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THE FIELD ARTILLERY JOURNAL

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ANIMAL TRANSPORTATION FOR FIELD ARTILLERY

BY LIEUTENANT MARK R. HARRINGTON, O.R.C.

The Author is an Ethnological and Archeological Explorer of Extended Experience. His Observations on Field Transportation Reflect the Practical Knowledge Gained in His Profession.—EDITOR.

BEGINNING OF ANIMAL TRANSPORTATION

HUMAN progress from earliest times, both in peace and in war, has depended largely on man's increasing ability to utilize natural forces for his own benefit. Among his earliest conquests along this line was the domestication of animals, whose brute strength he learned to turn into useful channels. The great importance of this domestication of animals may better be understood when we realize that the whole fabric of modern civilization, up to within a hundred years, when the steam locomotive came into use, has rested upon the use of draft and pack animals for transportation by land.

Man's earliest recognition of the types of animals which were destined to play such a vital part in his development may be seen in the ancient paintings and carvings decorating the walls of certain caves in western Europe, particularly in France, which date back to the Paleolithic or Old Stone Age—that period, dim and remote, when the simplest of human arts and crafts were born. In these paintings we may recognize, in addition to such creatures as the long extinct European rhinoceros and the sabre-tooth tiger, perfectly recognizable portraits of the massive mammoth, near kin, if not the progenitor, of the modern elephants, still important for transportation in some parts of the world; the European bison, related, if distantly, to the domestic varieties of oxen, whose humble labors have helped produce the crops to feed countless generations of mankind; the reindeer, still used for transportation in some northern countries; and most important of all, the *Horse*, now most useful of all the domestic animals known to man.

We have no reason for supposing, however, that the cave-men who drew these pictures realized their opportunities to tame and use the animals they portrayed—apparently they did not, for nowhere do we see representations of mounted men, or of animals

bearing burdens. To the hunters of the Old Stone Age the horse was as much wild game as the great cave bear or the hairy rhinoceros, and indeed, the type depicted resembles closely the still surviving wild horse of Asia. The domestication of the horse, at least, may have taken place some time in the Neolithic or New Stone Age; but the men of that time were either not so artistically gifted as their predecessors, or they drew their pictures on perishable materials, for nothing in the way of pictorial records concerning the horse as a domestic animal has come down to us from this period. Dr. George Grant MacCurdy of Yale University informs the writer that "there is no convincing evidence that the horse was domesticated in Neolithic times. With the coming of the Bronze Age, however, the presence of the bridle bit and harness trappings leave no room for doubt."

The ancient monuments of Egypt, of Babylonia, and Assyria, of Greece and Rome, show that the horse had already come into his own, when the earliest of these civilizations flourished, for we see him ridden by soldiers, and harnessed to battle chariots. Doubtless, also, horses drew the carts or wagons in the supply trains of the period, or at least, carried packs of provisions and other supplies for the armies. The use in transportation of camels, asses, mules, oxens, and to less extent, of elephants, is mentioned in the early writings of many countries, and it is clear that the use of animals of some sort for transportation was almost universal in the Eastern Hemisphere from the dawn of history, excepting only Australia and parts of Africa.

In the Western Hemisphere the situation was peculiar. Paleontologists have proven that the horse passed through a great part of his evolution in North America, developing from the tiny Eohippus, only about 11 inches high, and possessing four toes on each front foot, and three and a fraction on each hind foot, to a full size, singletoed animal, practically identical with the modern horse. In spite of this, the horse *had disappeared from the entire hemisphere,* before human inhabitants reached the Americas, for nowhere have archeologists found any trace of horses associated with American Indian remains dating before the Spanish conquest of Mexico; in fact, the only animals used for transportation in all the Americas before the conquest was the llama, a distant cousin of the camel, used in the Andes region of South America, as a pack animal only, and the dog in North America, which served as a pack animal, as well as for drawing on the plains that primitive vehicle, *the travois,* a contrivance consisting of two poles on which a frame is fastened for the transportation of goods. The animal works between the two poles, the small ends of which are attached to his harness, the

large ends dragging on the ground behind him. In the North the dog serves as a draft animal for sledges and toboggans in winter, as well as a pack animal in summer.

The horses brought by the Spaniards multiplied in their new home, and some, escaping from their masters, worked their way North and became the progenitors of the herds of wild mustangs or prairie horses. The Indians, although afraid at first of these new and mysterious animals, soon learned to ride them, to pack their possessions on them, and to use them for drawing *the travois*. The coming of the horse wrought a transformation in the life of many of the plains tribes, changing them from dwellers in settled villages and tillers of the soil, to nomadic buffalo-hunters, living in tents, and to dashing warriors who could carry their raids to distances hitherto undreamed of.

In due time the ox and the ass were also imported from Europe, and while no attempt has been made to bring in the elephant, the yak, the zebu, or the old-world domesticated buffaloes, the transportation camels were actually introduced in 1857 into the deserts of Southwestern United States, where for reasons that will be discussed later, they have proved a failure. In comparatively recent years the reindeer has been imported into Alaska, and seems to be a success.

EARLY USE OF ANIMALS IN ARTILLERY TRANSPORT

Whether cannon were invented in China or in Arabia is not very clear, but it is certain that when they first appeared in Europe, in very crude form, early in the 14th century, they were not provided with wheels of their own, but were doubtless transported, together with the wooden cradles to which they were attached, in the carts or wagons of the period, drawn by horses, mules, or oxen. In these same vehicles probably travelled their rude stone projectiles and the materials for compounding on the spot the so-called "serpentine" powder with which they were loaded. The next improvement was to mount the gun on a sleigh—a method still known in Norway and in Canada.

By 1376, however, two-wheeled carriages had been invented for the "bombards," as cannon were then called, and from that time onward progress was continuous. By the middle of the 15th century the limber for supporting the trail of the piece on the march had appeared, with a pintle passing through a hole near the end of the trail. Instead of a pole there was a pair of shafts on the limber, between which was hitched a single horse, the rest of the team, however, being attached in front in pairs.

In the 16th century we hear of large guns being drawn by oxen

in Italy, one piece, in particular, 15 feet long, requiring fourteen yoke of oxen. Horses were used only with lighter guns. In later times, elephants were used in India by the British Army to transport field pieces, and camels have served in different parts of Asia and Africa to carry the parts of dismantled guns and ammunition, and even to draw heavy ordnance. It is even said that in Persia and nearby countries camels have been used for the conveyance of very light pieces of artillery which were mounted on the saddle-pommel, and used in that position, the camel kneeling while the gun is loaded, aimed, and fired.

THE FIELD ARTILLERY HORSE

The experience of several centuries, however, has taught that the horse is best of all animals for Field Artillery transport. For horse and light artillery a certain type, usually classified as the light draft-horse, is selected, an animal weighing from 1000 to 1300 pounds, preferably about 1200, and standing 15 hands two inches to 16 hands high; comparatively short in the leg, short in the back, strong in the neck and quarters. Such horses have strong strains of blood from the heavy draft breeds—Shire, Clydesdale, Belgian, Normandy, or Percheron, particularly the latter, mingled with that of smaller types of horse.

For the heavier field artillery guns larger horses should be used, weighing from 1300 or 1400 pounds up, regular heavy draft animals of Percheron, Clydesdale, or other similar stock. We will devote little space to this sort of Field Artillery horses, for the reason that, of late years, tractors have been largely, although not entirely, employed, for transporting the heavier types of field guns. Indeed, it is probable that they will entirely supplant the horse for this purpose except under certain special conditions, and the spectacle of a howitzer moving slowly along behind a team of five or more pairs of magnificent Percherons will soon be a thing of the past. For the lighter guns, however, the 3-inch and the 75-mm. field pieces, it is probable that horses will be essential for many years to come, as no tractor has yet been developed that will offer the easy mobility, flexibility, and speed when needed, the ability to manœuvre over many kinds of terrain, that is furnished by a good team of well-trained light artillery horses. It is true that some light batteries have been motorized, but it is also a fact that in their present state of development they can not compete in many conditions of terrain and weather, with horse-drawn light batteries, or horse artillery, in fulfilling the first avowed purpose of Field Artillery—"to march rapidly and in good order, and to establish itself promptly and without confusion in such positions as will best utilize the available terrain," preparatory to opening fire.

Returning to a more detailed account of the light artillery horse, we may consider some of the characteristics to look for in selecting an animal for this purpose. First of all he should be healthy, and sound in wind and limb, he should be an easy keeper, his food being properly assimilated; and free from bad habits; his weight around 1200 when in good condition, his height about 16 hands, and his age preferably between four and eight. In temperament the horse should be alert and intelligent, responding quickly to stimulus; his action should be bold and free; the movements of his limbs parallel in direction to the median line of his back. He should pick up his feet smartly, showing the bottom, and travel freely without dragging or stiffness; but exaggerated high knee action is not necessary. Head and neck should be carried high. Quality of blood in the horse is shown by a fineness of hair, smoothness of bone, and trimness of joint, which is unmistakable.

Some other points condensed from Carter and Arnold's "Field Artillery Instructions" are as follows:

Head.—Forehead broad but not bulging; eyes full, clever and prominent; muzzle broad and fine; large open nostrils; a wide space between the branches of the lower jaw.

Neck.—Should be strong and muscular, supporting the head gracefully; some arch adds to the appearance of the horse.

Withers.—Should be muscular and smooth, neither too high and thin, nor too low and broad.

Shoulders.—Should present a happy medium between the straight and sloping types.

Chest.—Should be full and deep.

Forearm.—Should be comparatively long, broad and strongly muscled in its upper part, tapering to the knee.

Knee.—Should be broad as seen from the front, and amply supported from below.

Pastern.—Should be reasonably long, smooth, and free from surplus flesh, and, most important of all, should stand at an angle of 45 degrees. A horse with pasterns set at this angle is much less liable to have sidebones or similar ailments caused by concussion than a horse with straight pasterns, for the sloping pastern acts as a sort of spring or shock absorber.

Shank.—The shank with its attached tendon at the back should be deep, viewed from the side, giving ample support to the knee, but viewed from front or rear should appear flat.

Fetlock.—Should be smooth and deep.

Foot.—Should be large, the hoof dense in texture, preferably dark in color, soles concave, frog large.

Body.—Should be short on top, long below, broad along the back, ribs strongly arched, and of great depth.

Loin.—Should be broad and well muscled.

Croup.—Should be broad, fairly level, heavily muscled.

Thigh.—Should be strongly muscled, and quarters thick and full; lower thigh should be heavily covered with muscle, and deep from front to rear.

Hock.—Should show considerable depth when seen from the side, should be broad in front, but somewhat thin seen from the rear, without superfluous flesh. Hock should be smooth and its curves well defined. As the horse stands naturally, hocks should be straight and true, viewed from behind, without a tendency to turn out or in.

This concludes the list, which, as given in Field Artillery Instructions, is somewhat more detailed.

As to blemishes of trifling character, such as the scars of rope-burns and wire cuts, they rarely injure a horse for service, although they mar his beauty.

Horses, like people, differ greatly in physical and mental traits; none are perfect, although some approach our ideal more nearly than others. We must therefore select horses for field artillery purposes, which first of all combine health with the proper age, weight and build, and then from animals possessing these qualifications, choose those who come nearest to our ideal in finer points.

TRAINING

The light artillery horse must be trained for both saddle and draft. The system of training prescribed by Field Artillery regulations is based on kindness and patience, plus a knowledge of horse psychology, and is diametrically opposed to the rough and brutal methods of the "bronco-buster," who, often attempts to break a wild horse for riding at one sitting, and it must be admitted, frequently succeeds—in a way. The gentler method, however, yields fewer failures, and more permanent and dependable results. It must be self-evident that obedience based on fear alone is a pretty unstable article whether found in man or horse, and in a high-spirited individual, means merely smouldering rebellion, ready to burst into flame at some very inconvenient time. Surely obedience based on confidence and friendly feeling is best in man or beast, especially when this is supplemented by a knowledge that the guiding power, however kind during good behavior, may not be trifled with.

FEEDING

A horse's feed must consist of two elements, grain and roughage, or "roughness," as it is called in some districts, consisting of hay, cornstalks, or similar fodder. The proportion of each to be fed

varies according to the work the horse is doing, the more work the greater the proportion of grain is the general rule. This proportion varies from one-third grain and two-thirds hay (by weight) for light work, to two-thirds grain and one-third hay for very heavy work. Regulations formerly prescribed a daily ration of 12 pounds of oats, barley or corn, and 14 pounds of hay for each light artillery horse, and 14 pounds of grain and 17 pounds of hay for each field artillery horse of the heavy draft type weighing 1300 pounds or more. Substitutions are authorized of grain for hay, or *vice versa*, according to the amount of work the horse is doing. Daily rations for horses have been recently reduced about 25 per cent., which may be good economy, but is hard on the field artillery horse and his efficiency. Roughly, a horse should receive 2½ pounds of provender per day for each 100 pounds of live weight.

WATERING

The two greatest principles of watering are, first, always water your horses before, rather than after, feeding; and second, never water your horses while they are hot, unless their work is to be resumed at once.

HOUSING

The ideal stable for horses in garrison should be dry overhead, but of open enough construction, or with a sufficient number of openings, to permit the fresh air to circulate freely, and the temperature to remain the same inside as outside, as nearly as possible; at the same time so arranged that wind, rain, or snow can not beat in through open windows, or other openings, directly upon the animals. It should be kept so clean that no odor can be detected on entering the stable. A picket-line out of doors should be provided for tying the horses during the day, and paddocks where they may be turned from time to time to roll and enjoy themselves are a great advantage. In temporary camps the horses are tied to picket-lines stretched between the carriages.

CLEANING

Horses should be kept clean, which means that on working days they must be brushed free of dirt and manure before starting out in the morning, and thoroughly groomed after they return from work. When not used, as on Sundays, one cleaning a day is sufficient. The hoofs should be examined and cleaned daily, and the shoes also inspected.

HARNESS

It is most important that saddle and harness be carefully fitted to the individual horse to prevent chafing and sores caused by friction or pressure; and watch must be kept to see that such injuries do not

develop in spite of the fitting, and additional alterations made if needed. The harness should be kept clean and well oiled to prevent its becoming hard and stiff.

THE HARDENING PROCESS

Horses, like men, become fat and soft when deprived of sufficient exercise, in which condition they are exhausted by very slight exertion, are very susceptible to disease, and are, in fact, incapable of hard work. To restore the soft horse to condition it is necessary that he be exercised, not too hard at first, taking care not to exhaust him, but gradually increasing the work more and more until he is perfectly hard and fit, and capable of a normal amount of heavy work without exhaustion. It will be noticed that a horse in good condition is not only less open to disease, but is even less liable to such ailments as harness or saddle sores.

After a horse has once been hardened, regular daily exercise is necessary to keep him in that condition.

THE FIELD ARTILLERY TEAM

For transporting the 3-inch or the 75-mm. gun, it is customary to use a team composed of three pairs, known respectively as the Wheel, Swing, and Lead, each pair having its own driver, who is mounted on the near horse. The question is frequently asked, "Why is it necessary to use so many horses to pull a gun of this type?" The piece, limber and all, weighs only 3730 pounds, or with the cannoneers and their kits, say 4500 pounds gross, a weight which could be handled by one good team, or three horses at most, in farm work. The reason is not far to seek, for in farm work we usually have fairly good roads at least, or reasonably level fields; moreover, heavy loads are habitually moved at a walk, while in field artillery transport, on the contrary, we often meet with very poor roads, or no roads at all, plus rocks, mud, bushes, and every imaginable impediment and difficulty; and in addition, the necessity of frequently marching at a trot, or in horse artillery, at a gallop, all of which helps to explain why three pairs instead of one are needed to draw the light artillery gun. For rapid manœuvre over open country not more than six horses can be used without loss of efficiency, and this limits the size of the guns that can be thus employed.

