and twelve men, not to mention a Marine Corps Sergeant, three wagons, and one hundred and forty-four animals. Among the six officers were Colonel Phillips and Captain L. L. Leech of the Marine Corps, as observers. The Artillery officers were Captain J. W. Russey and Lieutenant S. S. Koszewski as battery officers and members of the board, Captain L. V. Warner as a member of the board, and Lieutenant W. M. Creasy as supply officer.

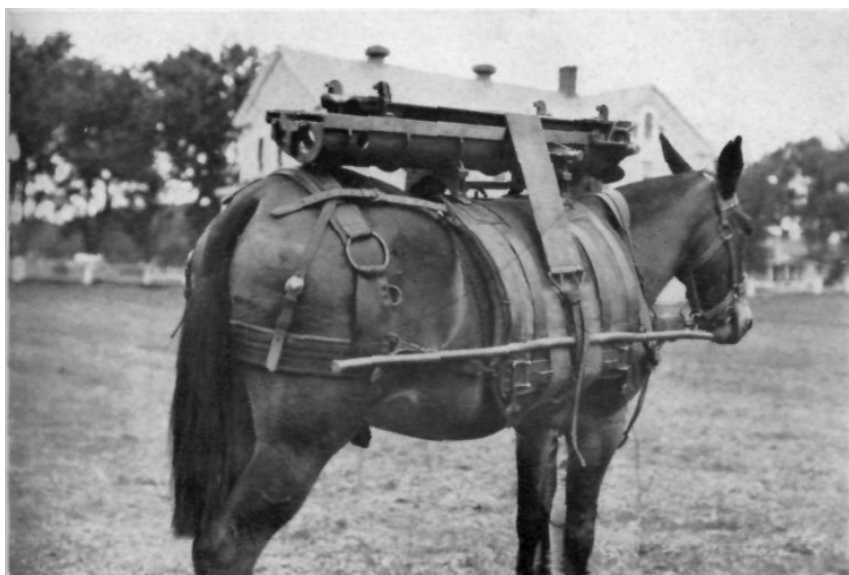
While sufficient reports on the test are now available to warrant additional comments on the experimental equipment, it is felt that such comments should be withheld until a complete and final discussion is possible.

As this article is being completed, the battery is within a few days of its homecoming. The march appears to be not only a success but a pleasant expedition as well.





PHILLIPS PACK SADDLE IN CONFORMITY WITH THE VIEWS OF COLONEL PHILLIPS AND THE PRESENT PACK ARTILLERY BOARD. NOTE DOUBLE HAIR CINCHAS AND SLOPING POSITION OF THE HOLDING STRAP CONNECTING SADDLE WITH BREECHING.



PHILLIPS PACK SADDLE AS RECOMMENDED BY THE EARLIER PACK ARTILLERY BOARD. NOTE OVERALL CINCHA AND HORIZONTAL POSITION OF HOLDING STRAP CONNECTING SADDLE WITH BREECHING BODY. THE PACK HAS SLIPPED FORWARD DROPPING THE LOAD ON THE MULE'S RUMP.

WHAT BRACKET, IF ANY, FOR THESE?



*Photo by Signal Corps*

MEDIUM T-2 ARMORED CARS, 60 B. H. P. LASALLE CHASSIS LINCOLN  
MEMORIAL IN THE BACKGROUND



*Photo by Signal Corps*

LIGHT T-1 ARMORED CAR, 40 B. H. P. PONTIAC CHASSIS ASSISTANT  
SECRETARY OF WAR, F. TRUBEE DAVIDSON, INSPECTING

## ARMORED CARS

THE War Department has recently approved the addition of a troop of twelve armored cars to each cavalry division at peace strength, this troop to be increased to a squadron of three troops when the division is brought up to war strength. The actual organization of these armored car units is, however, limited to a single troop at present. We have two types of experimental armored cars, the "medium" and the "light."

In connection with the organization of the First Armored Car Troop, now on duty at Fort Leonard Wood, Maryland, and ultimately to be assigned to the First Cavalry Division, General Herbert B. Crosby, Chief of Cavalry, made the following statement:

"Just as the Infantry has found tanks very useful in combat and has adopted tanks as part of its armament, the Cavalry has found armored cars similarly useful as part of its equipment, particularly for reconnaissance and communication purposes. While the tank is a cross-country vehicle, rather heavily armored and intended for fighting purposes only, the armored car is primarily a road vehicle, depending more upon its speed for protection against hostile fire than upon the thickness of its armor.

"To put heavy armor upon armored cars would reduce their mobility, speed and employment over ordinary country roads and bridges. American armored cars should be constructed (as are our present ones) on strictly commercial chassis, procurable in quantity in emergency. Given the chassis, armor plate and the necessary specifications, any machine shop in the country should be able quickly to turn out armored cars in emergency. In sections provided with a reasonable net of fair roads the armored car units will be invaluable adjuncts to all large forces.

"The mobility and speed of the armored car are its essential characteristics, and these very characteristics make it a difficult target. It is possible that, later on, part of the armor may be increased somewhat in thickness for certain vital parts of the car.

"Armored cars are essential components of both cavalry and mechanized forces."

### *Armored Car, Light T-1*

Weight .....	2,500 pounds.
Engine .....	Pontiac, 6 cylinder, 40 B.H.P.
Speeds (miles per hour) .....	1st—5, 2d—15, 3d—40.

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Crew ..... 3 men (1 driver, 2 gunners).  
Armament ..... Two 30-caliber machine guns; rear gun  
on antiaircraft mount.  
Cruising radius ..... 150 miles.

*Remarks:* The car is armored against .30-caliber bullets in front of the driver. It is built on a standard chassis equipped with 32" × 6.20" balloon tires. It has four-wheel brakes, and standard equipment. The chassis has a 108-inch wheelbase and is equipped with shock absorbers. The car carries 5,000 rounds of .30-caliber ammunition. It resembles very closely the present so-called "cross-country car," except for the armor in front of the driver's seat, the machine gun, and the six-cylinder engine with which it is provided instead of a four-cylinder. The windshield has been removed and a ¼-inch armor installed in its stead. This armor is of a height sufficient to permit the driver to look easily over the top. A belt of armor also covers the back of the front seat. A machine gun is mounted over the windshield, in position to be served by the gunner sitting next to the driver. The tonneau is open and has a machine gun mounted on it ready for fire against aircraft or ground targets. The car is equipped with two removable seats in the tonneau to provide for additional men if desired.

### *Armored Car, Medium T-2*

Weight ..... 5,500 pounds.  
Engine ..... La Salle, 8-cylinder, V-type, 60 B.H.P.  
Speeds (miles per hour) ..... 1st—5, 2d—20, 3d—45.  
Crew ..... 4 men.  
Armament ..... One .30-caliber machine gun.  
Cruising radius ..... 150 miles.

*Remarks:* The ½-inch armor plate is proof against the service bullet at all ranges above 80 yards and against the armor-piercing bullet at ranges above 780 yards. The car carries 7,200 rounds of .30-caliber machine-gun ammunition. A sub-machine gunner is seated next to driver. There are ports in the armor for pistol or rifle fire. The car is built on a 125-inch wheelbase, 1928 chassis, equipped with disc wheels to mount 32" × 75" balloon tires. The machine gun can be elevated above the level of the roof. A submachine gun and probably a 37-mm. gun will also form part of the armament. The speed of the car on the road is that of an ordinary seven-passenger, eight-cylinder touring car. It has a folding armored top which can be closed so as to afford overhead protection when needed. Habitually, however, the top will be open and the crew will fire over its sides. The total height of the car is 72 inches. The rear springs are reinforced to carry extra weight.

# REMOUNTS: BREEDING, PURCHASE, ISSUE AND TRAINING

BY MAJOR C. L. SCOTT, Q. M. C.\*

THERE seems to be throughout the service a lack of appreciation of the policies governing the operations of the Remount Service. That these policies are correct is evinced by the facts that civilians have become intensely interested; that more good riding horses are being produced yearly now than has been the case in the past twenty years; and that the Army is having less and less difficulty each year in securing satisfactory mounts.

## BREEDING

The government breeding plan was not evolved with the one and only idea of providing the Army with peace-time mounts. In fact, the peace-time requirements were a minor consideration. The principal idea is to stimulate breeding, increase the demand for and use of good horses by the commercial horse world so that there would be in the hands of civilian horsemen a large number of animals upon which the Army could call in case of war. The dealer is playing a most important part in this plan, as he arranges for the distribution of the farmer's product to the user and is now paying for top colts a price that will encourage production. This price is considerably in excess of the Army price, and the colts are being purchased a year or two sooner than could be done for Army service.

The object of the Army Horse Breeding Plan is, primarily, to produce within the United States and foreign possessions a large number of good horses which will be available for use in emergency and, secondarily, to mount the Army in peace time. The majority of horses produced under this plan in peace time will, of course, be used in civilian pursuits, but they form a reserve of horses upon which the nation can rely in case of a national emergency and are being maintained without cost to the Army while filling a commercial need.

## *Expenses*

All expenses directly connected with the Army Horse Breeding Plan, excepting the payment of salaries to officers, enlisted men and certain civilians on duty at the several Remount Purchasing

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\* The FIELD ARTILLERY JOURNAL desires to express its gratitude to the *Veterinary Bulletin*, to Mr. A. A. Cedarwald, editor of *The Remount*, and to Major Ernest G. Cullum, Q. M. C., of the Remount Service, for their valuable assistance in the preparation and illustration of this article, as well as to Major Scott, the author.—  
EDITOR.

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and Breeding Headquarters, who are engaged in other work, are to be paid out of the yearly appropriation of \$150,000 made by Congress for that purpose.

### BREEDING OUTSIDE OF REMOUNT DEPOTS

#### *Breeding Centers*

Purchasing and Breeding Headquarters are located at Lexington, Kentucky; Kansas City, Missouri; Fort Reno, Oklahoma; Colorado Springs, Colorado; and Salt Lake City, Utah. The officer in charge of each Purchasing and Breeding Headquarters selects, after careful investigation, the particular places in his territory where stallions should be placed. Such places are denominated "breeding centers." The question of locating a breeding center in any particular place should be determined principally by the number and type of mares available and by the interest shown in the breeding plan by the citizens in the locality. There are about 500 breeding centers in the United States, Hawaii, Canal Zone, and Fort Reno.

#### *Means to Encourage Breeding*

The officer in charge of each Remount Purchasing and Breeding Headquarters should secure the cooperation of all prominent citizens in each breeding center. Every effort should be made to bring the breeding operations to the attention of farmers and stockmen. Local interest should be aroused, and stallions, mares and colts should be shown at all state and county fairs where possible. Donations of prizes, ribbons, etc., should be encouraged in every possible way.

#### *Local Agent Selected by the Government*

The officer in charge of each Remount Purchasing and Breeding Headquarters selects a civilian assistant to handle the stallion in each breeding center in his district. This civilian will be known as "local agent." A good horseman, who is popular and well known and who takes an active interest in breeding and the welfare of his community, should be secured if possible for this purpose. The local agent, before the delivery of the stallion, must agree to provide suitable stable facilities, including an exercise paddock, to collect and turn in stud fees when charged, and to render periodical reports on the number of mares bred and colts produced.

#### *Method of Paying for Operation of Stallions*

Stallions may be placed in a community under two conditions, namely:

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(a) *On a stud fee basis:*—In this case a stud fee is charged, the amount of charge to be determined by the officer in charge of the Purchasing and Breeding Headquarters. The amount should ordinarily not be less than that charged by civilians in the same community that are breeding horses of a similar kind. Where no other breeding is being conducted, \$10.00 is the ordinary charge. The local agent will collect this fee and turn it in to the officer in charge of the Purchasing and Breeding Headquarters for deposit in the United States Treasury to the credit of "Miscellaneous Receipts." The agent will then be paid an equal amount from the breeding appropriation to recompense him for handling and breeding the stallion.

(b) *On a community agreement basis:*—Under this scheme a number of breeders mutually agree to share the expense of maintaining and handling the stallion without charge to the Government, and in return receive free service. The responsibility for the stallion is placed upon the recipient thereof who has been selected by the community as the local agent. The cost of maintaining the stallion is prorated among the owners of the mares bred. In general, the best agent is the person who is desirous of improving the horse stock in his neighborhood and is interested in the general welfare of his neighbors and his community as a whole, as well as himself.

### *Stallions*

While being conditioned and prepared for stud service, the stallions will be kept at the remount depots at Fort Robinson, Nebraska, Fort Reno, Oklahoma, and Front Royal, Virginia, unless specific instructions otherwise are issued. These stallions will be assigned by the Chief of the Remount Service, Quartermaster Corps, to breeding districts upon request of the officers in charge of the Remount Purchasing and Breeding Headquarters.

To spread equine diseases throughout the country in the distribution of government stallions would be a calamity to the remount work. To send out stallions that are not fertile or that are not in condition to secure colts causes all breeders to lose an entire breeding season, gives the stallion a black eye, and disarranges an entire community. Before being sent out to a breeding center all stallions will be tested for all equine diseases and for fertility and be put into proper condition for breeding. Stallions assigned from depots will be carefully tested and be personally inspected by both the depot commander and depot veterinarian before shipment. The complete record of all tests, the pedigree and any other data of value pertaining to the stallion will be transmitted to the officer

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who is in charge of the zone, in which the breeding center where the stallion is to be assigned, is located.

Stallions bought from the race track are keyed up and kept "fine" for long periods of time. In many instances they are "bowed" or are lame; in some instances they have been "doped" in order to race. It takes from six months to a year to bring such stallions to a normal condition when they will be good sires. Such stallions should be kept in depots until properly prepared for issue, should be trained for stud duty, and tested on depot mares before being shipped out.

The average price paid by the Government for a stallion is about \$750; rarely over \$1,000 is paid for any stallion. Some of the finest stallions owned by the Government were donations.

### *Changes in Location of Stallions*

A stallion once assigned to a breeding center will not be changed without the concurrence of the agent and the breeders of the community if he is being handled and bred according to instructions. Nothing will tend to disrupt a breeding center as quickly as the constant shifting of stallions without just cause or because some other agent or community desires the horse.

Stallions ordinarily should be changed to a different community, after the fillies sired by them reach a breeding age, in order to prevent inbreeding.

In order to inform Congress of the progress of this authorized breeding and in order to conduct the work intelligently, agents must necessarily answer correspondence and render periodic reports which are kept to an absolute minimum. An agent who will not keep the Remount Service in touch with the work is not desirable, and the stallion will be removed from his jurisdiction and assigned to another agent in the same locality who will carry out instructions or removed from the breeding center when such an agent cannot be secured.

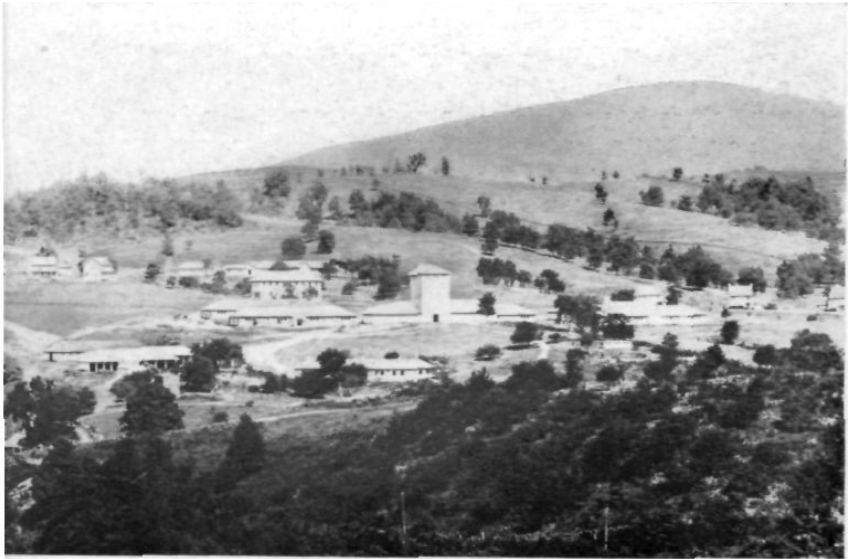
### *Mares*

The officer in charge, the veterinarian of the Purchasing and Breeding Headquarters and the local agent are charged with the selection of mares to be bred. The mares should be of riding type, free from transmissible defects and of good disposition. No unsuitable mares or mares known to be diseased should be bred. Breeders should be encouraged constantly to improve their brood mares by the retention of the best fillies. Mares of good type that are poor sucklers should be thrown out. Breeders should be impressed with the fact that the mare is fully as important in breeding





REMOUNT DEPOT AT FORT ROBINSON, IN THE PLAINS OF NEBRASKA



FRONT ROYAL REMOUNT DEPOT IN THE SHENANDOAH VALLEY OF VIRGINIA



ARAB STALLION, EL SAKAB, NOW STANDING AT WINNEMUCCA, NEVADA. HE IS 15.2 HANDS



FITZGIBBON, GOVERNMENT THOROUGHBRED, STANDING IN NEBRASKA

## REMOUNTS: BREEDING, PURCHASE, ISSUE AND TRAINING

as the sire. The number of services for each stallion should be fixed at the start of each breeding season by the officer in charge. No mature stallion will be allowed to stay in a community where there are less than twenty mares available and bred each season. Over-breeding should be prohibited, and the work of a stallion should be regulated by the number of services rather than the number of mares.

### *Ownership of Offspring*

The offspring of mares are the property of the owners of the mares and can be disposed of in any manner and at any time that the owners see fit. The Government will take no option or lien on them. In order, however, to encourage breeding and establish a horse market in each breeding center, the Government, whenever horses are required to be purchased for the Army, will inspect and buy such offspring in each center as needed, provided that they come up to Army requirements.

### *Breeding Operations*

After the stallion is assigned to the breeding center, the agent will be responsible for his care and actual breeding to suitable mares. The agent should receive complete, concise and definite instructions as to the handling and exercising of the stallion and as to the maximum number of services to be performed. He should be furnished yearly a stud book record for recording stallion services. This book contains sections for furnishing (a) notice to owner of mare for date of return service, (b) certificate of breeding of mare and foaling of colt, (c) stub section for retained record.

Owners of colts should be encouraged to register their colts in the Half Bred Stud Book of the Half Bred Stud Registration, maintained by the Genesee Valley Breeders' Association, Avon, New York, under authority of the Jockey Club.

#### SUMMARY OF RESULTS OBTAINED FROM THE OPERATION OF THE REMOUNT HORSE BREEDING PLAN SINCE ITS INCEPTION IN 1921 UP TO AND INCLUDING DECEMBER 31, 1927

<i>Year</i>	<i>Number of stallions in service</i>	<i>Number of mares bred</i>	<i>Number of foals secured</i>
1921.....	159	4,100	2,460
1922.....	219	6,800	4,080
1923.....	236	7,500	4,500
1924.....	277	8,700	5,220
1925.....	308	9,900	5,940
1926.....	382	11,800	8,260
1927.....	452	14,000	9,800
Total.....	.....	62,800	4,260
Yearly average.....	290	8,970	5,750

In the current, 1928, breeding season 540 stallions are at stud in 40 states, Hawaii, Porto Rico and the Canal Zone, and it is estimated that they will be bred to approximately

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20,000 mares. The result should be, judging by past standards, a foal crop of at least 14,000, in the foaling season of 1929.

### *Inspection*

The officers on duty in the Remount Service, including quartermaster and veterinary officers, will take advantage of every opportunity in the purchase of horses to inspect stallions, mares and colts. Each breeding center should be inspected once a year by some officer or the Remount Horse Breeding Expert. This inspection should preferably be made during the breeding season. Such inspections should be most thorough, and the agent and the breeders in the community should be consulted, advised as to the work, and rendered every possible assistance. Tact in correcting errors in breeding work is most essential, and proper comments on work well done will be most encouraging. At the time of the yearly inspection of stallions, arrangements will be made to purchase the colts sired by the stallions whenever the Army is in the market for riding horses. A complete written report of each inspection covering the condition and suitability of the stallion, the kind of horses bred, the percentage and grade of colts produced, the qualifications of the agent, the suitability of the community for producing horses, and the local conditions will be made; a copy of this report will be transmitted to the office of the chief of the Remount Service and a copy filed with the stallion's record at each headquarters.

Many experienced breeders handle government stallions, and many prominent breeding establishments handling private stallions are located in remount breeding centers. Officers on remount duty should neglect no opportunity to inspect these establishments with a view to obtaining data and pointers on how to conduct the Army breeding work in matters pertaining to the handling of stallions, mares and colts. Such prominent establishments have always rendered most valuable assistance in Army breeding work.

### *Reports*

Reports required of civilians should be kept to a minimum, but in order to place stallions, keep track of the work and render the yearly reports required by Congress, the Remount Service must obtain certain information.

Reports from agents and breeders are described in the following terms:

- (a) A questionnaire to determine the suitability of the agent and the locality before assigning a stallion.
- (b) A receipt for the stallion when assigned, together with an agreement to properly handle the horse.

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- (c) Periodical reports of mares bred.
- (d) Periodical reports of foals secured.
- (e) Reports of foals secured from mare owners on postal card.

### *Removal of Stallions*

Poor agents, failure to care for stallions, refusal to render simple reports, etc., may require the removal of a stallion or a change of hands. Before a stallion is removed from a breeding center, great care should be exercised to see that innocent parties in the community are not injured by the shortcomings of the local agent. The stallion should in such cases, when injury will be done to breeders, be put under the charge of another agent in the community or shifted at the end or before the start of the breeding season.

### *Determination of Colts Produced*

It will not be possible to obtain reports from all mare owners of colts secured, but in making estimate of foals produced by a stallion it is only logical to assume, in the absence of definite reports to the contrary, that the percentage of get by a stallion from mares *not* reported on is equal to his percentage of get mares actually reported on. In order to keep track of the foals secured and their suitability, post cards seeking data from mare owners should be sent out either by the officer in charge of the work directly to mare owner or through the local agent.

### *Stallion Records*

All headquarters conducting breeding work or handling stallions will keep up to date a stallion record, including pedigree, registration papers, race record, if there is one, and breeding record. This record is best kept by having an individual file for each stallion where all the foregoing data can be filed, as well as copies of all correspondence affecting this particular stallion, agreement with agent, etc. In other words, this record should show exactly what the horse has done from the time it arrived under the control of the headquarters in question. When a stallion is shipped from one headquarters to another his complete record or a copy of same will accompany him.

## BREEDING AT REMOUNT DEPOTS

The present breeding in remount depots is mainly carried out to test Government stallions, educate officers on remount work, in breeding technique, and to provide an object lesson for civilian breeders. It costs, counting all labor, forage, pasturage and upkeep of the post and the personnel on breeding work, about \$350

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per year to turn out a three-year-old at Remount Depots. This cannot be called an economy over the present system of procurement in the civilian market, and if the Army endeavored to pull out of the civilian market and lose the civilian contact in its peacetime procurement of remounts, it would defeat to a large extent the idea of stimulating mass production among civilian horsemen.

Breeding at depots was authorized and undertaken with the following objects in view:

- (a) To instruct officers and other personnel of the Remount Service in the practical handling of stallions, mares and colts, and the technique of breeding.
- (b) To provide the plants and means of handling, testing and training stallions before distribution to civilian agents.
- (c) To have available for inspection by civilian breeders government breeding establishments that would serve as an object lesson in handling stallions, mares and colts in a practical, economical manner, and particularly to demonstrate the value of grading up mares.
- (d) To have a small number of establishments where experimental work in the control of equine diseases of all kinds could be carefully studied in a practical and technical way.
- (e) To produce for the Army for issue to Service Schools and sale to officers a few high-class colts, the market value of which would cover, to a large extent, the cost of the experimental and practical work enumerated in a, b, c, and d above.

The following procedure must necessarily be followed in order to attain the objects enumerated above:

### *Instructions in Breeding Work for Remount Personnel*

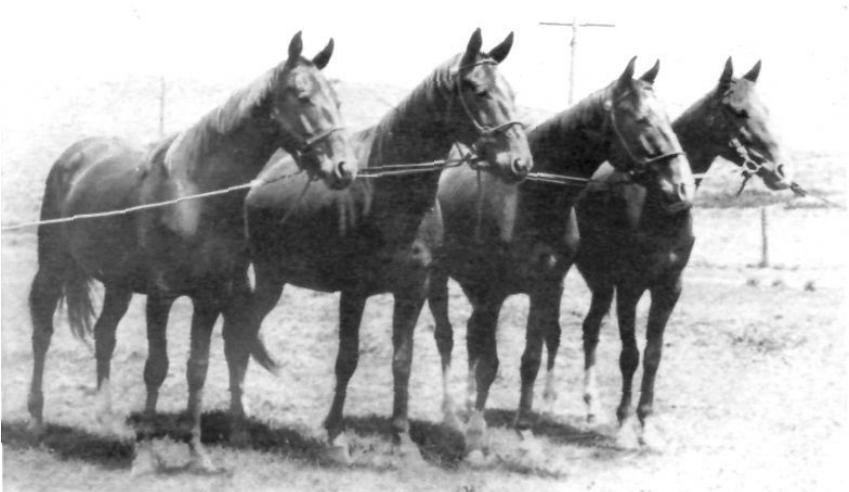
Splendid opportunities present themselves to remount personnel to study the practical and theoretical means of conducting horse breeding. In no private horse breeding establishment or other horse breeding operations in the United States is it possible to have on hand and compare a large number of colts of three seasons, the work of a large number of stallions and three of the produce of one mare.

The study of the results secured and the errors committed can be made not only from records but from an inspection of all the stallions, mares and colts secured over a period of three years.

In order to take full advantage of the availability of these animals for study, depot commanders will, at least once a year, set aside a certain period of the year to compare and study all the



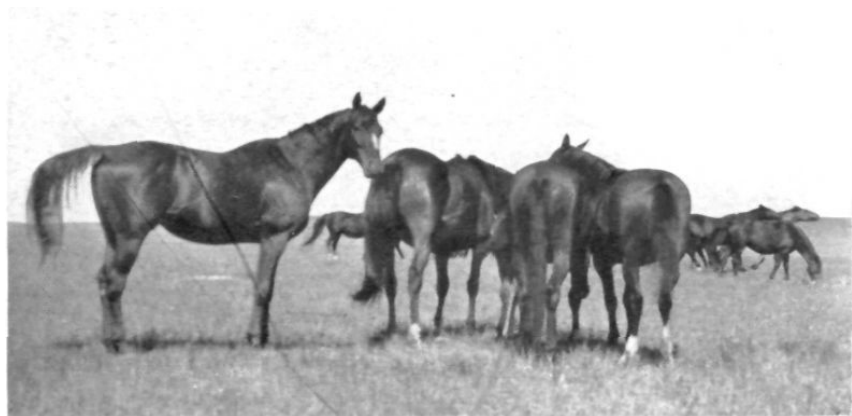
THOROUGHBRED COLTS IN NEBRASKA, Sired by Government Stallions



Three Year Olds by U. S. Thoroughbred Stallion, Meleorite, standing is Oregon



ROBINSON, FOUR YEAR OLD, BY GOVERNMENT STALLION, OUT OF HALF BRED MARE MAJOR GENERAL CHEATHAM. THE QUARTERMASTER GENERAL, UP THE REMOUNT SERVICE IS PART OF THE Q. M. C.



THOROUGHBRED STALLION DELAWARE LOOSE WITH HIS MARES ON C. D. CAREY RANCH, WYOMING



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colts of all ages on the depot, the mares with their colts, and the stallions, and their produce. All available depot personnel should be assembled and instructed in the breeding work at this time.

Officers on duty at Purchasing and Breeding Headquarters should arrange, when possible, to be present when this study is made.

It is most important that the results of this yearly study and of any other study or facts brought out in breeding work be fully and properly recorded on the proper forms provided for the mare, colt and stallion. If a proper record is not made the results of careful study and careful work are lost to the Remount Service and to future depot personnel.

### *Test of Stallions and Mares*

All stallions and mares sent into depot for use in breeding will be tested for fertility and all equine diseases as soon as practicable after their arrival at the depot. Those found to be infected or doubtful will be segregated and treated until cured or else eliminated from the animals for breeding.

No stallion will be sent out for breeding that it not fertile, free from disease and *in condition* to perform stud duty. Both the commanding officer of the depot and the veterinary officer on duty at the depot will inspect all stallions before they are sent out to insure that these instructions are complied with.

Stallions that have not been bred prior to their receipt at depots must be trained in their work and disciplined so that they can be handled and bred by the average horseman. Notations of the disposition, peculiarities and temperament of stallions should be made on their records so that anyone who receives the stallions may be properly informed.

### *Breeding Section of Depot*

In order to have a practical set-up to show visitors and breeders who inspect Remount Depots for breeding information, it is necessary to set aside a section of the depot to be devoted to breeding work. In addition to this reason for breeding section at depots it would be impossible to handle mares and colts unless they are segregated from the horses and mules received from purchasing points to prevent the spread of contagious and infectious diseases.

The larger the number of pastures and the more the mares and the colts of all ages are separated, the better will be the results secured. If large numbers of mares or colts are kept in one pasture, such arrangement does not permit of individual development, increases injuries from kicks, etc., and makes the control of diseases

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and infections difficult. As far as practicable, when necessary to stable them, each mare and each colt from a weanling until three years of age should be kept in a box stall.

In order to demonstrate the value of grading up mares, at least 50 per cent of the mares kept at each Remount Depot will be grade mares ( $\frac{1}{2}$  bred or better), the balance should be thoroughbred or pure bred. Constant effort must be made for improvement in both the grade mare section and the thoroughbred section of the brood mare band. Poor mares will be weeded out in each section and replaced by better mares of the same breeding as the one eliminated. Top grade mares will not be eliminated to make a place for thoroughbred mares.

### *Experimental Work*

Depot Veterinarians should be required to conduct experimental work and laboratory work on all breeding matters. Every assistance possible should be given civilians or Government experts who are conducting work of an experimental nature in breeding horses and in the control of equine diseases.

### *Production of Valuable Colts*

In order to produce for the Army and for sale to officers high-class horses, constant attention must be given to the handling, feeding, and development of the colts produced. If facilities and personnel do not permit of the proper system for such work with the maximum number of mares that are assigned to be bred, the number of brood mares should be reduced and recommendation to that effect made to The Quartermaster General's Office. It is better to raise a few high-class colts than a larger number of mediocre colts. The production of high-class colts is not only of more value to the Army but it is most necessary for the purpose of demonstrating to breeders the *proper conduct of such work*, which is one of the main objectives of depot breeding.