Besides their service in drawing guns and caissons, horses are employed for the battery wagon, store wagon, and other carriages directly attached to the battery. For the ammunition and other trains, however, motor vehicles are best when obtainable and road conditions permit, otherwise, although horses may be used, mules are considered superior. In districts where there are no roads, or where the roads are impossible on account of mud and shell holes,

pack animals must be used to bring up ammunition and supplies. For this purpose horses or ponies may be employed, but mules are better when obtainable. When horses or ponies must be used as pack animals in rough country, and it is possible to make a selection, short-legged, cobby animals should be chosen. The method of packing will be discussed under the section devoted to pack-mules, a system equally applicable to horses.

THE MULE

Captain Sydney Galtry in his instructive book, "The Horse and the War," makes a positive statement to the effect that "the experiences of the World War have shown that the mule is the best animal for all transport purposes except artillery." The Captain does not state why artillery is excepted, but the writer can fill in the omission from his own experience. The mule does wonderfully well plodding along through seas of mud or any variety of road, bad or good, trotting a little, perhaps, in the best places, but the dash, the responsiveness, the speed, in short, the "get up and git" of the light artillery horse when needed, are poorly represented in his long-eared half-brother.

The mule is practically an artificial creation; he is the hybrid offspring of a jackass and a mare, a creature which cannot reproduce his kind. Being dependent on mankind for his very existence, one might expect him to be properly mindful of his owner's wishes; but on the contrary, he can show on occasion, to its fullest extent, the headstrong willfulness for which his father's family is noted. Yet his virtues are many. He is practically immune from the diseases inherent in the horse, has sounder legs, as a rule, than the horse, is surer footed, and can stand more hardships. He eats less, drinks less, and is less particular about his food, although he is more fastidious about his water. Moreover, he thrives on hard work. Weight for weight, perhaps, a mule can not pull quite as much as a horse, but can pull his load longer, without exhaustion, under greater difficulties. On the other hand, he is eccentric in temperament; no one can tell which vice or virtue is going to express itself next. Usually suspicious of everyone, and ever apprehensive that something is going to be "put over" on him, the mule suddenly becomes conscious of his strength at the most inconvenient times. It is best to keep him working as much as possible, for in idleness he is sure to get into mischief. Many mules refuse to be led if the would-be leader faces them, but come along quietly enough if he turns his back. A story is told that during the late war a British noncommissioned officer came upon a Tommy trying to lead a newly landed American mule, while facing toward the animal, which refused to budge. "Hi sye" shouted the noncommissioned officer.

"Turn yer 'ead aw'y, can't yer? Don't yer see 'ee don't like yer fyce?" Abashed, the Tommy turned his back on the mule, whereupon he found to his astonishment that the "pencil-tail" followed him obediently. As they walked away it was noticed that the Tommy's neck and ears were growing redder and redder.

In selecting mules for supply, ammunition, or other trains, chunky, broad-chested animals should be selected, and tall slim ones should be avoided. The largest mules run to a height of 16 hands or more, and sometimes weigh upward of 1300 pounds, but the writer has obtained best results, everything considered, from mules 14 or 15 hands high, and weighing 1000 pounds, or somewhat less.

While eating the same kinds of food as artillery horses, weight for weight, the mule will eat about half as much grain, and this can be counted upon in planning for their rations, if they can get plenty of hay; if not, more grain must be allowed, perhaps 75 per cent. as much as the corresponding horse. They eat fully as much roughage as a horse of the same size, however. In handling mules, as with horses, quietness, gentleness, and patience will get more out of the animals in the long run than boisterous or brutal behavior. Although mules as a general thing are more serviceable in wagon trains and for pack purposes, they may be found useful for pulling battery carriages under certain conditions, for instance, in hot countries.

PACK MULES

Pack mules are chiefly useful for artillery purposes in carrying the parts of dismantled mountain guns through rough country, and for transporting ammunition and supplies over the same kind of terrain, or when wheeled vehicles can not approach a position where a battery is already established, by reason of mud, shell holes, or similar impediments, or combination of them. Pack mules for transportation in rough country should not be too large or long in the legs, for smaller ones, say 13 to 14 hands high, and weighing around 800–900 pounds, will do more work in proportion, and endure more hardship. Some prefer larger mules, 14 to 15 hands high. They work best from three to six years old. One of the reasons probably, why a small mule can stand a long trip better than a larger one, lies in the fact that when camp is made for the night the small mule turned out to graze can fill himself up quickly and has time to rest, while the large mule has to spend all his time in searching for food, and then does not get enough. Dark colored mules seem more hardy than white or gray ones, and mare mules are more tractable than horse mules, and follow the bell-mare more readily. Especial care must be taken to select pack mules with good teeth, and possessing no malformations of the jaw, which might interfere with feeding.

This bell-mare, or *madrina,* is a regular institution in every well-ordered pack train—that is, in the districts visited by the writer. She is usually a steady old mare, white or gray in color, and wears a bell on her neck, the sound of which is recognized by every mule in the train. She serves as a leader, and wherever she goes they all follow trustingly after. A good pack mule can be counted on to carry a load of about 250 pounds, on an average of 15 miles a day, in rough country, although in some countries visited by the writer, such as Eastern Cuba, the allotted load is less—about 200 pounds. Four mules are required to carry the parts of the mountain gun, including the carriage. To get his roughage the pack mule is usually supposed to graze about the camp at night, but grain is usually supplied at the rate of about 9 pounds per mule per day. If the mules have a tendency to wander away from the camp, or are hard to catch when wanted, they may be hobbled, or when opportunity offers, tied to a picket-line and fodder brought to them, or better still, turned out in an enclosed pasture, if such can be found.

PACK-SADDLES

There are two kinds of pack-saddles in use, one the cross-tree or saw-buck type, largely employed by Indians, traders and prospectors in the Western United States, good for short trips, but not steady work, and the *aparejo,* introduced into the States from Spanish-American countries, and probably of Spanish or Moorish origin. Wherever the *aparejo* originated, it is certainly the best known form of pack-saddle—the most convenient to fasten a pack upon, the least injurious to the animal's back, and the easiest to fit to the individual animal. It consists of a large rectangular flat bag of leather or canvas stitched across the middle, with an opening on each side, through which grass, moss or other stuffing can be inserted until the final result is a thick pad, firm, but not too hard, with a groove down the middle, of such a shape that when laid on the animal's back the backbone is entirely relieved from pressure. The top of the *aparejo* is stiffened with sticks called ribs and boot-sticks. Between the *aparejo* and the animal's skin are smoothly spread several cloths or blankets; above it a square of matting or canvas, the *sobre-jalma*, and the whole is fastened to the back with a broad girth or cincha encircling both mule and *aparejo*, and fastened tight with a latigo strap, while a broad crupper or breeching keeps the *aparejo* from sliding forward. The gun parts, or whatever the load may be, divided when possible into two parcels of equal weight, and fastened with the lair-rope, one on each side, are placed in position and supported there with the sling-rope, after which the longer *lash rope,* provided with a short girth, is pulled tight around pack, animal,

and all, and then passed over the pack again, and under the corners of the *aparejo*, in the famous "diamond hitch" which keeps the whole cargo firmly in place. In rainy weather a waterproof pack-cover or *manta* surmounts the whole. In eastern Cuba a large flexible basket of matting takes the place of the sling-rope. When laid upon the *aparejo* this basket forms a pocket or pannier on each side, in which the load may be arranged, and its flexibility is such that articles of many shapes and sizes may be accommodated, without interfering with the pack's compact form when completed and fastened with the "diamond" or other hitch. Two men are necessary to properly pack a mule, and the same two can, naturally, pack a whole train if there is time enough, otherwise more men are needed. With the train on the road in Cuba ride one or more mounted arrieros or drivers.

A standard pack-train consists of fifty pack mules, one bell-mare, fourteen riding mules, one pack-master, one cargodor, one blacksmith, one cook, fourteen packers. The fourteen packers ride the saddle-mules, the rest of the personnel are mounted on horses.

(Continued in Next Issue.)

THE MASSING OF ARTILLERY FOR THE BATTLE OF VITTORIO VENETO

BY MAJOR J. M. EAGER, F.A.

IN order to understand the part played by the Italian Artillery at the Battle of Vittorio Veneto (October 24–November 4, 1918), it is necessary briefly to explain the situation on this front and the general plan of the offensive.

After the Austro-German drive at Caporetto in the autumn of 1917 was stopped, new leaders were selected, new equipment procured, new men brought to the colors and an aggressive spirit was built up throughout the army. As a result, the Italians were able, not only to stop the spring drive which the Central Powers directed against them, but they also inflicted a severe defeat upon the Austrians at the Battle of Piave in May of 1918.

During the summer of 1918 it became apparent that the initiative no longer lay with the Austrians, and the Italians planned a great offensive. Its general scheme was as follows:

> To break through on a broad front by pushing across the Piave River, about half-way up from the Adriatic, then to drive ahead about twenty miles with a large manœuvring force to the Alpine foothill district around the town of Vittorio Veneto in order to separate the Austrian armies of the Tyrol from those of the Venetian Plains. (See the map at the end of this article.)
>
> As soon as the penetration was accomplished, to start rolling back the interior flanks of the Austrians with a view to opening wider the gap, cutting communications and disorganizing the withdrawal.
>
> The main effort, or penetration, to be assisted by intensified activity and persistent attacks all along the front from Switzerland to the Adriatic, in order to prevent the Austrians from withdrawing reserves with which to stop the penetration.

The first orders for this offensive were issued very secretly on September 25, 1918. The movements of troops and matériel took nineteen days, from September 26th until October 15th. The aviation and heavy artillery moved first; then followed the bridge equipment, consisting of twenty engineer units with nine kilometres of pontoons and foot bridges, and in addition, several hundred boats and barges of various types, 20,000 square metres of lumber and sundry other supplies. Finally twenty infantry and four cavalry divisions, with the artillery, were brought up and put in their battle, or reserve positions.

Troops and equipment for this attack were gathered from other parts of the front, from General Headquarters Reserve and from newly-formed units in the zones of communications and the interior.

The Eighth Army (see map of battle front) on the Middle Piave front was heavily reënforced, as it was to deliver the main blow and accomplish the penetration.

Two new small armies were organized, the Tenth and the Twelfth, which were wedged in on the right and left of the Eighth Army. Their missions were: first, to assist the Eighth Army in forcing its way across the Piave by covering its flanks from enfilading fire and by creating distractions with vigorous attacks along their own fronts; second, to get across themselves and protect the flanks of the penetration from counter-attacks which inevitably would be launched by the Austrian reserves; and finally these two small armies were given the rôle of widening the gap and enveloping the interior flanks of the separated Austrian armies.

The Tenth Army was put under the command of Lord Cavan. It consisted of the British XIV Corps, which came down from the Altipiani (Plateau) Sector, and the XI Italian Corps, already in place on the line.

The Twelfth Army, under the command of the French General Graziani, consisted of the First Italian Corps, already in place, the 23rd French Division and the 52nd Italian Alpine Division, both the latter arriving from mountain sectors.

Finally, the Ninth Army and the cavalry divisions formed a general reserve and were located in areas at the centre of the arc made by the Piave, the Grappa Mountain and the Altipiani fronts, these sectors being considered most exposed to counter-offensives.

On October 15th all movements were completed and the artillery in position. The battle should have started the next morning with three preparatory attacks by the Tenth, Twelfth and left of the Eighth Armies. The main blow of the penetration, to be effected by the right of the Eighth Army and the left of the Tenth Army, would have followed. However, it had been raining torrents for several days and the Piave was rising fast. It was evident that to cross at this time would be hazardous. So the Commando Supremo decided not to start the battle by drives along the Piave, but to attack on the Northern or Grappa front, making a serious offensive with the Fourth Army, with a view, not only to gaining time until the river went down, but also to attracting the Austrian reserves away from the Middle Piave. In order to do this the Grappa front was reënforced by three divisions and 118 batteries. This took four days. The battle on the Grappa started with an intense, but short artillery preparation, the Sixth, First, Tenth and Twelfth


AUSTRIA-HUNGARY
SWITZERLAND
TYROL
CARINTHIA
CARNIA
ITALY
VENETIA
VENICE
VERONA
TRIESTE
ISTRIA
Gulf of Trieste
Scale of Miles
0 10 20 30
Forts ♦ Passes ⚌
Naudersberg
Glurns
Meran
Bozen
Franzensfeste
Brixen
Lienz
Sachsenburg
Greifenburg
Reichenau
Villach
Malborgetta
Pontebba
Chiusa
Tarvis
Predil
Kronau
Rosenbach
Lauerburg
Velden
Feistritz
Hochalpel P.
Plöcken P.
Kötschach
Comelico
S. Stefano
Lorenzago
Pieve di Cadore
Cortina d'Ampezzo
Misurina
Auronzo
Sesto
Bohlenstein
Toblach
Innichen
Kreuzberg P.
Monte Piana
Col di Lana
Marmolata
Vinallongo
Schlern
Waidbruck
Vilpian
Vintschgau
Stelvio P.
Ortler
Monte Cevedale
Piazzola
Kaltern
Branzoll
Moena
Predazzo
Neumarkt
Panveggio
Cavalese
Agordo
Gosaldo
Primiero
Belluno
Cimolais
Tagliamento
Venzone
Gemona
Osoppo
Buja
Stupitza
Tolmino
Caporetto
Plezzo
Mt. Nero
Raccolana
Chiusaforte
Moistrocka P.
Assling
Veldes
Bischofla
Idria
Billichgraz
Daniele
Cividale
Udine
Spilimbergo
Aviano
Sacile
Pordenone
Vittorio
Conegliano
Serravalle
Ceneda
Asolo
Montebelluna
Castelfranco
Treviso
Cittadella
Preganziol
Mogliano
Mestre
Fort Malghera
Porte Grandi
S. Dona
Portogruaro
Latisana
Concordia
Odezzo
Sprezzano
Palmanova
S. Vito
S. Giovanni
Cormons
Görzia
Lower Loitsch
Heil Kreuz
Segrado
Monfalcone
Comen
Adelsberg
Nabresina
Opcina
Divacca
Kozina
Herpelje
Pirano
Cappodistria
Rakitovic
Pinguente
Montona
S. Lorenzo
Piave Vecchia
Trento
Rovereto
Riva
Arco
Levico
Primolano
Asiago
Arsiero
Vicenza
Rivoli
Villafranca
Peschiera
Solferino
Castelnuovo
Fonzaso
Feltre
Belluno
Borgo
Tesino
Lavarone
Folgaria
Caldonazzo
Pergine
Matarello
Mezzo Lombardo
Fondo
Cles
Malè
Tione
Storo
Lardaro
Cohdino
Lago di Garda
Salo
Peschiera
Cavalese
Predazzo
Moena
Vigo
Alleghe
Caprile
Agordo
Forno di Zoldo
Longarone
Pieve di Cadore
Tolmezzo
Paluzza
Paularo
Raccolana
Chiusaforte
Resiutta
Venzone
Gemona
Osoppo
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Heil Kreuz
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Divacca
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Pirano
Cappodistria
Rakitovic
Pinguente
Montona
S. Lorenzo
Piave Vecchia

armies assisting by making numerous demonstrations along their fronts. This part of the battle started on October 24th and continued violently along the fronts of all the armies mentioned, on October 25th and 26th. Italian gains were quite limited and their losses very heavy; the Austrians defended stubbornly everywhere, greatly favored by dominating fortified positions on the Grappa Mountain and by the torrential flood of the Piave. By the evening of October 26th, three Austrian divisions which were being held in reserve, had been sent to the Grappa.

By the night of October 26th–27th, the Piave had gone down considerably. The Commando Supremo ordered the crossing to be forced and the Eighth Army to start its penetration. Crossings were effected in only four places, two on the front of the Eighth Army and one each on the fronts of the Tenth and Twelfth armies. October 27th and 28th were critical days. The battle raged along the whole front, particularly violently on the Grappa and at the bridgeheads. The situation at the four bridge-heads was serious. Not many troops had gotten across, the Austrians destroying the bridges as fast as they could be constructed, and the river was still high. The enemy counter-attacked furiously, but the Italians managed to hold on and even succeeded in getting some mountain batteries across. The air squadrons were of great assistance, not only in attacking from above, but also helping to provide food and ammunition for the troops who had worked their way across the river.

On the 29th the flood ceased. That night numerous bridges were successfully constructed and soon the Eighth Army had crossed. On October 30th Vittorio Veneto was captured. The cavalry divisions had crossed immediately in rear of the Eighth Army, pushed quickly through the gap to Vittorio Veneto and thence by forced marches they cut deep into the enemy's rear areas. The Tenth and Twelfth armies also got over the river and soon were widening the gap and rolling up the separated halves of the Austrian group of armies. At this time the Commando Supremo ordered a general advance on all fronts. This resulted in numerous successful penetrations, envelopments and pursuits of the shattered enemy divisions. By November 4th, the date of the Armistice, the hostile forces were partly captured, partly in disorganized flight up the Alpine valleys, and the Austrian Empire passed out of history.

One of the most essential parts of this offensive was the movement of the masses of artillery and ammunitions. Fifty-seven hundred guns with 6,000,000 rounds of ammunition were located along the main battle front of 62 kilometres. Of these about 2600 guns and 3,300,000 rounds had to be brought up as reënforcements. Naturally, the greatest artillery strength was put behind the main blow or penetration. This took place on a twenty-kilometre front

ON THE ITALIAN FRONT

ANTI-AIRCRAFT IN THE ALPS

A VIEW OF THE PIAVE RIVER FROM THE ITALIAN TRENCHES

in the Falzé Papadopoli sector, extending ten kilometres to right and left of the Ponte Priula-Conegliano-Vittorio Veneto road. The artillery provided for this 20 kilometre zone of action was as follows: 165 large and medium calibre batteries destined for interdiction and demolition work, or about one gun for each 30 metres front; 90 trench mortar batteries (6 or 8 per battery); 100 large and medium calibre batteries destined for counter-battery work (the enemy had only about eighty large and medium calibre batteries in this sector); and 250 batteries of light or mountain guns, or about one small calibre gun for each 20 metres of front. Of these, 145 batteries were already in position for the normal defense of the sector, and 460 batteries had to be brought up. The Falzé di Piave-Papadopoli zone of action, where the penetration was effected, included the right of the Eighth and left of the Tenth armies.

The artillery strength of the various armies which played principal parts in the battle, and the number of guns per kilometre of frontage, were as follows:

Tenth Army: 183 batteries (100 medium calibre, 57 small calibre, 26 trench mortar), 1,030,000 rounds of ammunition; 26 batteries per kilometre in the zone of the main attack.

Eighth Army: 501 batteries (22 large calibre, 223 medium calibre, 203 small calibre, 53 trench mortar), 3,000,000 rounds; 29 batteries per kilometre, or in other words, one gun for each eight yards front in the zone of the main attack; 12 batteries per kilometre in the zone of the secondary attack.

Twelfth Army: 116 batteries (4 large calibre, 50 medium calibre, 51 small calibre, 11 trench mortar), 450,000 rounds; an average of 12 batteries per kilometre.

Fourth Army: 319 batteries (2 large calibre, 147 medium calibre, 128 small calibre, 42 trench mortar), 1,250,000 rounds; an average of 15 batteries per kilometre.

In addition to the above, 56 batteries, belonging to divisions held in general reserve, went forward to assist the attacking armies in the first phase of the offensive, and about 100 batteries, mostly long-range guns from adjacent armies, assisted the main effort by fire from the flanks. Seventy anti-aircraft batteries were scattered along the attacking front. It is interesting to note that about 140 batteries, or roughly, one-fourth of the small calibre guns were mountain artillery, mostly pack, although some were brought up in motor vehicles on account of shortage of mules. These did excellent work in accompanying the troops who first got across the Piave in the early stages of the battle, and they were also very effective in the pursuit.

The movement of these masses of artillery was accomplished in

five echelons, which went to the middle Piave region between September 26th and October 14th. In addition, two echelons were sent to reënforce the Grappa between October 19th and 23rd.

The efforts to keep these movements secret from the enemy are worthy of note. In order to insure surprise and to keep the intentions of the Commando Supremo from becoming everybody's secret, elaborate preparations were started for a fake offensive on the front of the Sixth Army. Furthermore, rumors were broadcasted that the Austrians were about to deliver a dangerous attack against one of the lower Piave sectors, probably around Montello, where they had attacked in the spring. Instead of issuing long operations orders in the usual form, great use of extracts was made. Verbal orders were used except in cases where written orders were imperative. Wherever possible, movement and travel orders contained false destinations or destinations which were not final, information as to correct destinations being issued en route, and the number of liaison officers was reduced to the minimum.

Other measures of secrecy which particularly concerned the artillery were as follows: movements from detraining points to positions were exclusively at night; battery emplacements and camouflage were completed before arrival of batteries; newly arriving groups were placed as near as possible to those already in position in order to obtain data from the latter and to avoid the necessity for adjustment; daily expenditures in armies which were to make the main attacks were kept at normal; on the other hand, the Sixth and Fourth armies, from which much artillery was being taken, intensified their firing, frequently sending single pieces to effect adjustments from new positions in order to give the impression that other batteries were arriving.

The first echelon of artillery to move to the Middle Piave consisted of 87 batteries from the General Headquarters Reserve. It was officially stated that these batteries were going to reënforce the Montello sector where the Austrian offensive was expected.

The second echelon of 194 batteries was gathered from the First and Third armies and from the Artillery Replacement Depots at Piacenza and Mirandola. In order to keep their destination secret, the armies which ceded these batteries were notified that the guns were going to form a general artillery reserve. After the batteries left their armies they were met by Commando Supremo staff officers, who gave them orders to go to their real areas for the offensive. Postal service was suspended for these units after October 10th.

The third echelon consisted of 63 batteries taken from the Sixth Army. They were not started until the last possible moment, because every effort was being made to give the impression that the Sixth Army was taking an offensive attitude. The batteries marched on

AN ITALIAN ADAPTATION OF DUCK-BOARDS

CABLE-WAYS ON THE ITALIAN FRONT

FOR AMMUNITION, SUPPLIES OR PERSONNEL
Scene on the Italian Front.

four roads with from four to six groups in a column and were told that they were going to reënforce the Fourth Army; but when well on their way, they were diverted to the Eighth Army.

The fourth echelon consisted of 43 batteries from the Seventh, First, Third and Sixth armies and the Replacement Depot at Piacenza.

The fifth echelon consisted of the divisional artillery of the fourteen divisions destined to reënforce offensive sectors. These were mostly light guns, trench mortars, English and pack batteries. They went to the Eighth, Tenth and Twelfth armies.

All guns were ready in position on the night of October 14th, including four 381-mm. railway batteries, which came from the First Army, and whose emplacements took two companies of engineers fifteen days of incessant work to construct. These guns were counted upon greatly for long-range interdiction of the area around Vittorio Veneto, the Seravalle passes and other distant points.

The movement of ammunition took 200 railway trains and 21,000 trucks. Nine days of fire were gathered for all artillery and two or three days for the trench mortars. The ammunition taken for the several armies which had to give up part of their artillery, was not transferred direct to the armies which were to use it, but was turned over to General Headquarters reserve depots, which in turn forwarded it to the armies destined to make the penetration.

Although the total forces under the Commando Supremo were inferior in number to the Austrians, General Diaz brought 42 divisions (of which 38 were Italian, 2 English, 1 French, 1 Checo-Slovak and in addition one American regiment of infantry, and some medical units) into the battle zone against 33 Austrian divisions. The Italian artillery superiority in the same zone was almost three to one. In order to obtain this superiority, it was necessary to reduce the Third, Sixth, First and Seventh armies to a total of only about 2000 guns. Although this might have appeared to be taking dangerous chances, still it was justified in view of the passive attitude assumed by the Austrians since their disaster at the Battle of the Piave in the spring of 1918, and the size and central locations of the Italian general reserve.

The offensive was a complete surprise to the Austrians who had seen nothing and had no idea of the magnitude or locations of the offensive preparations.

The principal factors which enabled the Italians secretly to prepare such a crushing volume of fire at the Battle of Vittorio Veneto, were:

Inactivity of the Austrians.

Convex front with good radial communications as compared

to the Austrian lines which were jammed up against the Alps.

The Piave River between the two hostile lines, which prevented raids during the period of preparation.

Very bad weather which most of the time precluded hostile ground and air observation.

Italian superiority in the air and concentration of aerial activities.

Carefully prepared and secretly executed movements.

Abundant mechanical means of transport and hard roads.

Excellent discipline, instructions and esprit of the Italian artillery, the batteries already in position doing everything imaginable to assist their newly arriving comrades.

NOTE: The information given above was extracted from a study made by Lieutenant-Colonel Francesco Laviano, Artillery, Royal Italian Army, and published in the historical appendix of the *Rivista di Artiglieria e Genio*, Vol. III, 63rd year. The maps are from American sources.

REPORT OF THE CHIEF OF FIELD ARTILLERY FOR 1923–1924

(Continued from Last Issue)

WAR PLANS

FIELD ARTILLERY ANNEXES

ALL required field artillery annexes to accompany the various War Department War Plans have been completed during the year.

To provide for the test mobilization in September of this year, the Branch Annex of the Field Artillery, pertaining to the War Department Basic Mobilization Plan, has been expanded into the Branch Plan.

This Branch Plan has been worked out in detail and includes in addition to the Basic Plan itself, the G-1, G-2, G-3 and G-4 Appendices, as well as the "Unit Plan of the Office of the Chief of Field Artillery." In addition to the above, the "Basic Plans," and "Unit Plans" of the Field Artillery School, the Replacement Centre and the Brigade Firing Centre, all of which are to be established at Fort Sill, Oklahoma, under the direct control of the Chief of Field Artillery, have been completed and are ready for the test mobilization in September, 1924.

MOBILIZATION PLANS

Prior to the World War no concrete plans for the mobilization of the field artillery had been formulated. As a result, the first days of the war witnessed considerable confusion, delay and unnecessary duplication of work. Valuable time was lost which, under different circumstances, might have jeopardized the cause.

In preparing this mobilization plan the records of all officers of the Field Artillery Reserve Corps, some 9500, were carefully examined, and 650 of these officers, whose records indicated that they would make suitable instructors in the various artillery activities, were selected for duty with the Branch Assignment Group, and were assigned tentatively as instructors at the four different field artillery schools to be established under the plans of this office. At the same time, a thorough study of the records of all regular army field artillery officers was made and these officers have been given tentative war assignments under the mobilization plans of this office, according to their suitability, experience, previous education and training.

Under the mobilization plans of this office, approved by the War Department, four field artillery mobilization concentration camps are to be organized in the United States. At each of these camps there

will be established a field artillery school, a replacement centre, and a brigade firing centre. These four mobilization concentration camps are to be located at Fort Bragg, North Carolina; Camp Knox, Kentucky; Fort Sill, Oklahoma, and Camp Lewis, Washington. The missions of each of these camps are the same; namely, to train field artillery officers and candidates, reserve officers, enlisted personnel, officer replacements, and artillery brigades, in artillery tactics and firing. The above locations for the Field Artillery Zone of Interior Installations were selected for the following reasons: first, the availability at each locality of an artillery range sufficiently large and suitable in every respect to permit of the firing of all calibres of artillery up to and include the 240-mm. howitzer; second, climatic conditions at each locality such as to permit of outside training throughout the year, which is essential to the training of field artillery; third, railway facilities sufficient for the handling of large amounts of matériel and ammunition; and fourth, an accessibility of camps selected such as to effect an economy in time and transportation when organizations are mobilized and ordered to camp for field training. The camp at Lewis will serve all organizations on the West Coast; the Fort Sill camp will serve all organizations in the South West, Camp Knox will serve all organizations in the Mid-West, and the Fort Bragg camp will serve all organizations on the Atlantic Seaboard. The two largest camps will be those located at Fort Bragg, North Carolina, and Camp Knox, Kentucky. This is for the reason that practically seventy-five per cent. of the field artillery organizations in the National Guard and Organized Reserves pertaining to the Six Field Army Plan are located within a thousand miles radius of these two camps. Under the present plans of the War Department only one of these concentration camps, namely, Fort Sill, Oklahoma, is under the control of the Chief of Field Artillery, but since the four camps have the same mission of training and are identical in every way, it is believed that the best interests of the Field Artillery and the Army would be served by placing all four mobilization concentration camps under the direct control of the Chief of Field Artillery and it is so recommended.

CONSIDERATIONS IN DEVELOPMENT OF WAR PLANS

It is fundamental that the peace organization of an army should be such that it readily lends itself to meet the organization called for in the various war plans. This applies not only to the Regular Army, but to all components of the Army—the Organized Reserves and the National Guard, as well as to such activities as the R.O.T.C., C.M.T.C., and Service Schools.

In April, 1917, upon the declaration of war, the relative strengths of the various arms of the service were approximately as follows: Field Artillery, 6.7 per cent.; Infantry, 36.5 per cent.; Cavalry, 14.2 per cent., etc., etc. In November, 1918, the relative strengths were approximately: Field Artillery, 13.7 per cent.; Infantry, 26.5 per cent.; Cavalry, .8 per cent., etc., an increase of 7 per cent. for the Field Artillery, and a decrease of 10 per cent. for the Infantry. As a matter of fact, the Air Service alone was called upon to undertake an expansion proportionate to that of the Field Artillery.

These figures are important. They should control, to a large extent, in determining the relative peace strengths of the various services and associated activities, recognizing that the expansion of the various arms to meet an emergency is the criterion for fixing their relative peace strengths. At the same time, the figures should not be slavishly followed; for instance, reducing the Cavalry to .8 per cent. would be an absurdity.

The disproportionate organization found in our Army at the outbreak of the World War was common to an extent to other armies. At the first battle of the Marne, the French Army was composed of 75 per cent. infantry to 15 per cent. artillery. As the war progressed, the strength of the field artillery arm was increased until in 1918, we find the French Army composed of 50 per cent. infantry and 40 per cent. artillery. An increase of 25 per cent. in artillery and a decrease of 25 per cent. in infantry.

In the organization of six field armies at war strengths, the relative strength of these two arms should stand out in the proportion of 7 infantrymen to 4 field artillerymen. These figures are pertinent and should be seriously considered in the formulating of all war plans.