It should be clearly understood that the object of breeding at Remount Depots is not for the purpose of raising remounts for supply to the Army and is not in any sense in competition with farmers or horse breeders. Therefore, the only justification in continuing to breed is because we are producing a type of horse which could not otherwise be provided for our schools or for sales to officers.

## BREEDING OF DRAFT HORSES AND PACK MULES

The demand in the commercial market for heavy draft horses from 1,500 pounds up and for good mules is at present sufficient

## REMOUNTS: BREEDING, PURCHASE, ISSUE AND TRAINING

stimulus for the breeding of these types of animals. The fact that a good draft sire or a jack cannot be crossed back upon its immediate offspring soon offsets the value of one of these sires in a community. If inbred too closely, the result is poor foals, and if not bred it means lack of patronage for the owner of the sire. This forces the owner to dispose of the stallion or jack, many times at a loss, and to buy at considerable expense a new sire. This necessity for frequent shifting of sire to new communities is one thing that discourages private owners of stallions and jacks and is one main reason for having such work operated by the Government. A government that operates a number of stallions in different sections of the country can easily arrange to make a shift of such stallions to prevent inbreeding and can also afford better than the individual to dispose of a stallion that is not worth shifting. This is frequently impossible and always expensive under private ownership. I predict that within the next half century it will be necessary in the United States, as in most European countries, for some government department to supervise breeding and furnish the sires for the production of both horses and mules.\*

For the artillery, a large 1,500 or 2,000 pound horse is not desired or necessary. A good active draft horse weighing 1,250 to 1,400 pounds, with a dash of hot blood, is now and always has been considered the best. The blood of the Remount stallions, such as the Arab, Morgan and Thoroughbred, is forming a fine basis for this cross of Artillery or light delivery draft horse. This hot blood also forms the basis for a fine cross with the jack to produce the active, breedy lead mules and pack mules. This cross produces what is known to the mule trade as the cotton mule and is the kind of mule that can do fast, active work and withstand the heat.

From the above it can be seen that the present Remount breeding not only serves the purpose of producing the riding horses but, by the distribution of hot blood throughout the United States, lays the foundation for an artillery draft horse and the Army lead and pack mule, known respectively in the commercial world as the light delivery horse and the cotton mule.

### PURCHASE

In each purchasing zone each year an effort is made to buy directly from the breeder. This method has not yet proved successful or economical, for either the Government or the breeder, although a considerable increase in the number of horses secured

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\*Present indications are that this arrangement will be in effect within the next ten years.—EDITOR.

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in this manner is noted each year. The reasons why this local buying has not been successful to date are as follows:

First, the breeding plan did not get into effect until the spring of 1921. The first crop of foals arrived in 1922 and were only about 2400 in number. It was only in 1927 and 1928 that the colts were old enough to buy at Army ages.

Second, the limited number of good horses available in the United States has made all the top colts raised to date worth two or three times the Army price. In fact, the scarcity of good horses has been so great that the top colts are being sold now to the same dealer, whom both the Army and the breeder are most prone to abuse and attempt to eliminate at the ages of one, two and three years at prices greater than the Army would pay at four and five years of age.

Third, inspection dates necessarily set by the Remount Service seldom fit in with the plans of all breeders. These men are busy at something else at date of inspections and prefer to sell their colts to a dealer along with other animals rather than be inconvenienced with leading or riding a colt some distance to an Army inspector, thereby losing at least a day from work.

There are now being produced each year approximately 15,000 colts sired by government stallions. At its maximum replacement rate our peacetime Army could take not to exceed 1,700 riding horses yearly. The breeder, particularly in the west, therefore, must depend, as he has always done, on the dealer to dispose of his colts just as any business must depend on the middle man and the wholesaler for disposition of products. In fact, it is certainly more to his interest to meet the dealer's markets and to please the dealer than it is to cater to the Army's small amount of uncertain business which necessarily depends on variable appropriations from Congress. In the fiscal year 1928 the Army purchased about 600 colts sired by government stallions from the colts foaled in 1921-22-23. The number will unquestionably go up each year and it is believed that within the next five years practically every riding horse we buy will have been sired by a government stallion.

Of the 600 colts purchased in the fiscal year 1928 only about 200 were purchased directly from the breeder. Now let us analyze why this condition exists. A dealer goes to a farm and is in the market for all kinds of horses and mules and at all ages. He will look over all the stock and make an offer for a lot, consisting, we will say, of a two-year-old colt, a five-year-old horse, a two-year-old mule, a ten-year-old mule and an eleven-year-old draft horse. The farmer, if to his advantage, sells them all. Now when an Army buyer comes along he tops the lot of all the young, fresh horses and

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the farmer is left with all the balance of his animals to feed through the winter. Naturally the breeder prefers the dealer who buys all kinds of stock and frequently pays more than the government will for a top horse. He, therefore, often keeps his colts by the government sire to help sell his other stock. If he is wise he will continue to breed for the commercial market, which, as far as he is concerned, is the dealer.

### ISSUE AND TRAINING

Since becoming settled down to normal peace-time work from 1926 to date, the average time a mature remount stays in a remount depot is about 100 to 120 days, and this has been the minimum time necessary for him to go through his sicknesses, be reconditioned, handled and issued. The average cost per day for forage at depots for a remount is 10 cents per day as against 35 cents per day in the hands of troops. If a quicker or more economical method can be derived for getting mature animals into the hands of troops, it would be gratefully received in the office of The Quartermaster General.

As to training and handling prior to issue, the Remount Service has been doing more of this work in the past few years than has been done since the war and reports from the chiefs of the mounted services and the organizations receiving horses have, in over 95 per cent of issues, been most flattering. However, it is my firm opinion that when a unit of our Regular Army arrives at such a stage in peace time that it cannot handle all kinds of horses, broken and unbroken, wild and gentle, and is willing to admit that it cannot and does not want to become expert in horsemastership, it is then about time to convert that unit into a motorized organization. Our Regular mounted units maintained in peace time are the nucleus for expansion in war. They must be experts in all their work, and in this motor age, beyond everything else experts in horsemanship and horsemastership if they are to be capable for training hastily organized units in time of war. Woe unto us the day that we cannot or will not make horse experts of our soldiers in regular mounted units in peace time! It means inefficiency for us in peace time and disaster for us in war.

### DEPARTMENT OF AGRICULTURE ASSISTANCE

Congress, in authorizing Army breeding, prescribed that the work should be conducted "in cooperation with the Bureau of Animal Industry, Department of Agriculture." This provision was inserted largely because of the fact that that department had been conducting work to encourage the breeding of riding horses from

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1908 to 1920 and had voluntarily transferred it to the Army. The transfer was made not because the work was not a success in the Department of Agriculture, but because a larger expansion in the work would have required a larger appropriation for buildings and personnel if it had been conducted by the Department of Agriculture. Army remount depots and army purchasing personnel were available without additional cost. All requests for advice and assistance made to the Department of Agriculture have been promptly and willingly complied with and have been of great value. Remount officers should take every occasion to seek its advice, and the assistance and advice of state agricultural colleges and stations should be sought. Also in return, prompt and considerate attention should be rendered all requests from the Department of Agriculture and state agricultural establishments.

# THE INCEPTION AND DEVELOPMENT OF THE CATERPILLAR TRACTOR

BY CAPTAIN L. A. MILLER, ORDNANCE DEPARTMENT, U.S.A.

THE inception of the steam traction engine, which was the forerunner of the modern "Caterpillar" tractor, was brought about because of a necessity that developed due to an economic condition. Agriculture was one of the important industries of early California. Grain was raised on a large scale by the holders of great tracts of land located in the Sacramento and San Joaquin valleys. The scarcity of labor created a demand for animal-drawn implements to do the actual work in the harvest fields.

As a result of this need, about the year 1885 two California manufacturers conceived, perfected, and placed on the market, almost simultaneously, a combined harvester. These pioneers of industry were Daniel Best of San Leandro and Charles and Benjamin Holt of Stockton. The introduction of the harvesting machines resulted in a great saving of labor, as even the earlier models would cut, thresh, and sack the grain from 40 or more acres of wheat per day. The implement was rapidly improved to the point where some of the later models were known to cover as many as 100 acres between dawn and dusk.

Almost immediately after the combined harvester had appeared, it became apparent that some power, other than animal, would be required to draw these huge machines. Harvest time temperatures in the interior valleys of California are high. The twenty-five to forty animals necessary to operate the "combine" suffered intensely from the heat. Much time was lost on this account.

The demand for suitable power to replace the animals caused many inventors to attack the problem. Daniel Best and the Holt Brothers were foremost among these, independently concentrating their efforts upon the development of a steam traction engine. In 1886, Daniel Best acquired patents covering a steam propelled round-wheeled tractor. The first "Best" tractor to be sold was loaded on a car at San Leandro on February 8, 1889. Holt Brothers at Stockton produced their first steam vehicle some two years later. In 1892, the firm name of Holt Brothers was changed to The Holt Manufacturing Co. During the year that followed, keen rivalry existed between the steam propelled products of the two companies.

Under all ordinary conditions the steam traction engines operated

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the combined harvesters very efficiently. Soon they were employed to plow the land and for many other agricultural purposes.

The location of the Holt plant at Stockton brought to it certain peculiar problems, which, by the beginning of the present century, had reached such serious proportions that there was urgent need for their solution. Adjacent to that city lay a vast river bottom of great potential richness, but very difficult to reclaim with the then existing implements. This peat land was very soft and practically bottomless. In the early days of reclamation it was almost impossible for horses or even men on foot to travel over it.

The heavy round-wheeled tractors had their limitations. While they worked very successfully during the dry season, they did not function satisfactorily in wet weather on account of the mud or slippery sod. Furthermore, they would not operate at all in sand or in soft ground. Therefore their use in connection with the reclamation of the river land was out of the question.

In order to produce a vehicle that would work under these adverse conditions, the Holt Manufacturing Co. built tractors with wheels of extreme width. The climax to this was a tractor which had wheels about 8 feet in diameter and 18 feet in width on each side of the machine. This was probably the largest and most powerful tractor ever built, but it emphasized the fact that the weight increased almost in proportion to the width of the wheels, so that very little was gained by this method.

The disadvantages of the round-wheeled tractors were seen and fully appreciated by Benjamin Holt. It now became apparent to him that a radical departure must be made from the wheel type of construction. He was at a loss to know how this was to be accomplished. During a trip to the St. Louis Exposition, he conceived the idea of a vehicle that would operate on raised rails, similar to a locomotive, laying its own track and picking it up again as it traveled along. Immediately upon his return to Stockton he set to work and built a track-laying attachment to replace the large, round drive wheels of one of the steam tractors.

This first track device was a very crude affair, built up of material found in the yard of the Stockton factory. In brief, it consisted of a set of flanged rollers, similar to car wheels, to carry the weight of the machine. These rollers ran on a flexible track or chain composed of links fastened together with pins. To each link was bolted a wooden shoe. This arrangement was like the rails and ties of a railroad track. The flexible track encircled an idler sprocket and a drive sprocket, by which the power from the engine was applied to the track. One of these attachments was used to replace each of the two round drive wheels, the track units being



## INCEPTION AND DEVELOPMENT OF CATERPILLAR TRACTOR

fastened rigidly to the main frame of the tractor. The improvised machine was completed early in the year 1905 and was the first tractor to be called a "Caterpillar."

The word "Caterpillar" was not a naturally descriptive adjective depicting the contrivance. It was only a fanciful or imaginative term indicative of the crawling motion of the tracks over the ground. The name was originally applied to this first experimental model by a photographer who went out into the country to take some pictures of the strange new monster. As he obtained his first glimpse, over the crest of a hill, he exclaimed: "Gee! that's not a traction engine; it's a caterpillar."

Thus the name "Caterpillar" was applied to the new type of tractor, and the word was soon registered in the U. S. Patent Office. "Caterpillar" still designates products manufactured by the Caterpillar Tractor Co., and cannot legally be applied to any other tractor or track-laying mechanism manufactured by concerns other than this corporation.

The improvised tractor was so successful that Mr. Holt immediately designed and built the first real "Caterpillar," which was completed during the latter part of 1905. This vehicle functioned so satisfactorily that the design was revamped and the second steam "Caterpillar" appeared in 1906. This tractor was sold to the Golden Meadows Development Co., of Louisiana, during December of that year.

No one anticipated, at this time, how far-reaching the development and perfection of the track-laying idea was to be. Mr. Holt and most of his associates thought that it would be only a special purpose machine which could be used under abnormal conditions. They then believed that the round-wheeled traction engines would still be standard for general use. This conception was corrected by an episode which occurred near Stockton while experimenting with the track-laying principle. Here, one of the standard 40-horsepower steam tractors mounted on "Caterpillar" tracks was used to pull the load formerly hauled by one of the large 60-horsepower round-wheeled steamers. It was found that the smaller tractor not only pulled with ease the load of the larger vehicle, which consisted of three heavy gangs of plows, but it was able, also, to haul a fourth gang of plows and to pull all four gangs at a 2-inch greater depth in the same field and under the same conditions. This experience was the first realization of the superior efficiency of the track over the round wheels. It proved that, with the "Caterpillar" tractor, the resistance to travel was practically constant on account of the weight of the machine being carried on tracks, which distributed it over a large area of ground, as compared

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with the round-wheeled tractor, in which the power to propel it varied according to the character of the soil over which it was operating.

So the development and perfection of the "Caterpillar" was continued during the next two years. The greater part of the work was done on the soft delta land near Stockton, and resulted in many improvements being made over all of the original designs. In 1908, the third steam "Caterpillar" was built. This vehicle was sold for use in connection with the construction of the Los Angeles aqueduct.

During the above period of experimentation and research, rapid strides had been made in the perfection of the internal combustion engine. As a result of this line of development, late in 1906, a gasoline-propelled "Caterpillar" was constructed. This vehicle was redesigned and rebuilt many times before the second gasoline-propelled tractor was assembled in the spring of 1908. In the summer of that year, the third gasoline "Caterpillar" was fabricated and was sold also for use in conjunction with the building of the Los Angeles water supply system.

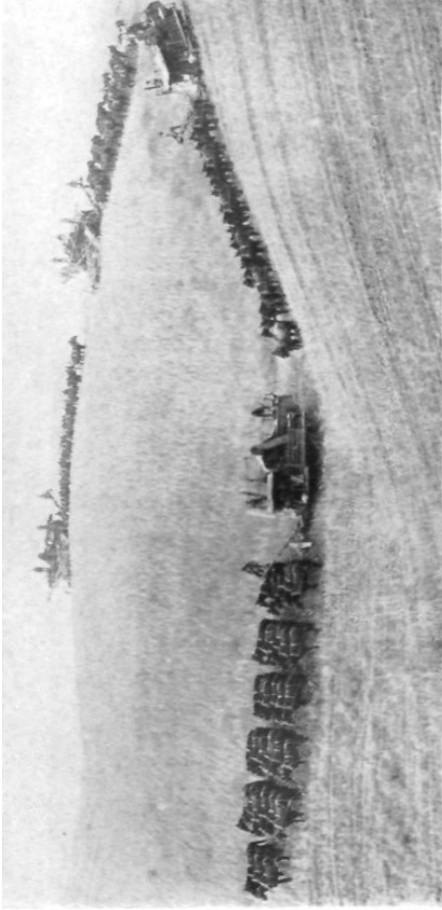
The gasoline-propelled "Caterpillar" gave such excellent service that in the spring of 1909 twenty-five of these machines were built for the Los Angeles project. This was the first industrial enterprise which employed "Caterpillar" tractors. They were used to transport the necessary building materials across the Mojave Desert and up roadless mountain sides to the scene of construction.

In 1908, the Holt Manufacturing Co. purchased the interests of the Best Manufacturing Co. of San Leandro, and Daniel Best retired from business. During the next year, the demand for tractors in the middle west for agricultural purposes caused the Holt company to establish a factory branch at Peoria, Illinois.

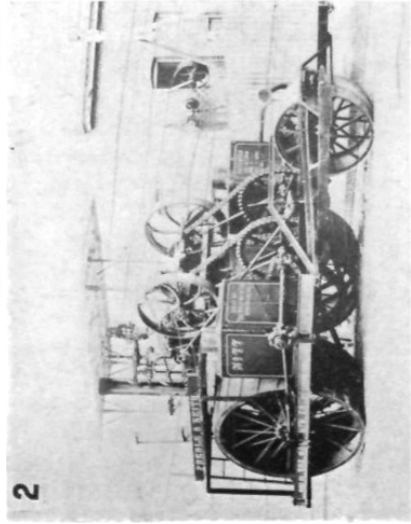
With the purchase of the business of the Best Manufacturing Co., it appeared that competition had been eliminated from the tractor field, but such was not the case. In March, 1910, C. L. Best, a son of Daniel Best, founded the C. L. Best Gas Tractor Co., the name of which was later changed to the C. L. Best Tractor Co. This concern began the manufacture of round-wheeled gasoline tractors at Elmhurst. However, the firm soon moved to San Leandro, where it occupied the factory site and buildings which had formerly been used by the Best Manufacturing Co.

The C. L. Best Tractor Co. began to fabricate a gasoline-propelled "track-laying" tractor in 1912, and sold it for agricultural purposes throughout the western states. This again stimulated the development of the track-type tractor.

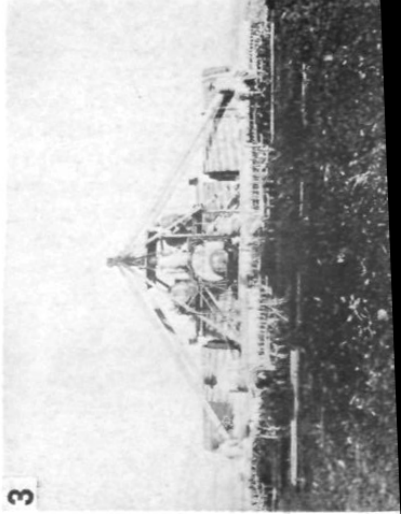
The manufacture and improvement of "Caterpillar" tractors



2



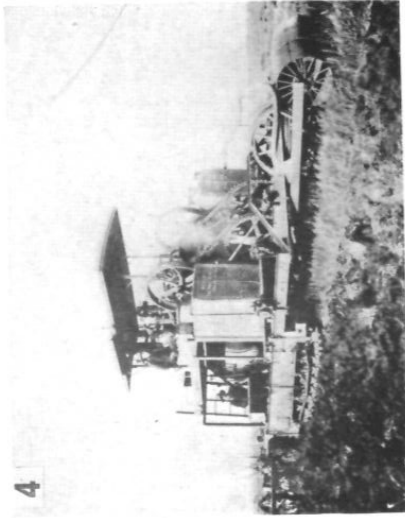
3



ONE: TWENTY-FIVE TO FORTY HORSES WERE NEEDED TO PULL THE COMBINED HARVESTERS WHICH APPEARED ABOUT 1885

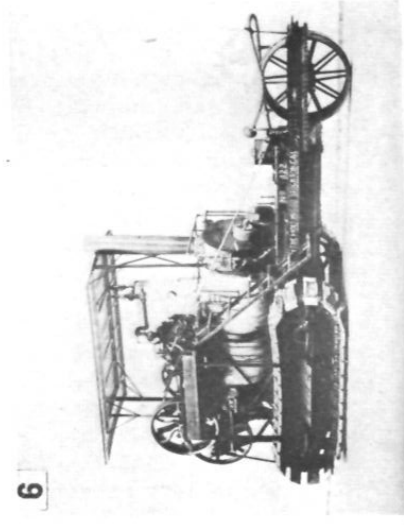
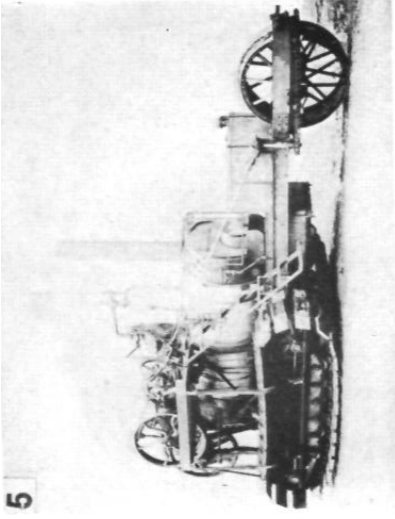
TWO: STANDARD STEAM TRACTION ENGINE OF 1904

THREE: PROBABLY THE LARGEST AND MOST POWERFUL TRACTOR EVER BUILT. WHEELS WERE 8 FEET IN DIAMETER AND 18 FEET IN WIDTH



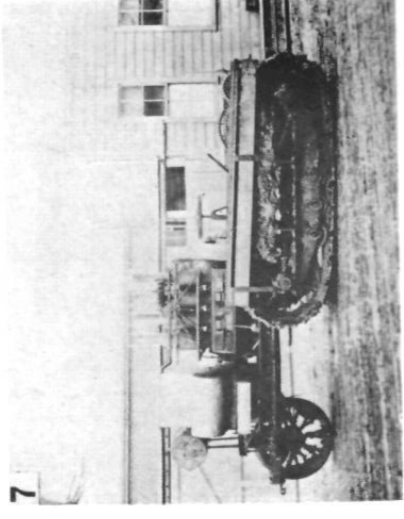
FOUR: FIRST TRACK-LAYING  
VEHICLE INVENTED BY  
BENJAMIN HOLT AND  
PRODUCED IN 1905

FIVE: EARLY STEAM TRACK-  
LAYER



SIX: PERFECTED STEAM  
"CATERPILLAR" OF 1908

SEVEN: EARLY GASOLINE  
TRACK-LAYER



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continued, and between 1909 and 1914 their sale and use spread from this country to South America and Europe.

With the invention and application of the multiple disc clutch to automotive vehicles, the cumbersome front steering wheel of the tractor was eliminated and the vehicle began to assume the lines that are so well known today.

The World War, therefore, found the tractor well advanced through the experimental and development stages and already introduced into most of the countries engaged in the great struggle. Germany and Austria-Hungary were using "Caterpillar" tractors quite extensively for farm work. When war broke out, these machines were immediately conscripted for military service. One of the "Caterpillars" was captured by the British during the early stages of the conflict. This incident caused the English to negotiate at once with the Holt Manufacturing Co. for the delivery of a commercial tractor to be tested out for military use. The captured tractor also furnished the basis upon which the British later developed the design of the famous fighting tanks.

When the order came from England for a trial tractor, there rested on the docks in New York one of the largest machines that had ever been built. This "Caterpillar" had been ordered by Franz Joseph of Austria-Hungary for use on one of his estates. It was painted in Franz Joseph's colors and bore his coat-of-arms. War had been declared, and the tractor could not be delivered. So representatives of the Holt company uncrated the tractor, painted out the Austro-Hungarian colors, repainted it a neutral color, and shipped the same vehicle to England.

At this time there were four models of "Caterpillar" tractors in production, which were known as the 45, 60, 75 and 120-horsepower types. The Allies soon adapted these commercial models to military use. The British ordered a great number of the 60, 75 and 120-horsepower types, the majority being the 75's. The French Government obtained a few hundred of the 45's and a limited number of the 75's. The Russian Government obtained a few of the 60's and 75's. The Holt Manufacturing Co. also granted patent licenses under which many more of these vehicles were made abroad by the Allies.

Soon after the United States entered the war in 1917, the Ordnance Department of the United States Army obtained several hundred of the 75 and 120-horsepower models, which were afterwards designated as the 15-Ton and 20-Ton Artillery Tractor, respectively. In conjunction with the Holt engineers, the department then designed three distinctly military models known as the 2½-Ton, 5-Ton and 10-Ton Artillery Tractors. The Holt Manufacturing

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Co. was charged with the production of the 10-Ton Tractor, while other concerns, licensed by the Holt Company, built the 5-Ton. Only a very limited number of the 2½-Ton were made. This little tractor was used solely for experimental purposes.

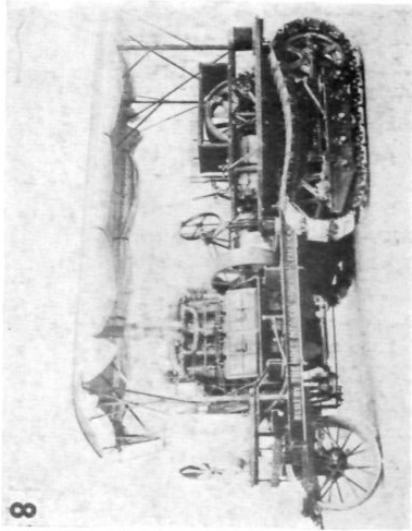
The introduction and successful application of the fighting tank crystallized the idea of the Self-Propelled Gun Mount of the track-type. A weapon of this description was advocated by the builders of "Caterpillar" tractors early in the war. The project, however, was developed too late to play an actual part in the conflagration. Nevertheless, several of these motor gun carriages were later constructed by the Holt Company at Stockton.

The requirements of the war caused the Holt Manufacturing Co. to fabricate the large, high-powered, 10-Ton Artillery Tractors. The armistice halted the emergency production schedules in November, 1918, and the Holt company returned to the commercial field for its business. The military tractor was entirely too large and too expensive for the average farmer to buy for agricultural purposes. It was, however, ideally suited for usefulness in contracting, snow removal, logging, road work, and in the industrial field. In fact, the demand was so great that the company immediately decided to build the best tractor possible for these new lines of work. As a result of this decision, new commercial models known as 5-Ton, 10-Ton and Western 10-Ton were soon placed on the market. Then came a redesigned 5-Ton known as the T-29, and a small, purely agricultural vehicle known as the 2-Ton or T-35.

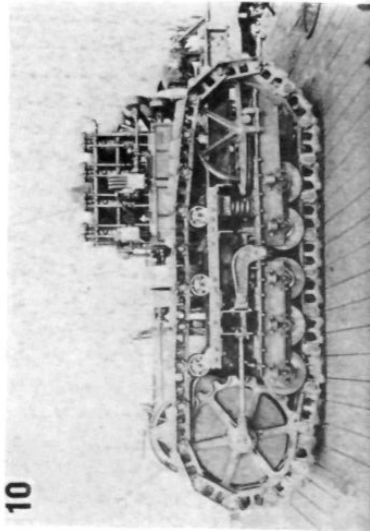
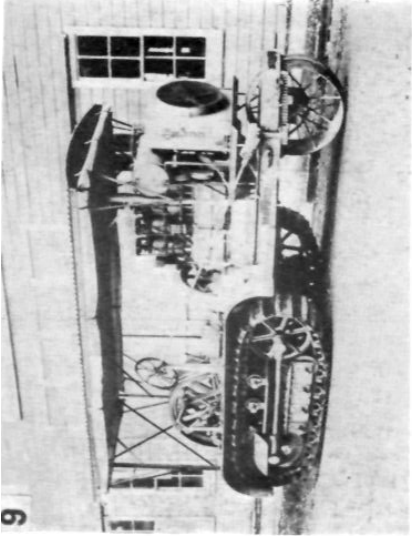
Stiff competition existed between the Holt Manufacturing Co. of Stockton and the C. L. Best Tractor Co. of San Leandro during the reconstruction period immediately following the war. Many disputes over patents arose between these two firms. Settlement was finally reached by the Holt Manufacturing Co. purchasing from the C. L. Best Tractor Co. all of the patents then owned by that organization. The Best company thereupon received from the Holt company a license to build and sell tractors under all patents previously owned by them, and, in addition, under all patents then owned by the Holt Manufacturing Co.

The "Best" Sixty was placed on the market in 1919, and the Thirty followed in 1921.

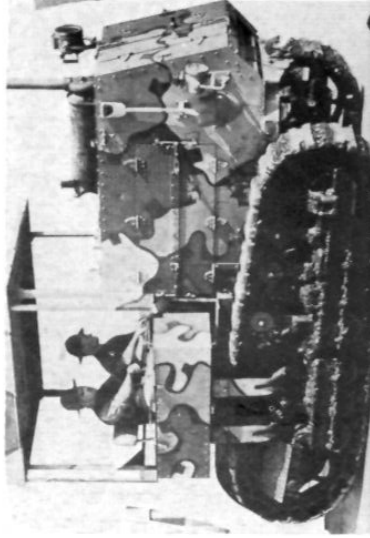
The World War was a factor in the process of developing the present highly efficient "Caterpillar" tractors, because of the lessons learned by the entire automotive industry through that experience and because new fields of usefulness, demonstrated during the conflagration, presented increased demands for power and endurance. During this conflict, and up until 1921, the tractor went through a very extensive study on the part of engineers for the



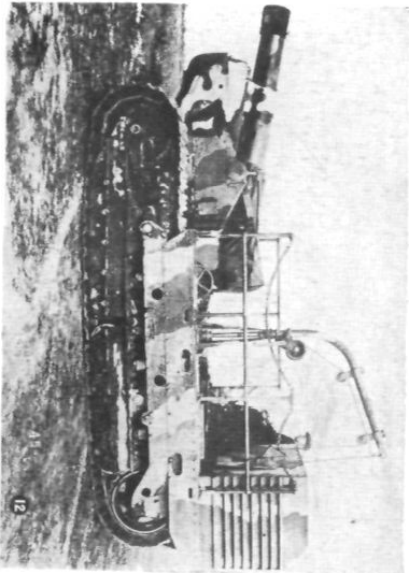
EIGHT AND NINE: EARLY  
GASOLINE CATERPILLARS  
WITH FRONT STEERING  
WHEEL, THE MULTIPLE DISC  
CLUTCH NOT YET INVENTED



TEN: THE FIRST  
COMMERCIAL TRACTOR  
WITHOUT FRONT  
STEERING WHEEL

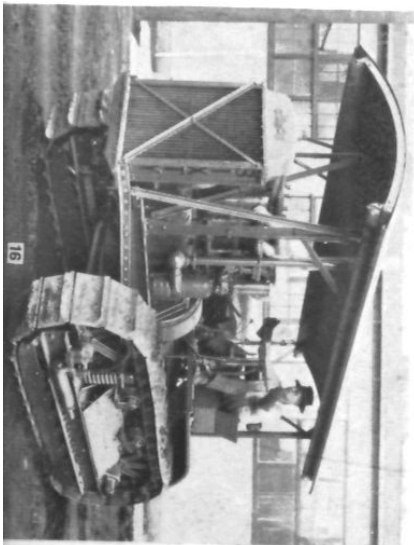


ELEVEN: WAR  
PRODUCTION ARTILLERY  
CATERPILLAR TRACTOR



TOP: SELF-  
PROPELLED  
8-INCH  
HOWITZER  
PRODUCED  
IMMEDIATE  
LY AFTER  
THE WAR

BELOW:  
RECENT  
MODELS





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allied governments and engineers of the Holt and Best companies. It is well to point out here that up to this time very little attention had been given to the cost of operation and maintenance of the track-type machine. Work had just started on this phase when war came on.