A study of past wars will show that the relative importance of field artillery has been an increasing function of time. A measure of this relative importance is shown in the increase in casualties inflicted by the field artillery in successive wars, a result of which has been, as previously stated, an increased proportional strength of field artillery in an army. The following figures, taken from French sources, illustrate this fact:

In the Franco-Prussian War, the losses in the French Army from rifle and machine-gun wounds were approximately 70 per cent., while the losses from shell and grenades was about 25 per cent. During this same war, the losses in the German Army were from rifle and machine-gun fire approximately 90 per cent., and losses from shell and grenade fire about 10 per cent. During the Russo-Japanese War, the losses suffered on both sides from the two causes named, were approximately the same as those suffered during the

Franco-Prussian War. A study of these figures would explain, in part, the comparative strengths of the various services at the commencement of the World War.

Turning now to a study of the World War, and comparing the following figures with those previously given, we find a reason for the comparative strengths noted at the close of the World War:

> During the 1914 Campaign; the Aisne Campaign, 1917; Flanders, July, 1917; Verdun, August, 1917; and Malmaison, October, 1917, the losses from rifle and machine-gun fire were approximately 20 per cent., while losses from shell wounds were approximately 72 per cent.
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> In Picardy, 1918; Aisne, May, 1918; Soissons, July, 1918; and Campaign-Argonne, September–November, 1918, the losses from rifle and machine-gun fire were approximately 27 per cent., while losses from shell wounds were approximately 55 per cent.

With these facts in mind it is desired to call attention to the fact that under the present mobilization plans of the War Department, certain separate battalions of field artillery, namely, the 2nd, 3rd, 9th, 14th, 16th and 18th, are required to expand more than 600 per cent.; and certain regiments, namely, the 5th and 17th, will be required to expand more than 900 per cent. This is due to the fact that the peace strength of the Field Artillery has been reduced to such an extent that there are no other units available to which inactive units can be assigned for expansion during an emergency. It is believed that the expansion demanded of the above-mentioned units is entirely too large, and must result in these units being delayed in their organization, in the event of an emergency, so that they will be unable to join the respective higher organizations to which assigned, as promptly as would be desired.

To offset this condition, it is considered extremely important that all associated field artillery activities, such as the Field Artillery National Guard, Field Artillery Officers' Reserve Corps, R.O.T.C., and C.M.T.C., be kept at their minimum strength or above, and that, as far as practicable, training in strictly field artillery subjects be stressed.

Before the World War there was no artillery of greater calibre in the Field Artillery than the 6-inch gun. During the World War the necessity for greater ranges and greater destructive power resulted in the designing of the 155-mm. gun, 8-inch howitzer, 9.2 howitzer and the 240-mm. howitzer. These calibres are now a part of the organization of corps and general headquarters reserve artillery. The Chief of Field Artillery has stressed from time to time the importance of keeping alive a small number of these medium and

heavy artillery units in the peace-time organization of the Field Artillery to assist in the organization of the large number of these medium and heavy artillery regiments required under the mobilization plans of the War Department. At the present time the medium and heavy field artillery in the Army consists of the two reduced strength regiments mentioned above, and as stated these regiments are required to expand more than 900 per cent. The 5th Field Artillery is organized as a reduced regiment with one battalion of 155-mm. guns and one battalion of 240-mm. howitzers. The 17th Field Artillery is organized as a reduced regiment with two battalions of 155-mm. howitzers. The normal organization of each of these regiments is three battalions. Since these two reduced regiments will be called upon in an emergency to expand into the artillery pertaining to three army corps, which is nine regiments of 155-mm. howitzers, and three regiments of 155-mm. guns, the Chief of Field Artillery believes that the peace organization of the Field Artillery should be increased so that there will be at least one heavy brigade consisting of one regiment of 155-mm. howitzers, one regiment of 240-mm. howitzers and one regiment of 155-mm. guns, available at all times to assist in the organization of corps and general headquarters reserve artillery.

Notwithstanding, the fact should not be lost sight of that the Field Artillery today, as regards its heavier calibres, is far ahead of what it was upon the entrance of this country into the World War in 1917. Particularly is this so when we consider the heavier calibres assigned to national guard and reserve units.

A board of general staff officers was convened by the Director of the War Plans Division in 1920, for the purpose of defining the general plan of organization to be adopted for the Army under the National Defense Act, approved June 4, 1920. This report outlined the general scheme of the field artillery organization of the Regular Army and was approved by the Chief of Staff on August 31, 1920, subject to the following exceptions:

> "The development of the field howitzer as recommended by the Calibre Board of substantially the same mobility as the 75's will be continued by the Ordnance Department, and when such weapon has been developed the organization of the field artillery brigades with the infantry divisions will be fixed at three regiments, one to be armed with the new howitzer."

Based upon the above instructions, the Ordnance Department, during the past year completed its study and development of the 105-mm. German howitzer. The service test of this howitzer and carriage was held under the direction of the Field Artillery Board at Fort Bragg, North Carolina. As a result of this test, the Chief

of Field Artillery has recommended that this weapon be tentatively considered as the divisional howitzer, and that certain 75-mm. gun battalions of our present peace establishment be issued these 105 German howitzers as additional equipment. This is, of course, only a makeshift procedure, since no organization can take the field with a double set of equipment. It can take the field equipped as a 75-mm. organization or as a 105-mm. organization; but not as both.

The present temporary expedient of thus issuing the double equipment was recommended merely so as to get this howitzer into use as early as practicable, and familiarize the field artillery personnel with it, leaving until a more propitious time the settlement of organization.

Based upon the experience gained during the World War and under the provisions of the National Defense Act of June 4, 1920, a reorganization of our Regular Army was begun in 1920. Tables of organization, both peace and war strength, for all calibres of field artillery, have been completed and revised. During the time between September 1, 1920, and June 30, 1924, approximately 180 different tables of organization have been prepared in this office and submitted to the War Department for approval. A number of these tables have been revised during this period to meet changes in grades and ratings and changes in organization directed by the War Department. The large number of tables of organization necessary in the Field Artillery is due to the large number of different calibres of guns and howitzers in our field army organization, each of which requires a different amount of personnel and equipment necessary for its efficient functioning.

MATÉRIEL

In no one regard was this country more unprepared for war in April, 1917, than in its shortage of war matériel. Especially in the Field Artillery were conditions in this respect pitiful. Upon the outbreak of war this country had 930 pieces of artillery, the greater percentage of which was not suited for actual war purposes. In February, 1918, when the Office of the Chief of Field Artillery was organized, nearly a year after the declaration of war, there was available a sufficient number of nondescript guns of various types and calibres to equip only thirty-seven field artillery regiments, while one hundred and six field artillery regiments were actually in training in this country alone. Those who visited camps at that time may still recollect our dummy guns made of logs, and other makeshifts used at drills. Shortages in other necessary matériel such as fire control instruments, ammunition, harness, etc., were even more serious.

Upon the signing of the Armistice a great amount of war

matériel was on hand and, fully appreciating the serious condition which had existed at the outbreak of the war, steps were immediately taken to obviate a recurrence of the unprepared condition found in April, 1917, by reserving a certain portion of this excess matériel.

At the present time the matériel situation as regards the Field Artillery is satisfactory, excepting as regards modern light howitzers and modern pack howitzers, both of which are lacking, and certain calibres of ammunition of which there are insufficient reserves. However, it is felt that the time is rapidly approaching when active steps must be taken to replace such of this reserve ammunition as has been expended or which may have deteriorated. This is more true of some calibres of ammunition than of others.

One of the most important functions of the Matériel Section of the Office of the Chief of Field Artillery is its coöperation with the other departments in the development and test of various types of field artillery matériel. This development work may be divided roughly into two classes: First, development of matériel which should be incorporated immediately into the service, either as improvements in detail or replacement for obsolescent matériel; and, second, development of matériel to be standard for manufacture in event of an emergency. It is contemplated that in the event of an emergency the Field Artillery would primarily function with the matériel which was on hand at the close of the World War, or matériel of the first class; but if the emergency were of major proportions and extended over considerable time, matériel of the second class would rapidly be brought into service as the war progressed.

The 105-mm. howitzer, recently tested by the Field Artillery Board at Fort Bragg, North Carolina, is an example of a development of the first class. Shortly after the war, the 155-mm. howitzers, which had formed a part of the divisional brigade during the war, were withdrawn from the divisional organizations and placed in the corps. This action was taken on the recommendation of the Board of Officers which was sent to Europe upon the recommendation of the Chief of Field Artillery, immediately upon the termination of the war, to study field artillery armament and organization. This Board (the so-called "Calibre Board"), after careful consideration, reported as its opinion that the mobility of the 155-mm. howitzer was not in keeping with the desired mobility of divisional artillery, and recommended a howitzer of 105-mm. calibre with certain determined ballistic qualities. The recommendation having been approved by the Chief of Staff, development work on the 105-mm. howitzer was carried on with both a split-trail and a box-trail carriage. Certain modifications of the carriages were made as a result of the tests, and an improved design of the pilot box-trail

carriage has been approved and manufacture authorized. This new carriage offers great promise. As a temporary expedient to meet the immediate necessity for a light field howitzer, the Field Artillery Board has tested and approved the German, Model 1916, 105-mm. howitzer, rechambered for American ammunition. This weapon gave excellent results in recent tests, and the Chief of Field Artillery has recommended a tentative issue of this type of howitzer to the service as a divisional weapon.

Another example of development work of the first class is offered in the program to adapt the Model 1897 French gun to the use of a modern panoramic sight. At the present time this gun is equipped with a sight which, though extremely accurate for precision firing under certain conditions, is not suited for firing under "open warfare" conditions in unmapped country.

On the other hand, matériel such as the higher-powered general headquarters reserve artillery guns of extreme range, and heavy howitzers of increased power and flexibility, must be considered as matériel of the second class. Their cost, the limited number of active organizations armed with these weapons, and the priority of light field artillery units in mobilization plans, make it logical that only a limited number of these pieces be provided in peace time, sufficient only to determine their suitability for manufacture in emergency, and to permit establishment of data for range tables, manuals for service of the piece, and tables of organization and equipment.

There are on hand a sufficient number of 75-mm. guns, of standard and reserve types, 155-mm. howitzers, 155-mm. guns, and 240-mm. howitzers, to fully meet our mobilization plans. Due, however, to the shortage of ammunition available for immediate use with 240 howitzers, certain organizations which should be equipped with these weapons upon mobilization would be issued the British 8-inch howitzers. In addition there is a comparative shortage of shell ammunition for the 155-mm. G.P.F. guns, the reserve of this ammunition being proportionately less than for the 75-mm. guns or 155-mm. howitzers.

The adoption of the light field howitzer, of which the German 105-mm. howitzer is a type, as a standard calibre, to be issued in limited numbers as they are made available, would increase greatly the power and efficiency of the divisional artillery armament. The issue of this matériel, and the manufacture of ammunition for these howitzers, should be increased progressively as funds become available.

The model 1923-B pack howitzer, 75 mm., which is a modern design of pack howitzer, with a range of approximately 9000 yards, is undergoing proof tests at Aberdeen. The characteristics of this

weapon compare favorably with those of the modern pack artillery weapons in the hands of foreign powers.

The desirability of establishing a standard design of modern high-powered field gun of medium calibre, as an accompanying piece for the 155-mm. howitzer in corps artillery brigades, has been stressed in previous reports. The 155-mm. G.P.F. gun lacks the mobility which should be characteristic of the medium field gun of the corps. To meet these requirements a 4.7″ gun has been developed and is now being proof-tested. Tests of this gun have proved most satisfactory so far.

The tests of the heavy artillery types, the high-powered 155-mm. gun and long 8-inch howitzers, on split-trail carriages, are progressing satisfactorily. It is hoped through these tests to establish a standard design of modern weapons of this type.

Tests of commercial tractors to determine their suitability as a means of artillery traction have been continued with marked success. At the present time one battery of divisional guns at Fort Benning, Georgia, is so equipped, and is conducting extended tests.

Experimental work is being done looking to an improvement of the cross-country ability of light commercial motor vehicles in order to secure suitable transportation for field artillery reconnaissance details. The Quartermaster Corps and the Ordnance Department are working on this problem, which includes the development of a light motorcycle, with low speeds, which may be adaptable to operations with tractor columns. The Field Artillery Board, with a view to economy, has recommended that the experimental manufacture of motor carriages be confined to the development of carriages for heavier calibres. This recommendation having met with the approval of the Chief of Field Artillery, work on the continued development of motor carriages for light guns and howitzers was suspended when the design of a carriage for this type of armament reached completion.

The motor carriage for the 4.7″ corps gun, and long 155-mm. howitzer, has been completed and is ready for ordnance tests at the Aberdeen proving ground. The Mark IX motor carriage, for the new 155-mm. gun and long 8-inch howitzer, has been sent back to the manufacturing arsenal for modifications recommended after preliminary proving ground tests.

No new models of divisional tractors are under design or manufacture. Experimental work with this class of tractor is being confined to the light commercial type.

A corps artillery tractor designed by the Ordnance Department is undergoing proving ground tests at Aberdeen, Maryland. To date, no conclusions can be drawn as to the practical value of this

tractor. The general headquarters reserve artillery tractor is undergoing preliminary tests at Rock Island Arsenal, its manufacture having been completed.

No important changes have been made in fire control equipment during the year. In response to requests from many line officers, a mechanical computer for correction of firing data has been designed and manufactured, and this device is now under test by the Field Artillery Board. An extended study of the control of fire by high-burst ranging has been made by the Field Artillery Board, and a limited number of observing instruments for use in high-burst ranging are being modified at the present time.

In coöperation with the Air Service, firing has been done in an attempt to develop a system of fire direction, based upon airplane photography. Work in this connection is still in progress.

Field Artillery Basic Allowance and Equipment Tables have been issued to the service and sufficient time has elapsed since the issue of these tables to the service to permit of drawing conclusions as to the suitability of these tables in their present form. The general impression in the field artillery service appears to be that the Basic Allowance Table is not necessary, and that the Equipment Table is applicable to the use of both the staff departments and the line. The Chief of Field Artillery concurs in this view, and is prepared, when a revision of these tables is authorized, to submit tables of equipment, based upon recommendations from the service, which, it is believed, will meet all requirements.

One of the most exhaustive tests undertaken by the Field Artillery Board, and one which is far reaching in its results, was the experimental firing to determine the safety zone which should be prescribed for infantry advancing under 155-mm. howitzer fire. This test was undertaken at the request of the General Service School, Fort Leavenworth, Kansas. Assisted by the engineer company at Fort Bragg, North Carolina, and a representative of the Chief of Ordnance, an extended series of firings were carried out, involving trench demolition and wire cutting. Valuable data were obtained in the first series of firing, but a number of unsolved questions arose which will require further experimental firing. The accuracy of the American range tables, with the consequent effect upon necessary expenditures of ammunition, and the variation in effectiveness of high-explosive shell at different angles of impact, are all under study in the extension of this test now being carried on.

Considerable progress has been made during the year in radio development. The needs of the combatant arms have been submitted

to the Signal Corps and conflicting requirements are being coördinated by that agency. Based on a report of the Field Artillery Board, the Chief of Field Artillery has recommended to the Signal Corps that future development provide for equipping the field artillery as follows:

(*a*) Artillery ground-to-ground sets to be identical with those furnished the Infantry for ground-to-ground communication.

(*b*) Artillery ground-to-airplane sets to be identical with sets supplied to the Infantry and Signal Corps for similar purposes.

(*c*) That the radio telephone be eliminated.

The above principles have been accepted in order to standardize our radio equipment which must be manufactured in quantity in a war emergency, to reduce the training time of operators, and to facilitate intercommunication between artillery and infantry and between artillery and the air service.

The demand of the service for the radio telephone is somewhat insistent. However, in view of the fact that the radio telephone requires at least twice as large a kilocyclic band for non-interference as does the radio telegraph, it is obvious that either the radio telephone must be eliminated or the number of radio sets in operation must be reduced. Of the two evils the elimination of the radio telephone has been accepted as being the least.

The needs of the field artillery as to the number of radio sets and nets have been recommended to the Signal Corps as being practically the same as at present with the addition of a fire control net for divisional artillery battalion headquarters.

The SCR 77-A set is undergoing considerable improvement, the main features being the addition of a weather-proof protection for the set, and a modification permitting of the use of any tube as an oscillating tube.

Two SCR 77-A sets are now authorized for issue to each separate battalion. This is essential for training as these sets can only receive and transmit to similar sets.

Progress has been made on a gas mask telephone transmitter. The Navy type with diaphragm transmitter and Army type with transmitter button inside the mask have been tested by the Field Artillery Board. Future development has been recommended to be along the lines of the Navy type diaphragm transmitter. A study is being made of the present telephone equipment as a result of the many recommendations received during the year in regard to this equipment.

One of the most serious weaknesses in the present communications equipment is the reel-cart. Both models issued, the Reel,

Model 1909, and the Battery Reel, Model 1917, require a considerable length of time to refill with wire. Designs of reels-carts under development include the feature of demountable reels, interchangeable with reels upon which wire is purchased commercially.

A list of the projects which have been under consideration by the Field Artillery Board during the year follows:

A method of high-burst ranging.
Modification of chest, battery reel-cart.
Test of re-chambered German 105-mm. howitzer.
Test of divisional tractors (three types).
Test of divisional motor carriages.
Test of experimental 75-mm. ammunition and containers for same.
Test of modified canteen covers.
Test of 15-ton jack for heavy artillery.
Test of washers, under 155-mm. howitzer fuzes.
Test of reconnaissance tractors.
Test of German observation periscope.
Test of experimental sight-mountings, 75-mm. gun.
Test of laced boots for enlisted men.
Test of water-proofed clothing.
Test of signalling panels.
Test of telephone, type EE-8.
Test of gas mask telephone transmitter.
Test of special handwheels for gun carriages.
Test of generator flash lights.
Test of oil lanterns for aiming stakes.
Test of trailers, modified anti-aircraft, for 240-mm. howitzer batteries.
Test of re-rifled 240-mm. howitzers.
Test of Unkle deviation boards.
Test of reserve ration, new type.
Test of observation instrument for airplanes.
Test of wire spikes, new design for linemen.
Test of 155-mm. howitzer ammunition.
Test of Pavesi Tractors.
Test of Holt T-35, Best and Fordson Tractors.
Test of Dodge on Chase treads.
Test of Puljack device for extricating vehicles.
Test of brackets for machine guns.
Test of portable charging set for storage batteries.
Road test of rolling kitchen.
Test of plotting scale, metallic, triangular.
Test of khaki equipment dressing.
Study of Basic Allowance Tables and Ordnance Equipment Charts.
Compilation of Training Regulations.
Experimental firing, 155-mm. howitzers.
Study of variation in effectiveness of shell due to varying angles of impact.

In concluding the discussion of the matériel situation, it should be pointed out that many of the problems mentioned are continuing from year to year, and that they are progressive in their nature.

Gun and carriage design and automotive developments, require considerable periods of time for their accomplishments, and results are not immediately observed. It is felt, however, that our progress has been satisfactory and sound conclusions have been drawn to influence further work.

The Chief of Field Artillery, especially, desires to express his gratification in the earnest and hearty coöperation which has been given this branch by the Supply Services charged with the development of new matériel for the field artillery. Their effort has been untiring, and their support of our attempts to solve the problems before the field artillery arm has been all which could be desired.

A serious shortage of horses, both in the regular and national guard field artillery units has existed for some time. This condition, stressed in previous reports, has seriously affected the development and training of units of this branch of the service. To meet the conditions of summer training, it is of the utmost importance that regular units have their full quota of horses. Particularly is this the case in those summer camps where the regular commands are depended upon to furnish horses for the training of the National Guard, R.O.T.C., and C.M.T.C. In view of the anticipated purchase of horses by the Remount Service this coming year, a careful tabulation has been made of the shortages of horses and the necessary replacements in all field artillery units. It is of interest to note that this is the first purchase of horses made since the signing of the Armistice, November 11, 1918.

As seriously affecting the morale and efficiency of field artillery officers is the decision of the Comptroller General and the Judge Advocate General of the Army, that field artillery officers on duty with motorized field artillery units will not be allowed transportation and forage for their mounts and mounted pay. In view of this ruling, officers of this service are reluctant to provide themselves with serviceable mounts as they are at all times liable to lose their mounted status by assignment to a motorized unit or its equivalent. It is advanced that all field artillery officers should be constantly prepared to serve efficiently with mounted units and to this end should always be encouraged to provide themselves with suitable mounts. Favorable action on legislation proposed to correct this condition is hoped for in the near future.

(EDITOR'S NOTE: *A review of the progress in the development of matériel since the Armistice follows this part in the original Report.*)

A SERVICE TEST OF THE HOLT T-35 TRACTOR

BY CAPTAIN WILLIAM B. DUNWOODY, F.A.

IN the investigation of the development of mechanical tractive power the Field Artillery Board has had under test a number of types of commercial tractors to determine their suitability for the use of field artillery. One of the most promising of these for light field artillery is the Holt, Model T-35, 2-ton caterpillar. After performing very satisfactorily in tests conducted at Fort Bragg and at Aberdeen Proving Ground, twenty-one of these small tractors were sent to Fort Benning, Georgia, and issued to Battery "A" of the Eighty-third Field Artillery for a year's test in actual service. All but one of the twenty-one were new vehicles direct from the Holt factory and the only modification from the regular commercial style was the addition of an artillery pintle. One tractor was shipped from Fort Bragg, where it had been in use about a year, and it was equipped with some tool boxes and an extra rear-facing seat.

The idea in sending twenty-one tractors to a single battery was that they should each pull only a one-axle load, that is, either a gun or caisson, and the battery was organized accordingly on that plan. After several months of use in the ordinary performance of drill and firing practice with a few special tests included, it was thought that the tractor showed sufficient power to pull two axles, either gun and caisson, or two caissons. Since the weight of the tractor is only 4500 pounds, and a working rule had been laid down that a tractor should not be required to pull more than its own weight as a regular load, it was only after several requests that permission was finally granted to try two axles behind the tractor. This reduced the number of tractors required in the battery, leaving a number of spares, and the results were so entirely satisfactory that it was very soon decided to try an extended field service test in the form of a long road march, with part of the battery pulling two axles and part pulling one axle to definitely determine the tractor's capability. The obvious advantages of the two-axle load are fewer vehicles, less road space, economy of personnel, fuel and spare parts. The tractor's ability to stand up mechanically under so heavy a load for a long period and whether or not there would be enough reserve power for hard pulls and bad going, were the main questions to be settled by the test.

The route chosen was from Fort Benning, Georgia, to Fort Bragg, North Carolina, and return to Fort Benning, roughly one

thousand miles, and it turned out that the actual distance marched was one thousand and thirty-eight miles, which included forty-eight miles marched on the Fort Bragg reservation. To get the comparative effect of the test, various loads were hauled, each behind the same tractor throughout. One section had two-axle loads with the caissons full of ammunition; one section had two-axle loads with only thirty rounds in the front caisson to approximate the weight of a limber, while two sections had one-axle loads, and the reel and cart made up a two-axle load, as did the water and gasoline trailers each. Then there were five spare tractors which had no load, except when they were hooked on in an emergency to take the load of a disabled tractor.

Starting out from Fort Benning on July 9, 1924, with twenty-one tractors and ten other motor vehicles to march a thousand miles and get back before the first of September and with only a light Dodge repair truck and an F.W.D. load of spare parts to make all repairs, and considering that there were only the battery mechanics to keep up twenty-one tractors of a type with which all were comparatively unfamiliar, seemed to be tempting Providence as anyone who has ever marched with tractor-drawn artillery will realize.

However, so strong is the constitution of these little giants and so steady and reliable their performance that the round trip to Fort Bragg and back was accomplished in thirty-four marching days—nine hundred and ninety miles, at the average rate of twenty-nine and one-tenth miles a day. The entire return trip averaged thirty and seven-tenths miles a day, the last six days of which ran well over thirty-five miles a day and the last two days' mileages were forty-two and forty-one miles, respectively, which might be called a strong finish. Only one day on the entire trip was it necessary for the battery to lay over for repairs.

Although the roads were excellent all the way, the bridges strong, and there was very little rain and mud, the weather was intensely hot all the time—a fierce steady heat which is torture to men and animals walking. When compounded with clouds of dust arising from the continued drought, it was no mean test of endurance to drive a tractor seven or eight hours a day and take the jarring and bouncing that a driver gets from one of these small, short-coupled vehicles with their back-breaking bucket seats.

In behalf of the tractor driver it is to be remarked that his is about the hardest and most important job in the battery. Upon his skill and alertness and endurance much depends.

It has been well said that a horse isn't very likely to run into the vehicle ahead and ruin himself, but let a tractor driver fall asleep, or let his wits wander for a minute, and he will find his

tractor trying to climb over the load ahead with a good prospect of succeeding, and the usual result of a broken radiator at the very least. The strain of constant alertness is considerable, as any driver will testify. Although arrangements were made to relieve the drivers during the day's march, some preferred to stay on the job and refused relief.

The itinerary both ways was along the main highway *via* Macon, Milledgeville and Augusta, Georgia; Aiken, Columbia, and Cheraw, South Carolina, and Laurinburg and Raeford, North Carolina. Much could be written of the delights of passing through the great Georgia peach belt at the peak of the packing season, where the battery was loaded with fruit whenever it halted near a packing house; or through the cantaloupe country of North Carolina; and finally on the return trip of the abundant watermelon patches of South Carolina and Georgia. So generous and hospitable were the fruit growers along the route that the matter of robbing orchards and melon patches was not a problem. Where an abundance was offered for the taking, there was no thought of pilfering.

Of accidents and mechanical troubles there was a sufficient scarcity to make the march at times almost monotonous. The second day out before the battery was well shaken down to march discipline, an unhappy driver crashed into the vehicle ahead, breaking his radiator and most of the other forward assemblies of his tractor. It was quickly determined that all the necessary parts for repair were on hand except a crankcase. A car was dispatched at once back to Fort Benning for a new crankcase. It returned about 9:00 P.M. with the news that there was no spare crankcase nearer than Peoria, Illinois, and brought out an F.W.D. from the battalion upon which the crippled tractor was carried back to the Post next day. The fact that the T-35 can be easily loaded on, and carried in, a three-ton truck, is a significant one. On two occasions it saved the battery losing a day's march when, by leaving a tractor behind to be worked on, it was possible for the battery to go on and send a truck back at night to bring up the tractor with the repair finished. Another time a Sunday was used to send a disabled tractor on a truck two day's march ahead of the battery to be repaired at Augusta Arsenal.

The only other important incidents were when one tractor burned out its bearings twice, once on the way up and once on the way back, and another turned over in the ditch. The latter was just coming off of a small narrow bridge when a Ford came swooping down toward him. The tractor driver turned sharply to the side to avoid being hit and the earth gave way at the roadside, turning the tractor completely upside down. The driver was thrown clear and the tractor when hauled out and put right side up, buzzed off with only a dented hood.

CLOSE UP OF ONE-AXLE ROAD

UP HILL AND DOWN. THE ENTIRE TRACTOR COLUMN IN VIEW BETWEEN FORT BRAGG AND RAEFORD, N.C.

A HALT ON THE MAIN HIGHWAY IN SOUTH CAROLINA

ROUGH GOING ON THE MORGANTOWN ROAD, FORT BRAGG

The battery made its entry into Fort Bragg with the entire column closed up and every vehicle running after four hundred and ninety-two miles in eighteen marching days. During the period July 29th to August 8th, inclusive, the battery remained at Fort Bragg in order to give the Field Artillery Board an opportunity to test the merits of the T-35 tractor under more strenuous service conditions. To this end a three days' march over selected, difficult terrain on the Fort Bragg reservation was arranged. For comparison, Battery "B," Second Field Artillery, horse-drawn 75's, was to lead over the ground. The two batteries covered forty-five miles in the three days, over hills and through woods and swampy creeks, with washed-out, rutted, sandy and corduroy roads. The only mishap during that time was one tractor which threw a track and a collision on the way back to the post at the completion of the trip, which resulted in a broken radiator. The manner in which the T-35's with their loads of from 1900 to 6900 pounds negotiated all the difficulties of terrain, was a great satisfaction to the officers of the battery and to the Field Artillery Board, and demonstrated that this tractor possesses mechanical excellence greatly superior to any of those models in previous use in the service.

Commenting upon the tractor itself, the outstanding superiority of the T-35 in the eyes of the field artilleryman who has had experience with the 5-ton wartime model, lies in its power and durability.

That a tractor weighing 4500 pounds should pull two caissons of ammunition weighing 6900 pounds up Findlayson Mountain by a rutted and sandy road, stop the load on the side of the mountain and start it with the caisson brakes set, taxes credulity, but it actually happened. That this same tractor should pull the same load a thousand miles besides and have no more trouble and show no more wear and tear than another tractor which pulled no load over the same distance, argues well for its material and design.

As to speed and gasoline consumption the performance was satisfactory. The best average speed that could be maintained in steady marching was five miles an hour. This is as it should be. Too much speed is one of the basic causes for unsuccessful tractor operation. A whole march can be ruined the first day, and it is easy to sense on a long march by the number and nature of repairs each night, whether you have been letting out a little too much. There is a point where the difference is slight between a successful operating speed and a ruinous speed. The gasoline consumption averaged almost exactly three miles to the gallon if we exclude the operations on the Fort Bragg reservation, where conditions were much more severe than on the rest of the trip. The one-axle loads and spare tractors got about two-tenths of a mile more out of a gallon of gasoline.

There are many excellent features of design in this tractor. The engine is very compact and completely enclosed together with the fan-gear housing. The fan is driven by friction gears instead of a belt. The gasoline feed is by gravity through a very short line, and there is a very efficient though bulky air cleaner. There are only three truck rollers on each side and no upper rollers. The rollers are enclosed in a housing which keeps out dirt and are greased with 600 W through alemite plug connections. The transmission and final drive run in a bath of motor oil. The gear shift is standard type and enables gears to be changed without stopping the tractor. The track shoes, pins, bushings, and space blocks are very hard and durable and the cotter keys which hold the track pins in are run through the track shoe, outside the pin which eliminates the constant wearing out of cotter pins and consequent slipping out of track pins, so prevalent in the five-ton tractor. A noteworthy feature is the large rugged construction of the truck rollers and their roller bearings, not one of which wore out on the road. Two rollers continued in service for a long time, with large sections of the flange broken off, but without affecting their perfect functioning.

Compared with the many admirable qualities the unsatisfactory features are very few. The chief weakness was found to be in the gudgeon bolts and gasoline tanks, both of which can be remedied by a slight alteration in design. The gudgeon bolts are too small in cross-section at the middle, due to the manner in which they are bored and grooved for oil circulation, and every breakage occurred at this same point. After about seven hundred miles, nearly all the gasoline tanks began to leak, due to the fact that the seams were made by crimping, rivetting and soldering the two pieces of metal. The solder loosened up around the rivets and started leaks in nearly every tractor. This could easily be remedied by using a welded tank.