In April, 1925, a new corporation known as the Caterpillar Tractor Co. was formed. During May of that year, it purchased the interests of both the Holt Manufacturing Co. and the C. L. Best Tractor Co. The management of this new organization included most of those responsible for the success of both of the original firms. The Caterpillar Tractor Co. now maintains its executive offices and a factory at San Leandro, California, with a factory also at Peoria, Illinois. The Western Harvester Co. of Stockton, California, which occupies the old Holt factory, is a wholly owned, subsidiary corporation and is actively engaged in the manufacture of "Holt" Combined Harvesters.

At the time the Caterpillar Tractor Co. succeeded to the two pioneer tractor organizations the Thirty and Sixty were in production at San Leandro. At Stockton the "Holt" Combined Harvester and other agricultural implements were being manufactured. The tractors under fabrication at Peoria were the 2-Ton or T-35, the 5-Ton or T-29, and the 10-Ton.

The combined harvester and other implements remained in production at Stockton. The San Leandro organization continued to fabricate the Sixty and Thirty. The consolidation of the Holt and Best lines soon disclosed an ever-increasing demand for these two models, which brought about increased production of them. The manufacture of the 10-Ton was discontinued during 1925 and that of the 5-Ton during 1926. This left the 2-Ton, Thirty and Sixty in production at Peoria.

Recently, a field has developed for a tractor more sturdy and powerful than the 2-Ton, and, at the same time, lighter and more economical than the Thirty. In each of the fields of tractor usefulness such as logging, oil, snow removal, industry and agriculture, the demands on small tractors require new and improved construction. As a result of this requirement, coupled with an accumulation of betterments based upon actual experience over a given period of time, a new member was added to the "Caterpillar" family on December 1, 1927. This new model was designated the Twenty. All of the latest automotive developments have been incorporated in this vehicle. Early in 1928, this new model will be in production both at San Leandro and Peoria.

The successful tractor of today must be one of the most carefully designed and well-balanced mechanisms that it is possible to

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produce. A vehicle of this type is subjected to greater abuses than almost any other piece of machinery in current use. It is variably loaded up to and often beyond rated draw-bar capacity and must operate under the most adverse conditions of dust, dirt, mud, sand and grit. These foreign substances will attack the finely finished bearing surfaces of the machine, entering through the carburetor or the breather and through every moving joint or possible opening, unless thoroughly excluded. Lastly, the tractor must run year in and year out, frequently both day and night, giving continuous service.

All of the "Caterpillar" models, as now produced, are fabricated from the best materials obtainable. Each part subjected to wear or unusual stresses is given the proper heat treatment, scientifically applied, to produce maximum strength and durability. In addition, these components are subjected to exacting metallurgical tests to insure that the material is of correct specification, that it responds properly to the prescribed heat treating operations. The tolerances and general workmanship are held as close as in any other automotive device built.

It was most fortunate for the "Caterpillar" that the two companies engaged in its development were located in California, where there exists the greatest variety of extreme conditions of soil or climate. There is soft, boggy, peat land to be reclaimed and cultivated, hard adobe to be ploughed, and the toughest kind of deep hardpan to be broken in subsoiling, as well as the most ideal orchard land to be tilled without packing. There are the steep, snow-covered grades and rocky trails of high Sierras, with the big logs to be handled under the roughest kind of mountain logging conditions. On the other hand, there are the sandy desert wastes to be reclaimed, where dust and grit, the most deadly enemies of tractors, abound. These conditions permitted each stage in the evolution of the "Caterpillar" to be given a practical testing out in the field, close at hand and under the constant observation of the builders.

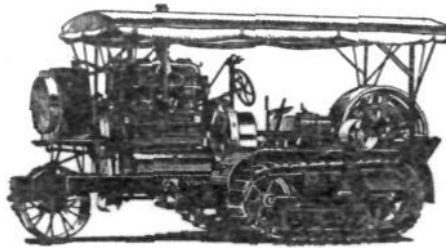
The problem of dust and grit exclusion from the engine and from the bearings has cost the Caterpillar Tractor Co. and its two predecessor organizations many thousands of dollars in research and development work in order to arrive at a satisfactory solution. This problem is now solved for all practical purposes, but the research still continues in an endeavor to improve the existing methods employed.

In fabricating the current models, which consist of the 2-Ton, the Twenty, the Thirty, and the Sixty, it is the aim of the manufacturer to produce a fool-proof machine of long life, which will

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function at a low cost of operation and maintenance, and which will perform its work at the lowest possible ultimate expense to the user. The refinements of design and methods of manufacture employed, together with a simplification of the mechanism providing maximum accessibility, coupled with a thorough standardization of all parts, have gone a long way toward the realization of this ideal. The great progress made during the past few years has resulted in a product so far superior to the war-time models as to make comparisons useless.

These results obtained in the construction of power equipment were not arrived at suddenly. They are the culmination of many years of experience in the developing, testing, manufacture and servicing of tractors under all known operating conditions. The present "Caterpillar" models represent the patient and conscientious work of a corps of engineers and builders who have concentrated for nearly a lifetime on a single line of work, determined to excel in that one particular field.



## "THE PASSING OF A VETERAN"

ON JUNE 13 passed away the oldest member of the Fourth Field Artillery, the veteran mule, Tip.

Tip joined the Army at Vancouver Barracks in 1905 when he was assigned to the old 17th Battery which later became Battery "A" of the Second Field Artillery. In 1909 he was transferred to Battery "A" of the Fourth and served continuously with this regiment until a few years ago, when he was retired from active duty with full rations and allowances.

During his service he took part in the famous thousand-mile hike, the Vera Cruz Expedition, the Punitive Expedition into Mexico, and went through the great Texas City Flood.

In his retirement he at first refused to admit the approach of age. After attempting a few hikes he realized that he could no longer keep up with a battery and thereafter discreetly accompanied outgoing organizations only a courteous distance before turning for home. No doubt the delights of his leisure were no small compensation for his having to stay at home. That this should have been so is not surprising when one considers the high privileges accorded him. These even included grazing rights on the Commanding Officer's lawn, a concession of no small significance. Possibly the only rebuff he received in these years was administered by the Commanding Officer's wife, who suggested that he go elsewhere when he started to include her flower garden in his domain. Tip took the suggestion with dignity and the flowers remained unmolested, although he ever afterward viewed the colonel's lady with marked disfavor.

Unfortunately Tip's retirement brought him many enemies among his comrades remaining under the pack, who were consumed with envy of the perquisites of his favored position. It was a sad day for him whenever he accidentally got shut in a corral with his former friends, who invariably ganged up on him and administered as much corporal punishment as possible before the stable crew could come to his assistance.

According to one first sergeant, whose veracity cannot be questioned, once when help was slow in coming Tip was pretty badly battered. On being finally extricated, he paused just long enough to give forth one heart-rending bray and then set out at a fast limp to the Veterinary Hospital.

Tip was successfully smuggled aboard the train when the battalion moved to Fort Robinson. After three weeks in his new home he finally departed this vale of packs.

All the Fourth lament Tip's passing and trust that in the Place of Many Mansions there are also a few green fields in which a faithful mule may graze away Eternity.

# MOGUL

BY HARRY G. BISHOP

[The following story by Captain (now Colonel) Harry G. Bishop, then of the 3d Field Artillery, first appeared in the January, 1912, number of *Everybody's Magazine*.

As it brings out very forcibly and pleasingly certain human elements so common and so dear to the pre-war army, but which are not so evident now and which may be forgotten in this age of mechanization, the story is republished at the request of several officers by the kind permission of *Everybody's Magazine*.—EDITOR.]

THE slanting rays of the afternoon sun had attained sufficient obliquity to throw the brilliant spot from the tin roof of the west building in the K Battery stable-yard squarely into the blinking eyes of old Mogul, tethered with his mates to the long picket-line; and obviously it was up to him to shift his position if he cared for his further comfort. Like all geldings, he was lazy, particularly so on this hot afternoon, and it was a question with him whether the game was worth the candle.

Quite slowly he turned his gaze to the right and then equally slowly to the left. By rights, being the near leader of the First Section piece, he should have been tied at the head end of the line. But the "rooky" member of the stable gang, who had led the First Section horses out of their stalls an hour before so that the bedding might be spread for the night, had mixed them up; and there he was—the proud and mighty leader of the First Section, sandwiched in between two low-down caisson horses—wheelers at that!

For a brief second he gazed at the knot at the end of his halter-shank. He could untie that in about two minutes—thanks to this same "rooky's" knot-tying ability—back out of the line, and wander where he listed; but that struck him as too easy and peaceable. He would cross over under the picket-line and turn his back to the afternoon glare.

With a quick lunge of his body to the left, he rudely jostled the dozing caisson wheeler on that side, at the same time slipping the halter-knot along the picket-line in the same direction by a swipe of his head, made a quick quarter-turn to the right on his forehand, let go with one of his hind hoofs, cracking the animal on his right a blow just above the stifle, made another quarter-turn to the right, kicked again, this time with both hoofs, and in the ensuing commotion backed under the picket-rope, and the thing was done. Of course, this maneuver was followed by some squealing and biting among the near-by horses, and a few of the young animals "pulled back" on their halters, snorting violently.

The sentinel, who had been leaning comfortably against some bales of hay, came out of his day-dreaming long enough to yell out: "Hey, there, Mogul! Damn you, anyway!" And quiet again fell

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over the yard. The heavy heads sank lower and lower, hindquarters sagged, some to the right and some to the left, tails hung limp, and the afternoon nap was resumed.

But sleep came not to the big bay gelding, although the sun no longer shone in his eyes and though he was quite satisfied with himself over the way in which he had showed off before those lowdown caisson animals.

The exertion of turning around on the crowded picket-line had stirred his blood just enough to drive sleep away; and furthermore, as it was only an hour to feeding time, he was beginning to get hungry. Ah, yes! Hungry! When was he not hungry? Had he ever gotten enough to eat? No, not even on the night when he had broken loose and, wandering into the gangway of the stables, had dined at the forage cart, thereby nearly ending his valuable life in the convulsion of flatulent colic.

So, standing stupidly with head bowed and eyes lazily blinking, his mind roamed back through his twelve years of life to the days when he was a pop-eyed, loose-jointed, lean, long-legged, ever-hungry colt; to the days when, with his bay mother, he had roamed that clover-carpeted pasture down by the creek in old Missouri.

Ah, that was a glorious spot! The creek, with its sparkling clear water where he used to splash about and drink great mouthfuls of the cold spring nectar; the "bottom," with its carpet of short green turf, so juicy and succulent; the uplands, with their clover and timothy, tall, rich, and green; the maple and oak grove where he and his mother would stand hour after hour in the shade on hot days, along with old Sam, the worn-out plow-horse, and the herd of sad-eyed Jerseys—all dreaming and listening to the hum of bird and insect, and the noisy music of their master's reaper in the distant fields. He recalled the many times when, in the exuberance of his coltish spirits, he would suddenly cease grazing, snort furiously, with uplifted head and bulging eyes, and then, arching his fuzzy tail, go galloping wildly up the path along the creek.

Always he would keep to the path along the brook and go as far as the grove; but one day, just before he came to the clump of willows on the river bank, he had spied something half-hidden therein. The "something" was a small boy wearing a torn straw hat, and a shirt and knee-breeches, with very dirty sun-kissed legs and feet; and he was fishing in the stream. The instant Mogul saw this boy he had leaped violently to one side, and at the same instant the apparition had spoken, calling out: "Ah, g'wan, you fool colt!" And then he had circled the bushes with short, quick side-steps, with much arching of his neck, lifting of his tail, and a great deal of snorting and blowing. So ever after, though age and a more mature

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horse-sense had somewhat dampened the ardor of his cavortings, he could not pass a clump of bushes without this manifestation; for he was always looking for, always expecting to see, the boy with the torn hat and the fishing-rod.

Thus his mind roamed on through his colthood and the later days. He dimly remembered the time when he first trotted along a dusty road, nuzzling the flanks of his mother, who was in harness, because he was eternally hungry; the early days of bit and saddle and harness; the proud day when he was first teamed up with Dan, and learned to work at the plow, the cultivator, and the wagon; and later when he went out to make the acquaintance of trolley-cars, road-rollers, and automobiles. He recalled the day when they took him away from old Dan, whom he was never to see again. They had led him aboard the train and taken him down to St. Louis. There he had gone into a paddock with many other horses, and there he had first seen a uniform. Three men in khaki coats and baggy trousers (the Horse Board, as he afterward found out)—these men had looked and felt him all over, ridden him, trotted and galloped him, and finally had burned his left shoulder with a big "U. S." Then had come another car-ride and the stable-yard of K Battery of the Seventh Regiment of Field Artillery of his good Uncle Sam's army.

They had led him in and tied him on the "spare line," where he had stood in all the splendor of his young horsehood, a magnificent bay without blemish or defect, fifteen and a quarter hands high, chest full and deep, back short and straight, with deep loins, medium high withers, and a neck built for a collar—an ideal artillery draft-horse. After drill, nearly half the battery had come over to view him and appraise his points in varied and picturesque profanity. And that day he had first met Kelly, the short, sandy-haired Irishman who swore much, drank more, but withal was the best driver in the regiment.

"Ah, me beauty! ah, me darlint!" Kelly had cried. "We'll match yez with Hobbs, an' it's th' lead of th' First Section piece where yez will wurruck, me b'y." And after the many days of longing and bending and running in the "bull-ring," to the lead of the First Section he had gone, paired with Hobbs, the place of honor in the battery, and with the sandy-haired Kelly as the permanent driver.

Then had come seven years of ideal life: plenty of food, plenty of water, just enough work to keep in the pink of condition, and a ceaseless daily grooming that brought to Mogul a coat as fine as silk and as resplendent as a mirror. From Oklahoma the battery had been moved to Vermont, and then to Texas, and it was now

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in the wind-swept artillery post in Wyoming. How they loved this life, he and Hobbs and the man Kelly—the drills, the marches, the car-rides, the camps, the maneuvers, the sham battles! Now he—But ah! What was that?

Somewhere down the line a horse moved uneasily, awoke, and nickered, and then, like a little wave breaking on a pebbly beach, the nickerings ran along the line and grew in frequency and volume, interspersed with squeals, the stamping and pawing of hoofs, and little kicking affrays. Over in the stable gangway a loutish soldier in a dirty stable frock was trundling the forage cart along, while a compatriot, with much banging of the tin measure, was ladling out the oats. It was feeding time, and the line of horses was becoming impatient. Came the grinding of feet on the cobblestones, and into the stable-yard marched the men of the battery, halted, fell out, and stood "to heel."

This formation, in military parlance, is "afternoon stables." First, the horses are led to water, section by section, then the grooming is done and the animals are placed in the stalls for the night.

The watering had proceeded as far as the Third Section when the notes of a bugle came floating through the hot afternoon air. The lieutenant, third in rank, whose duty it was to attend this formation on this day, and who was pretending to be examining a horse, for the sole reason that this particular horse was tied in the only shady spot in the stable-yard, suddenly came to life and, notifying the senior sergeant, started to obey the summons. "Officers' call" was sounding at the post headquarters.

Along the picket-line men glanced at each other in a knowing way or made remarks in undertones and went on with their work in a nervous, abstracted manner. One of the non-coms., a married man with a family, looked worried and gravely remarked to a corporal in a questioning tone, as though he expected the latter to affirm an opposite opinion. "Well, I guess it's come at last?"

For a long time now, there had been considerable of interest to the nation in the daily papers, something that was growing in importance by leaps and bounds, something that had caused unusual activity in the War and Navy Departments; an activity that, threading the military hierarchy, had come rapidly down to the last rearrank private.

Fifteen minutes after the lieutenant had left to obey the summons of the bugle, the captain came trotting into the yard.

"Cease grooming and lead in," he ordered, and then to the senior sergeant: "Fall in the men; march them back to barracks to pack their field kits. The battery will entrain at daylight for Tampa."

It had come at last, as the old sergeant had thought. The nation



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was in arms, and the "high-ups" at Washington were going to strike the first blow and strike quickly.

That night, after supper, Kelly went to "The Kid's Place." He had been ordered to report to the quartermaster-sergeant to help unpack reserve ammunition. But going to "The Kid's Place" and forgetting to report to the quartermaster-sergeant were characteristic of Kelly. At "The Kid's Place" he discoursed long and volubly to an admiring alcoholic crowd on his own and the battery's prowess; and when "The Kid" put up the shutters, Kelly retired to the stable-yard and to the stall of Mogul and Hobbs. He could sleep there quite comfortably. Walking as far as barracks was unnecessary; and then, he would be sure to be on hand when it was time to harness.

\* \* \* \* \*

The battery was moving slowly along a chalky white road, foot-deep in a minutely fine dust which, rising in clouds from the impact of hoof and wheel, hung almost motionless over the column in the still, hot air of the early morning, enveloping the moving mass of men, horses, and carriages like a huge veil. The tropical sun had risen over the eastern hills, small, round, and blood-red, visual portent of a day of hell heat, a day that had begun at a temperature almost beyond human endurance. The leaves of the rank vegetation that lined the roadway hung limp and lifeless in the soul-killing atmosphere.

First came the captain—not the one who had stopped the grooming that afternoon, months ago back in Wyoming; he had long since gone home *via* Newport News in a sealed box—but a new one, a little younger than the other, but gray and thin, his head hanging low on his breast. Then came the two trumpeters, thin and pale and haggard, and the guidon-bearer, with the little piece of torn and stained scarlet silk hanging limp on its staff, like the leaves on the palms near by.

Next came the First Section, the gun and limber with its team of six, Mogul and Hobbs, with Kelly driving, in the lead; then the caisson, followed by three more gun sections, four ammunition or caisson sections, and the store and forge wagon section; after these came the led horses—of which there was none.

Off to the right a few hundred yards, a column of infantry was plodding over the half-broken ground. Still farther to the right were other columns, and to the left of the road there were still others. To the rear were more columns, with here and there a wagon bearing a flaming red cross, mute symbol of the surgeon and the reward for the work to be done that day.

Far ahead, almost beyond the range of vision, were little squads of cavalry radiating, fan-like, from the central mass of infantry and

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artillery. Along the road, half-hidden in the chalky grass, guarded here and there by a signal-corps private, standing specter-like in the white dust veil, a thin wire—the field telegraph—stretched its sinuous length back to where sat the brigadier, pushing this mass of flesh and blood and metal always on, on, a willing sacrifice for the Republic.

The captain of the battery reined in his horse, the underfed beast all too willing to obey a summons to stop; and, backing it to the roadside, watched his command file past. In the lead, Mogul plodded through the chalky dust and swayed unsteadily from side to side, his flanks rising and falling rapidly, and his breath coming in short sobs. He was no longer the horse that had marched so proudly out of the Wyoming stables that morning five months before; he was now only a bundle of bones done up in a dead and withered hide. There was a big swelling on one of his legs, his hoofs were cracked and broken, and the luster had gone from his eyes. Kelly, gaunt and spiritless, was plying the whip to what remained of poor old Hobbs to keep him in draft.

The captain raised his arm vertically, and the long column came to a halt.

"Five minutes' rest," he commanded.

Kelly slid from the saddle and, limping to the front of his team, unhooked the steel collars and wiped off the lather; then, taking his canteen from its ring on the saddle cantle, held it up and from force of habit shook it.

"'Bout four spoonfuls," he muttered, raising it to his parched and blackened lips; then he hesitated, glancing at the sobbing animals. Taking the sponge from its place in the collar flange, he emptied the water into its dusty, crinkly folds and, going again to the head of his pair, gently sponged their eyes and hot, dusty nostrils and lips.

"Kelly!"—it was the captain speaking—"Unhook your pair and go get in the lead of the Seventh Section."

The Irishman gazed up at the officer stupidly.

"Quick!" added the captain. "Your pair is played out. We're goin' into action mighty soon, and I've got a better pair to put in here."

The driver's face went purple. "Better pair!" he gasped. "Does the captain think there is a better pair in all th' bat'ry than Mogul and Hobbs? Fer sivin years now we've pulled in th' lead o' th' Furrst Section, so, an' nivver yit have we failed th' captain. Sure an' it'll be breakin' their hearts to go to the resarve."

"Sh! sh! Kelly," the captain interrupted; "your pair is worn out. They'll drop in their harness in the next two miles. Jorgensen

## MOGUL

is bringing up his pair. You can stay here and drive in your old place, but this pair goes out. I'll send them back with Jorgensen."

"Oi'll stay with me own horses, if th' captain don't moind," and, with the hot tears filling his eyes, Kelly slowly unhooked his pair and started with them back down the column.

The brigadier was not having things all his own way this day. For four mortal hours he had hammered away at the regiment of the enemy holding the bridge-head, which it was his duty to seize. The sun was sinking low and the place must be carried by nightfall. The infantry advance had been stopped and its first thin line was lying hidden in the folds of the ground four hundred yards from where he expected to make his final charge, waiting until the artillery could change to a more favorable position and open up again.

From where the ammunition reserve caissons lay, posted in a little thicket of palm and mangrove, Kelly could see the firing battery limbered up and moving slowly along by the flank and then up the slope of a hill some six hundred yards away. When near the top the guns were unlimbered again and made ready to fire. The infantry fire, which had died down to only an occasional shot, now broke loose in a tumultuous rattle, and under its cover the guns were run by hand up to the crest; and as they suddenly turned their torrent of shrapnel upon the enemy, the infantry advance recommenced. Little squads of men suddenly rose from the earth and darted forward all along the line, their rifles a-trail, gained a little ground to the front, and then sank to earth and invisibility, to be followed quickly by other squads. And thus, inch by inch, foot by foot, they slowly closed in on their prey, while the hot atmosphere was incessantly punctured by the metallic cracking of their rifles, like the hammering of a thousand motor-driven riveting machines.

But although the scene out on that fire-swept plain was the one grand pageant of the lives of all who lived to tell of it, Kelly had no eyes for this life-and-death struggle. His gaze was fixed on that mass of men and horses and carriages—the gun-limbers—parked a little way down the slope of the hill, in the rear of the guns now spitting angry sheets of flame at every tick of the watch.

His eyes were snapping with an angry light, his breast heaved with his burning resentment, and he cursed and mumbled to himself. The heat, the fatigue, the mad thirst for water had upset his reason a little and magnified the affair of the forenoon out of all proportion. He, Private Michael Kelly, the best driver in all the regiment, with the best pair in all the regiment, relegated on the day of his first big battle to a place in the *reserve*, and the place of honor given over to a nameless Swede with a pair of plow-horses!

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Mogul, standing with one hind foot drawn forward and head hanging low, now and then forgot the tortures of the heat and thirst in little cat-naps. But always, as he awoke, he would raise his head and glance inquiringly from side to side, or look back contemptuously at the strange swing pair in his rear. He also, in his dull, unreasoning way, knew that he was out of place, and resented it. For a half-dozen times now, he had laid back his ears and had kicked viciously at the pair behind him. Well, too, did he know where his place should be! He had not hauled a gun for seven years, on parade, on the march, at target practise, and in action, not to know that he belonged on yonder hillside with those gun-limbers; and he would thrust forward his ears, champ, whinny, and, pawing the ground, gaze longingly at the line of mud-colored, thundering guns. Whereupon Kelly would fondle him and, in a strange mixture of oaths and endearing epithets, pour out his reflections on the injustice that had come to them.

Thus the minutes slipped past; and then suddenly occurred one of those unforeseen things which no reasonable amount of foresight can prevent or circumvent.

The open ground between the ammunition reserve and the guns, supposedly out of reach of the enemy's fire, suddenly became a fire-swept hell, and, simultaneously with this, the battery commenced to run short of ammunition. The captain signaled for another caisson to come up.

The lieutenant commanding the reserve instantly mounted the drivers of one of the two caissons that were still loaded, and started it across at a gallop.

Two hundred yards after it had left shelter, a wheel-horse went down badly wounded, quickly followed by a driver; and the team, falling into confusion, came to a halt. There was only one loaded caisson left—Kelly's, and the lieutenant hesitated to risk that one also; so, uncoupling a team from one of the empty caissons, he started to the rescue, rode straight into a salvo of shrapnel, and was annihilated.

The minutes were passing quickly now. They always do at such times.

Mogul, excited by the swift departure of the other teams, was standing erect, pawing the ground and snorting at the convulsed mass writhing in its death-agony out in the open.

Kelly had sprung to his feet and was "standing to horse" at Mogul's head. Even Hobbs, who had stood in a lethargy for hours, was cocking his ears and moving restlessly in his harness.

"There, there, me little b'ys—aisy, aisy, now!" crooned Kelly. "We'll be goin' soon. Back to the bat'ry fer us! Back to our own!"

## MOGUL

Truly they were going back to their own—and very soon.

Things were pretty much at a crisis now for the brigadier. The battery, entirely out of ammunition had ceased firing. The enemy's line, unharassed by the shrapnel fire, burst into one long crescendo of spiteful, crackling musketry. The infantry advance had come to a halt, and its thinning lines were lying belly to earth, unable to go forward or backward.

The senior sergeant of the reserve, a little white about the mouth, mounted the drivers of Kelly's caisson and those of one of the empty caissons. As Kelly swung into the saddle and glanced back at the one loaded caisson trailing behind, a thrill of enthusiasm ran through him which extended itself to his mount, and Mogul threw his weight into the collar, eager to be off.

The sergeant mounted and rode up to Kelly. "I'm goin' ahead with the empty caisson and draw their fire. When yez see the first salvo fired, ride like hell and beat it across before they kin git in th' next one. Good luck to yez, Kelly. Forr'd march!" And the empty caisson rolled out into the open, the drivers lashing their animals into a gallop.

One hundred yards, two hundred, almost three hundred, and then, simultaneously with the distant boom, boom, boom of the enemy's artillery, came the near-by crash of the exploding shrapnel.

Kelly looked not to see what had happened to the courageous sergeant and his empty caisson. He dared not. But, calling over his shoulder to the wheel and swing drivers, "Now all together, b'ys!" he dug his spurs into Mogul's flanks and laid the whip, blow after blow, over the off-horse's quarters, and they were off out into the dust and smoke from the last volley. There were rifle-bullets crackling overhead and cutting up little patches of the turf at their feet; but a rifle-bullet could not stop a galloping horse at that range. It was the deadly shrapnel they were racing to beat.

The wheel-driver suddenly dropped his reins and pitched down between his galloping pair, bounced up and down for a moment on the limber-pole, then fell on through to the earth.

They were moving fast now. The six horses, all up in their collars, with traces stretched taut, were leading out in wild, rapid lunges, their bellies almost grazing the shrapnel-spattered grass. Behind, the heavy caisson with its precious load swung and lurched like a drunken thing, now on one wheel and now entirely in the air.

There were three hundred yards yet to make before they would swing around into the friendly shelter of the little hill, but the enemy's gunners were working fast. Not far over their heads there came a sudden weird whistling, snuffed out in a sharp explosion, and Kelly, dropping reins and lash, fell forward on Mogul's neck,

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his arms instinctively gripping the animal. He thought some one had hit him with a baseball bat on the left shoulder, until he saw something red pouring in great sheets over the steel collar of his horse. Then Kelly stopped thinking and seeing forever.

Hobbs, no longer feeling a pressure on the lash of his bridle, tried to swerve to the right. He smelled water that way. Mogul smelled water also, but there was something stronger than water calling *him*. Straight ahead of him was the line of guns, and his eyes were on Number One, the old First Section piece he had hauled for so many years. He could see the gunner now, the chief of the section also. He knew *them*; they would give him water. In fancy he could hear the signal for limbering up, and he threw still more of his strength, all of his strength, every atom of it, into his gallop; for he was going back to his own. Thus he held his mate in, and, unguided by the hand of man, raced straight to the one place where of all places in his life he was most wanted. And the gun crews danced and yelled with delight as the race neared its finish.

Fifty yards straight ahead was a big clump of bushes, and upon this patch of shrubbery a gunner of the enemy's battery, a mile and a half away, had laid the sights of his gun. This same gunner held his fire until he judged the flying team was about four carriage-lengths from it. Then he snapped the firing gear, and six seconds later his shrapnel exploded a hundred yards in front of it, and the resulting hail of leaden slugs tore through it in a great cone of death.

Just why Mogul did it, no one in the battery ever knew; but the swing-driver who lived to talk about it later, and the rest of the battery who saw the thing happen out there in the open, say that when Mogul, racing straight on a path that would carry him close by this bush, came within a few yards of it, he suddenly gave a snort of terror, and, with arched tail and dilated nostrils, swung well off from his path and circled the bushes, carrying the whole team and the carriage with him well out of the cone of the shrapnel burst which had come at this instant. The swing-driver did not know why he did this. But we who know of the old willow bush by the river bank could tell, if we chose.

A few seconds later the team swept into the shelter of the hillock and up in rear of Number One gun, into the hands of a score of yelling, dancing cannoneers; and Mogul, panting in short, spasmodic sobs, came to a standstill, gazed piteously at all the familiar faces for a brief second and then sank to the earth, his legs crumpling under him; for the half-spent shrapnel case had torn its way through one of his flanks, and Kelly, clinging in a death-grip to his neck, fell with him.

## MOGUL

But there were other things to do right then; so all they did was to cut the traces. Eager hands were tearing open the caisson door and dragging out those long brass cases that were to save the brigadier.

Again the sheets of flame danced and darted along the front of the battery; the infantry line came to life, and things happened quickly. As far as the eye could pierce the dust and the bluish haze that hung over the snapping muskets, there came the glitter of bright steel as bayonet left its scabbard and leaped to the muzzle. The harsh rattle redoubled itself for a moment, then suddenly ceased altogether. Came a prolonged cheer and the rush of many feet, more cheers, the crashing of heavy bodies and the rasp of metal, and the bridge-head was carried!