Another weakness which was remedied by daily inspection and tightening, was the tendency of the brackets which held the two ends of the suspension spring, to work loose. These brackets were held to the frame by cap screws which had to be tightened nearly every day. A better means of fastening them could be devised.

After about six or seven hundred miles a noticeable increase in carburetor trouble developed. Constant leaking around the drain cocks and the necessity for frequent carburetor adjustments became evident. This was no doubt due to wear caused by vibration, but became such a nuisance that consideration might profitably be given to a more rugged design and construction.

At first the mechanics complained that the tractor was inaccessible for repair due to the completeness of the engine housing, but later they became so expert at disassembling that they no longer thought it hard to get into.

As has been noted, the only modification from the commercial vehicle was the addition of the standard artillery pintle. For the particular purpose of field artillery there are certain other modifications which are practicable, desirable, and in some cases almost a necessity. It needs a pintle in front, so that the tractor can pull backwards or in tandem, and can itself be towed forward if disabled. On the march a disabled tractor had to be towed backwards, which was hard on the man guiding it.

Another necessity is a radiator guard. The radiator projects in front beyond every other part and the slightest collision damages the radiator core. It must be admitted that the toughness and durability of these cores is nothing less than astonishing. Time and again they were bent and dented in collisions, without starting the slightest leak, but nevertheless for vehicles which habitually operate in column, they should have some protection.

A very desirable modification would be the addition of another seat facing forward. This would provide a place for a chief of section where he has control of his driver, or for an assistant driver. It would add weight to the tractor, which is an advantage, though more needed at the front end than the rear. The design of the present seat needs improvement to make it less uncomfortable.

The addition of a muffler was not felt to be necessary—certainly not at the cost of power, though it would be desirable to reduce noise as much as possible.

A word about cost here. A total of $8776.93 for all purposes was allotted for this march, of which only $4159.62 was spent. Over half this, or $2481.26, went for gasoline and oils. Compare the total cost of this movement with the probable cost of a similar movement by rail carrying fifty vehicles, motor and trailer, and a hundred men.

For the tractors themselves the total cost of broken parts replaced and chargeable to the march was only $270.92, not including the one which was smashed and sent back the second day out from Fort Benning. This speaks as strongly as any other feature of the march for the durability and excellence of construction. All the officers and men in the battery were enthusiastic about the capabilities of this great little tractor, and it does seem that in the Holt T-35 tractor the Field Artillery has hit upon a piece of motive power that shows great promise for the light guns and will be watched with keen interest by the officers who are interested in motor traction.

PACIFISM

BY NEWTON D. BAKER. FORMER SECRETARY OF WAR

ADDRESS AT THE NATIONAL CONVENTION OF THE RESERVE OFFICERS' ASSOCIATION OF THE UNITED STATES

MR. CHAIRMAN, LADIES and GENTLEMEN, I am of course deeply grateful to General Hough for the generous phrases with which he has introduced me to you. Frankness, however, compels me to admit that the bravery which I showed at the front when he was facing that artillery-swept field was pure ignorance. I didn't know the least thing about it. I went wherever I was taken.

We landed in a barn and there was a brick wall looking toward a field and some shells had come through that wall. General Hough was standing on the inside of the wall looking out and I joined him there. We saw those shells falling out in the field and exploding. And then they had some powwow about it and asked me whether I wanted to go across that field. I said, "I don't know anything about it." Then they had some more powwow about it and they decided it would be better to take me in a motor car about a half mile further up the road past a church and through a cemetery—that was to make me cheerful, I suppose—and then down through some lateral trenches into the front-line trench another way, which they did.

When I got there I fell into a very interesting conversation with a boy about nineteen years old, who was on outpost duty in the front-line trench. General Harbord, to whom General Hough has referred, and General McArthur were with me. They annoyed me to death. They wanted me to leave all the time. I finally said to them, "I am not in a hurry. I want to talk to this young man," but I left. I said to them, "What was the hurry in there? You seemed to be so impatient." He said, "Mr. Secretary, didn't you see that German aeroplane above those trenches? Didn't you hear the machine-gun bullets coming out of that aeroplane and hitting all around?" "No," I said, "I didn't hear them at all." So you see it was pure ignorance. I didn't know artillery fire when I heard it, and I didn't know rifle-gun bullets or machine-gun bullets when they were spattering up the ground around me. Perhaps if I had been wise I might have been less entitled to the very generous phrases which General Hough has used with reference to me.

I very well remember that morning at Baccarat. I remember that we stayed in the house of the Mayor of the village, Monsieur Mochelle. I landed there the evening before and had dinner in that house, and at his table that evening there were four daughters and one son. The son I should suppose was probably fifteen years old.

I sat at the table next to Madame Mochelle. In the conversation I spoke of the pleasure of seeing so large a family, four beautiful young women and this nice lad of fifteen. She said to me with very simple dignity, "Mr. Secretary, when this war broke out I had five sons and Jacques is the only one left. I have given the other four to France."

When Colonel Hough came for me the next morning at four o'clock I went out just as the sun was rising, or rather when the dawn was beginning to make it a little lighter than pitch dark; we were passing along a road in an automobile and suddenly I began to feel that we were in the presence of company and that we were no longer going along a deserted road. As I looked out the windows of the motor car, on both sides of the road, lined up, I saw the dim and shadowy figures of American soldiers, the first American regiment I saw at the front. And I remembered what Madame Mochelle had said and prayed, if I may be frank about it, that very few American mothers would be called upon to be as heroic and bear the grief which she had borne.

On the copy of the program which has been handed to me, I am set down to speak on the subject of "Pacifism." It is not strange, indeed it would be very strange if it were otherwise—it is not strange that all throughout, not the United States only, but all through the world, the cry for peace has gone out from stricken peoples. We have had now the most drastic of experiences that the human race has ever endured. The World War cost the lives of soldiers in battle to the extent of ten millions of young men. Somewhere in Europe and in the United States at the close of the war there were twenty millions of young men disabled by the war; and scattered all over Eastern Europe principally, were the bones of another twenty, maybe forty, millions of men, women and children, chiefly old men and old women and babies, who had died of starvation as the result of this war.

In Poland, at the end of 1916, after the Austrian and Russian armies had swept back and forth across that country several times, it was said by those who knew, that there was not a child in Eastern Poland under the age of five years then living. And after the war was over a Polish gentleman, whose word I have every reason to rely upon, told me that it was still possible when walking in the forests of Eastern Poland and stirring the fallen leaves with a walking stick to come upon the bones of babies that had been separated from their families and had drifted off into the woods to hide from these advancing armies, or retreating armies, as the case might be, and there had starved and found no burial except as the autumn leaves had given them a covering.

The world has been through that experience, and if there is one

cry on every lip, it is that peace shall be established in this world. Of course with such an intense and agonizing emotion affecting so widely and universally the human mind and the human heart, it is not singular that all sorts of schemes and devices and plans and theories have grown up as to how peace is to be attained and preserved. Many of them are highly fantastic. Many of them are far too hopeful, judged by any canon of experience or any lessons which history teaches.

And yet I want to say for my part that I not only have tolerance for, but I have immense respect for all these varying theories, however much they may be overdrawn. I think the noblest impulse in the human mind now is an impulse to bring such a situation to pass in this world that civilized men will devise agencies of understanding and coöperation which will substitute just determinations of just and disinterested men for the arbitration of war with all its cost of life and treasure.

It has always been so in history. We have still among us religious societies several hundred years old which grew up at the end of the Thirty-year War. My recollection is—I have not refreshed it—that the Thirty-year War ended in 1640. Now the Thirty-year War was one of the great religious wars that disrupted the whole continent of Europe. It broke out and flared up and devastated wide areas and then would die down. People would suppose that peace had come. Then it would flare up in some fresh place. Some new spark would light up the embers and off it would go again. Finally the Treaty of Utrecht was made, I think in 1640. That war came to an end as the result of the complete exhaustion of the disputants.

At that time there was, as there now is, a feeling on the part of the people that war was an intolerable thing and that the only way to answer it was to resolve never to have anything more to do with war. And there grew up then the same sort of pacifist sentiment which I am now describing as current throughout the civilized world today. Those societies have persisted down to now. They are non-resistant. They derive it from their religious beliefs. But they were born out of the agony of a war-exhausted continent.

We must not be surprised if, in the desperation which this recent war caused, the desolation which it has left, there are people who take that extreme view, that the answer to war is complete nonresistance and who look with suspicion upon every effort at preparedness as if it in itself constituted a provocation and an incitement to further war. That extreme view has characterized every period of exhaustion following world wars.

My judgment very frankly is, and I have given a very great deal of attention to the history of war, that after all, while this wide-spread

sentiment for peace instead of being a pious wish, instead of being a mere aversion toward a thing, will coördinate itself and become a constructive impulse; that most of the people who have that fine desire will realize that in order to get peace in this world we must work for it; that we must organize the work upon some basis that will substitute something else for war; and that all of these various plans instead of being persisted in will gradually be realized; and that the central thing is to sacrifice one's pride of opinion for any particular way and coöperate in the most promising plan which commends itself to the largest number of people.

It seems to me therefore important for us who love peace to try to examine, if we can, very briefly just a few of the considerations that make for peace.

First, I want to tell you something that I know to be true. It may surprise you, but I hope none of you will forget it, and none of you will fail to tell it to others when you hear the contrary asserted.

I know the military history of the United States and I assert without fear of contradiction that no war in which the United States has ever engaged has been caused by or advocated by or encouraged by any military man or body. The Regular Army of the United States and the National Guard of the United States have an absolutely blameless record so far as that is concerned.

We have had these wars and nothing could be more superb and heroic than the way the Regular Army and the National Guard have jumped to the defense of the country when the tocsin sounded and the war was on. But nowhere in our history can anybody find, for I have looked, a soldier, professional or national guard, who took any part whatever in agitating for a war.

I think that is important to be remembered, and when we are dealing with a military organization like this Reserve Officers' Association, it will quiet a great many apprehensions, it will still some anxious fears on the part of people who want peace, if they can be made to realize that the Army has always been for peace until war broke out.

Another consideration I think we ought to examine. It is not enough to merely want peace. There is authority of Scripture, there is authority of history, there is authority of experience for this statement, that merely crying out for peace where there is no peace does not produce it. The great things in this world, Gentlemen, do not come without great effort. The things that are worth while in life must be struggled for. And if it be true, and I think it is, that things which are desirable require effort largely in proportion to their desirability, then peace, being the greatest conceivable human good, must necessarily be contrived and secured by the greatest

amount of effort; and those who imagine that peace can be obtained by sitting still and doing nothing are tragically deceived. Nor are those right who believe that peace will come as the result of national weakness. The weakness of the hind never produced peace in the jungle.

Historically, what has caused war? Curiously enough, so far as external causes are concerned, the causes of war have changed as civilization has gone on. I remember reading in the Diary of Samuel Pepys a story which seemed to me entertaining and certainly instructive: that at the time of the coronation of Charles II a dispute grew up between the French Ambassador and the Spanish Ambassador at the Court of Charles II as to which of them was entitled to have his carriage ride nearest to the carriage of King Charles II as he went to be crowned.

Now that was a very important matter.

The Spanish Ambassador, fearing that the French Ambassador might get some sort of inside track, had his servants go just at the time the procession was about to start, and cut all the leather harness of the horses that drew the carriage of the French Ambassador. And, foreseeing that there might be a retaliation of the same kind, he had had harness made for his horses of chains covered with leather, so that if the servants of the French Ambassador came to cut his harness they would find it impossible to do so.

When the procession started off the French Ambassador gave orders that his carriage should follow that of the King. They started to drive the horses and they drove them immediately away from the carriage, the harness being cut to strips.

The Spanish Ambassador rode in great triumph after the King and thought he had done a tremendously fine thing.

The French Ambassador was so filled with indignation that he rushed across the Channel into the presence of Louis XIV, the proudest king in Christendom, the Grand Monarch, and told his story. The King at the moment happened to be playing piquet with his wife and mother-in-law. One of her sons was on the throne in Spain and she was fearful that that might bring a war between Spain and France. She tried to quiet Louis XIV. He said, "Madame, hold your tongue. I have business on hand." He rung for his secretary of state for foreign affairs and dictated to him in her presence, the presence of his wife and mother-in-law: "Tomorrow morning send a message to the King of Spain and to every other king in Europe that from this hour my ambassador in every court in the world takes precedence over every other ambassador at that court, and require an immediate submission to that demand, and declare war at once upon every nation that does not yield to it."

Well, it is an interesting circumstance that the military power of France at that moment was so great that everybody yielded to it, and there was no war as the result of it. But I cite that, because it seems to me a rather picturesque incident of the way wars used to grow up. The prestige of a proud king! An assertion of the dominance of a proud sovereign!

Now that has all passed away. Kings have either become nonexistent or so circumscribed in their powers that wars of prestige are not likely to take place.

But from the earliest history of mankind wars have been largely caused by fear. When we were children, all of us, I have no doubt, would read the story of Alexander the Great, how he conquered all the world and then sat down and wept because there was no more world for him to conquer. Well now, of course, that is a very foolish story. That is not the history of Alexander the Great.

Philip of Macedon left Alexander, his son, a newly established empire, and Alexander was very anxious to consolidate the empire which his father had established and build at Macedon a more splendid civilization than the earlier Greeks had built at Athens. And every time he got to Macedon and began to lay out his plans for the building of his great city and the building of his fine civilization, his empire was attacked by somebody just outside his borders. He would get his army together and go and conquer that people. Then he would say, "Now, perhaps I have safe frontiers. I will go back to Macedon and see if I can't get started with the building of this civil administration."

Then the people just outside of those whom he had conquered last would get together and say, "This fellow intends to get after us next. The wise thing for us to do is to get together and get at him first." So they would form a confederacy just outside of his newly established border, attack his border, and he would have to come back from Macedon and conquer them.

Here was mutual fear; Alexander, unable to give his attention to civil things because of these constant combinations just outside of his frontiers against him, and the people outside of his frontiers afraid to let him alone for fear as soon as he recovered from one war he would start another one and they would be the next victims. That is history. He was seeking to establish what all soldiers know, strategic frontiers, frontiers which were normally safe military barriers against aggressions against his country. From earliest time now the establishment of strategic frontiers has figured as the cause of war.

When the last war was over the French wanted the left bank of the Rhine. There aren't any French people in that part of Germany. They did not want to incorporate a strange element in their population,

but they wanted a strategic frontier. They wanted a river that they could fortify and which would afford a safe barrier against aggression.

When the Germans took Alsace-Lorraine in 1870 they took it not because they wanted territory, but because they wanted the Vosges Mountains, an unscalable and impregnable barrier against French aggression at some later time.

So through history these strategic frontiers, these military barriers, have been the objectives of war.

Now under modern conditions the whole character of war is changed. The world has become very much more intimate than it used to be. There was a time when the United States was almost self-sufficient. Now our lines of economic interest run all around the world and none of you can sit down at your breakfast table in the morning without having before you, in one form or another, products that come from eight or nine different countries of the world. You have every sort of product and ingredient in products that are brought into your table linen, your cutlery, your china, and all that sort of thing, which means that eight or nine different nations have been in economic alliance with the United States in order that these ingredients may be brought together and manufactured, representing American investments in overseas industry and commercial resources.