An aide-de-camp came galloping into the battery. The brigadier had tasted blood and was fierce for more. The battery was to move rapidly to a new position and open fire on the retiring enemy.

Lying half buried in the dust, Mogul heard the shrill whistle of the captain sounding the "Attention!"—heard as though far, far off the bugle-call for the battery to limber up. He heard the tramp of hoofs and the crunching of the wheels as the limbers bore past him, trotting up to the guns; heard the bumping of the lunettes as the gun trails were hooked up; heard the hoarse command of the captain, "Cannoneers mount, double section, pieces by the left flank, *TROT!*"

He lifted his head and opened his glassy eyes, tried to rise. Something behind was holding him down. He struck angrily at his wounded flank with his black, swollen muzzle. The battery was moving now. Again the guns were going away and leaving him behind, just as they had done that forenoon when they formed for action. No, he would not be left this time! He rose up on his forelegs, pawing madly and dragging himself toward the moving column. Why could he not get loose? Where was Kelly?

As the Fifth Section swept past, a cannoneer, huddled on the caisson chest, turned to his chief and yelled: "Gord A'mighty, Sarge, look at old Kelly, dead as hell, an' Mogul wit' his innards all shot out, a-tryin' ter foller th' bat'ry!"

The sergeant looked, hesitated; then, seeing that the khaki-covered back of the junior lieutenant was disappearing in the dust swirl ahead, reined in his horse, slipped out of the saddle, and strode toward the struggling animal, drawing his revolver from its holster as he went. It was a dangerous thing to leave a battery like this on the battle-field, even for a moment; but the sergeant had followed its guidon for many years and Mogul was dear to him.

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The proud leader of the First Section whinnied with delight as the man approached.

The man swore under his breath and gritted his teeth as he drew back the hammer of his weapon.

As the heavy leaden slug tore through the frontal bone, Mogul's head fell heavily to the earth, a scarlet stream spurting from the rent and was greedily lapped up by the dust, a convulsive shudder ran over him, and he lay quiet. He was a colt now once again, back in the sun-kissed meadow, by the riverside in old Missouri. Now he was drinking great, long mouthfuls from the spring-fed brook, and splashing along the gravelly bed. Now he was galloping over the acres of glorious clover, knee-deep. Now he was snorting and circling the willow bush and on, on, through the cool, green glades of the grove and into the beyond—that great mysterious beyond of his early days, which lay just the other side of the oak and maple grove, where there was always more cool, running water, more pastures of clover and timothy, great hills of corn and mountains of oats—on, on into the horse-heaven he galloped.

Mogul had come back to his own!



## BIRDS OF EBONY\*

"And the 'spotlight' o'er him streaming, throws his shadow on the floor."

BY REAR ADMIRAL GEORGE R. CLARK, U. S. N. (RETIRED)

IF THERE is anything the matter with the Navy, in these days when the favorite indoor sport is to assail the armed forces, and the modern "birds of ebony," with a persistency worthy of Poe's Raven, continue their rapping at the Navy's door, it is a tendency on the part of not a few to drift into a lack of reverence for the old-time qualities of duty, loyalty and discipline. Following the trend of the times, when many who are unable to build shacks are tearing down cathedrals, numbers without and some within the services, for reasons best known to themselves, are engaged in hurling epithets, attacking policies, ridiculing methods, and generally weakening the lawful authority of and lessening the respect due to their superior officers. These practices are especially dangerous at the present time when the world, seeking a so-called new freedom, is in revolt against restraint of every kind, and ready to listen to any promise of rainbow gold. "Duty," said Lee, "is the sublimest word in the English language." That sentiment must have been uttered soon after the defeat of the Southern Army at Gettysburg, of which, according to Bruce, the most distressing feature, after all, was that it revealed Lee's entire lack of a lieutenant upon whom he could rely for the prompt and skillful execution of his plans. Grouchy at Waterloo, Mann at Corsica, Landais off Flamborough Head, Elliott on Lake Erie, Custer at Little Big Horn, Hooker in Virginia—all these would have given better service if, while subordinating selfish ambition and personal opinion, they had been animated and governed by Mahan's principle of displaying "energy in forwarding the *general object* to which the officer's particular command is contributing."

"I much fear," said Lincoln in his letter to General Hooker, "that the spirit you have aided to infuse into the army, of criticising their commander and withholding confidence from him, will now turn upon you. . . . Neither you nor Napoleon, if he were alive again, could get any good out of an army while such a spirit prevails in it." Elbert Hubbard, referring to the letters, states that "Hooker had harshly and unjustly criticised Lincoln, his commander-in-chief, and had embarrassed Burnside, his ranking officer. Lincoln told Hooker the truth in a way that did not humiliate, but which certainly prevented the attack of cerebral elephantiasis to which Hooker was liable."

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"If you must vilify, condemn and eternally disparage," says Hubbard, "why, resign your position, and when you are outside, damn to your heart's content. But, I pray you, so long as you are a part of an institution do not condemn it. Get out or get in line."

Hooker failed to do his work, "and was superseded by a Silent Man who criticised no one, railed at nobody, not even the enemy."

History shows that a great majority of the defeats were due to failure on the part of some one to measure up to the standard that forbids self-glorification, and demands devotion and loyalty to the service, singleness of purpose, forgetfulness of self. These qualities are sorely needed today in order that the wheels of government may run smoothly and our leaders, on whom rests the responsibility, may do the work given them to do.

These officials may be trusted to uphold the traditions of a service rich in its history of victories and achievements, a record unmarred by a single failure to respond promptly and successfully when danger threatened or duty called. The policy, organization, system, training, call it what you will, that has resulted in such a record surely cannot be wholly bad, and deserves support rather than censure. The policy of conservatism, a slowness in accepting new devices and ideas without trial and investigation, so thoroughly disliked and vigorously combated in some quarters, should be adhered to, not with apologies but with pride, as a factor that has had no small part in the making of a splendid record.

General Bragg, in his speech nominating Mr. Cleveland for the presidency, said that he loved him for the enemies he had made. By that same token the country should love the armed forces, for their most bitter and persistent enemies are found among those violently opposed to law and order in all their forms, and constituted authority wherever found. For that reason, if for no other, all, especially wearers of the uniform, should hesitate to take any action that plays into the hands of these enemies now so active in parlor and street. Readers between the lines have not forgotten that not long ago, on the occasion of an industrial upheaval, the fate of a great empire rested largely upon the steadfastness and discipline of its army and navy. Fortunately for the empire involved and the welfare of the whole human family, these forces, despite radical attempts to undermine their allegiance, stood fast and the danger was averted. This incident was but another illustration of the truth of Pinckney's assertion that all governments rest upon force. It should be remembered that the Constitution defines treason (a word quite freely used of late) as consisting, among other things, of "adhering to our enemies, giving them aid and comfort." No surer way can be found to render that aid than

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madly to attack officials now faithfully and efficiently serving in positions of trust and responsibility. "I believe in free speech," said Marlborough, "but not on board a man-o'-war."

No sudden and radical departure from long established and well tried custom, whatever may be the motive, which, by reason of the methods employed, is made at the cost of discipline and morale is worth the cost.

The fault is plain and the remedy simple. Let us swing back to the governing principles of the early days when the cheerful "Aye, aye, sir," and the prompt action responding to every order from the bridge testified to the fine understanding and feeling of trust and respect prevailing among all rates and ranks. "Choose yourself, my Lord," said Nelson when offered the Navy list from which to choose officers for his fleet. "The same spirit actuates the whole profession. You cannot choose wrong." Herein the great sea commander put spirit of the service above all else, a trust soon afterward justified by his victory at Trafalgar.

Let us keep in mind St. Vincent's maxim, "The whole of discipline is contained in the one word 'obedience,'" that word to mean not only a carrying out of orders, but loyalty to the spirit of authority, ready and hearty compliance with the wishes of the senior. Napoleon believed that the soul of an army is an honest attachment of all its parts to their leader. West Point's motto is "Duty, Honor, Country." Such beacons should help us keep step in finding our way to the old road that leads to full cooperation and faithful service.



# THE EXPERIMENTAL MECHANIZED FORCE

Notes from 1st Battalion, 6th Field Artillery

BY CAPTAIN LEON DESSEZ, F.A.

*(Continued from last issue)*

THE Experimental Mechanized Force returned to Fort Leonard Wood from its march to Upper Marlboro on July 18. Until starting its march to Gettysburg on July 31, the 1st Battalion, 6th Field Artillery, under command of Major J. W. Anderson, was occupied chiefly with problems which combined marches over poor roads with the reconnaissance, selection and occupation of positions. It was felt that the battalion was getting sufficient experience in portée marches on concrete and hard macadam roads while marching with the rest of the Experimental Mechanized Force.

These problems usually started with a road march of about 10 miles on gravel or dirt roads. Several times this necessitated unloading the tractors while on the road and towing the trucks out of sand holes or up steep hills when the road surface was loose. Unloading on the road furnished interesting comparative data on the different kinds of ramps used in the battalion and on the various methods of reducing the delay caused by such situations. The road marches were followed by detrucking the battalion and the occupation of positions by the battalion tractor drawn. In some problems there was a displacement forward followed by entrucking and return to the park portée; in others the trucks returned empty to the park while the rest of the battalion returned tractor drawn.

In this series of problems Battery A continued to have all of its tractors, guns, caissons and the two self-propelled mounts loaded in Class B trucks, while Battery B had its tractors loaded on trailers towed by the Class B trucks. These same trucks were loaded with the guns and caissons.

With this equipment the battalion marched as the 3rd Section of the Experimental Mechanized Force to Gettysburg on July 31 and returned to Fort Leonard Wood August 2. The organization was camped in the wheat field at Gettysburg and the officers and enlisted men went over the battlefields August 1.

Unencumbered by other units marching with it, the battalion made better time on the march to Gettysburg than it made on the march to Upper Marlboro. The head of the column left Fort Leonard Wood at 7:00 a. m. and entered camp at 4:07 p. m. The distance was 69.3 miles, and the length of halts, including the noon halt for lunch, was one hour and twenty-six minutes. The running rate—i. e., average rate exclusive of halts—was 9 miles per hour

## THE EXPERIMENTAL MECHANIZED FORCE

and the road rate—i.e., the average rate including halts—7.5 miles per hour. On the return trip the head of the column left camp at 7:00 a. m. and entered the post at 3:00 p. m. The time halted on the road, including the noon halt, was one hour and ten minutes. The running rate was 10.1 miles per hour, and the road rate was 8.6 miles per hour. The long hills south of Gettysburg slowed down the march considerably.

The week beginning August 6 witnessed no combined battalion work. Battery A during this period built several loading ramps. The U-shaped steel ramp, with a flange at the bottom to hold it to the ground and with an anchor at the top to secure it to the truck body, had proved generally satisfactory and safe, and it was the type built. In addition, the battery started work on altering the bodies of the Class B trucks. This was completed August 20. By modifying the truck bodies it was possible to lower the floor 8 inches, which greatly facilitated loading and unloading and appreciably increased the overturn angle.

During this period Battery B put its Class B trucks and trailers on the spare line and began conditioning the pneumatic-tired trucks which were issued and transferred to it from other organizations of the Experimental Mechanized Force. The last of these vehicles was received Saturday, August 11, and, inasmuch as the battery left for a long practice march the following Tuesday, a lot of work was necessarily done in a short time.

This march was to Tobyhanna, Pennsylvania, and return, lasting from August 14 to 17, inclusive. Battery B and the pneumatic-tired equipment of Battalion Headquarters Battery were the elements of the Sixth Field Artillery which participated. Only the pneumatic-tired equipment of the Experimental Mechanized Force made this march.

The equipment was as follows:

In the four gun sections of Battery B the guns and caissons were loaded on old F. W. D. four-cylinder trucks equipped with pneumatic tires;

The first section had as its tractor a Caterpillar 20, loaded on a Walters truck;

The second and third sections had, as their tractors, Caterpillar 20's loaded on Coleman 5-ton trucks;

The fourth section had a T-35 tractor loaded on a Coleman 3-ton truck.

In addition the detachment contained:

- One new F. W. D. six-cylinder truck,
- One Indiana "Big Steve,"
- One Class B with pneumatic tires,
- Four G. M. C.'s,

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Three cross-country trucks,  
One Reo repair truck,  
Six cross-country cars (Ford),  
One touring car, Chevrolet (Experimental),  
Three motorcycles (Indian) without side car.

This made a total of 29 automotive vehicles moving on their own power and 4 tractors carried in trucks.

The first day's march was to Pottstown, 123 miles. The head of the column left Fort Leonard Wood at 5:00 a. m. and reached Pottstown at 5:40 p. m. The total time halted was one hour and fifty-four minutes; running rate, 11.4 miles per hour; road rate, 9.8 miles per hour.

The second day's march was from Pottstown to Tobyhanna, 90.9 miles. The head of the column left Pottstown at 5:08 a. m. and arrived at Tobyhanna at 2:57 p. m. The total time halted was two hours twenty-six minutes; running rate, 12.3 miles per hour; road rate, 9.2 miles per hour. There are several very steep long hills near Tobyhanna which made it necessary to halt the column to prevent the motors from overheating.

The third day's march was from Tobyhanna to Conowingo Dam, 152.7 miles. The head of the column left Tobyhanna at 4.25 a. m. and arrived at Conowingo Dam at 7:22 p. m. The total time halted, including lunch and dinner halts, was four hours, sixteen minutes; running rate, 14.1 miles per hour; road rate, 10.2 miles per hour.

The fourth day's march was from Conowingo Dam to Fort Leonard Wood, 56.2 miles. The head of the column left Conowingo Dam at 7:22 a. m. and arrived at Fort Leonard Wood at 1:20 p. m. The total time halted was 53 minutes; running rate, 11 miles per hour; road rate, including halts, 9.4 miles per hour.

The whole march of 423 miles in four days was a very trying test for the personnel, especially as it rained continuously for the last fourteen hours. It was a particularly severe test for the motor equipment. A number of mechanical troubles developed, but these were probably due to the quality of lubricating oil. The trucks which seemed to hold up best were the Walters truck and the Indiana "Big Steve."

## **123rd FIELD ARTILLERY**



## **ILLINOIS NATIONAL GUARD**

THE coat of arms reproduced above has recently been approved for the 123rd Field Artillery, whose headquarters and armory are at Monmouth, Ill. It is armed with 155-mm. howitzers, tractor drawn, and is part of the 6th Corps Artillery.

123rd Field Artillery had its origin in the 6th Regiment Infantry, Illinois National Guard, which was organized on May 4, 1882, from existing companies of the 4th and 7th Regiments and the 14th Battalion, Infantry, Illinois National Guard.

Following the Civil War (1861-1865) until 1872, the Militia of Illinois was in a semi-official status, and not until 1886 were uniforms furnished by the State.

The 6th Regiment was on strike duty in 1886 and again in 1894; Companies A, F and B were on strike duty in 1889, Company M in 1893, and Company C in 1894. The regiment attended annual summer encampments from 1883 to 1897 inclusive, the strength varying from a minimum of 26 officers and 273 enlisted men in 1883 to a maximum of 47 officers and 655 enlisted men in 1891.

The regiment was mustered into Federal Service for the Spanish-American War as the 6th Regiment, Illinois Volunteer Infantry, at Springfield, Ill., on May 11, 1898; served in Porto Rico from July 25, 1898, until September 7, 1898; and was mustered out of the service of the United States at Springfield, Ill., on November 25, 1898.

The 6th Regiment, Infantry, Illinois National Guard, was immediately reorganized, the companies being located in the same towns and cities as formerly; the same commanding officer and a majority of the former company officers. The regiment attended annual summer encampments from 1899 to 1916, inclusive; continued in State service until March 26, 1917, when it was mustered into Federal Service for local guard duty; moved to Camp Logan, Texas, in September, 1917. The regiment (less M. G. Co., which became the 108th Trench Mortar Battery) was designated the 123rd (Heavy) Field Artillery, 58th Field Artillery Brigade, 33rd Division, on September 19, 1917.

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The 123rd Field Artillery sailed from Hoboken, N. J., on May 27, 1918, on the steamship *Scotian*; arrived at Liverpool, England, on June 8, 1918; left England June 11 and arrived in France, June 12, 1918; served in the Lucey Section (Lorraine) from August 26 to September 11, in support of the 89th and, later, the 1st Division; supported the 1st Division in the St. Mihiel Offensive from September 12 to 15, when it moved to the area of the Second French Army; entered the Meuse-Argonne Offensive in support of the 91st Division on September 26. The 91st was relieved by the 32nd Division on October 7, but the 123rd Field Artillery remained in support of the latter division until October 15, when it was relieved and sent to a rest area. It served in the American Army of Occupation until April 29, 1919 (being attached to its own, the 33rd Division); left France on the U. S. S. *America*, arriving at New York on May 24, 1919. The regiment was disbanded at Camp Grant, Illinois, on June 9, 1919.

The First Battalion, 123rd Field Artillery, Illinois National Guard, was reorganized in 1921, and by G. O. No. 38, Military and Naval Department, State of Illinois, dated November 17, 1927, and reconstituted to perpetuate the World War 123rd Field Artillery.



# THE 1928 OLYMPIC EQUESTRIAN TEAM

BY MAJOR SLOAN DOAK\* (TEAM CAPTAIN)

ON NOVEMBER 19, 1927, following the participation of the U. S. Army Horse Show Team at the National Horse Show, I was called to Washington and informed by the Chief of Cavalry that the United States would be represented in the equestrian events of the Olympic Games to be held at Amsterdam, Holland, from August 8 to 12 inclusive, that Brig. General Walter C. Short would be manager, and that I would be captain of the team. He directed me to take charge of the training of the team.

The tentative plan of procedure for such training contemplated two special training centres; one at Fort Riley, Kansas, with the cavalry element of the U. S. Army Horse Show Team as a nucleus; the other at Fort Sill, Oklahoma, with the artillery element of the U. S. Army Horse Show Team as a nucleus. To these elements were to be added such other military riders and horses as might be suitable and available, as well as any civilian riders and horses that might be suitable and available. From all these sources a team would finally be selected and assembled about May 1, 1928, at Fort Riley for further training.

In accordance with the above plan, Major O. I. Holman, Cavalry, and Captain R. C. Winchester, Cavalry, were ordered to Fort Riley to join the team. Major A. W. Roffe, Cavalry, who was on duty as an instructor in the Department of Horsemanship at the Cavalry School, was able to train with the team during the time he was not otherwise engaged. When actual training began the Cavalry element was composed of the following officers: Major Sloan Doak, Major H. D. Chamberlain, Major O. I. Holman, Major A. W. Roffe, Captain F. H. Waters, Captain W. B. Bradford, Captain F. L. Carr, Captain R. C. Winchester; while the Artillery element was composed of the following officers: Major C. P. George (in charge), Captain N. J. McMahon, Captain W. H. Colburn and Lieutenant E. Y. Argo.

All the horses of the Army Horse Show Team at Fort Riley and Fort Sill that were considered suitable for the Olympic contests were held in training as were all other suitable horses at these two posts. A request was made throughout the service for a report on all government or privately owned horses that might be suitable and would be available. As a result from this request, five horses were considered from reports sent in, to be suitable to try out, and were shipped to Fort Riley. Of these five, only one horse, named

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\*Extracts from official report to Chief of Cavalry dated August 18, 1928—EDITOR.

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*Fairfax*, owned and loaned by Major J. R. Underwood, Veterinary Corps, was retained. Six civilian owned horses were sent to Fort Riley for trial, and eventually none of these was taken abroad.

The combined cavalry and artillery elements trained at Fort Riley from May 1, 1928, to June 2, 1928, the date that the team left for Rye, New York.

The two equestrian events for which the team prepared were, first, the Equestrian Championship or Three Day Event, and, second, the Prix des Nations or Jumping Competition. Roughly, the training for the Three Day Event followed the three general lines—conditioning, schooling and jumping. The conditioning was brought about progressively in order that in the end the horse would be able to complete successfully the endurance phase of the contest, which included road marching, steeplechasing and cross country. The schooling consisted of putting the horse through the various movements that were prescribed for the contest. The training in jumping was over obstacles of three kinds: those that were anticipated to be encountered on the steeplechase course, in the cross country and in the stadium.

The preparation of the horses for the jumping competition followed the two general lines of conditioning and jumping. The conditioning desired was such that the horse could negotiate without undue fatigue as many as sixteen obstacles 4 feet 8 inches in height and many with over a 5-foot spread and at the rate of 15 miles an hour. The horses were trained over courses of varied obstacles which included those used in the 1920 and 1924 Olympic Games and those used at Nice and in Holland in 1927. The jumping horses were also schooled for control in direction and pace and for handiness.

In order to avoid the excessive heat of the middle west in the final stages of conditioning and in shipment by rail, arrangements were made through Mr. John McEntee Bowman for the final training of the team to be done at the Westchester-Biltmore Country Club, Rye, N. Y. Accordingly, the final selection of the team was made on June 2, at which time it left for Rye, N. Y. The members selected to compose the team were as follows: Major Sloan Doak, Cav.; Major C. P. George, F. A.; Major H. D. Chamberlain, Cav.; Major A. W. Roffe, Cav.; Captain W. B. Bradford, Cav.; Captain F. L. Carr, Cav.; Lieutenant E. Y. Argo, F. A.; and Captain P. T. Carpenter, Veterinary Corps. The enlisted personnel of the team consisted of: Sgt. Linton Young, Pvt. Charles King, Pvt. Irwin Steele, Jr., Pvt. Willie Johnson, Pvt. Abraham Lacour, Pvt. Leonard Young, Pvt. George Boatzer, all 9th Cavalry; Pvt. Theodore Wise, F. A., S. Det. (Col.), and Sgt. Frederick Gormley, Cav. Sch. Det.

## THE 1928 OLYMPIC EQUESTRIAN TEAM

The horses arrived at Rye in excellent condition. Mr. Bowman made available to the team all necessary facilities for training, including excellent stables, construction of all desired jumps and the use of the grounds at Bowman Park. The enlisted men were comfortably quartered near the horses, while the officers were most pleasantly cared for at the Westchester-Biltmore Country Club. Training was carried to its completion by July 10, when the fifteen horses to go were vanned from Rye to Hoboken and loaded on the *S. S. President Roosevelt* without mishap.

While at Rye, arrangements were made for the purchase of the highest quality of oats and timothy hay for use not only at Rye but for the entire time until our return to New York, thus making unnecessary any change in forage. Also, there were obtained and installed on the ship two treadmills upon which our horses were worked daily at the walk and trot, to preserve their condition. This feature was most successful and enabled us to land our horses in Holland in as good condition as when they went aboard.

On board ship our horses were in box stalls about 9 feet square, each provided with a pinch bar to closely enclose the horse in case of rough sea. The bedding was of peat moss. Here, as in all other places, each horse was provided with individual feed box, hay net, water bucket and salt box. We were fortunate in having a smooth passage over, landing in Amsterdam July 20.

Upon docking at Amsterdam at about 3:00 p. m. we found that General Short, who had preceded us by three weeks, had waiting, on tracks on the dock, a special train which carried officers, horses, equipment and forage to Hilversum, about 20 miles from Amsterdam. At Hilversum we were most cordially and hospitably received by all officials. Every possible courtesy and assistance was rendered us by those with whom we were thrown in contact. Ample training grounds were provided to us by a private citizen.

During the eighteen days between landing and the opening of the equestrian events the training and conditioning of the horses for each competition were advanced as far as possible. In view of the amount of rain prevalent in Holland at this time and the probable heavy going that would be encountered during competition, our horses were galloped and jumped in the mud. As many different kinds of jumps as possible were utilized at appropriate heights for the three day horses and for the jumpers. One stiff work-out was given our three-day horses eight days after their arrival, and their condition was shown to be excellent.

### THE EQUESTRIAN CHAMPIONSHIP

After close observation of the condition of the horses, the record of their daily performances and bearing in mind the experiences of

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1920 and 1924, the following team for the Equestrian Championship was selected and as required was submitted 48 hours before the competition:

1. <i>Misty Morn</i>	Ridden by Major Doak
2. <i>Benny Grimmes</i>	Ridden by Maj. Chamberlain
3. <i>Verdun Belle</i>	Ridden by Capt. Carr
Reserve. <i>Ozella</i>	Ridden by Maj. George

The reserve horse or rider could replace any other horse or rider up to one hour before the beginning of the competition. Contestants were shown over the steeplechase and cross country course after the designation of the team and reserve. *Ozella*, who was considered the surest entry, was placed in reserve especially so that after our looking over the course she could replace what was thought to be the weakest horse of the other three.

The requirements for the Horse Championship were as follows: First day: Schooling of known prescribed movements, value 300 points; Second day: Endurance, value 1,400 points; Third day: Jumping in stadium over an unknown course of 12 jumps at rate of 14 miles per hours, 300 points.

The second day in detail consisted of:

- A. Road march of  $4\frac{3}{8}$  miles at rate of 9 miles per hour.
- B.  $2\frac{1}{2}$  mile steeplechase at rate of  $22\frac{1}{2}$  miles per hour over 13 jumps.
- C. 9 miles road march at the rate of 9 miles per hour.
- D. Cross country 5 miles at the rate of 16.7 miles per hour.
- E.  $1\frac{1}{4}$  miles gallop at  $12\frac{1}{2}$  miles per hour to finish.

Horses carried 165 pounds and were penalized very heavily for any overtime. For example: the allotted time in the cross country was 17 minutes and 46 seconds. If he were one minute late his time penalty would be 210 points or over two-thirds of the maximum score, for schooling or jumping. In "A" most of the distance was in soft going. In "B" the footing was good though quite uneven, and some of the jumps were stiff. In "C" about 3 miles was in very heavy sand, over sand dunes, and about 1 mile was on brick pavement. In "D" there were more than 40 obstacles, which included wide and deep irrigation ditches, most of which had seepy banks for about 2 feet on each side; solid natural rail fences 3 feet 10 inches high, in some places in front of wide ditches, sometimes as "in and out," sometimes in or beyond ditches, sometimes following a sharp change of direction, and many of them in the latter part of the "cross-country" when the horse was most fatigued (these latter caused several falls); five road crossings with ditches on each side of the road (these ditches had vertical banks and some

## THE 1928 OLYMPIC EQUESTRIAN TEAM

of them with water 4 feet below surface of ground). The ground was comparatively level, but the course was full of sharp turns which made it impossible to gallop at much speed for any considerable distance. "E" was in sandy going.

After being shown the above course, and from experience in 1920 and 1924 Olympic Games, weighing the relative value of the endurance phase with that of the schooling or stadium jumping, there was no doubt but that the horses should be chosen for absolute soundness, galloping and staying ability, courage and broad jumping, so long as they could show creditably in the schooling and stadium jumping phases. Bearing the above in mind, *Bennie Grimes* was considered the weakest of the horses originally nominated, and *Ozella*, ridden by Major George, was substituted for him. This gave us a team of three horses, one of which, *Misty Morn*, was 15-16 thoroughbred, and the other two were registered thoroughbreds.

In the schooling phase of the three-day test our team was placed tenth out of fifteen nations, 256 points behind Holland, the leading nation. We had no expectation of standing high in the schooling phase because of the fact that our horses had been in training for such a short time. In contrast, one horse shown by the Holland team was known to have been in training for six years and competed in the 1924 Olympic Games. The other two horses had been in training for a long period and were thoroughly schooled.

In the endurance phase our team finished first, placing us in second place for the first two days, until we were eliminated as a team by the judges' decision to eliminate *Ozella* because of failure to take one obstacle on the cross country course. Other than the above failure to take one jump, none of our horses were penalized for any cause, and each horse received a bonus for undertime on the "Steeplechase" and "Cross Country," which were the only phases on which a bonus was allowed. The official veterinarian stationed at the finish of the ride stated that our horses were in better condition than those of any other nation.

In the stadium jumping, the two horses remaining completed the course, one with two faults, the other with six faults. Had *Ozella* not been eliminated any reasonable jumping score that she might have made would have been sufficient to have placed our team second by a wide margin.

The results were as follows:

*A.—Teams:*

1. Holland
2. Norway
3. Poland

*B.—Individual:*

1. Holland
2. Holland
3. Germany

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At the end of the endurance phase, after being notified officially that *Ozella* had been eliminated, Captain Carr and I went back to the obstacle in question and checked carefully the markers indicating the course preceding the obstacle. The obstacle itself was a two-bar post and rail fence in a depression about 75 yards beyond a right angle turn. We found that the marking was sufficiently faulty at the turn to justify a claim for reinstatement. It was also found, upon investigation of the official records, that eight riders had gone off the course at this point, six of whom regained the course without elimination, the other two being eliminated. The data obtained was submitted with the claim to the Jury of Appeals. Before this claim was submitted, the Secretary of the Dutch Olympic Equestrian Committee stated that he considered our claim a just one, and that he thought undoubtedly the claim would be allowed. However, after much discussion by the Jury of Appeals, the claim was disallowed.

I am sure that our methods of conditioning and training for the three-day event were thoroughly correct in every way and second to none, with the one exception that our horses needed more time for training in schooling and should be more highly collected generally when being shown in schooling. The fact that our team, which stood tenth out of fifteen at the end of the schooling phase the first day, was first on the endurance ride on second day, and stood second for the two days (until one of our horses was declared eliminated), and the two remaining horses jumped well in the Stadium—so that our team, without the elimination, would surely have placed us second to Holland—bears out this view. To show the severity of the endurance test, 18 horses were eliminated and others suffered loss of points by refusals, falls and overtime.

### THE PRIX DES NATIONS

Considering the past performances of the horses for the Jumping Competition, their selection was self-evident. The following team was entered:

- |                        |                                    |
|------------------------|------------------------------------|
| 1. <i>Nigra</i>        | Ridden by Major Chamberlain        |
| 2. <i>Fairfax</i>      | Ridden by Major Roffe              |
| 3. <i>Miss America</i> | Ridden by Captain Carr and Reserve |
| <i>Jack Snipe</i>      | Ridden by Major Doak               |

The first three horses actually competed.

The course consisted of sixteen obstacles from 4 feet 4 inches to 4 feet 8 inches high with most of them spread between 5 and 6 feet and including two "in and out's," double oxer, triple bar, bank and fence, water, fence and bank and fence, gate, stone wall, double bars over water, etc. The course was very reasonable, though a

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thorough test, and I know that any or all of our horses entered were capable of negotiating the course without fault. However, it was reasonable to assume that any good jumper over such a difficult course, making 15 miles an hour, with many turns might make an error at one or more obstacles. None of our horses jumped without fault but each made a very creditable performance. Their scores were as follows:

- |                        |  |
|------------------------|--|
| 1. <i>Nigra</i>        | One front knock down—4 faults.   |
| 2. <i>Fairfax</i>      | One front and one hind knock down; one run out—totaling 8 faults and four faults for overtime. |
| 3. <i>Miss America</i> | One hind knock down and front foot in water—totaling 6 faults.                                 |

This gave the team 22 faults placing the team eighth out of sixteen entries. The winning team had one horse to go without fault, and each one of the other two horses had one hind knock down. Two teams were eliminated, and the others had faults ranging from 4 to 62. Results were as follows:

<i>A.—Teams:</i>	<i>B.—Individual:</i>
1st Spain	1st Czechoslovakia
2d Poland	2d France
3d Sweden	3d Switzerland

As always heretofore, Colonel Pierre Lorillard, Jr., rendered immeasurable assistance to the team. In fact, it was he who, by taking care of all the finances, made it possible for our country to be represented in the equestrian events. Besides this great responsibility, he accompanied the team to Holland and was always willing to give his services wherever needed. During the intensive training period abroad, he shared with the other members of the team their burdens and attended to the many tasks that could only be performed by a non-riding member.

During the course of the competition, and in considering the same since its completion, I have come to the following conclusions:

(a) Our horses in the three-day event were potentially the equal of any team, and superior to all except possibly Holland and Germany. They needed at least one more year to perfect them in the schooling movements. They needed experience in competition over jumps in a stadium. For the endurance phase of the test they were thoroughly fit and had the soundness and courage to finish in excellent time and condition.

(b) Our jumping horses were all experienced jumpers, and fully capable of jumping every obstacle on the course. Until the past few months their training has been primarily for showing in

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American horse shows. This training tends to develop a horse to jump vertical jumps. In the contest at Amsterdam there were twelve spreading jumps and four vertical jumps. Our horses would have been better prepared for such a course if they had been trained over spreading jumps for a long period of time, instead of for the few months that were available. I feel, however, that the horses performed creditably. It is worth noting that of the six horses representing the United States, three in the Equestrian Championship and three in the Jumping Competition, four were horses owned by officers, one was purchased privately and presented to the Government for use of the 1924 Olympic Team, and one was purchased during the war under abnormal conditions. Of the three-day horses, *Misty Morn* is owned by Major Doak; *Ozella* is owned by Lieutenant J. M. Callicut, F. A.; and *Verdun Belle* is owned by Captain Carr. Of the jumping competition horses, *Fairfax* is owned by Major J. R. Underwood, V. C.; *Miss America* was purchased and presented to the Government; and *Nigra* was purchased by the Government during the war. It is probable that the horses competing in 1932 will be largely privately owned, either by officers or civilians

As to our riders, their pure riding ability does not suffer by comparison with that of the riders of other nations, and in some cases is far superior. However, some advantage accrues to the foreign riders in that, as a whole, they are more accustomed to competitive riding than are some of our riders. It will be a distinct advance for us when we shall reach that point where the members of our teams are experienced competitive riders.





# **FIELD ARTILLERY: PAST, PRESENT, AND FUTURE**

BY GENERAL HERR OF THE FRENCH ARMY  
EIGHTH INSTALLMENT

[This treatise by General Frédéric Georges Herr, published in French by Berger-Levaul, Paris, is believed to be an outstanding book on the subject of field artillery. In the belief that heretofore there has not been an opportunity to read this in English, it is hoped that its publication in serial form, beginning in the May-June, 1927, JOURNAL, will be the means of acquainting more of our officers with this excellent work. During the World War, General Herr was successively the commander of an artillery brigade, an infantry division, an army corps and of an army detachment. He then became Inspector General of the French Artillery.—EDITOR.]

## **PART III**

### **THE FIELD ARTILLERY NEEDED FOR PEACE TIME**

#### **CHAPTER I**

##### **MATÉRIEL REQUIRED FOR THE FIRST PHASE**

IN CHAPTER I of Part II we outlined a most desirable artillery organization, one which the lessons of the War have shown to be necessary and which the progress of industry and ballistics permits us to realize now or in the immediate future.

Is it necessary to consider putting this organization into effect at once?

Evidently not, for a capital reason sufficient unto itself. The manufacture of all the matériel for a complete new artillery organization, such as the one we have described, would involve expenditures that no nation could consider in its present economical situation. Especially for France this would be entirely out of the question.

Nevertheless, we can affirm that production will be undertaken without delay when necessary financial resources finally become available. The War revolutionized many ideas with reference to military art, it opened many new avenues and advanced certain industries with gigantic strides. The consequences of this upheaval have not all been realized yet; definite conclusions cannot yet be drawn, and the evolution of industry is still in progress. Thus, matériel which we might make today would run the risk of being displaced and made obsolete before it could be used.

The answer must be found elsewhere.

We actually possess important stocks of artillery matériel. We must preserve them provisionally, if not wholly at least for the major part. We can therefore confine our efforts to those kinds of matériel where radical modifications are essential.

One question is immediately raised. Should we retain these stores of matériel as they exist today? Should we, on the contrary, make all possible modifications to bring this matériel as near as possible to the optimum organization which we have outlined above?

The reply is not uncertain. We should modify existing matériel

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only with extreme caution. Modifications which appear very simple often lead to considerable changes effecting the entire weapon. They also involve delays of execution and expenditures which are often far from being in proportion to the results obtained. It is much better in most cases to use this time and money to study and produce new matériel which will have the latest improvements and will represent unquestionable progress.

With this principle accepted we should proceed as follows:

We admit that the government has provided our country with a law for the organization of our army based upon the lessons of the War, giving a rational proportion of matériel for our effective strength and fixing the number of weapons which should be provided for the large units and the army as a whole.

The problem which now arises is to provide this number of weapons.

To bring this about we must first seek in existing stocks of artillery matériel those weapons which, by their ballistic and maneuver characteristics, most nearly resemble the types which the lessons of the War have shown to be necessary. It is possible that for each type of matériel modifications which are easy to make will better their functioning appreciably. If a careful study of this question shows that such changes can be obtained at slight expense and without entailing complete transformation of the matériel, they should be made without delay.

This choice having been made, it is necessary to determine what types of matériel are still lacking to make up a satisfactory organization. These types of matériel should be studied at once with a view to the realization of ideal characteristics. Experimental models should be constructed as soon as possible after this study. They should be subjected to all necessary ballistic and tactical tests, and if found satisfactory, everything should be prepared so that rapid production in large quantity could be started with minimum delay as soon as the financial resources of the country permit, or at least at the beginning of any serious political tension.

Among the types of matériel which are considered unsatisfactory, some, although of old model, are not entirely without value. They should be placed in storage to constitute a reserve to fulfill first needs until new matériel could be delivered in quantity, and later, to reduce the deficits which may occur in production during the campaign, or to replace more modern matériel on the inactive fronts, which might better be used elsewhere; and lastly, to take care of any unforeseen needs. As for models which have become too obsolete, they should be destroyed without hesitation. It would be absurd to employ storage space, personnel and money to store and maintain them.

As an illustration, we could place in the category of matériel to be retained in service, with certain minor modifications, the following weapons:

The 105-mm. gun.

The 155-mm. howitzer C. S. (Schneider) 1917.

The 155-mm. gun, G. P. F. (Filloux).\*

The 194-mm. gun G. P. F. (Filloux).

The 220-mm. howitzer T. R. (Rapid fire).

The 220-mm. gun L. (Long).

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\*Under condition that the Latil tractor actually in service and which is absolutely unsuitable, be replaced by a more powerful one.

## FIELD ARTILLERY: PAST, PRESENT AND FUTURE

The heavy guns with range above 20 kilometers.

The heavy mortars.

The category of matériel to be placed in reserve includes:

The 75-mm. gun.

The anti-aircraft auto-cannon (75 and 105-mm.).

The 155-mm. guns (model 1877/1914, 1917 and 1918).

The 280-mm. rapid fire mortars.

Everything else should be destroyed, particularly the old Bange matériel and the A. L. V. F. 19 G and 24 G guns, which have absolutely insufficient range and efficiency.

Some types of matériel in our present artillery armament, which will be urgently needed for the next war, are represented only by obsolete models, or, worse yet, are totally lacking. That war will have for its initial theater of operations the right bank of the Rhine, that is to say Westerwald, Taunus, Odenwald and the Black Forest—mountainous, rough and difficult country, very suitable for minor operations. For this reason the infantry will have to conduct difficult local attacks necessitating accompanying weapons, and the terrain will positively impose, in addition to flat trajectory weapons, the use of curved trajectory artillery for direct support. We are also very badly armed today for anti-aircraft defense. The new types of matériel which are indispensable for these different purposes, and which we must order without delay, are:

An infantry accompanying gun, armored and mounted on caterpillars.

A powerful, long-range, rapid-fire gun for direct support to replace our present 75-mm. gun, whose range is manifestly too short.

A light, rapid-fire howitzer.

Auto-cannon, some on wheels and some on caterpillars, with high muzzle velocity, flat trajectory and powerful projectile for use against aircraft and tanks.\*

With these four modern weapons and the types of matériel of the first category mentioned, we would be in shape to begin another campaign under advantageous conditions, without risk of finding ourselves insufficiently armed in the presence of a superior artillery, and we could wait for war production to accomplish the completion of our modern artillery system.

## CHAPTER II

### TECHNICAL STUDIES

The solution which we have just described entails the necessity of uninterrupted studies which must keep up with technical and industrial progress day by day. Thus the program for new construction to be undertaken upon mobilization must be always up to date. Thanks to this method of procedure, we will ever be ready to provide, in a minimum time, an artillery which will constitute a real "technical surprise" for the adversary, and will assure us incontestable superiority for some time.

The summary of the history of heavy artillery in France before 1914,

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\*To these four weapons, but with less urgency, we might add the super-cannon of the "Big Bertha" type with exceptionally long range.

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which we presented at the beginning of this study, is in itself a severe criticism of our technical organization of that time, when our ideas and our studies were equally anarchistic.

At that time we were anarchistic in our ideas because there was no superior entity charged with determining the proper organization of artillery for war, and with authority to carry out its views. The Technical Committee, the General Staff, the Superior War Council, the Director of Artillery and the School of Fire all had equal say in these matters and could not conciliate their diverging opinions. There was nobody to bring them together.

Anarchy existed in experimentation because each constructing arsenal had two or three independent engineers among its personnel, each ignoring the other, often even jealous of one another. They were working without contact with the large industries and therefore they were poorly informed. There was also no conception of a general coherent organization of artillery, with all the gamut of matériel which it comprises, to orient their minds toward a common end, to hold together fragmentary studies undertaken here and there, and to coordinate individual efforts.

The reason for this insufficiency of our experimental departments is to be found in defective organization.

It was an established principle that all experimentation with artillery matériel should be undertaken in arsenals which manufactured artillery. It was thought that in this way inventive rivalry would be maintained between officers of the different arsenals. They also thought that the new types of matériel would be faultless and of proper construction because they would have been designed by the same arsenal which would be charged with their manufacture.

The system gave mediocre results, and it is not an exaggeration to say that, since the time when the 75-mm. matériel was perfected, nothing satisfactory in the way of experimental matériel came from the arsenals. Further, we must admit that the few designs since that date which were satisfactory came from Puteaux Arsenal, which, after having perfected the 75-mm. matériel, kept up its technical training better than the other establishments.

This situation, already unsatisfactory in peace time, grew still worse during the War in spite of the competence and undeniable good faith of the personnel. The arsenals, fully occupied with quantity production, became disinterested in all questions of experimentation, which only served to disturb intensive production, and their performance in that respect was clearly below what we had the right to expect. Very few experiments came to a practical conclusion at an opportune time.\*

We have the right to conclude from the lack of productivity of those twenty years that our system should be modified from top to bottom. The Experimental Service should be distinct from the Manufacturing Service, but with the understanding that the officers who compose it must be obliged to pass through manufacturing establishments in order thoroughly to understand methods of production, their possibilities and their limitations. In addition, all new matériel should be submitted before adoption to the manufacturing service for careful examination and decision as to whether or not it is "good from the production standpoint."

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\*It was for this reason that the experiments with the 75-mm. gun, requested in 1917, could never be completed.

## FIELD ARTILLERY: PAST, PRESENT AND FUTURE

The Manufacturing Service tends more and more toward centralization in order to augment its efficiency for quantity production, which naturally is its principal reason for existence. The Experimental Service, on the other hand, should remain separate for each arm, and, as far as artillery is concerned, it should be kept under control of the Director of Artillery.

We see, then, the Experimental Service put directly under the Director of Artillery and including:

1. A *Technical Section*, charged with keeping complete records of all technical questions of interest to the artillery and deciding the relative merits of projects submitted for examination.

2. A *Technical Laboratory*, charged with making the different models of matériel and accessories which should compose the artillery of tomorrow.

3. The *Testing Commissions*, charged with experimental studies of ballistics and matériel.

But here we should interpose an entity designed to serve as a connecting link between the Director of the arm and the High Command. This organization is the office of the Inspector General of Artillery, created during the War and reestablished in 1919, but its functions were not completely defined.

The Inspector General of Artillery should have the following duties:\*

To keep the High Command informed on the progress of manufacture of war matériel and to study the effect of such progress on the evolution of tactics.

To put the needs of the High Command in appropriate technical language.

To establish close liaison between the High Command and the working units (i.e., between the Director of the arm and his Experimental and Manufacturing Services), in other words, between tactics and technical work, speaking professionally, a liaison which is indispensable to military progress.

To maintain permanent and close contact with civilian industries so as to steer their studies in the direction indicated by the evolution of tactics.†

### THE MANUFACTURING SERVICE

We have already called attention to the fact that all types of matériel should be easy to produce in quantity even during war.

From this point of view the lessons of the last war are particularly instructive.

In spite of the fine effort made by our national industries, beginning with the month of June, 1916, to construct with the least possible delay

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\*Let us add here, even though it is a somewhat different trend of thought, but to avoid coming back to it, that the Inspector General should also have, as one of his duties, supervision, in the name of the Commander in Chief, of the technical and tactical instruction of the arm, so as to make sure that it is progressing along proper lines. In order to do this he should also review the programs of instruction of the different military schools, and see that the instruction of officers in artillery matters given by these schools is properly oriented.

†To sum up, the Inspector General, aside from his more extended functions, should inherit those technical responsibilities which formerly belonged to the Artillery Committee, which was so improperly and so illegally discontinued in 1910 by simply publishing a decree.

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the types of heavy artillery matériel which were set forth in the program of May 30, 1916, numerous incidents brought about incessant delays in construction as compared with the schedule prepared by the Ministry for Armaments.

These delays were due to two very distinct causes: insufficiency of preliminary studies; actual difficulties of manufacture.

The lack of sufficient preliminary study was undeniable. No coherent system of modern artillery had been studied in peace time by the government arsenals. A few industrial firms worked at the solution of the problem, but their studies were not completed.

It was therefore necessary, under pressure of the necessities of the moment, to adopt and place orders for many types of matériel which existed only in the form of indefinite projects. The processes of manufacture had to be largely improvised, and it is therefore not in the least surprising that unforeseen difficulties were encountered which caused regrettable delays.

Our matériel was too difficult to make. It was conceived under prewar principles which aimed especially at obtaining perfection of fire and transport, and which were little concerned with difficulties of production, because in time of peace construction can be carried on at leisure.\*

Also, in principle, manufacture was supposed to be intrusted to government arsenals, which were used to this sort of work, trained to overcome difficulties, and with proper tools for it. When it was necessary to intrust construction to large civilian firms, they had a great deal of difficulty in correctly producing the various parts of artillery matériel.

We must conclude that every simplification of manufacture will increase the number of factories capable of undertaking construction of matériel and will effect a notable increase in production.

The following solution of this question has been proposed: Let us have two kinds of production for all matériel; in time of peace, when we have time and practically unlimited means at our disposal, we could attempt perfection in construction and use the best kinds of materials; in time of war we could change to rougher construction, more ordinary materials, and more simple processes. This solution appears to be defective in that it has the inadmissible fault of upsetting known methods of manufacture at the critical moment of passage from peace to war production, and thus there is a risk of serious consequences. A single method of manufacture must be adopted which will be used under all conditions, and which must therefore be the rougher method applicable in time of war. Matériel thus constructed will be a bit heavier and less pleasing to the eye, but it can be easily produced in quantity in time of war. This procedure conforms absolutely with the general evolution of modern industry.

The consideration of facilitating construction in time of war brings about the adoption of a *standardization* which should be as complete as possible. Standardization would tend to increase to the maximum the number of assembled pieces of matériel, and, for each assembly, to reduce to the minimum number and to make uniform the component parts which enter in its construction. Such measures will not only increase

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\*These ideas were so strongly rooted that the 105-mm. matériel, built by an industrial firm which did not entirely fill the conditions of perfection, was received half-heartedly by certain artillerymen, who had previously fixed all sorts of requirements which obstructed its production.

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the efficiency of national manufacture but will also considerably simplify the repair of matériel in the army parks. Furthermore, it will reduce the cost of maintenance to a large degree. The Technical Service should maintain close liaison with the directors of national industry so as to keep itself informed of the general progress realized in industrial standardization in connection with all new projects.

As a corollary to standardization, the principle of *interchangeability* has come into effect. As a matter of fact, the factories which made artillery have contributed greatly to perfecting the technique of manufacture of interchangeable parts and have proven that these methods speed up production. It is therefore advantageous to keep up these practices in our government establishments and to introduce them into private industries.

We cannot possibly leave this question of manufacture without discussing a solution which has been referred to many times. Why, we ask, does the government persist in manufacturing its war matériel itself? Why does it not intrust to the great private industries the care of studying and constructing artillery matériel in their own fashion, thus freeing the army from technical worries which—as we have often repeated—are reconciled with difficulty with strictly military problems? In addition everyone knows that the government is as mediocre in industrial matters as it is in business matters, and everything which it attempts to make itself becomes exorbitant in price.

Many reasons oppose the adoption of this solution. Must we not fear first of all that industry, freed from all idea of competition, would lose interest in costly experiments if production were doubtful and distant? Would it not be to their interest, with the aid of clever management, always to construct the same matériel in order to avoid costly experiments and scrapping of tools? Would they not also be tempted to profit by the ignorance of the military authorities, who could not keep in touch with scientific commercial progress, and to impose upon us the adoption of more or less well-developed types which they would offer in filling orders for the government? Lastly, would any of them supply the necessary financial resources in time of peace for upkeep of unproductive, costly equipment destined to serve only in time of war? This is a formidable burden which the government alone is capable of bearing.

For all these reasons the government should have its own shops and ordnance constructors. It should be able to hasten progress by offering assistance. It should be prepared to meet the industries and have representatives of proven competence, capable of discussing technical questions with them on a basis of indisputable technical equality.

This by no means implies that the government should refuse assistance from private industry; far from it. It should, on the contrary, treat industry as its great ally. The time of isolated and divergent effort has passed. As compared to Germany, where officers, technicians and industrial men work in perfect collaboration, every country where individualism has become strongly established would remain in a dangerous state of inferiority. The unreserved, intimate and devoted collaboration of all the active forces of the nation for the common good of national defense during the War gave too valuable results for us to commit the error of renouncing it in time of peace. Preparation for war, like the struggle itself, requires participation of all resources and enthusiastic cooperation from all. Everyone today is thoroughly convinced of this necessity, so further discussion of it seems superfluous.

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### PERSONNEL FOR EXPERIMENTAL AND MANUFACTURING SERVICES—TECHNICAL OFFICERS OR MILITARY ENGINEERS?

In order properly to carry on technical studies, and as an absolute guarantee of proper technical and practical work, the government must have personnel competent to direct manufacture.

Some years ago the Navy solved this problem by creating the Corps of Naval Artillery Engineers.

The War Department, on the contrary, has not had a similar special corps up to the present time. It has carried on these services with the aid of officers obtained by selection or at their own request, but many times simply detailed in the absence of sufficient volunteers. The latter often show little aptitude for these functions. These officers, temporarily detached from their arm, must return to duty for at least two years in each successive grade.

The adoption of the system in use in the Navy has been proposed for the Army, viz., the creation of a Corps of Military Engineers. The chief arguments put forth in favor of this scheme are as follows:

It is said that experience is the best teacher. Officers whom the War Department employs in the technical services can be placed in two categories: those who, because of their taste for mechanics or applied sciences, request technical work, and who sooner or later are tempted to resign from the army and carry elsewhere the benefits of the experience gained in the service and at the expense of the government; private industry seeks this kind of men and can readily attract them with the enticement of lucrative positions; men of the other types vegetate sorrowfully in the lower grades, see their careers compromised, and are often retired as majors and simple Chevaliers of the Legion of Honor. This state of affairs is still further aggravated today as the prosperity of industry offers more numerous and advantageous openings to competent officers. The government can no longer get the technical personnel which it needs.

The only remedy for this situation is in the creation of a Corps of Military Engineers which the government could build up and keep in its service by assuring moral and pecuniary advantages similar to those which can be offered by private industry.

As regards the basic causes for the difficulties in obtaining technical officers, we are in accord with the partisans of the creation of a Corps of Military Engineers. It is incontestable that in the present state of affairs the government is powerless to keep in its service technical officers who are attracted to private industry by big pay checks. It is also incontestable that the only means of combating this is to assure to our technical personnel the same treatment which they can find in industry.

However, we must not draw the conclusion that we must take away from the technicians their standing as officers and baptize them as engineers. We believe that technical officers should get the same money that engineers get.

An old French prejudice establishes as an intangible principle that an officer serves for honor and that he is above mere questions of money. This prejudice may have had some foundation at a time when living was cheap and when officers were obtained from the wealthy classes of society, but it has now become an anachronism and mere nonsense with the present high cost of living, and especially since the procurement of



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officers has become democratic to the extreme. The question of daily bread is just as important for army officers as for civilians. The government has no right to ignore this new condition today and to refuse to give it consideration. In order to retain the services of technicians whom it needs and who are only too tempted to leave, the government must concede certain advantages—advantages of career on one side, and pecuniary advantages on the other.

Advantages of career: It is sufficient for this purpose to institute new technical courses (or simply to reorganize those which already exist), and upon completion of these courses officers who have shown the desired aptitude would be given technical brevets, similar to general staff brevets, which assure an increase in seniority for promotion to higher grades for officers holding such brevets.

Pecuniary advantages should be of two kinds. First, all breveted officers would have the right to a fixed increase in pay for the remainder of their careers; secondly, and most important, every technical officer employed in a government establishment, who is noted for his efficiency, competence or ingenuity in successfully completing a difficult problem, effecting a profitable discovery, bettering production processes, reducing costs, increasing the output of a shop, etc., would be recompensed financially by the payment of a single sum as a bonus, or by apportionment of a certain percentage of the gains or economies resulting from his suggestions.

The objection may be raised that such a system would heavily overburden the budget. But, in the first place, the advantages of career would be a gift without cost. And as for financial advantages, increases in pay, which everyone agrees are necessary, would cost the government the same whether they are paid to technical officers or allotted to military engineers. Financial compensation would be well spent money for the government since it would always stimulate the zeal of technicians and would incite them to seek improvements and all possible economies without respite. It would also assure government ownership of their inventions. For that matter, we have only to apply to military technicians the methods which private industry uses with respect to its engineers, and which it employs only because it is found decidedly advantageous to do so. These methods are already in effect in the Navy (special brevets conferring financial advantages) and in aviation (flying bonus), and we notice that they have them in England, too. They give excellent results everywhere.

But, we repeat again, it is nowise necessary in applying this system to call technical officers *engineers* and to organize a *special closed corps*. We will go even further and say frankly and plainly that the creation of a corps of military engineers would have most grievous consequences. The advantages of pay and career would certainly attract many candidates, all belonging to the élite. Their departure without hope of return would have the grave inconvenience of robbing the arm from which they would be principally recruited, that is, the artillery.\* After entering in such a closed corps they would become definitely lost to the army, and many among them would not benefit the corps of engineers because at the age at which they would be taken in their ability would not yet be apparent, their technical specialty still uncertain, and some who might

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\*We do not want a situation like that which actually exists today in the Colonial Artillery. It lives in misery since the creation of the Corps of Naval Artillery Engineers.

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pass excellent theoretical examinations might perhaps turn out to be very mediocre engineers.

In the system which we extol, the technicians would remain a part of the artillery arm. They would return periodically, bringing the benefits of their technical knowledge and their methods of working. They would at the same time refresh their professional knowledge, their knowledge of military requirements, and their appreciation of the necessities of war. Also any officer holding a technical brevet who did not prove satisfactory in his capacity would be returned to troop duty. He thus ceases to be a useless outcast among the technicians and comes again into the fold of the army which will profit by the knowledge he has acquired in his special studies. Briefly, there will be a constant reciprocal exchange of ideas between the technicians and the strictly military officers to the common profit of both.

This system for the most part is actually in existence, but it should be perfected and rendered more supple and cured of the congenital vices which prevent it from functioning and rendering proper service. Let us not forget that this organization endowed the army with the remarkable de Bange system of artillery, and we also owe to it the 75-mm. gun which has never yet been equalled by any other materiel. Let us conserve it then, correcting its known faults, improving it as we have indicated above by the only methods which can cause it to continue to exist.

Let us add that it would certainly be well for these technical officers to specialize, some in the technical service and others in the manufacturing service. Specialization should not take place too early. The technical personnel should complete preliminary tours in the manufacturing service to become familiar with the necessities and possibilities of production. Reciprocally the manufacturing personnel should be initiated in the problems of design to learn what would be demanded of them and what to expect in construction.

The technical section could be located most advantageously in Paris. It is the intellectual center of the country, where the personnel would be in contact with scholars and engineers of the great civil industries, as all, or nearly all of them, have their experimental departments here. Also, it would thus be more directly and immediately at the disposition of the War Department.

The government arsenals, charged with construction, would get the manufacturing personnel. We should follow the example of private industry by detailing the inventor of a project to the factory which is to make it so that he could follow the construction and apply from day to day the modifications suggested during the actual production.

On the other hand, there is nothing to prevent our obtaining the collaboration of private plants by intrusting to them, under government control, certain studies which are pressing or which require very special knowledge, and by having these factories actually construct the particular articles on which their studies were made.

### CHAPTER III INDUSTRIAL MOBILIZATION

Industrial mobilization is a topic which has been greatly discussed since the War. It has been the subject of numerous studies and magazine articles. It has been the object of proposals as varied as they are

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interesting. The echo has resounded in the Parliament. This subject, therefore, is so universally well known today, even to the general public, that we can treat it succinctly here without great inconvenience in spite of its importance. We will attack it from the point of view of the artillery exclusively. It is true that the artillery is the principal client and benefits most from this mobilization.

It has been said, and endlessly repeated, that there was no preparation for industrial mobilization before the War. This is far from the truth. In 1914 there was an effective plan for supply and manufacture. But as no one had foreseen the length of the campaign or the form which it would take or the requirements it would bring about, nobody even had an idea of the complexity and magnitude of the problems which would come up.

Speaking only of artillery production, the plan in force in 1914 included only the daily production of:

14,000	rounds of 75-mm.
465	155-mm. shell.
2,600,000	rounds for small arms.

The government arsenals could furnish most of this. For this production and for the needs of private industry our plans called for retention of only 50,000 workers at the rear.

If we compare these figures with those in the following table the insufficiency of these supplies is immediately apparent. The situation at the time of the armistice was actually as follows:

(a)	75-mm. shell, maximum daily output obtained.....	230,000
(b)	155-mm. shell, maximum daily output obtained.....	50,000
(c)	Small arms cartridges, maximum daily output obtained.....	7,000,000
(d)	75-mm. cannon, maximum quarterly output obtained.....	2,067
(e)	Total production of heavy artillery weapons.....	6,722
(f)	Total production of heavy artillery mounts.....	485
(g)	Total weight of asphyxiants (tons).....	49,000
(h)	Personnel employed on November 1, 1918.....	1,703,000

We, therefore, have the right to conclude that future wars will be above all wars of factories, and it is only proper that industrial mobilization today has become one of the most important activities for those charged with preparation for war.

The problem is presented in the following manner:

It is first necessary to divide all the national resources in the best manner between the combatants and the workers, between the army at the front and the army in the factories. We conclude that this division would vary according to the enemy whom we would have to face, and would be greatly influenced by his military strength and his industrial capacity. We can imagine two extreme cases.

In one we would be opposed by an adversary having indisputable numerical superiority in well-armed combatants. It would then be necessary to hold the lines at any price at the beginning while waiting for our allies to get into action; without doubt it would be wise, in order to avoid initial defeat, to throw every available man into the battle at the frontier, even the cleverest specialists and the most distinguished scholars. As soon as intervention by our allies would bring about an equilibrium we could withdraw from the army progressively all the personnel necessary to recommence all, or part of the manufacturing. This is

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on the whole just about what we did during the War, but it was not done as a result of a premeditated plan.

The other case would be where we would, on the contrary, have great numerical superiority in combatants from the very beginning. It would then be best to proceed at once with a wise distribution of resources between the front and the interior.

Many other cases could be placed between these two extremes. We should then adapt ourselves to the circumstances. Mobilization—including in this general word all the constituent mobilizations: military, financial, economic, industrial, agricultural—should be studied under its numerous and diverse aspects, anticipating circumstances so as to permit us to face the unexpected.

The problem is, therefore, delicate and complex. Its solution requires great finesse, a keen appreciation of opportunity, a perfectly open mind, and the absence of any foregone conclusions. It is not possible here to describe mobilization in all its phases. For simplification let us take a particular case, that which requires mobilization of all industry. This will give us the solution under the worst conditions.

First, it is necessary to draw an exact and complete picture of the needs for national defense, to scrutinize the list of resources of the country in raw materials, means of transport, factories, skilled labor, in order to know what must be sought elsewhere.

We must begin then by preparing the entire program of production, by taking a census of existing facilities and by planning their operation—that is to say, their mobilization.

The different parties interested are numerous. They are, as far as the War Department is concerned, all the services working for national defense, Artillery, Engineers, Sanitary, Quartermaster, Chemical Warfare, etc. The coordination of their individual programs, and placing them in a general program, can only be done under the direction and with the approval of the General Staff of the Army. There should, therefore, exist in the General Staff of the Army an industrial section charged with the preparation of all industrial mobilization plans and having general charge of production.