The struggle of modern nations is no longer for the prestige of kings or so much for strategic frontiers as it is for access to the raw material resources of the world. That is going to be more and more true as we get nearer to the point of exhausting our coal and oil and other natural resources. We, with everybody else in the world, the English and the French and the Germans, are going to want equality of opportunity of access to these resources in Africa and Asia, where those resources will be as yet unexploited and unexhausted.

So there is going to grow up an increasingly intricate and interwoven civilization in which our interests, the things we need to maintain life and keep our civilization going, are going to be ever in other places where our investments will be and where it will be necessary for us to have an equal right with other peoples if we want to keep up in the march of civilization.

All of these interests are points of contact, and every point of contact is a point of possible misunderstanding. That is life.

When Robinson Crusoe was on his desert island he was alone and lord of all he surveyed. There was no one his right to dispute. But one day when he walked around his island he found another man. Ah! There are two of them now. He wasn't so much of a lord as he was before. There was another man there.

And if Robinson had wanted to go to a particular place on that island and dig a well and the other man had wanted to go to that same place and dig a well at the same time, there would, by virtue of there being two of them, have come a conflict of interest, a conflict of right, and there had to be some way of deciding who should dig the well. Now, originally the way of deciding that was that each of them would pick up a stone and the bigger one would hammer the smaller one in the head, dispose of him, and then dig the well.

After a while, when there got to be more than two people on the island, one of whom was the biggest and a little bit free with his stone hammers, the small people would get together and say, "This won't do; taking us one by one he can dispose of us all and take everything we have, all that we make, but if we combine, three or four of us will be able to restrain his greed, make him act justly."

So there would be a combination of the weak to meet the aggression of the strong. Then they would set up some kind of a rough court amongst themselves, elect a chief whose judgment was to decide these questions.

Exactly that same process is true of nations. In ancient times the big bully nation would assert its will. As time went on it was found that that would not do. Alexander tried world empire. The little nations got together against him and prevented it. Rome tried it and was finally subdued by the barbarians on the outside, the barbarians who finally captured Rome.

Germany tried it and was stopped. Trying to establish the dominion of one nation over the world, the other nations got together and prevented its being done.

The illustration I am making, you see, is this: These points of contact are possibly points of conflict of interest and with the kinds of agencies men have now, such as the wireless, so that communication among nations may take place in a fraction of a second, it is no longer possible for us to rely upon the old-fashioned agencies of diplomacy to prevent the occurrence of war.

In Roman days, when the Roman Empire or Republic was affronted at the conduct of some other country, they sent a messenger to this other country and they made him wear a kind of a little apron. When he got to the Senate of the other country, or to their king or whoever might be their chief authority, the Roman ambassador would explain: "My country is affronted at your country because you have done thus and so, which is an indignity and a wrong to Rome, and I am sent here to represent Rome and to say to you that I have in my apron"—and then he would gather it up and make a kind of bag of it—" I have in my apron peace or war. If you right this wrong, I will hold it and give you peace. But

if you will not right this wrong to Rome, I will let my apron fall and war will be set loose at the hands of the Roman Empire."

Well, sometimes the opposing authority would say, "We are indifferent about that. Let us have war." "Very well, I declare war on you in the name of the Roman Empire. This is January. Expect us in August."

Then he would go back to Rome. He would go back and tell the Senate what they had done. They would have an election and determine who should be the general, and after they had elected the general they would give him a commission to go out and get up his army and by August he would be ready and march up. And they would have gotten their army together and then they would have a fight.

That is not the way it is done now. The contrast to that is the beginning of the war in 1914. I happened to be crossing the ocean at the time the Austrian Crown Prince was murdered in Sarajevo. I was coming home from a trip to England and Europe. Everybody on that boat felt that that was a most unhappy event, that it might cause difficulties in Europe. Nobody supposed it would cause a World War.

That was in July. In August the whole world was at war. There was no sending of ambassadors and waiting until August—sending them in January and waiting until August.

As a matter of fact, when that began to come to a head, Sir Edward Grey, the great foreign minister of England, was exceedingly anxious, deeply anxious, tried to prevent war. He sent frenzied telegrams to the German Emperor, to the Austrian Emperor, to the Russian Czar, begging, not that they would keep the peace, but that they would keep it for a day, long enough to have some conversations, long enough to get representatives together. But the answer came back: "I dare not wait, because if I wait my adversary will get an advantage of a day." And under modern conditions, with the kind of implements we now use, with war depending on mass formation and rapidity of transportation and the accumulation of supplies, the man who loses an hour loses a battle. We now live in a world which is jumping, a world in which an impulse spreads with the rapidity of prairie fire; nay, more than that; it is carried on waves of electricity and encircles the globe. The first part of the thought comes back to you before you finish the thought, having gone clear around the world and set the world, maybe, on fire.

Now, it is a beautiful dream. It is a dream that every impulse we have drives us to, that peace can be made and kept in this world. Experience does not teach us that it is so. History does not teach us that it is so. Philosophy does not teach us that it is so. But

the moral nature of man compels us to believe that it can be done. And it equally compels us to work to that end.

So I am a pacifist. I am a pacifist in my hope; I am a pacifist in my prayers; I am a pacifist in my belief that God made man for better things than that civilization should always be under the blight of this increasingly deadly destruction which war leaves on us. And I am a pacifist in believing that the real contribution to that sentiment lies in adequate, sane preparedness on the part of any free people to defend its liberties.

In 1916 a doctor, a friend of mine, went to Serbia to see what he could do. He was one of a group of American doctors who went over there to help the Serbians fight. King Peter's Army had been driven back from the frontier of Serbia to Monastir. An army of 500,000 Serbians was reduced to a struggling 40,000. King Peter was practically in exile from his own country. He had this little struggling remnant of his once great army down at the very tip of his country and his enemy was in possession of practically all of his country and all of his great cities. But here he was in this last town of his country.

My doctor friend was there. He went into a restaurant one night to get some little supper, and as he sat at the table with an interpreter, he saw three very old men—very, very old men, entirely bald and with long sweeping beards—venerable looking men. They were seated at the table next to him talking with the greatest animation, drawing things on paper with lead pencils. They were Serbians.

The doctor became so much interested in the animation of those old gentlemen that he said to his interpreter, "Listen in and tell me what those old men find so interesting to talk about." The interpreter listened for a while and then said, "Doctor Thompson, they are discussing the next war."

With their country in ashes, with their army destroyed, with their adversary in possession of all of their country except a little fringe at one end, these three old men were speaking for, preparing for and discussing the plans of the next war!

Now, do not let us forget that the world is filled with people like that. I do not exonerate America from having at least the possibility of irrational and impulsive national action. I think perhaps we have a certain security that sober second thought and leadership among us is likelier to restrain us than it would be to restrain most peoples who have nationalistic and aggressive ideas. And the civilized part of the world cannot afford to lay down its armies and leave weapons in the hands of uncivilized parts of the world.

Now really I have said all I came here to say. I wanted, if I could, as the result of my own observation and study, to reassure any sincere person by the existence of this Reserve Officers' Corps

of the preparatory plans of the Federal Government. I wanted to reassure them by telling them that the history of our country shows that the Army has never provoked war. I want to point out the character of modern war, the immense destructiveness of it, the suddenness with which it happens, and the tendency to become universal which is a characteristic of modern war.

And then, last, the fact that we live in a world where anybody can start a war which we may have to finish.

I was Secretary of War from 1916 to 1921. The history of the United States is that we have never been prepared for war. It used to be the fashion two or three years ago to make some very critical observations about the War Department under my administration and that of my predecessor for not being prepared for the war. Well, I have no defense to offer on that subject except this, that if either I or any of my predecessors had gone down to the Congress and asked for a million-dollar appropriation to get ready, we would not have gotten it. We would have been regarded as alarmists who wanted to go to war.

The actual fact is that after we did go to war it was five weeks before the Congress of the United States appropriated a single additional penny to get ready, and we were already at war.

The United States has never been prepared for war and we have gotten along fairly well for a number of reasons. In this last war, the only reason that we did not have to pay a heavier penalty was that our Allies held the front while we got ready.

Something was said here tonight about Russia. I hope the American people will never forget what we owe Russia. In the early days of the World War those brave, simple people died by the millions with the most superb and magnificent courage. They held the front while France and Great Britain mobilized their larger armies. And if Russia has been since in a profoundly disturbed state and an impossible intellectual froth has seethed over the top of that cauldron, do not let us be too critical of her.

I do not know what would happen in the United States; I do not know what state of mind we would be in if we had lost as many millions of our sons as Russia gave to that cause. Russia is coming out of her troubles. They are a great, brave, generous, heroic people. And Russia will be all right. I feel hopeful about her.

But we fared well in this war in spite of these modern conditions that I have described to you, because our Allies held the front while we got ready. Aye, I very well remember we had scarcely gone into the war before general officers, military men, came from overseas to this country to consult with our General Staff, to consult with me, about how we could help with this work. And the French General and the English General each told me in the same words, "Mr.

Secretary, it costs us 10,000 lives to educate a major general. Pick your most experienced men; get the most highly trained men you can at the very outset, because the more they have to learn after the war begins, the more you have to pay in human life."

Now it was a providential dispensation that we could train our general officers alongside of these veteran French and British officers and back of the lines which they were holding; but I pray God that the time will never come when we will be summoned by any heady, passionate attack of some other nation upon us to defend our country and find ourselves obliged to educate general officers at any such expense of life as that.

I believe we ought to have trained officers. It takes a shorter time to train an American officer than any other in the world, largely because of the immense advantage with which we start, by what our colleges and universities give to American youth. Your great university here in Columbus is a factory for the making of the most plastic and valuable raw material for officers that you can find anywhere in the world. These young men and similar young men ought to be educated and given as much training as they can, in order that if this last emergency does come, your sons and my sons, when called upon to join the colors, will join under as highly trained and skilled men as possible.

I have only one further word to add, and that is to reënforce the idea with which I started out. Peace will not come by merely wishing for it. We must work for it. We must fight for it. We must be willing to abate something of our prejudices in the matter.

Everybody in this audience knows that I believe that the League of Nations is the way.

I do not want to be obstinate about that. I am perfectly willing to call it by some other name. I am perfectly willing to have its constitution changed as anybody may want to change it. I am perfectly willing to throw it on the scrapheap just as soon as we get something else that will do the job better. I am indifferent as to the manner. This is an obstinate, hard-hearted old world we live in. I am not going to be of the unyielding type. I will yield any point just so long as we are working to get some agency that will focus the consciousness and the intelligence of mankind on these international conflicts in such a way as to bring about understanding instead of misunderstanding, and justice instead of injustice.

I read not long ago a Greek play. I do not recommend you to read it, because it is so unutterably sad that you can only read three pages at a time, and then you have to stop. It is a play by Euripides, Iphigenia in Taurus. It is a story of the Greeks just as they were about to start off to the Trojan War. Agamemnon was the King. Calchas, the soothsayer, had been consulted as to what he had to

say about it. He told King Agamemnon that the Greeks could not start off on this great international enterprise with hope of success unless they get Iphigenia, the daughter of King Agamemnon, the most beautiful girl in Greece, and offer her as a sacrifice to the gods. Agamemnon sent off and got Iphigenia, and his wife, the girl's own mother, Clytemnestra, brought her. And she only learned when she got her daughter there that she was to be slain on the altar of her own father, a sacrifice to national ambition. Then she ceased being the Queen and became all mother. National ambition became nothing to her. She wanted to grasp her girl and save her from that sacrifice. And it was too late.

I have thought as I read that story, "Ah, the world has not changed very much. That is what we keep on doing all the time."

Instead of sacrificing a young girl, this generation has sacrificed ten million young men on the altars of national aspiration, simply because we did what Clytemnestra did—we waited until the time of the sacrifice, when it is too late to rescue the youth.

Now, my brethren, let us be up and doing. When I came in here I saw a lot of boys. I thrill when I see boys. The world belongs to them. It is their world. And every time I see a boy I feel that he is asking me a question: "What kind of a world are you making for me to live in?" And I want to answer, and I want that answer to be twofold:

First, "Son, if you are ever called upon to fight for your country, you will have a fair chance." And,

Second, "If anything that I can do, any word that I can speak, will help to further international arrangements to such a stage that peace with justice will take the place of war, then by the glory of the Almighty you will be permitted to live in a world in which you can achieve the highest things your faculties are capable of, unterminated and undestroyed, as your ancestors were, by this dreadful menace which brought recurring war in the world."

R.O.T.C. DUTY

BY CAPTAIN GEORGE P. HAYS, F.A., CORNELL UNIVERSITY

OUTPUT

THE primary consideration which influences an officer on R.O.T.C. duty is how he can increase his output of candidates commissioned. The numerical output shows to a great extent the value and efficiency of the unit, and the effort of the officers concerned. To increase this output sacrifices are sometimes made in discipline and instruction, but these sacrifices are not a matter of record whereas the output is. To secure successful results from a numerical standpoint military training must be popular with the students. To insure definite benefits this popularity must be secured on a sound basis—that of proper instruction, facilities and equipment. We are very fortunate in this respect in the Field Artillery with the diversity of our subjects and the variety of our drills. The following facilities and equipment assist in attaining this popularity:

Sufficient well-trained saddle horses for equitation instruction.

Sufficient flat saddles for equitation and riding classes.

Bridal paths along picturesque places.

Horseshows, hunt meets and polo matches.

Ample drill ground for mounted manœuvre.

Sufficient matériel for most effective training in cannoneer drill.

Facilities for pistol practice.

Facilities and ammunition for service practice.

Sufficient battery commander's instruments, topographical and communication equipment for small working parties.

Sufficient training regulations issued to the student for future reference at government expense.

Proper classrooms and facilities including charts, movies and sectionalized matériel.

Well-organized summer camps held in a desirable locality.

Neat, well-fitting uniforms provided at government expense.

Unfortunately for our plans, there are many obstacles which limit the enrollment in the advanced course after the course has become popular with the student body.

Lack of academic credit toward graduation is the main obstacle at present and, unless secured in actuality, will become more detrimental in the future. A superficial examination indicates that ample academic credit is given in many universities for R.O.T.C. work, but this credit is termed "elective" and is only of value in those academic courses which permit the use of such elective credit. At

present, in many colleges (such as engineering) prerequisite subjects are required for graduation, nor can elective credit be substituted therefor. The future trend seems to be toward greater specialization with the elimination of elective credit. This limits our enrollment to those students who have the ability and time to successfully pursue their academic course and R.O.T.C. work in addition.

With each future increase in the scholastic standard and requirements our enrollment will be measurably decreased. The most zealous advocate of R.O.T.C. training hesitates to recommend it to a student who has not the time and may consequently "flunk" out of college.

Attendance at summer camps prevents the enrollment of those students who must work, or who pursue courses requiring practical experience as a prerequisite toward graduation.

Irregular students who will not remain in the university for two years after completing the basic course, are precluded from enrollment in the advanced course. The number of these students in a school requiring compulsory drill is often high; they reached 40 per cent. of our basic enrollment at Cornell during 1923–1924, but this number was readily reduced by proper faculty ruling and action.

Athletes who are unable to complete four terms of basic drill are lost to the advanced course where the commandant rules that their athletic work can not be substituted for drill credit.

In the face of these limitations the growth of the R.O.T.C. output will be slow, and to secure large results these obstacles must be removed by appropriate action of the college authorities; therein lies the responsibility of the P.M.S. and T.