But it is necessary to go further on the road to centralization. Since all of our national resources must be mobilized, it is not only the Secretary of War who is interested, but all cabinet officers. As a result, an Interministerial Bureau is indispensable. This would really be a Bureau of National Defense. This bureau should function under the direction of the Prime Minister and should contain representatives of all the departments which control the armed forces of the country, and of all those concerned with the economics and industry of the nation.

In order to limit ourselves to the artillery in conformity with our previous line of reasoning, let us see what measures should be taken in time of peace to prepare the mobilization of the factories to make artillery matériel.

(a) *Program of Production.*—This program should include an estimate of all matériel to be used at the time of mobilization, a careful consideration of the wear of guns, the consumption of munitions, replacement parts, machine tools and raw materials necessary to obtain a given output, not only of new matériel, but of repairs as well.

Certain factories would be used for production and others for repairs. War orders should be determined in peace time. Plans should

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be placed at the disposition of the factories, raw materials should be stocked in sufficient quantities, so that work could commence without delay after the order to mobilize.

(b) *Allotment of Orders.*—In order to provide a scientific organization of work for quantity production of interchangeable parts; for ease of direction, inspection and control; for economy in general expenses; for reduction of transportation; we should have only a limited number of large factories, or groups of factories very near each other. We should, therefore, anticipate the closing of the small shops and the transfer of their machines and laborers to the great industrial centers thus created.

Naturally the government arsenals maintained in peace time would function as the nuclei of these groups on mobilization. In addition we could entrust this rôle to certain large factories already specialized, like Crusot at Saint-Chamond, and to the principal steel, automobile, and chemical industrial firms, etc. These group centers would receive orders for complete assemblies, guns, carriages, caissons, and ammunition, and would apportion them among the firms under their jurisdiction. The chief of the group would be responsible for such construction as had been entrusted to him.

The Administration and Inspection Services should have a strong organization. Most competent and energetic men, with character and ability to command, should be placed in charge.

(c) *Supply of Raw Materials.*—As soon as orders were apportioned among the groups of factories, the latter should be in a position to fill them. For this reason we must anticipate their supply of raw materials.

Although it is relatively easy to keep informed of the number of machines existing in an industry by an annual count, it seems nearly impossible to obtain even approximate data on the quantity and quality of raw materials in stock at any given time in all the factories of the country. A general periodical count of these stocks is nevertheless necessary.

The procurement plans of the different services will give the tonnage required and the delivery dates anticipated.

To give an idea of the complexity of the problem, just recall that steel factories for example need not only the essential materials for production in order to function, such as minerals and coal, but they also need many heavy and bulky products which must often come from far away, such as acid and basic refractory bricks, pig iron, manganese ores, etc. None of these things should be forgotten in the plans. It is even desirable to deliver these stocks ahead of time at increased rates in order to avoid congestion of transportation when the shipments of finished matériel commences.

(d) *Transportation.*—Transportation is of capital importance. The general plans for production should take this into consideration and apportion orders in such a manner as to limit transportation from factory to factory to the absolute minimum.

During the entire War a special service should regulate transportation in consultation with G-4 of the Army.

(e) *Factory Plans for Mobilization and Production.*—As soon as orders have been apportioned, a mobilization plan should be established in each factory. The Director of Manufacture should agree to it, it should be revised annually and should include in the internal factory plan for production the following:

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A scientific organization of the shops;

Removal of useless machines;

The mobilization of labor: exemption of employees from the draft, method of procuring additional personnel, utilization of female labor, establishment of control, etc.

The mobilization of the government arsenals should be prepared in the same way. In addition they must, in time of peace, instruct and procure the personnel for the direction, inspection and control of the mobilized factories.

(f) *Financing of War-Time Factories.*—This question is beyond our control. We mention it only in passing in order to indicate its importance.

This summary is necessarily incomplete but is sufficient to give an idea of the magnitude of the problem and of the formidable work required to elaborate and perfect a program for complete industrial mobilization.

*But, no matter how well prepared it may be, industrial mobilization will be efficient chiefly on account of the competence and energy of the men charged with putting it into effect, by their character and their independence when facing financial, industrial and political powers.*

### UNCERTAIN ELEMENTS

It is dangerous to push plans for industrial mobilization too far along with military mobilization. Although it may generally be possible to modify the concentration of armies rapidly and without serious trouble, even during action, as was proven in 1914, it is much more difficult to alter a production plan which is in full operation. The least inconvenience which could result therefrom would be a very long delay in deliveries.

However, circumstances will certainly make changes necessary in the initial plan. It may become advisable, for example, to shift a portion of the factories originally reserved for the artillery over to aviation production. It may become necessary to prepare to retaliate with some new means of warfare, as we had to do with gas during the last war, etc.

We should, therefore, anticipate and prepare alternate plans for the initial plans which are based on predetermined factors; sometimes, too, even the numerical requirements might be reduced or increased.

In addition to this kind of uncertainty there is also the question of reinforcing our factories with additional machines and personnel, that of opening new factories, and, most serious of all, that of moving them from invaded territory.

We know the agonizing situation in which we found ourselves in 1914, due to the invasion of the north and northeast regions, where we had the bulk of our steel industry, melting furnaces, foundries, forge shops and brass works. The devastations caused by the Germans only momentarily modified this state of affairs because the location of the factories, for imperious economical reasons, had to be where coal and minerals were to be found, or at least near one or the other of these raw materials and also near navigable routes which could bring the other cheaply. At the beginning of a war it would be wise not to count too strongly on these factories. We should supply ourselves largely from our allies or from neutral nations and also by pushing the activity of factories in the interior to the limit. Later, if circumstances become

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favorable, we could shift our efforts to the factories of the north and northeast.

We must also consider the mechanical industries near Paris, where their accumulation is a justifiable source of worry. Among them are some which are of little importance from the point of view of tonnage and personnel, but which are nevertheless capital industries, such as optical glass, the entire production of the country of this commodity being concentrated around Paris.

A hasty consideration of these matters shows the necessity for studying the regions of France from this point of view in order to find those localities which are certain not to be reached by an invasion, and which can receive the factories that may have to be moved back. A factory cannot be built just anywhere, for we must have water, gas, motive power, means of transportation and facilities for housing workers.

In the study of the vast problem of industrial mobilization, we very fortunately already possess a solid starting point in the experience acquired during the late hostilities. Of course, everything which was done then was not perfect. Many solutions made under the stress of necessity were too rapidly conceived and too hastily carried out. The financial side of many questions was of necessity neglected. But we know the defects of the completed work; it is sufficient to mend them in order to perfect and strengthen the structure and to adapt it properly to the needs of the present moment.

It is necessary before leaving this subject to make one very important remark. No matter how well prepared it may be, industrial mobilization will always be slow to get in operation. It will not suffice simply to issue an order to cause all factories immediately to commence production at full capacity, for matériel, munitions, arms, and motors to be delivered in abundance and in the proper proportions so that the army will, as by the wave of a magic wand, be instantly provided with all that it needs. Preparations for production will cause delays, sometimes for certain products very long delays, perhaps eight or ten months, if not longer. We had many experiences in this respect during the last war, and they should prevent us from getting lost in the lure of dangerous illusions.

The conclusion to be drawn from all this is that there exists a minimum of supplies and construction which is indispensable in time of peace if we do not wish to be caught short at the moment war is declared. It is the responsibility of competent authorities to determine this minimum, with a certain margin of safety, and to take all necessary steps to insure its existence at the desired time.

### CHAPTER IV

#### THE ORGANIZATION AND OPERATION OF MOBILIZATION AND INSTRUCTION

When the required quantity of weapons has been precisely calculated; when adequate measures have been taken to supply the mobilized troops with matériel which they need; when technical studies of the types of matériel which are to be produced in large quantities from the beginning of hostilities have been completed, at least in the form of test pieces; when the methodical preparation of industrial mobilization gives assurance that war production can be commenced without delay and that

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nothing will happen to impede its progress, there still remains the work of organizing the artillery. In other words, the elementary units, the batteries and groups must be in organic groupments supplied with all the necessary means for functioning; they must have proper armament; they must be assigned to larger units, to divisions, corps, army and general reserve. There still remains the task of getting these types of matériel into the units of the mobilized army, and consequently into the units of the peace-time army which should contain the same armament and organization as in war time.

This work is for the general staff of the army, whose duty it is to reconcile the possibilities and service of peace time as closely as possible with the tactical and technical exigencies of war, and to reconcile the one with the other with the least possible friction.

It is impossible to exaggerate the importance of this work, because the opportune arrival on the field of battle of the numerous varieties of modern artillery matériel and their rational employment and combined efficiency depend wholly upon the organic distribution of the artillery among the large units, upon the judicious assignment of the various types of matériel to each arm of the service, and in each arm to its subdivisions, upon the established relations of command, and upon preparation for proper cooperation and the organization of the Command.

The history of the last war furnishes numerous striking examples of faults of organization, which it was necessary to correct under the pressure of circumstances with all the inherent difficulties of hasty improvisations. We can cite at random for the artillery alone:

(a) The faulty assignment of the rapid fire 155-mm. Rimaillho howitzers to the army artillery when their logical place was in the corps artillery, or even, because of their insufficient range, in the divisional artillery.

(b) The regrettable discontinuation of the corps artillery and its reconstitution under another form with an organization which was never wholly satisfactory.

(c) The non-existence of the heavy artillery, which later was found to be necessary and had to make up from all types of weapons and blindly organized.

(d) The absence of artillery reserves and, above all, of a general reserve.

(e) The defective balance between the supply organizations required for the infantry and the artillery.

(f) The serious gaps in the organization of artillery commands, and the defects in their regulations, etc., etc.

Many of these imperfections were only discovered by the test of war, and nobody can properly be held responsible for them. But other defects were recognized in peace time by officers with clear minds, and were not immediately corrected because changes met with an opposition which was not always inspired by worry for the best general interest.

Today, after the sad experience of four years has clearly shown the dangers of repenting at the last minute, we have the right to hope that everyone will work together willingly to determine and establish the most logical organization for the artillery, so that it will conform as closely as possible to the needs of mobilization and so that it will give most promise of efficiency in war.

The organization of the artillery in peace time should include all the



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elementary organs which must be included in its war organization, and, in order that we can easily pass from one to the other, it is necessary that the instruction of the arm and its mobilization be performed for known missions.

Artillery, more than all the other arms, is an "arm of officers." Fire efficiency is absolutely dependent upon the professional ability of the officers and noncommissioned officers. The numerous cannoneers required by modern matériel are in reality only automatons; these cannoneers must know and execute correctly and rapidly a restricted number of mechanical operations such as fuse setting, loading, laying and firing. They have no part in the conception and preparation of fire. These duties are done by officers only, and the noncommissioned officers must insure good performance by watching and verifying the execution of commands by the troops. A battery, or a group of batteries, has often been compared to a factory where the laborers work at machines or tools under the supervision of foremen, without needing to know the ideas of the engineers and of the directors who create their work, and without ever having to take any important initiative.\*

This comparison is just as exact as the fact that with an increase of caliber of cannon we obtain an increase in range. It is true that in the light artillery we are sometimes obliged to call on the spirit of decision and the inborn qualities of the troops. This is the case in direct fire, for example, where the skill of the gunner counts largely in the result obtained. This case will become more and more rare with the increase of range; indirect fire, which is already the rule today, will continue more and more to be the exclusive procedure. Also, as soon as we pass to the usual calibers of heavy artillery, the functions of the cannoneers become more and more mechanical, and in the larger calibers of heavy, long range artillery the soldier is really no more than an automaton.

Artillery, then, is only as good as its chiefs. We see then the importance of the officer personnel.

The idea is certainly not new; we must then agree on the qualities which this formation should generate and cultivate. In our pre-war light artillery, which then represented nearly all of our combat artillery, we dwelt upon the necessity for officers having a sense of maneuver, an aptitude for command, equestrian talents. These were the qualities which we forced them to develop; instruction in fire came afterwards. Officers with horse batteries were most appreciated and most favored; all the brightest officers considered it a point of honor to have served in this branch of the arm; details in the arsenals, foot regiments, coast batteries and technical services on the contrary received little consideration, were regarded as unmilitary, and were considered as speculations having no direct connection with the art of war.

With the War all this hierarchy was reversed, all these ideas were upset. It was suddenly discovered that beautiful evolutions hardly found their use in battle; that going into battle usually took place at a walk, more often at night and always without formality; that the organization of fire, the conduct of fire, and the maintenance of liaison raised problems more delicate to solve and of greater importance. We began to understand that artillery was made for firing, that it had no other reason

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\*Naturally this is only true in so far as actual execution of orders on the battlefield is concerned. In the artillery, as in other arms, other factors enter; moral qualities should be as well developed here as elsewhere.

## THE FIELD ARTILLERY JOURNAL

to exist, that the effect of its fire was its only interest and that this effectiveness depended above all on the scientific value of the methods and the technical instruction of the officers. We learned that mathematics, ballistics, physics, and meteorology had more practical application in field artillery than sports, an elegant bearing on a horse or a wonderful voice for giving commands.

We must be just to the artillerymen; they did not remain obstinately in their error. They resolutely attacked the work of regaining lost time, filling the gaps in their instruction, adapting themselves to the new exigencies of modern war. They succeeded during the hostilities in perfecting sound, technical doctrines for all needs, often with hesitation and after long delays.\* This result was due to the fact that the officers of the arm, having for the most part received a good scientific education in the schools at the beginning of their career, were for this reason capable of accomplishing this evolution with success.

This remarkable professional training of our artillery officer personnel, which was recognized even by our enemies,† should be maintained and developed for the army of tomorrow if we expect to cope with the increasing difficulties in the use of artillery in battle. This is one of the most important problems to be solved in the reorganization of the arm. It is not only a question of revising the programs of the Battery Officers', Application, and Advanced Schools in such a manner that officers in passing through each grade will confirm their prior knowledge and acquire new information; it is also necessary that, while doing duty with troops, high ranking officers, and in fact officers of all grades, be able to develop their junior officers and to instruct reserve officers along these lines.

The instruction of personnel should be planned and conducted in such a manner that all officers will be made capable of commanding all kinds of units of the arm, at least after a hasty refresher course. We should not see in the future, as we so often have seen during the War, division artillery commanders clamoring for the assignment of heavy artillery officers, because they had been given heavy units which they did not know how to handle. We should not have today artillerymen for field and siege or for light and heavy artillery. All officers should know the characteristics, maneuver qualities and methods of employment of all types of weapons.

As far as the troops are concerned, this is not at all the same proposition. There is no longer any idea of teaching the gun crews how to serve all matériel. With military service as short as it is now, time is absolutely lacking for such instruction. Specialization is necessary. As a result we have the imperative necessity that all subdivisions of the arm and all specialties be represented in peace time by a sufficient number of

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\*We have seen, in Part I of this work, that it was only in 1918 that the artillery was in possession of a truly scientific method of fire.

† In an article in the *Artilleristische Monatshefte* of May-June, 1919, the renowned German General Rohne renders them homage with an impartiality which cannot be mistaken: "The incontestable superiority of French artillery over our own," he writes, "is due mostly to the better mathematical and scientific training of their higher officers, who are nearly all graduates of the *École Polytechnique*."

We must add, to be just, that the officers required to make up the full strength of the artillery came largely from the *École Centrale*. They had a sound scientific training and took an active part in the evolution described above.

## FIELD ARTILLERY: PAST, PRESENT AND FUTURE

troops and units, so as to provide continuous training of cannoneers for the reserve units of each of these subdivisions.

Specialization should, as a matter of fact, be carried still further. The maneuver of the piece and handling of horses no longer constitutes the only object of instruction as in former years. We must add today telephone and radio communication, knowledge and handling of ammunition, emplacement of batteries in the field, motor driving, maintenance and repair of matériel, etc. While each cannoneer of a given unit should have a general knowledge of all these things, the complexity of each of these duties requires of the cannoneer a very pronounced specialization. Among the noncommissioned officers themselves it is no longer possible to seek the perfect interchangeability which we used to obtain. Officers alone can and should know all types of equipment. Even so, it often happens that in the course of their career they will be called upon repeatedly to specialize temporarily in some particular duty.

The preceding arguments show the error committed by those who have proposed the extreme reduction of artillery units in peace time, replacing them by centers of instruction to which the quotas of men would be assigned. The number and complexity of matters to be taught officers and troops are so great today that we cannot count on assembling more than 1,000 or 1,200 men in the same center of instruction if we wish to insure training under the best conditions. This number is precisely the strength of a well organized and manned regiment; therefore the result is that the regiments themselves will be the real centers of artillery instruction.

The peace-time organization of the artillery should not only permit a very sound instruction of officers and men; it is also necessary that it expand, on mobilization, to a satisfactory war organization with sufficient rapidity. Rapidity is necessary because any organization which would require several weeks or several months to organize after mobilization would present grave dangers. A satisfactory allowance of officers is necessary because we have just seen that the fire efficiency of an artillery unit depends almost exclusively on the ability of its officers.

To appreciate fully the difficulties of the problem, it is well to examine the process by which artillery changes from a peace to a war status, and to study its functioning. When we say that a battery is split up to form two, three or four new units, that does not mean that one-half, one-third or one-quarter of its effective strength is used to form these units, but it means that the mother battery furnishes a small active nucleus of noncommissioned officers and specialists, often only a few individuals who are indispensable for the creation and preliminary formation of new units, and around whom the reservists are organized. The nature of this nucleus varies with the unit to be formed. If it is a battery, for example, it would be chiefs of section, gunners, cannoneers, and telephone operators. For a motorized supply unit it would require noncommissioned officers trained as mechanics, artificers, chauffeurs, etc.

If we were assured of finding the necessary specialists among the reservists, and if they were ready to occupy instantly, and without refreshing their knowledge, the posts to which they were to be assigned for combat, we would have no need to provide in our peace-time units the nuclei for mobilization which we are discussing. But it is apparent that certain work, like that of the gunners, for example, requires long and careful preliminary training, and it would be hazardous suddenly to intrust the driving of a heavy tractor to a taxi-driver.

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This is the principal reason why the number of war-time units determines to some extent the number of peace-time units. The latter cannot fall below a certain figure without seriously compromising mobilization.

After the experience of the War and as a result of the War Department's preliminary estimates, it is now possible to determine a ratio of expansion for peace-time artillery units with sufficient accuracy, if it is done as we have explained. This coefficient varies naturally with the kinds of units of the arm; weakest for the light artillery, it increases with the caliber of the matériel served, to attain its maximum in the long-range heavy artillery. This is easy to understand by referring to what we have said above about the duties of the enlisted personnel in these subdivisions. But as an average, we can say that it is about one to three or four, and could not go above the last figure without rendering illusionary the entire operation of mobilization.

As we have already remarked, the peace-time standing army only enters into the constitution of war units in the guise of a nuclei of specialists. Possibly at present, when the reservists still have experience from the War, we could, if necessary, permit these nuclei of specialists to be reduced to a strict minimum, and thus a peace unit could form more than four active war units. But the day is not far off when available reservists will be less and less experienced. The classes which have only had eighteen months of service and perhaps soon will have but twelve months, will have only a superficial instruction which will not penetrate sufficiently in their minds and which will be quickly lost after return to civil life. At the present time it would be wonderful to be able to count on strongly constituted active nuclei. The regulations governing the number of reserve officers cannot fail to take account of this approaching eventuality. To reduce these nuclei below the figures indicated would be to misunderstand the lessons of the last war; it would be scrapping the perfected and powerful tool which the War has given us; it would also show lack of appreciation of the true worth of an adversary who is incompletely disarmed and who is already rebuilding his industrial power while waiting to manufacture new armament.

We see from this hastily painted picture the difficulties to be solved when it is necessary to draw up legislation for the tables of organization for officers and troops for the artillery.

The War Department first fixes the number of pieces of matériel of all kinds which it judges necessary for the mobilized army. From this number the General Staff of the army deduces the number of units (batteries, supply units, transportation units, repair units, etc.) which will insure the service of this matériel. The latter number serves as a basis for fixing the number of peace-time units for each subdivision of the arm. The necessity of instruction, of daily routine, of constituting nuclei for mobilization, finally determines the number of effectives to be assigned to each peace-time unit and the total of all the effectives of the basic units determines the entire standing army strength of the arm in the peace-time army.

Many additional points could be brought out to show the decisive value of the arguments set forth in the present chapter. But that would carry us beyond the limits which we have fixed, and, furthermore, we believe that the brief summary which precedes is sufficient to call attention to the difficulties of the problem of organization and to outline what the solution should be.

**END OF PART III**

## FIELD ARTILLERY BOARD NOTES

SINCE the last notes very little has been accomplished in the matter of tests, due to reduced personnel on the Board and to the fact that the troops have been engaged in summer training with the other components of the Army.

A Chevrolet wire-laying, cross-country car has been received for test. This car carries two operators in addition to the driver and a total of 3½ miles of field wire on type DR4 spools, two spools being mounted in operating position at a time.

About 5 miles of experimental seven-strand field wire has also been received for test. This wire is designed to take the place of both the present type W-40 eleven-strand field wire and the type W-44 seven-strand outpost wire.

The tests on both the car and the wire to date have been satisfactory.

Three water carts of 150-gallon capacity, each mounted on 3-inch ordnance limber running gears and to be drawn by an artillery pair of horses, have been received for test. Also a light spring wagon to take the place of the present mountain wagon. This wagon is of more sturdy construction than the present wagon and has higher side boards, which will permit of better loading of the radio and other equipment carried in this type of wagon. Tests on these items of equipment will start in the near future.

The Training Regulations Section has forwarded to the Chief of Field Artillery the first draft of the Field Artillery Field Manual; a review of Training Regulations, 430-70, "The Firing Battery"; 430-165, "Dismounted Formations and Ceremonies"; and will shortly forward a review of 430-60, "Service of the Piece, 240 mm. Howitzer." The review of T. R. 430-90, "Field Artillery Communications," will be completed by the end of September.

It is believed that the Field Artillery Field Manual, when finally completed, will meet the demands for a concise compilation of our regulations in one text. It may be suitable for publication in one volume of pocket size, about 7¼ × 4½ inches, containing about 250 pages; that is somewhat larger than one volume of our "Provisional Drill and Service Regulations for Field Artillery, Horse and Light, 1916."

Since the last notes, the following reports have been forwarded to the Chief of Field Artillery:

Reel, Artillery, M-1909, and Cart, Artillery, M-1918.

Makaroff Coincidence Trainer, Type A.

Best "30" Tractors.

Packing Boxes for 105-mm. Ammunition.

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Hat Cords, Rayon.

Modification of Trail, 75-mm. Gun, M-1897.

Jack Beam for 155-mm. Gun.

Pintles, Tractor, T-2.

New officers assigned to the Board are as follows:

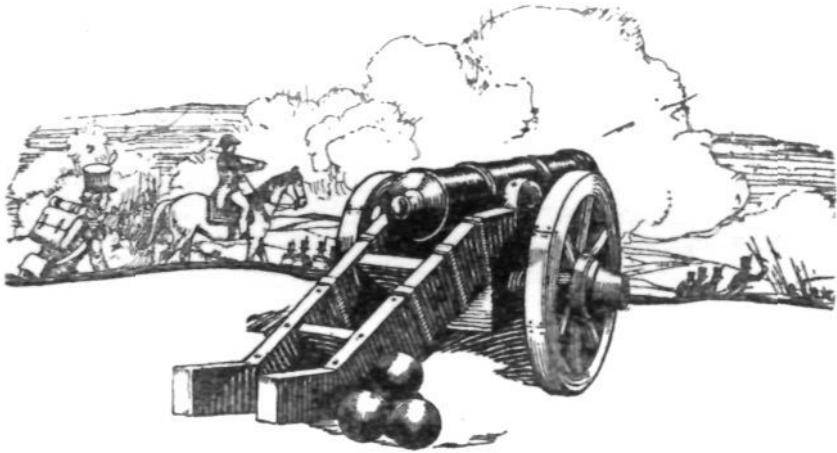
Major G. H. Paine, Test Section, Equipment and Modifications on Standard Matériel.

Major T. G. Gottschalk, Not yet joined.

Captain J. S. Crawford, O. D., Ordnance Member.

Captain Alan L. Campbell, Not yet joined.

Captain Oscar L. Gruhn, Not yet joined.



# POLO

## YALE RETAINS INTERCOLLEGIATE CHAMPIONSHIP

HARVARD, Yale, Princeton, West Point and Pennsylvania Military College were the teams which contested for the 1928 intercollegiate polo championship. Yale, recovering rapidly from the loss of its outstanding star of last year, Winston Guest, came to the front with a well-balanced, powerful team. The final match was between Yale and Pennsylvania Military College, which has forged to the front so rapidly in polo. This game was of particular interest due to the fact that Pennsylvania Military College had beaten Yale during the winter in the intercollegiate indoor championship.

The best game of the series was the Yale-Princeton game. The Tigers got the jump on the Elis and were leading when the first half gong sounded, but Yale finally slipped through for a 7-6 victory in the last chukker.

Teams and scores:

### FIRST MATCH

<i>Yale, 7</i>	<i>Princeton, 6</i>
Mr. Oliver Wallop .....	Mr. J. K. Shaw
Mr. J. H. H. Phipps .....	} Mr. Frank Hitchcock } Mr. H. Alexander
Mr. F. C. Baldwin .....	
Mr. Hardie Scott .....	Mr. R. C. Stewart, Jr.

Referee: Capt. D. S. Rumbough

### SECOND MATCH

<i>P. M. C., 4</i>	<i>West Point, 2</i>
Mr. Henry Schaffhauser .....	Mr. Harold Brown
Mr. C. J. Bower .....	Mr. P. D. Harkins
Mr. J. Whitehurst .....	Mr. F. W. Haskell
Mr. D. N. Jones .....	Mr. C. E. Hughes

Referee: Capt. D. S. Rumbough

### THIRD MATCH

<i>Yale, 8</i>	<i>Harvard, 2</i>
Mr. Oliver Wallop .....	} Mr. W. J. Iselin } Mr. L. A. Shaw
Mr. J. H. H. Phipps .....	
Mr. F. C. Baldwin .....	Mr. J. P. Cotton, Jr.
Mr. Hardie Scott .....	Mr. J. P. Mandell

Referee: Capt. D. S. Rumbough

### FINAL MATCH

<i>Yale, 11</i>	<i>P. M. C., 5</i>
Mr. Oliver Wallop .....	Mr. Henry Schaffhauser
Mr. J. H. H. Phipps .....	Mr. C. J. Bower
Mr. F. C. Baldwin .....	Mr. J. Whitehurst
Mr. Hardie Scott .....	Mr. D. N. Jones

Referee: Maj. F. B. Prickett

Umpires: Capt. D. S. Rumbough, Maj. J. W. Rafferty

## THE FIELD ARTILLERY JOURNAL

### POLO IN THE 6TH FIELD ARTILLERY

The 6th Field Artillery Polo Team normally plays in the spring and fall tournaments staged by the War Department at Washington, and plays match games with the Maryland Polo Club and the 110th F. A., Maryland National Guard. This year the Southeastern Intercircuit Tournament was held at the Philadelphia Country Club and was preceded by the Morrow Cup and the President's Cup Tournaments. The Sixth entered a six-goal team consisting of Lieutenant Lentz, No. 1; Lieutenant Williams, No. 2; Lieutenant Kiefer, No. 3; Lieutenant McFarland, No. 4. This team defeated the Pennsylvania Military College 13-3 and the Bryn Mawr Polo Club 13-6 to win the tournament.

In the President's Cup Tournament, Lieutenant Keefe was substituted for Lieutenant Lentz, making a 7-goal team, and the following teams were defeated: 16th F. A. (Benson, Tate, McClure and Palmer), Bryn Mawr, and Philadelphia Country Club. The tournament was won by the 6th F. A.

Then followed the Intercircuit Tournament in which the 7-goal team played. The 16th F. A. and First City Troop were defeated to win this tournament and the right to represent the Southeastern Circuit at the Intercircuit Tournament in Cleveland.

The Maryland Polo Club Team was also defeated 13-10 after giving them a 3-goal handicap.

The 6th Field Artillery has an average turnout of twelve players on practice days and about twenty-four ponies, of which nine are private. The government mounts are very mediocre, but with the aid of a few remounts from Front Royal a string is being developed.

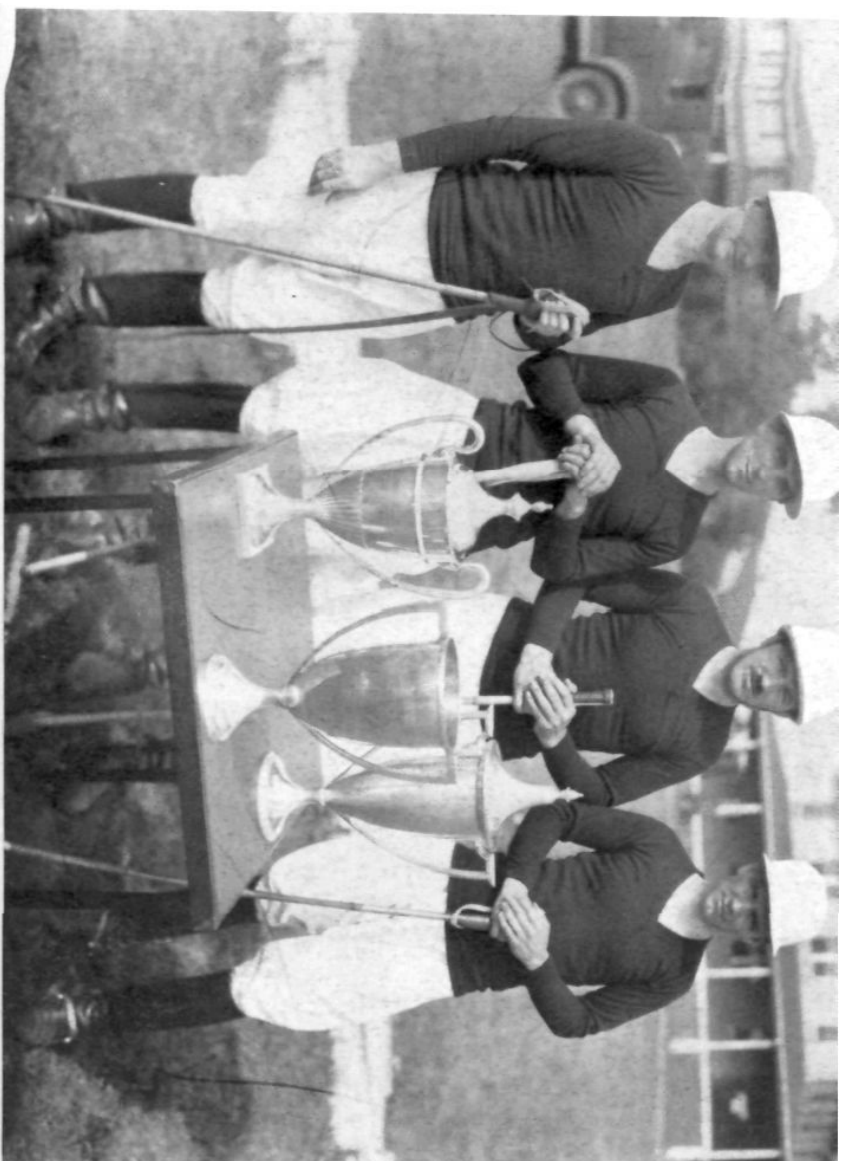
The Sixth has one fair polo field, and a new field, which should be very good, is being made.

Three of the members of the 6th F. A. Polo Team—Williams, Kiefer and McFarland—were members of the Hawaiian Army Team in 1925 and Lieutenant Keefe played in the Philippines.

### INTERCIRCUIT CHAMPIONSHIPS

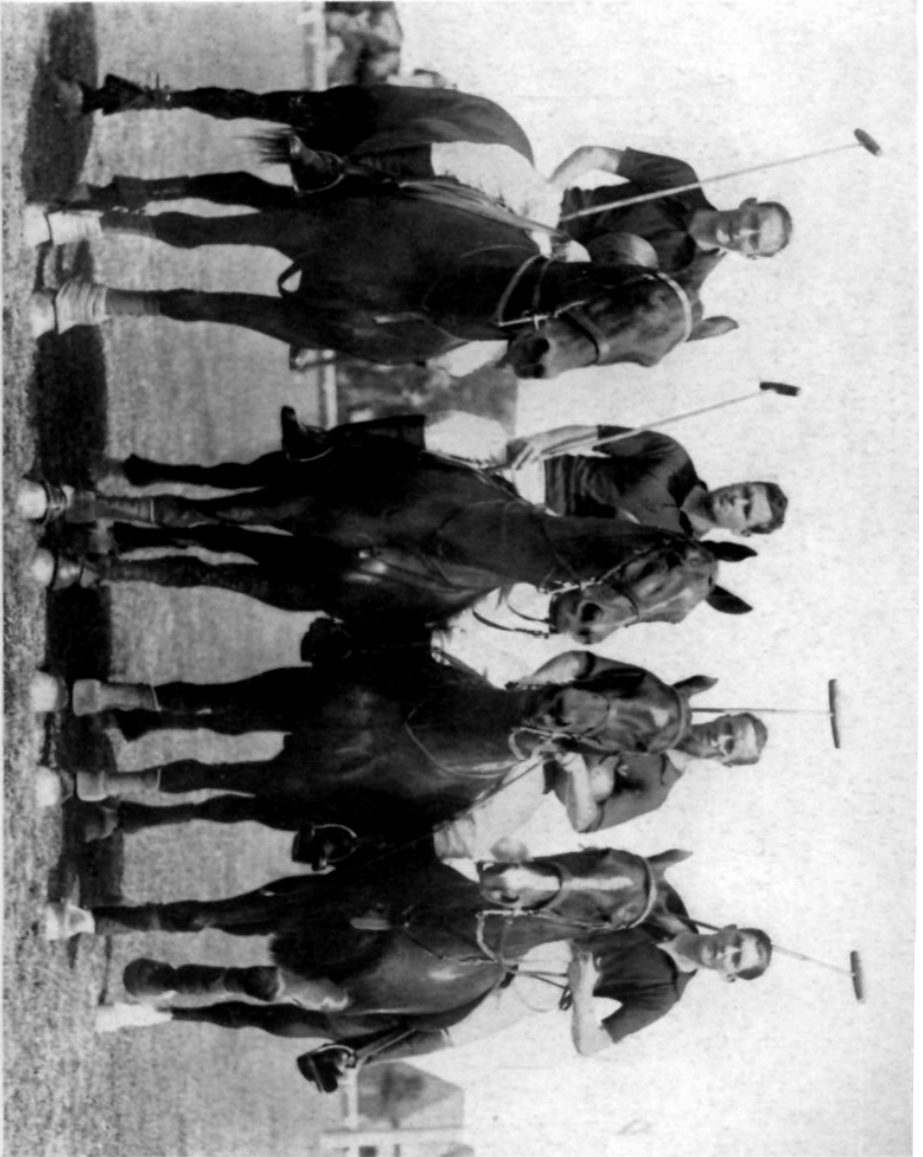
Point Judith won the 1928 intercircuit championship at Cleveland by defeating San Mateo and Fort Riley. Six teams fought for the championship, three of which were Army teams: Fort Hoyle (6th F. A.), representing the Southeast; Fort Riley (Cavalry School), of the Rocky Mountain circuit; and Fort Bliss (Cavalry Division), champions of the Southwest. The civilian teams were: Point Judith, from New England; San Mateo, representing the





THE SIXTH FIELD ARTILLERY POLO TEAM

The players: Lt. T. F. Keele (1) Lt. E. T. Williams (2) Lt. H. W. Kiefer (3) Lt. C. N. McFarland (4)  
The silver: Morrel Cup, President's Cup, Southeastern Intertrout Cup. All taken at Philadelphia Country Club



Oliver M. Wallop      J. H. H. Phipps      F. C. Baldwin      Handle Scott  
THE YALE TEAM, INTERCOLLEGIATE CHAMPIONS OF 1928

## POLO

Pacific Coast; and Chagrin Valley of the Central Circuit, defenders of the championship.

Players, teams, scores and handicaps:

### FIRST MATCH, AUGUST 18

<i>Fort Riley</i> , 11	<i>Fort Hoyle</i> , 8
Capt. V. M. Cannon (2).....	Lieut. T. F. Keefe (1)
Capt. P. H. Morris (2).....	Lieut. E. T. Williams (1)
Capt. L. K. Truscott, Jr. (4).....	Lieut. H. W. Kiefer (2)
Capt. J. C. Short (3).....	Lieut. C. N. McFarland (3)
Earned, 11	Earned, 4; Hcp., 4

Referee: Maj. J. K. Brown

### SECOND MATCH, AUGUST 19

<i>Fort Bliss</i> , 9	<i>Chagrin Valley</i> , 2
Maj. A. H. Wilson (5).....	Mr. J. A. Wigmore (1)
Maj. T. de la M. Allen (3).....	Mr. D. S. Ingalls (3)
Capt. T. E. Voight (2).....	Capt. W. J. White (4)
Capt. C. L. Stafford (2).....	Mr. T. H. White (4)
Earned, 9	Earned, 2

Umpires: Maj. J. K. Brown and Mr. G. H. Dempsey

### THIRD MATCH, AUGUST 20

<i>Point Judith</i> , 7	<i>San Mateo</i> , 5
Mr. G. H. Bostwick (1).....	Mr. Kenneth Walsh (1)
Mr. William Post (2).....	Mr. George Pope (1)
Mr. Gerald H. Dempsey (3).....	Mr. Hugh Drury (4)
Mr. J. C. Rathborne (3).....	Mr. Lindsey Howard (2)
Earned, 7	Earned, 4; Hcp., 1

Umpires: Maj. J. K. Brown and Capt. W. J. White

### FOURTH MATCH, AUGUST 22

<i>Fort Riley</i> , 14	<i>Fort Bliss</i> , 3
Capt. V. M. Cannon (2).....	Maj. A. H. Wilson (5)
Capt. P. H. Morris (2).....	Maj. T. de la M. Allen (3)
Capt. L. K. Truscott, Jr. (4).....	Capt. T. E. Voight (2)
Capt. J. C. Short (3).....	Capt. C. L. Stafford (2)
Earned, 13; Hcp., 1	Earned, 3

Umpires: Capt. W. J. White and Mr. G. H. Dempsey

### FINAL MATCH, AUGUST 26

<i>Point Judith</i> , 13	<i>Fort Riley</i> , 8
Mr. G. H. Bostwick (1).....	Capt. V. M. Cannon (2)
Mr. William Post (2).....	Capt. P. H. Morris (2)
Mr. Gerald H. Dempsey (3).....	Capt. L. K. Truscott, Jr. (4)
Mr. J. C. Rathborne (3).....	Capt. J. C. Short (3)
Earned, 11; Hcp., 2	Earned, 8

Umpires: Capt. W. J. White and Maj. J. K. Brown

## THE FIELD ARTILLERY JOURNAL

### ARMY RELINQUISHES JUNIOR CHAMPIONSHIP

After defeating the fast Roslyn quartette by a score of 13 to 3, the Army Junior Polo Team lost the Junior Championship of the United States in the finals of the Old Oaks of Rumson, New Jersey, by a score of 12 to 8.

The 1928 Junior Championship Tournament, which was played at the Philadelphia Country Club, and started Monday, July 16, drew out five good teams: Old Oaks, Philadelphia, Roslyn, Aiken, and the Army. The withdrawal of Aiken left Old Oaks paired with Philadelphia, and the Army matched against Roslyn in the semifinals. The first game resulted in an 18 to 4 victory for Old Oaks. The second was won by the Army, 13 to 3. This Brought Old Oaks and the Army together in a final game marked by what was probably as clever an exhibition of polo as was ever played in a Junior Championship Tournament.

Observers of the tournament have remarked that, in general, the class of mounts used was superior to that of most Junior Championships. A look at the names of the players, some of whose strings are very well known, will indicate the truth of this statement. This is certainly the case with the Army players, whose mounts compared favorably with those of any team in the tournament, not only in handiness and speed but in condition and stamina as well. In this connection Army followers will be interested to note that about half of the mounts used by the Army players were privately owned.

#### ARMY, 13—ROSLYN, 3

The decisive defeat of Roslyn by the Army in the second game was somewhat of a surprise. The Long Island four was rated a goal higher than the Army in official handicaps and was well mounted. Although the Roslyn team started off with a rush leading the Army 2 to 1 at the end of the first period, from then on there was little doubt as to the final outcome. This, however, does not mean that the game was not hard fought throughout.

Smooth team play and hard, accurate stroking were the contributing factors in the Army victory. By outriding their opponents, the soldiers had the game well in hand at all times.

#### *Army 13.*

No. 1—Lieut. M. Jones.

No. 2—Major C. C. Smith.

No. 3—Major G. S. Patton Jr. (Captain).

Back—Capt. George Huthsteiner.

Goals—Army: Jones 6, Smith 6, Huthsteiner 1. Roslyn: N. S. Talbott 1, H. Talbott 2.

Referee—C. S. Lee.

#### *Roslyn 3.*

No. 1—A. C. Swartz.

No. 2—E. A. Hopping, Jr.

No. 3—H. E. Talbott, Jr.

Back—N. S. Talbott.

## POLO

OLD OAKS, 12—ARMY, 8

Led by Arthur Borden, Princeton star, and James Cooley, who shot a total of seven goals, the Old Oaks team wrested the Junior National Polo Championship from the Army in the final game of the tournament by a score of 12 to 8. The match was fast and furious, and the general excellence of play during parts of the game was more typical of the quality of polo exhibited in the Senior tournament rather than that of the Junior. Three times was the game tied, once in the fourth, once in the fifth, and again in the sixth. At the end of the fifth chukker, the Army had the lead 8 to 7, but this advantage was lost in the sixth when the Old Oaks scored twice.

Play started with a rush. Jones took the ball from the first throw-in, galloping down the field with it, but shot wide. For several minutes the Army continued to threaten. However, Old Oaks four soon hit its stride, and immediately jumped to a 3 to 0 lead, due in part to our weak and costly hitting in defense of goal. Patton started the Army's scoring on a short drive in the second period. Cooley followed with a tally. On the next throw-in Jones picked out the ball, and got away on a brilliant run down the field for a score. In the third period the Army drove its offense into Old Oaks territory time after time, only to miss goal by inches. Balding's long shot from near center field was the only goal.

With the score 6 to 2 against them, Army players staged a sensational rally in the fourth that netted them four goals in rapid succession. Smith and Jones repeatedly got away from the Rumson players and, hitting clear and hard, each scored two goals. Several saves by Huthsteiner successfully blocked the Old Oaks attempt to score. At the end of the first half the teams were tied 6-6.

Passing up the usual intermission, the two opposing teams opened the fifth period in aggressive play. Borden scored thirty-nine seconds after the throw-in. Jones again evened matters soon after with his fourth tally. Shortly after the bell Patton put the Army into the lead for the first time with a goal from scrimmage. This was the Army's last goal, and constituted the turning point of the game.

From then on the Old Oaks forged ahead, scoring five times before the game ended. Four of these were made by Cooley and one by Borden. In the last three periods the Army could not stem the tide of the Old Oaks advance, and were thrown back on the defensive. The game ended in a 12-8 victory for Old Oaks.

Except for some costly missing which resulted in several goals for Old Oaks in the early periods, and two mounts that were pulling

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in the latter part of the game, the Army team compared very favorably with Old Oaks. The Line-up:

*Old Oaks, 12.*

No. 1—J. C. Cooley.

No. 2—A. Borden.

No. 3—G. Balding.

Back—H. W. Williams.

Scoring—Army: Smith 2, Jones 4, Patton 2. Old Oaks: Cooley 7, Borden 2, Balding 2, Williams 1.

Referee—C. S. Lee. Time of periods—7½ minutes.

*Army, 8.*

No. 1—Lieut. M. Jones.

No. 2—Major C. C. Smith.

No. 3—Major G. S. Patton.

Back—Capt. G. Huthsteiner.

Players and mounts have returned to the Army Polo Center at Mitchel Field to participate in further games and tournaments on Long Island, with a special view to developing the high goal team for the Open Championship and where Captains C. E. Wilkinson, C. H. Gerhardt and P. P. Rodes, ineligible for the Juniors on account of their handicaps, will be available to the team.

Captain Wilkinson and Captain Rodes, both of the Army squad, have been trying out for places on the team that is to represent the United States in the matches against the Argentine four in September. Both have played in several fast games and are showing up well.



## FOREIGN MILITARY JOURNALS: A CURRENT RÉSUMÉ

### "The Journal of the Royal Artillery," July, 1928

"Duncan" Gold Medal Essay, 1927-28, by Captain K. M. Loch, M. C., R. A.

This is the winning essay in the yearly competition which was based this year on the following instructions:

"Since aerial operations in the future will assume greater importance than was experienced in the last great war, discuss the advisability of rendering all, or the bulk of artillery units of the field army capable of dealing with air targets. What changes would be entailed by the adoption of such a policy in regard to:

"(a) Organization.

"(b) Training.

"(c) Equipment, including ammunition of the Royal Artillery."

The instructions naturally suggest the scope of this article. Captain Loch has treated it in a very simple and readable form, and the essay is free from much of the technical discussion which often makes such articles rather heavy reading. A particularly important point, in view of the efforts for mechanization in both the British and American armies, concerns itself with the use of the field gun on a self-propelling mount. Captain Loch finds that this should be very useful for antiaircraft use.

His final conclusion is as follows:

"In conclusion—the very formidable menace to modern armies introduced by the advent of flying calls for the employment of all means of air defence, both active and passive. As regards the share of the artillery, it is hoped that what has been said has demonstrated that special anti-aircraft units are essential. The remainder of the artillery can, in certain circumstances, afford valuable support to these A. A. units, but only in an adequate manner, when assisted by them in technical detail. Attractive as it may appear, the idea of the land artillery battery as an independent self-supporting A. A. unit is a snare and a delusion. On the other hand, it is submitted that the value of the support which land artillery can afford in

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supplementing the fire of A. A. units fully justifies training and development on the lines indicated."

**"The North-West Frontier,"** by Colonel H. Rowan-Robinson, C. M. G., D. S. O.

This is another one of these lectures on Indian problems which make the British journals so readable. So long as Great Britain remains in India it seems that she is likely to have the same problems on the North-West Frontier which have faced her almost from the beginning. While the world has changed very largely in the last few hundred years, it appears that the type of warfare which must be expected and provided against on this front has not greatly changed.

In discussing the matter of protection against raids by mountain tribes, a commentator on the lecture says:

"As a matter of fact, most of these people are undoubtedly the ordinary Aryans of the plains of India; but when the Aryan invasion slowly filtered down through Afghanistan many Rajputs on the way to India remained and occupied some of these fertile valleys, and living in that sturdy climate they became more and more rugged and more and more hardy, like all mountaineers do. . . . As they were ill folk to tackle, the great invaders let them alone; they guarded only the routes and boxed them up in the hills, in the same way as we do, and closed the same raiders' routes as we do. I know many remains of Graeco-Bactrian posts all along the frontier within a quarter of a mile of a British post. So the problem of these wild devils is age old, and not unlike the problem which made Hadrian build his wall across North Britain."

However, he makes another interesting point to show that the use of motor transport has necessarily changed the tactics of raiding hill tribes. He says:

"Then, mind you, raiding motor transport is not very popular. You do not get much. You capture two or three lorries. How are you going to get the stuff away into the mountains? When you have twenty camels or a couple of dozen mules, you just take them with you. But in a raid on a motor lorry the loot is not much good to you. The rescue party will be out in an hour probably; so the motor road is making the raiding of transport rather less popular."

**"The Battle of Cambrai,"** by Major General H. D. DePree, C. B., C. M. G., D. S. O., p. s. c.

This is an interesting discussion which is too long to be covered



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fully in such a review. The author, however, makes the following interesting point in beginning his article:

"During the past winter a number of very interesting lectures have been given at the Royal United Service, Royal Artillery and Royal Engineer Institutions, and numerous articles have appeared in the service journals on the mechanization of the army; while the thoughts of officers of all ranks and all branches of the service have been directed toward this subject to an increasing extent. It may not be out of place, therefore, to give a description of the Battle of Cambrai, the first battle in which tanks were used under the most favorable circumstances and in adequate numbers. My excuse for doing so is that an ounce of practical experience when bullets and shells are flying about is worth a very great amount of theory and imagination as a foundation for the consideration of a big problem like mechanization.

"The Battle of Cambrai is also interesting on account of its violent changes of fortune, and because the British offensive was brought to a standstill not in the trench system of the Hindenburg Line, but in the open country beyond.

"In considering the bearing of the lessons of these operations on future war it is necessary to remember that the Mark IV tank was a much slower and less reliable weapon than its successors are; but on the other hand the use of tanks came as a surprise to the enemy and anti-tank weapons were much less developed than they are likely to be in future wars. The lessons of this battle show that the introduction of new weapons and new methods has not changed the old principles of war, and that surprise, cooperation of all arms, sufficient reserves and rapidity of movement have as great a value as ever."

This issue of *The Journal of the Royal Artillery* also contains the following articles:

- (a) Speeding up and Simplifying "Survey."
- (b) Forward Observation.
- (c) The Story of "R. A., Shaforce."

This is an article on the artillery component of the contingent which Great Britain dispatched to Shanghai at the time when the international condition was most critical there.

- (d) The Benefit of the Doubt.

This is another one of these interesting hunt articles by a British officer stationed in India. It concerns the shooting of an ibex.

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an t-oglach.\*

GA GASCED AR A RAGAM INDIU †

**Irish Army Quarterly, June, 1928**

This is the first time that this Irish military publication has been reviewed in the FIELD ARTILLERY JOURNAL. Ireland has perhaps always been very close to the hearts of America, both on account of the large Irish-American element and the sympathy which that picturesque nation knows so well to inspire. That there are many things to hold us together is instanced by an article in this issue on the United States Infantry School at Fort Benning, and the quotation of a verse reprinted from our own FIELD ARTILLERY JOURNAL.

**"Lecture on Liaison with Artillery during the Attack,"** by Colonel J. J. O'Connell, A. S. I.

The following quotations indicate the scope of this peculiarly interesting article:

"Artillery is a special arm organized with a view to helping Infantry by means of powerful fire-effect. It must be distinctly borne in mind that artillery never acts on its own behalf but always on behalf of infantry. The artillery is so armed as to be able to do for infantry what the latter cannot do for itself. Artillery can hit objects much farther away than infantry, and can destroy cover that is invulnerable by infantry fire, so that every care must be taken to improve its accuracy and get maximum results from its employment."

\* \* \*

**"'Heaven helps those who help themselves.'**

"This proverb is especially applicable to infantry combat. Modern infantry has a varied armament: every unit, even the smallest, has rifles and bayonets, hand and rifle grenades, light automatic guns; in addition, the battalions have light mortars and guns and heavy machine guns. Consequently even the smallest units can reduce unaided the majority of enemy points, provided that they use the material in their possession with skill and resolution. By calling on the battalion for its more powerful material, a large proportion of the outstanding stronger points can be reduced. In this way it will only be necessary to call on the artillery for aid in the case of a small number of particularly strong points."

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\*Gaelic name of the *Irish Army Quarterly*. "An t Oglach" means "The Soldier."

†The motto "GA GASCED AR A RAGAM INDIU"? means: "What kind of fighting shall we have today?"

## FOREIGN MILITARY JOURNALS: A CURRENT RESUME

### **"Getting Help from Artillery.**

"This is simply a step further than turning the artillery's fire to advantage—in this case the infantry tells the artillery what would be the most helpful thing for it (the artillery) to do. The infantry themselves must do this—no artillery observation officer can do it for them. It is the infantry that has to advance and is fired at while doing so. When it is necessary to call on the artillery it is necessary to be dead exact. It is no use saying: 'Can't you do something for us.' If you are held up you must tell the artillery all about it. You must state clearly:

1. What precise enemy element is holding up your advance.
2. Where exactly that element is located—to the yard, if possible.
3. Where the element can be seen from—so that the artillery can observe their own fire for themselves, being more familiar with the job.

"To secure exactness in locating enemy elements, a sketch—accurate, however rough—is of enormous help to the artillery. Another useful method was employed by the French in Morocco—Infantry N. C. O.'s were issued with a certain number of tracer bullets which they fired at the exact points occupied by the enemy."

This issue of "Ant Oglach" also contains the following articles:

- (a) The Defense Plans Division.
- (b) The Manoeuvre of Bantry Bay.
- (c) Procurement—Men and Material.
- (d) Military Organisation.
- (e) The Views of The "Other Ranks."

This is an article by Sergeant Major F. H. Chandler, which makes an interesting plea to make this particular military publication of greater interest to the non-commissioned officer.

- (f) The Military Situation and Its Main Influences.
- (g) National Policy, Military Policy, and The General Staff.
- (h) The Men of the Future.
- (i) History and Development of Chemicals in War.
- (j) Marching.

A very readable and practical article on the subject of infantry marching.

- (k) When Dublin Was Not of Ireland.
- (l) An article in Gaelic, which cannot be indicated in English

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print by the ignorant reviewer; it evidently concerns Oliver Cromwell, in whom the Irish will always take a continuing interest, and looks perfectly fascinating. The inclusion of this article in Gaelic is evidently part of the effort of the Irish Free State to perpetuate that language.

### **"Revue Militaire Francaise," May-June, 1928**

In the May number, Colonel Armengaud concludes "**Lessons in Aviation Learned from the War in Morocco.**" Having discussed the numerous roles played successfully by the aviation in Morocco, Colonel Armengaud considers the future use of aviation for these same missions in a European war, where conditions will be different.

He considers first the consequences of an enemy air force. In Morocco there were no hostile airplanes, so the French aviation was left free to bomb the rear areas, to reconnoiter, and to attack enemy ground forces. In a European war, before the French aviation may enjoy these ideal conditions it must have superiority of the air, which can be gained only by air force much more powerful than they have at the present time.

Colonel Armengaud next considers the consequences of enemy anti-aircraft artillery, which he admits will increase the losses in airplanes but will not prevent aviation from successfully performing its work. Although the anti-aircraft artillery will be effective against airplanes engaged in combat against ground troops, it will do little harm to bombing planes which can fly at high altitudes.

In considering the future effect of fire from rifle and machine guns, considerable information can be gathered from a study of the Moroccan campaigns, where this type of fire was not lacking. Both types of weapons brought down several planes by hitting the pilot or the radiator of the plane. Proper armor will greatly diminish losses.

In Morocco aviation was able to establish bases well forward. The heavy artillery and night bombers of a European enemy would necessitate placing bases well to the rear of the front lines. The aviation must nevertheless prepare alternate bases well advanced for momentary concentrations.

The war in Morocco pointed out the necessity of an "aviation of the line" for constant use in combat against ground forces as a complementary arm to the artillery, infantry and cavalry.

The use of aviation as an arm complementary to the artillery was forced upon the French high command from the beginning of the war in Morocco. In Europe, as well as in the colonies, aviation can supplement the artillery in covering dead spaces and spaces

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defiladed from terrestrial observation, by furnishing observed fire where the artillery can only deliver systematic zone fire. Aircraft can prolong artillery support in an advance where frequently heavy or even light artillery cannot keep up with the infantry. Colonel Armengaud here quotes Marshal Petain:

"As long as the problem of tactical mobility of artillery is not solved, the army which would break through the enemy's front will see its infantry supported by a feeble part of its artillery and that part poorly supplied in ammunition. The liaison of arms which made possible the initial success will be succeeded by a dissociation of arms which will allow an attacking army to realize only a limited success. On the contrary when the artillery can follow closely one can always expect decisive victories."

Aviation can be an arm supplementary to the infantry by means of its machine guns and bombs. Machine guns in the air with observation can supplement the machine guns on the ground which frequently have no observation.

In conclusion Colonel Armengaud asks the question: "Can the results obtained in Morocco be obtained in European warfare?" He answers his own question in the affirmative. The solution is a greater number of planes available at the outbreak of the next war.

**"The Last Offensive of Abd-el-Krim,"** by General Vanbremesch, appears in the May and June numbers. The Riff chieftain had planned his offensive very cleverly, his forces were sufficient, and his individual soldiers were courageous and capable.

The plan of maneuver was excellent. The point of attack was well chosen on a part of the front lightly held and behind which were important objectives. The secret of the preparation was so well guarded that the French intelligence service discovered the assembly for the offensive only a few hours before the first shots were fired. Everything was well prepared for the execution of the offensive. Abd-el-Krim had in his army 3,700 rifles, several automatic weapons, grenades, and two 75-mm. guns.

However, the plan was not executed as it was conceived, because of insufficient organization and education of the performers. The plan was to enter the French lines, to force certain friendly tribes to take up arms against the French, and then to push on to important objectives. Once inside the lines the attacking forces were led astray from their mission by opportunity of easy loot. They were not content to leave a small covering force at Issoul, held by the French, and then push on with the main body to

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Redoune. The entire force stopped to attack rich but tactically unimportant posts about Issoul, thereby giving the French two months time to rush reinforcements to the threatened front. Even had they wished to do so, the leaders of the attacking troops would have been unable to withdraw their men from the scene of easy plunder. The mass of the native soldiers were incapable of understanding or consenting to a maneuver in which they could not see immediate results.

To explain the tactical defeat of the Moroccan forces, we find the same causes which explain the strategical defeat. In the native army there was neither command nor organization. The various tribes were practically independent; there was no unity of command. This condition rendered useless the excellent individual qualities of the native soldiers, who were held in check by a handful of Senegalese under capable French officers.

**"The Battles of Napoleon,"** by General Camon, is a study of Napoleon's system of enveloping attacks on the enemy's rear.

In his battles Napoleon constantly sought to develop the following general plan: The enemy being in position, Napoleon deployed before the hostile front a holding force to immobilize the enemy and to force him to throw his reserves into the battle. During this frontal engagement he sent a secondary force against the rear of the enemy flank closest to the natural line of retreat. The enemy who had used up his reserves in the frontal engagement had no more with which to oppose this enveloping attack. He was forced to take troops out of the line on the menaced flank and to throw them in front of the enveloping force. This left in this part of the enemy front a "Line of Rupture." It was on this weakened portion of the line that Napoleon launched his "Mass of Rupture," placed in advance opposite this portion of the front behind a fold in the terrain.

At times the enemy placed itself in front of an obstacle over which its retreat was difficult. In this case Napoleon's plan was more simple. He immobilized the adversary's front and sent a force to cover the enemy's line of retreat. He then crushed the enemy while it was in disorder caused by this maneuver.

**"The System of Reward in the Roman Armies,"** is an article by Captain Andrieux, who in a former number wrote about "The punishment of misdemeanors in the Roman armies." It was realized by the Romans that not only was it necessary sternly to punish insubordination, desertion, and treachery, but it was also well to reward acts of bravery and loyalty. For this purpose the Romans instituted a series of rewards, both pecuniary and honorary.

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The honorary rewards were numerous and consisted of bracelets, necklaces, clasps, crowns, lances, aigrettes, etc. Of these decorations the common soldiers received bracelets and necklaces. The tribunes and prefects received the lances of honor and the crowns.

As a pecuniary reward a commander frequently rewarded good conduct by increase in pay. Sometimes an honorary reward carried with it an increase in pay also. An increase in ration was another form of reward for bravery. In certain cases, when a city had been taken by assault, in place of turning over all the spoils to the state, the commander distributed a large part to legionnaires who had distinguished themselves in the attack.

Other articles that appear are "The Battle of the Avre," "The Defense of Bois de Ville and Herbebois," and "Forced Landings."

### **Revue d'Artillerie, April, 1928**

Lieutenant Colonel Bourboulon in his article, "**Counter Battery**," contends that normal counter battery action in future wars will comprise numerous long range concentrations (12 to 15 kilometers or more), extensive employment of aerial observation, and great mobility of artillery. He believes that the characteristics of modern war—viz., the predominance of automatic weapons, the intensive employment of gas, the augmentation of the range of artillery, and the great role played by aviation—will cause the fronts to be more fluctuating. Hence artillery dispositions, offensive as well as defensive, will be based on echelonment in depth and on mobility.

Particular care must be given to instruction in topographic control, communications, rapid application of corrections, aerial adjustments, and high burst ranging.

The weapons provided must have very long range coupled with great mobility. This mobility must be such as to permit rapid displacement and emplacement without entailing great labor on the part of the personnel. For this reason, and because horse-drawn artillery will not be able to exist in gas infested areas, mechanical traction must be utilized. Such traction must be capable of movement across country as well as on roads.

Counter battery artillery of a corps should occupy all the depth possible, i.e., from 2 to 8 kilometers behind the front lines. The various calibers should be organized longitudinally in groupments. The transverse organization, though in general use during the war, leads to great difficulties in the installation and maintenance of communications and in maintaining proper coordination with the divisions. The various groupments should comprise complete units. For instance, the organic artillery of a corps would consist of two

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regiments, each comprising one battalion of 105's, one of 155 howitzers and one of 155 G.P.F.s. The regiments of reinforcing artillery from the general reserve would have the same composition.

The zones of action for corps artillery will be determined by the dispositions of the enemy artillery. Such zones may, or may not, be superimposed on the zones of action for divisional artillery. The common procedure of designating the far limit of range of the divisional artillery as the near limit of the corps artillery zone of action does not appear sound. Enemy batteries are scattered over the field of battle, and many of those most dangerous to the infantry will be found close up to the front in the zone of the division artillery. This artillery is usually fully occupied in supporting and protecting its own infantry. The corps artillery, by reason of its organization and its special means of observation, aerial especially, is particularly able to carry on counter battery missions over the entire terrain occupied by the enemy. It may, of course, be assisted by the divisional artillery when available, as in the preparation for an attack. Fire on fleeting targets and interdiction or harassing missions should be handled by divisional artilleries in their zones of action, thus leaving the corps artillery free for counter battery.

The training of artillery radio personnel should include exercises in which several planes or instruments are sending simultaneously with different wave lengths. This situation will be the rule in war and must form the basis for instruction in peace.

Major LeNotre in his article, "**Artillery Fire Against Tanks,**" discusses the problem of defense against this relatively new and increasingly important weapon of the infantry. Obstacles, mines, or special weapons may be used, but it is evident that the artillery must play a major role in combat against tanks.

The infantry regulations state that tanks should be employed in mass. Ordinarily a platoon of five tanks will be assigned to an infantry battalion. The tanks must be concealed as long as possible and then brought into action simultaneously on a broad front in order to scatter the enemy fire.

The provisional regulations for tanks state that one tank battalion per division will ordinarily allow sufficient tanks for simultaneous action over the entire front or for an action in depth over part of the front only. The allotment to battalions will depend upon the mission. For a battalion taking part in the main blow and attacking on a front of 400 to 500 meters a tank company should be allotted, giving two platoons in first line and one in reserve. Battalions in the secondary attack may have one platoon of tanks allotted.



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Tank operations, then, will be characterized by surprise, mass action on a broad front, large numbers of tanks, and variable echelonment in depth according to the effort required. Our infantry will be menaced by the guns of many tanks appearing simultaneously at short range, hence the artillery intervention must be particularly rapid and effective. This means obtaining direct hits or very close bursts for light artillery. During the war the greatest tank losses were caused by single pieces firing at short range.

The regulations provide for action against tanks by battery and by single piece. Experience has shown that battery concentrations against tanks have had very little success, and this study deals with the single piece only. The author cites several examples of the efficacy of the single gun at short ranges.

In order to obtain maximum effect, a rapid precise fire must be delivered when the tank approaches a previously registered point. The gun commander must know the zone of dispersion at this point, and, if the tank moves safely through it, fire must be begun at another registered point. The terrain must be thoroughly studied and organized. As the anti-tank gun pertains particularly to the defensive, the time and the facilities for such organization will usually be available. All suitable points in the zone of action must be registered. Obstacles should be placed so as to halt or slow down the tanks. If necessary, artificial registration points should be installed and a complete panoramic sketch of the zone of action should be made.

Armor piercing shell should be provided; if not, the most powerful H. E. shell available should be used. A tracer element would be of great assistance and should be developed for anti-tank use.

Using the H. E. shell, the point of aim should be somewhat below the center of the tank. With the A. P. shell the sight should be kept at the center of the tank.

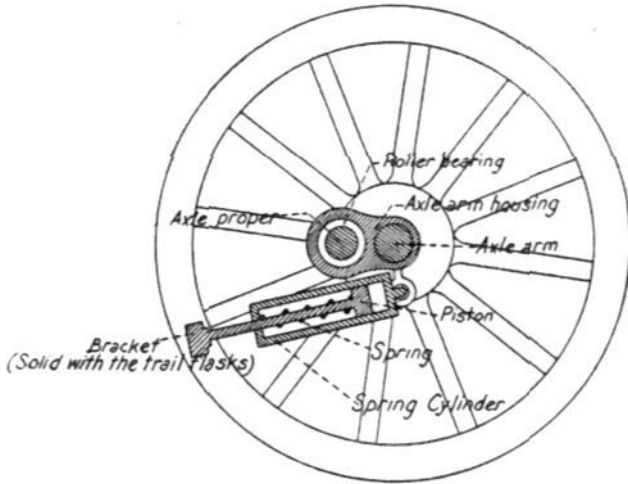
Before installing an anti-tank gun the infantry must be consulted, and the entire action of the piece must be in close liaison with that of the neighboring infantry. As complete protection as possible must be provided for gun and crew, and arrangements must be made for prompt change of position. A platform, of course, should be provided for the gun.

The importance of the tank necessitates a most careful study of anti-tank fire. Many problems of this sort should be fired each year in order to obtain practical knowledge of the difficulties involved.

In this number appears a "**Description of a Light Howitzer**" just constructed by the Dutch firm, Hollandsche Industrie in Handelmaatschappij, at The Hague. The weapon is a 105-mm. howitzer, 22 calibers long, with a range of 10,350 meters and a projectile

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weighing about 33 pounds. The powder charges provide for six zones. The weight of the piece in the firing position is about 3,200 pounds.



*Dutch Shock absorbers for 105mm Howitzer Carriage*

In order to provide for high speeds on the road, an elastic suspension is provided between the wheels and the carriage. The axle proper does not carry the wheels. Turning around the axle on roller bearings are two sleeves or housings carrying the axle arms for the wheels. The axle proper is kept in position by two sets of springs attached to the housing and to the trail flasks. This suspension allows a speed of about 19 miles an hour without damage to the materiel.

# **CURRENT FIELD ARTILLERY NOTES**

## **Field Artillery School To Experiment with Transportation of Horses by Motor Truck.**

In conformity with a recommendation of the Commandant, the Field Artillery School, Fort Sill, Oklahoma, an experimental truck for the transportation of animals will be converted at the Normoyle Quartermaster Depot, Fort Sam Houston, Texas, and sent to the Field Artillery School, Fort Sill, for use. The truck will be designed to carry six horses and will be used for experiments in the transportation of horses by motor over long distances. The conversion is necessary inasmuch as reports indicate that there is no commercial vehicle being manufactured which will carry six animals, and that there is no immediate prospect of such a vehicle being put into production. The present Army truck can be converted for experimental use at a cost of about \$2,400.

## **Consideration To Be Given Further Substitution of Cross-Country Cars for Motorcycles.**

The Secretary of War has directed the chief of each combat branch and supply branch to study Tables of Organization and Equipment with a view to recommending whether or not cross-country cars can be more fully substituted for present authorized solo motorcycles, motorcycles with side cars, five-passenger cars, staff cars, and reconnaissance cars. In this study consideration will be given:

1. The number of persons required to be transported and the multiple uses of the various vehicles.
2. Service requirements, such as use for messenger, command and reconnaissance purposes.
3. Performance of transports under various service conditions as to roads and terrain with consideration for the comparative necessities for repair facilities.

The superiority of the cross-country car over the motorcycle and other wheeled motor passenger vehicles for cross-country transportation is well established. This points to the possible desirability of a greater substitution of the cross-country car for the motorcycle and other passenger cars.

In the Experimental Mechanized Force now assembled at Fort Leonard Wood, Maryland, twenty-four motorcycles and twenty cross-country cars are being used, permitting a comparison of vehicles, as well as facilitating a decision as to whether or not the cross-country car can satisfactorily replace the motorcycle in whole

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or in part. Experience with motorcycles indicates that they are more difficult than automobiles to maintain in running condition in a military organization. Although balloon tires increase the cross-country performance, motorcycles cannot attain the cross-country mobility of the average cross-country car. However, the solo motorcycle has proved its value as a messenger carrier. This is particularly true where good roads are available. They are economical as compared with the cross-country cars, being one-man carriers, cheaper in gas and oil consumption, and have the advantage of negotiating roads without interfering with marching troops. Reports from foreign armies indicate practically all of them are using many motorcycles and that side cars are used not only for carrying personnel but also as machine-gun carriers and radio carriers.

It is expected that the opinions of the chiefs of interested branches will depend somewhat on the powers and limitations of both cross-country cars and motorcycles as brought out in the operation of the Mechanized Force at Fort Leonard Wood this summer.

### **Movietone Training Pictures**

An exhibition of movietone training films was given at the Fox Theater in Washington at 9:00 a. m., June 18, 1928.

These films have been in the making at Fort Benning, Georgia, for the past several months. They are the result of experiments conducted at that station with a view to determining if this new invention can be used advantageously for training purposes.

While the Army has used moving picture films to advantage for training activities, particularly during the World War, these have the disadvantage of a great part of the film being taken up by titles and of the necessity of supplementary explanations being given by the instructor while the picture is being shown. It is believed that the new apparatus recording both sound and motion simultaneously will obviate the necessity for this. The pictures which have been made are based on simple scenarios which illustrate training by a group or organization in some phase of tactical instruction such as rifle marksmanship.

The exhibition on June 18 was arranged through the courtesy of the Electrical Research Products Company, Inc., in order to afford officers of the War Department an opportunity personally to judge the value of such a method of instruction.

### **Laced Boots Adopted for Enlisted Men of the Field Artillery**

The War Department has authorized a laced boot in lieu of the present garrison shoe and canvas legging for peace-time wear by enlisted men of the cavalry and field artillery.

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The new boot will be of soft, flexible, tan leather, close fitting about the ankle and calf, with a boxed toe, no buckle or strap at the top, and the height will be such that the top of the boot will come as close to the knee as comfortable wear will permit. The proposed allowances of this boot will be three per enlistment.

In order to avoid mixed clothing within organizations, the laced boot for the present will be authorized only for enlisted men of the cavalry and field artillery. Consideration will be given later to an authorization for the wearing of such boots by mounted enlisted men of other branches.

In addition to presenting a neater appearance and to being more comfortable while riding than the shoe and canvas legging, the adoption of this boot will effect an approximate saving on clothing of \$10.35 per man per enlistment.

### **Ambassador to Cuba Completes Training Period with Officers' Reserve Corps**

Col. Noble Brandon Judah, Jr., Ambassador to Cuba, recently took leave from his post in Havana in order to participate in the annual summer training of his regiment of the Organized Reserves at Camp McCoy, Wisconsin.

Colonel Judah is the Commanding Officer of the 332d Field Artillery, which originally was the 149th Field Artillery, 42d (Rainbow) Division, with which the Ambassador served during the World War.

The 332d Field Artillery wound up its training period at Camp McCoy, Wisconsin, with a brigade problem in which the 331st F. A. and 497th F. A. also took part. This was the first brigade problem on such a large scale that has ever been handled by an American reserve field artillery brigade.

In commenting to the Chief of Staff on the work of his regiment during its training period, Colonel Judah was most enthusiastic over the progress the officers of his regiment had made under the Regular Army instructor assigned to it.

Colonel Judah is well qualified to speak of Reserve Corps activities and progress, as, in addition to the prominent place which he has reached in civilian activities, he has had a varied and extensive military career. Appointed second lieutenant, Battery C, 1st Illinois Field Artillery on February 7, 1916, he reached the grade of major July 21, 1917, and that of lieutenant colonel, August 25, 1918. He saw active service on the Mexican Border during the concentration of the National Guard in Texas in 1916 and accompanied his regiment, the 149th Field Artillery, to France in October,

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1917. He later became Assistant Chief of Staff for Military Intelligence of the 42d Division and the Third Corps, participating in the Champagne-Marne, Aisne-Marne, St. Mihiel and Meuse-Argonne actions. He was awarded the Distinguished Service Medal, French Legion of Honor (Chevalier), Croix de Guerre (with palm) and was cited for bravery in orders of the IV French Army.

After the war, he was appointed a lieutenant colonel in the Officers' Reserve Corps and later reached the grade of colonel. Since his appointment he has manifested a lively and keen interest in the development and activities of this component of our National Defense. His patriotic action in taking leave from his post to participate in the training of his regiment is only one manifestation of this interest.

### **Field Artillery R. O. T. C. Unit To Be Established at the University of Florida**

The War Department has approved the recommendation of the Commanding General of the Fourth Corps Area for the establishment of a field artillery unit at the University of Florida. The unit will be established with the beginning of the school year of 1928-29.

For this year the enrollment will be limited to the First Year Basic Course. As no mounted instruction is prescribed in this course for field artillery units, the issue of animals to the institution will be deferred until the year 1930.

### **Thirty-Five Thousand Trainees in C. M. T. Camps This Summer**

With the opening of the second camp at Plattsburg, New York, the last of the Citizens' Military Training Camps scheduled for the summer of 1928 has started. The total enrollment of all camps as reported to The Adjutant General reaches 35,591. This is the greatest enrollment of any summer except that of 1927, when 39,676 were trained. The popularity of the camps was indicated by the number of applications for entrance. The total number of applications received, 57,868, exceeded that of any other year.

Fort Sheridan, Illinois, which opened July 27 and closed August 25, leads all camps with a record attendance of 1,995. The next largest camp is the second Plattsburg Camp with a reported attendance of 1,834. The Second Corps Area, with Headquarters at Governors Island, New York, led all corps areas with a total enrollment of 5,243. The Seventh Corps Area, Headquarters, Fort Omaha, Nebraska, was second with 4,911.

## CURRENT FIELD ARTILLERY NOTES

The total number of men enrolled this summer by corps areas as compared with last summer's enrollment follows:

<i>Corps Area</i>	<i>1928</i>	<i>1927</i>
First Corps Area.....	2,971	3,371
Second Corps Area.....	5,243	4,909
Third Corps Area.....	4,187	4,872
Fourth Corps Area.....	4,017	5,050
Fifth Corps Area.....	4,161	4,461
Sixth Corps Area.....	4,578	4,809
Seventh Corps Area.....	4,911	5,384
Eighth Corps Area.....	2,512	3,291
Ninth Corps Area.....	3,011	3,131
Total.....	35,591	39,278

1928 attendance by camps follows:

<i>Camps</i>	<i>Dates</i>	<i>Enrollment</i>
Fort McKinley, Maine.....	July 5 to August 3.....	847
Fort Adams, Rhode Island.....	July 5 to August 3.....	834
Camp Devens, Massachusetts.....	July 5 to August 3.....	797
Fort Ethan Allen, Vermont.....	July 5 to August 3.....	618
Plattsburg Barracks, New York.....	July 2 to July 31.....	1,496
Plattsburg Barracks, New York.....	August 6 to September 4.....	1,834
Fort Niagara, New York.....	July 2 to July 31.....	346
Madison Barracks, New York.....	August 3 to September 1.....	191
Fort Hancock, New Jersey.....	August 3 to September 1.....	321
Fort Monmouth, New Jersey.....	August 3 to September 1.....	412
Fort DuPont, Delaware.....	August 3 to September 1.....	230
San Juan, Porto Rico.....	June 22 to July 21.....	495
Fort Washington, Maryland.....	July 6 to August 4.....	773
Fort Howard, Maryland.....	July 6 to August 4.....	582
Fort Hoyle, Maryland.....	July 6 to August 4.....	604
Fort Eustis, Virginia.....	July 6 to August 4.....	1,385
Fort Monroe, Virginia.....	July 6 to August 4.....	462
Fort Myer, Virginia.....	July 6 to August 4.....	174
Fort Barrancas, Florida.....	June 17 to July 16.....	583
Fort Bragg, North Carolina.....	June 17 to July 16.....	1,017
Fort Moultrie, South Carolina.....	June 17 to July 16.....	787
Camp McClellan, Alabama.....	June 17 to July 16.....	700
Fort Oglethorpe, Georgia.....	June 17 to July 16.....	615
Fort Screven, Georgia.....	June 17 to July 16.....	315
Camp Knox, Kentucky.....	July 2 to July 31.....	1,458
Fort Thomas, Kentucky.....	July 2 to July 31.....	1,110
Fort Benjamin Harrison, Indiana.....	June 20 to July 19.....	1,559
Fort Benjamin Harrison, Indiana.....	August 1 to August 30.....	34
Camp Custer, Michigan.....	July 26 to August 24.....	969
Fort Brady, Michigan.....	July 26 to August 24.....	253
Camp McCoy, Wisconsin.....	July 26 to August 24.....	171
Fort Sheridan, Illinois.....	July 27 to August 25.....	1,995
Jefferson Barracks, Missouri.....	July 9 to August 7.....	1,385
Fort Snelling, Minnesota.....	August 1 to August 30.....	1,433
Fort Lincoln, North Dakota.....	August 1 to August 30.....	303
Fort Des Moines, Iowa.....	August 1 to August 30.....	807
Fort Crook, Nebraska.....	August 1 to August 30.....	597
Fort Leavenworth, Kansas.....	August 1 to August 30.....	1,576
Camp S.D. Little, Arizona.....	August 2 to August 31.....	140
Fort Logan, Colorado.....	June 20 to July 19.....	382
Fort Sam Houston, Texas.....	June 14 to July 13.....	1,009
Fort Bliss, Texas.....	August 2 to August 31.....	160
Fort Sill, Oklahoma.....	July 6 to August 4.....	802
Fort D. A. Russell, Wyoming.....	June 20 to July 19.....	58
Fort Del Monte, California.....	July 1 to July 30.....	1,255
Fort W. Scott, California.....	June 22 to July 21.....	135
Fort MacArthur, California.....	July 1 to July 30.....	174
Vancouver Barracks, Washington.....	June 15 to July 14.....	576

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Fort Lewis, Washington.....	June 16 to July 15.....	333
Fort George Wright, Washington.....	June 18 to July 17.....	193
Fort Missoula, Montana.....	June 17 to July 16.....	151
Fort Douglas, Utah.....	June 15 to July 14.....	155
Total.....		35,591

The total number of young men trained in Citizens' Military Training Camps since 1921 is as follows:

1921.....	10,299	1925.....	33,914
1922.....	22,119	1926.....	34,194
1923.....	24,483	1927.....	39,676
1924.....	34,082	1928.....	35,591

### Over One Hundred Thousand Students Enrolled in R.O.T.C. Units

Figures just compiled in the War Department show that there were 112,349 students enrolled in the 323 units of the Reserve Officers' Training Corps during the school year 1927-28. Of this number 72,371 were enrolled in 224 senior units and 39,978 in the 99 junior units. The enrollment in the 278 combatant units totaled 106,676, while those of the 45 staff units numbered 5,673. The Infantry leads all other branches with a total of 188 units. The Chemical Warfare Service has the smallest number of Reserve Officers' Training Corps units with a total of one.

The Fourth Corps Area, Headquarters, Fort McPherson, Georgia, leads all corps areas in the number of Reserve Officers' Training Corps students with an enrollment of 17,364. This corps area also leads in the number of Reserve Officers' Training Corps units with a total of 52. The Ninth Corps Area with its 17,271 students comes second.

The state of Illinois leads all states of the Union with an enrollment of 10,549 students. California is second with 9,043. Hawaii has Reserve Officers' Training Corps enrollment of 1,124 and Porto Rico an enrollment of 285.

The Field Artillery has twenty Reserve Officers' Training units, including the newly-formed unit at the University of Florida. Our enrollment was about 15,000 students for the school year 1927-1928. Approximately 800 Reserve Officers per year are commissioned from these units and the number of reserve commissions awarded in this manner is steadily increasing.

### Peace Pacts and European Armaments Ten Years after the War

If Germany and her war-time partners are left out of account, their military strength having been reduced by the peace treaties, the other ex-combatant and neutral nations of Europe today have standing armies of which the combined numerical dimensions far



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exceed their total in 1913. In some instances the additions are insignificant, and here may be mentioned the United Kingdom and Ireland. Before the war these two countries had 406,000 men under arms; now they have 408,000. But France has augmented her pre-war standing army of 646,000 by 20,000. Italy had 274,000 men under arms in 1918; today she has 347,000. Belgium went up from 47,000 to 79,000; Greece, from 25,000 to 66,000; Rumania, from 103,000 to 205,000.

Even Switzerland, a non-combatant in the war, has enlarged her so-called active militia from 28,000 to 170,000. On the list of increases are: Denmark, from 14,000 to 33,000; Holland, from 26,000 to 29,999; Spain, from 98,000 to 224,000; Sweden, from 26,500 to 28,500.

The peace strength of Europe as a whole is today approximately 1,000,000 less than in 1913, but the reduction is amply accounted for by the treaty limitations put on German, Austrian, Hungarian and Bulgarian armaments, and by the fact that Soviet Russia and the Russian succession states now have a total of about 900,000 men under arms instead of the Russian total of 1,200,000 before the war. The estimated grand total for Europe is 3,000,000.

If all efforts at land disarmament in Europe have hitherto failed, it was not because of lack of readiness on the part of the European governments to conclude formal peace pacts. Genoa, Locarno, London have seen security and good-will agreements signed, and now Paris has been the scene of another accord, perhaps more far-reaching than its predecessors.—*Detroit Free Press, Sept. 2, 1928.*

### **82nd (All American) Division Decennial Reunion**

Alvin C. York (Sergeant York), the Tennessee mountaineer who became one of the outstanding heroes of the World War, Major General George B. Duncan, former Divisional Commander, and F. M. Williams, erstwhile "two gun" western sheriff who won the Distinguished Service Cross while commanding a machine gun company, are among the former members of the 82nd Division who are expected to attend the "Ten years after" reunion which will be held in New York City, September 21, 22, and 23, at the Hotel McAlpin.

A program of sight-seeing and theater parties, a field day and review at Governor's Island, and a monster dinner-dance at the McAlpin have been arranged. The date of the convention marks the tenth anniversary of the division's memorable drive in the Meuse-Argonne area, the last offensive of the war.

The appellation "All American" is derived from the fact that the division was recruited from every part of the United States.

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It carried on its rolls representatives of all nationalities, creeds, and religions of the white race, as well as a large number of American Indians. It was trained at Atlanta, Ga., and took part in the St. Mihiel and Meuse-Argonne offensives, as well as being in the lines on the Toul, Marbache, the Somme and the Vesle.

The 319th, 320th and 321st Regiments of Field Artillery, which constituted the 157th Field Artillery Brigade, were part of the 82nd Division. From February until October, 1918, the Field Artillery brigade was under command of General C. D. Rhodes.

### **91st (Wild West) Division's Meuse-Argonne Reunion**

The 91st Division, from all sections of the Pacific Coast and Rocky Mountain States, will gather in Seattle on September 29 for their tenth annual Meuse-Argonne reunion convention. This date is the eve of the anniversary of the beginning of the Meuse-Argonne drive, in which the division representing the Far West was "blooded." Elaborate preparations have been made for the reunion.

The 346th, 347th, and 348th Regiments of Field Artillery and the 316th Trench Mortar Battery of this division, constituting the 166th Field Artillery Brigade, were commanded during the war by the following officers:

Brigadier General Edward Burr, September 5, 1917, to August 18, 1918.

Brigadier General D. E. Aultman, August 19, 1918, to September 10, 1918.

Colonel Edward Kimmel, September 10, 1918, to October 8, 1918.

Brigadier General Beverly Brown, October 9, 1918, to October 19, 1918, and November 8, 1919, to November 18, 1918.

Colonel L. E. Bennett, October 19, 1918, to November 7, 1918.

### **Other "Ten Years After" Reunions**

The 36th Division (National Guard) and the 90th Division (National Army) will celebrate their decennial at San Antonio, October 8 to 12, 1928, in conjunction with the meeting of the American Legion in that city. The 37th Division had their decennial at Toledo on September 1, 2 and 3. The 32nd and 90th Divisions are also having "ten years after" reunions, and the 42nd has already completed theirs at Columbus, Ohio.

### **Board Designated To Study Animal Allowance and Replacement**

The following named officers have been designated as a board to study the allowances of animals in the Army, their distribution, and their replacements required:

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Major Matthew H. Thomlinson, Infantry,  
Major James J. O'Hara, Cavalry,  
Major Charles L. Scott, Quartermaster Corps,  
Major Rene E. de R. Hoyle, General Staff,  
Major Marion O. French, General Staff,  
Capt. Miles A. Cowles, Field Artillery.

This board will consider the advisability of any further reduction of animals in the Army by reason of possible further motorization. It will also recommend any further increase in motor transportation deemed desirable in lieu of present animal transportation.

Figures furnished by the Remount Service, Quartermaster Corps, indicate that there were approximately 40,000 animals in use during the fiscal year 1927 at the various posts, camps, and stations of the Regular Army throughout the United States and its insular possessions.

### **National Defense To Be Considered in Road and Bridge Construction.**

A movement to consider national defense and military necessity in the future construction of highways and bridges has been inaugurated by the National Defense Committee of the Norfolk-Portsmouth, Virginia, Chamber of Commerce in a report to the Board of Directors of that body. This committee, made up of Reserve officers, considers that it is within the province of chambers of commerce throughout the country to consider the practicable availability of highways for joint commercial and military uses. The committee states that the serviceability of highways is limited by the vertical clearances of bridges. In a survey recently made by the members of the committee, it has been shown that no standard for vertical clearances has been set and that in many cases this clearance is less than 10 feet. The committee, therefore, recommends that in future construction and, where possible in repair, provision should be made for a vertical under-pass clearance at a minimum of 10 feet 6 inches. From a military standpoint, this figure is arrived at from the fact that the standard Class B truck (the heavy truck used by the Quartermaster Corps) requires a vertical clearance of 10 feet 4 inches from wheel base to top of bows. From a civilian standpoint certain loads, particularly in agricultural communities, need and can use to advantage the vertical clearance recommended, particularly those loads composed of hay or tobacco. In the case of the latter, a clearance of less than 10 feet 4 inches makes a difference of two hogsheads of tobacco in a truck load.

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In addition to recommending that the Norfolk-Portsmouth Chamber of Commerce undertake the advocacy of the above-mentioned standard minimum under-pass clearances within the state of Virginia, a recommendation was made that steps be taken to secure cooperation from other states of the Union toward the same end.

The recommendations of this committee have received the indorsement and approval of Mr. John S. Rixey, State Highway Commissioner of Virginia.

### **Malleining Public Animals Prior To Sale**

It has frequently been noted that public animals are condemned and sold to civilians without having had a mallein test within twenty-one days of the sale, as required by AR 40-2100. This is a matter of great importance and one that should receive careful consideration.

Every animal sold to a civilian must be certified as free from communicable disease, and this cannot be done if the horse or mule in question has not been mallein tested within the prescribed time. The Army must never be guilty of spreading contagious or infectious diseases among the surrounding civilian owned animals.

### **Swedish Officer to Be Attached to Field Artillery**

The Acting Secretary of War has authorized the attachment of Lieutenant E. G. Marchander, Royal Swedish Artillery, to the First Field Artillery, Fort Sill, Oklahoma, or to the Field Artillery School, at the same station, at his option, for a special course in motors which will begin on September 12, 1928.

# THE UNITED STATES FIELD ARTILLERY ASSOCIATION

TO MEMBERS:

In compliance with Article VII, Section 1, of the Constitution, notice is hereby given that the Executive Council has fixed 4:30 p. m., Saturday, December 15, 1928, as the time of the annual meeting of the Association, to be held at the Army and Navy Club, Washington, D. C.

The business to be disposed of will be the election of one member of the Executive Council from the regular army to succeed Major General Fox Connor, whose term of office will expire this year, action on the proposed amendment to the Constitution, and such other business as may properly come before the meeting.

PROPOSED AMENDMENT TO THE CONSTITUTION

Washington, D. C.,  
May 12, 1928.

The Secretary, United States Field Artillery Association,  
Washington, D. C.

Sir:

In conformity with Article IX of the Constitution of the United States Field Artillery Association, the undersigned, being active members of the Association, hereby propose a certain change in said Constitution for the following principal reasons:

The usefulness of the Association to its active members is needlessly impaired by the requirement that all publications shall be furnished to active members without payment other than the annual dues. Much available matter, of vital interest to field artillerymen, might be published and offered for sale to active members, which cannot be published gratis on account of the expense involved. It is believed that the interest of the active members in this regard will be safeguarded by the Executive Council.

The proposed amendment to said Constitution is clearly set forth as follows:

It is proposed to amend Section 3, of Article V, by striking out the period at the end of said Section, substituting therefor a comma, and adding to said Section the words "except such publications,

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other than the Journal, as may be designated by the Executive Council.", so that said Section shall read, when amended, as follows:

Sec. 3.—Active members shall be entitled to receive all publications issued by the Association without payment other than the annual dues, except such publications, other than the Journal, as may be designated by the Executive Council.

Respectfully submitted,

ANDREW MOSES, Col., F. A.	G. R. ALLIN, Lt. Col., G. S.
E. P. KING, JR., Major, F. A.	(F. A.)
E. H. DEARMOND, Lt. Col., F. A.	A. C. MCBRIDE, Major, G. S.
E. R. REDMOND, Col., F. A. Res.	(F. A.)
MILES A. COWLES, Capt., F. A.	R. S. PRATT, Lt. Col., G. S.
T. G. M. OLIPHANT, Major, F. A.	(F. A.)
C. A. SELLECK, Major, F. A.	K. S. PERKINS, Major, G. S.
J. N. GREELY, Major, G. S. (F. A.)	(F. A.)
CORTLANDT PARKER, Major G. S. (F. A.)	A. C. SANDEFORD, Major, F. A.
R. E. D. HOYLE, Major, G. S. (F. A.)	A. F. BREWSTER, Lt. Col., F. A.
H. W. HUNTLEY, Major, G. S. (F. A.)	R. M. DANFORD, Major, F. A.
	D. C. CUBBISON, Major, F. A.
	E. J. DAWLEY, Major, F. A.
	H. L. LANDERS, Lt. Col., F. A.
	J. A. CRANE, Major, F. A.
	H. PARKHURST, Major, F. A.
	LEROY W. HERRON, Col., F. A. Res.
	D. M. BEERE, Major, F. A.