DISCIPLINE

There is an impression in the Army that R.O.T.C. students possess such mental attributes and occupy such a peculiar status that proper disciplinary training cannot be maintained at college. Some even maintain that best results are secured by eliminating disciplinary drills during the school year, introducing such training only during the period at camp.

A reserve officer in active service will copy, to a large extent, the methods and attitude of the regular officers under whom they receive their early training. If this association is marked by the absence of discipline (and the attendant characteristics of its lack) the reservist will neither appreciate nor know how to enforce discipline in his command. This impression owes its inception chiefly to the desire to popularize military training and reap a consequent increase in output of candidates commissioned, but if military training could be popularized by eliminating disciplinary features,

CLASS IN FIRE CONTROL INSTRUMENTS

CORNELL UNIVERSITY R. O. T. C. STUDENTS FIRING ON CAYUGA LAKE RANGE

SERVICE PRACTICE AT CORNELL

we can ill afford to experiment with officers commissioned along those lines.

My experience has shown me that discipline, if properly introduced, can be obtained and maintained in the R.O.T.C., and that in the best disciplined batteries we have the most esprit de corps and best morale. To obtain and maintain discipline certain principles must be observed; as in every organization, it is dependent largely upon the characteristics and personality of the officer commanding.

Students must be properly started as freshmen and should be directly commanded for the first two months by a regular army officer. The value of discipline from an efficiency standpoint should be stressed. Thereafter, cadet officers commanding, should be carefully supervised, and should a slump in discipline become too pronounced, a regular army officer should again bring the battery under control.

The standard of discipline should not be too high; set a reasonably high standard, but bear in mind that military training occupies but a small percentage of a student's time in college, and do not expect more progress than the actual drill hours permit. The standard that can be required includes:

Prompt, cheerful obedience to orders and attentiveness to instruction clearly and exactly presented.

An appreciative attitude on the part of the student for individual instruction.

A cheerful performance of all tasks incident to and part of the training of a field artilleryman, including cleaning of matériel, harness and equipment, and grooming after an equitation or draft period.

A sufficient response from those students who can afford the time for additional voluntary work.

An outline of what I consider too high a standard includes:

Cheerful obedience and attention to instructors poorly equipped professionally and temperamentally.

Cheerful continuance of work that has become meaningless or monotonous, or compulsory work to take place out of drill hours.

A cheerful performance of compulsory tasks whose recognized object is the bettering of conditions not an incident of immediate drill (such as fatigue and repair work, or grooming animals not used by class, etc.).

Methods of securing and maintaining discipline as generally employed in the regular army are best adapted to the temperament of American citizens and should be closely followed in R.O.T.C.

work. For an officer on R.O.T.C. duty to cast aside his previous experience in the handling of enlisted men as inapplicable, attempting to substitute therefor some unfamiliar methods is fatal.

COURSE OF INSTRUCTION

Opinions vary among officers on R.O.T.C. duty as to what subjects should be taught and the time devoted to each. A reserve officer may serve in the line or staff, with guns of various calibre, with horses or motorized units. This consideration influences some instructors to touch on all the various fields with the result that when commissioned, the candidate has a general hazy knowledge of a number of things, but has acquired no specific knowledge that may be immediately utilized.

The mission of the R.O.T.C. is to equip candidates to perform the duties of a second lieutenant of field artillery. In the time allotted he cannot in addition learn to command a battalion, a regiment, a brigade, and to perform the duties of the staff. Properly instructed, the student should be thoroughly familiar with the matériel, regulations and drill pertaining to one type of gun, and to one type of motive power. More cannot be successfully attempted if he acquires a sufficient knowledge of artillery firing, tactical employment of a battery, and administration. Such knowledge as he receives should be complete and accurate, and so impressed upon his memory that it readily returns upon review.

The final results obtained by introducing or stressing subjects for propaganda purposes are of doubtful value; straight field artillery training properly presented is in itself very interesting to most college youths.

The coördination of work toward two objects should be sought in planning the basic schedule: To provide the best ground work for advanced course work; to provide a complete, though limited, training for those students who do not take the advanced course. The latter object should not be disregarded; the future benefit that may be derived from basic training alone, is at present indeterminate, but may be very large.

The following outline is given of our course at Cornell:

First Year, Basic course:

Time: 3 hours per week; total hours: 90. (Complete two general subjects.)

(*a*) School of the Soldier; guard duty; pistol.

(*b*) Matériel, regulations and drill pertaining to one gun (preferably the French 75 mm.). Additional subjects should be scheduled only when time permits. Service practice at the close of the school

year is invaluable to show the degree of proficiency, and to give a definite object to work toward.

Second Year, Basic course:

Time: 3 hours per week; total hours: 90.

The entire time should be used to develop qualified drivers. Additional subjects should be scheduled only when weather or facilities do not permit proper instruction in duties of a driver.

First Year, Advanced course:

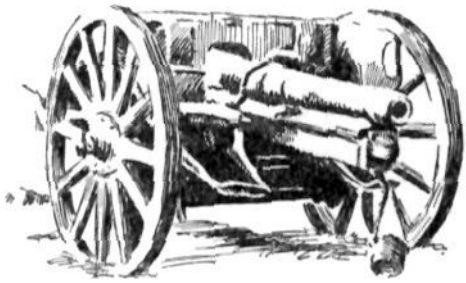
Time: 5 hours per week; total hours: 150.

Devote the entire time to theoretical and practical work covered in Reconnaissance and Occupation of Position (T.R. 430–155), and Artillery Firing (T.R. 430–85). The mastery of the subjects are necessarily a prerequisite for summer camp, and will not permit attendance at basic drill.

Second Year, Advanced course:

Time: 5 hours per week; total hours: 150.

The primary task of senior students is the proper command and instruction of the basic batteries, which consumes three hours per week with some additional time for preparation. The remaining time is devoted to a study of organization and tactics, administration, law and history.



DISCIPLINE

BY MAJOR W. E. BURR, F.A.

ONE hears the expression occasionally, "Well—Jones is a good soldier," with the emphasis on the last word.

What is it that is meant or implied by such a description of an individual? Does it refer to the professional qualities, the appearance of the man, or does it have to do with his general make-up, his frame of mind, as you might say?

If we should step back a few chapters in history the answer would be simple. Before the spread of education and the acknowledgment by governments that all individuals had intellects and were entitled to a "place in the sun," a good soldier was an automat, and by the word soldier we do not mean those alone who stood in ranks. Battles were won primarily by shock tactics, campaigns by a series of battles or manœuvres by groups of the automats.

The automat was trained to keep his place in his formation and upon the success of that training depended the success of the operation as a whole. What was it that enabled the Romans under Cæsar to defeat the barbarians? Was it not the cohesive effect of groups of automats directed by an intelligent mind against the untrained and vain rushes of individualists? In other words, in the past, a good soldier implied a well-disciplined soldier.

Now, the same answer may be used for our times if we modify somewhat our opinion of the word discipline.

Like most everything else in the world our ideas concerning discipline have progressed. In the past it signified implicit obedience of an unthinking sort. It represented a frame of mind wherein the individual was trained to act automatically, no matter what the crisis or the conditions surrounding him might be. It resulted from the developments in warfare which made final success dependent upon the effect of one shock group against another. No intelligence could be expected from those in ranks and none was desired. To quote from a famous poem,—

"Theirs not to reason why,
Theirs but to do and die."

True, the appropriateness of this quotation may be questioned on the ground that such should be the creed of every soldier, but it is quoted to lend force to the statement that in the past discipline was not in any way considered connected with intelligence. Consider the manner in which it was taught and enforced. Its foundation was laid upon the fear of the individual as to what might happen to him if he transgressed the bonds of discipline. Brutality was

the keynote, and with this as the basis there was built the whole cohesive effect of the unthinking, unseeing masses of automats.

The most common understanding of discipline, even to this day, connects it with the word "Prussian." The most famous results developed from this understanding, both from the point of view of a desire for relief from a detested regime and a yearning for progress, and from the point of view of results achieved, was the suppressing of all discipline in the Russian Army in 1917. Then and there occurred a famous jump from one extreme to another. It failed of success, and why? The answer is, that it never will work where there is no education, and therefore no intelligence.

But can the word "Prussian" be connected fairly with our present-day ideas of discipline? Some insist that it is; others act as if it were; and many wish it could be. But the intelligent can see no connection at all. In other words we find, either by conditions existing, or ideas expressed, that many and varied are the conceptions of discipline. This is an unfortunate condition, especially when it is considered how many of the civilian population are convinced that discipline must be something "Prussian."

Why is it that with the standardized training methods adopted in our Army, both for officers and men, that such wide degrees of efficiency exist between organizations under otherwise more or less similar conditions? Cannot it be laid to the variety of methods by which the regulations are applied and interpreted by individual ideas of discipline? To train individuals, especially in masses or groups, many things have to be forced upon more or less unwilling and relatively ignorant minds. To be successful in the application of such forcing requires the application of one kind or another of discipline. Hence the variety of results. Of course such a deduction must be based upon the premise that other things, such as education, native ability, training, etc., are equal in the individuals applying the discipline. When it is considered that such is far from being the condition obtaining in the service today, we should not be too critical of the results achieved. Rather should we congratulate ourselves that some sort of discipline is achieved at all. But is it not strange that we should find ourself in such a condition where discipline is remarkable for its presence rather than for its absence as compared to our pre-war standards?

Sir Ian Hamilton, author and soldier, has said that discipline, as it is understood and can be applied today, in contradistinction to the discipline of the automats, must be based,—

"Upon a sense of duty (res publica);
Upon a generous emulation (force of example);
Upon military cohesion (esprit de corps);

And upon the fear a soldier has of his own conscience (force of conscience)."

There is nothing Prussian in such a creed, nothing to cause the subordinate or the man in ranks to fear his superior from a physical standpoint. Nor is there anything morally degrading in the application of such a type of discipline. Let every soldier from the highest to the lowest balance these aims against what have been, or still are, his own ideas of discipline. Let him decide whether he is of the past or of the present.

Before we attempt to apply General Hamilton's ideas to our own needs, let us see if there is anything in them which is either incompatible with the ideas of our service or foreign to our American beliefs.

Consider the first, a sense of duty. Surely our country was founded somewhat upon that rock. With what better attribute could we endow an organization, which after all is only an aggregation of trained individuals, than with a strong sense of duty? Which is to be preferred, a unit that is held together by the fear which it has for its leader, or the unit that understands its duty and will perish in its efforts to do it, even though leaderless? Surely we do the country no harm, either, when we endeavor to inculcate that trait in its citizens.

A generous emulation—Perhaps in this age of individualism, emulation may be decried; but many believe that what this country lacks are leaders worth emulating and the spirit to emulate them. Mankind after all is prone to ape his fellows, either consciously or unconsciously, and a little yeast may leaven the whole. Will we not serve the service and our country by providing a proper example of force of character that will move our subordinates to follow and emulate us? Certainly there is nothing un-American in this, a trait so similar to that which impels every normal American boy to dream of the heights he intends to rise to in emulation of his elders.

Military cohesion (esprit de corps). Put in another way, we can express this as organization. As Americans we pride ourselves upon our efficiency in organization. It is the foundation of our successful business methods. As soldiers we must acknowledge it to be the backbone of our aims. A unit with esprit will never admit defeat.

And the last—the fear a soldier has of his conscience, fear that he may be afraid. We teach that the best defense is the offense. In a crisis will the discipline that is based upon the fear a man has of his leaders prove superior to that which is founded upon conscience? Which is most liable to cause a leaderless man or unit to advance farthest in the face of enemy fire? Certainly the development

of conscience will do neither the service nor our country any harm.

So much, briefly, for the desirability of this kind of discipline. Admittedly it will fit in not only with our needs, but with our material and conditions of life.

Let those who have read this far pause a moment and reflect as to whether their own organizations, units, commands, no matter what they are, possess discipline of this character. For those who are cetrain that "their men" are of this class, there is no object in reading any further. We salute you and wish that there were more of you.

But for those who admit imperfections in themselves and their units, and who see the light which the writer holds up so imperfectly and dimly, but earnestly, let us conduct an inquiry into the difficulties encountered, the reasons therefor and at the same time discuss improvements. In so doing we shall give rank its due and lead off with the seniors. Should not the elders set the example for juniors? That is our first point. And what we mean is that too much must not be expected from the younger generation unless the older provides the proper model. The subaltern is prone to follow the senior. When rules and regulations, and even laws are winked at by the "General" can the "2nd Looey" or the "Buck-Private" be blamed if he does a bit of winking also? Can the driver be punished for failing to care for his team, if the captain seeks his billet before assuring himself of his battery's well-being? Can the captain be criticized if the colonel fails to look after his regiment's comfort? Unfortunately we believe this to be a not uncommon fault. As we grow older the hardships of the service, of life, sometimes seem to overburden our sense of duty. The detailed requirements slacken as we advance in rank, but the responsibilities increase, and not the least of our responsibilities is our duty to furnish not merely an example, but "the example." What respect can a senior expect to command from his juniors if his conduct, ability and character do not furnish the model? The system of military rank is based upon the need for leadership. There can be no real leadership, as far as discipline is concerned in these modern times, unless the senior commands the respect of the junior.

To secure this respect many may have to readjust themselves. It should be remembered that the junior ranks have been leavened with many young officers who have not had the advantages of disciplinary service such as juniors were subject to before the recent war and the consequent rapid promotion. Experience is a hard teacher, but it is by far the best. Those who have had experience should use it for the benefit of their juniors.

In this connection, would it not be wise if, except for the

exceedingly technical subjects, all instructors at our various service schools were as far as practicable senior to the students. It seems that at least for the broad generalized subjects such as tactics, strategy, military history, etc., there should be enough senior officers who could not only instruct the junior ranks, but at the same time, by reason of their rank and service, command their respect. To have the senior officers instructed by juniors, as so often occurs, appears to be a somewhat topsy-turvy condition and not conducive towards inculcating the maximum confidence or respect for the higher grades.

Another point which is subject to discussion is the often heard criticism by senior officers of the improper ideas and conduct of juniors. It is something to have this state of affairs recognized, but is it not fair that we should go a step farther and place some of responsibility where it justly belongs? The senior who is critical of his subordinates should first examine his own conduct, ability and example, and then decide as to whether he is in a position to be critical. We can well abide by the old saying about the pot and the kettle, especially where the efficiency report requirements are considered.

To be a model is not an easy task. For many of us it might mean considerable in the way of a changed outlook on the service, and life also. In the service it is often hard to separate the official from the personal or social side. An officer should not attempt to be a chameleon, with official and unofficial codes or standards. In these modern days of all sorts of standards and beliefs it behooves us to be consistent if we are to command respect.

Above all the senior should be proficient in his profession. With so much progress being achieved in the art and science of war, much study is required to keep abreast of the times. The relief from minor tasks should permit those who are older in the service to devote more time to a complete mastery of their duties. It cannot help but be admitted that to have the junior feel that he is superior in knowledge to his senior is a most unfortunate condition. Will such a state of affairs produce the proper leaders either for war or peace?

Let us now turn to the younger generation and see if it can be set forth wherein the trouble lies in the inability to secure discipline.

Very often it is found that the proper example or model is lacking. This phase has just been discussed and may be dismissed for the present.

Next, there is the real failure of the younger officer to possess a true conception of discipline. Failing to understand or appreciate its present-day meaning, he can hardly be blamed for his inability

to secure it. The most common error appears to be the belief that instead of being a voluntary submission to recognized authority, it consists of a rigid or automatic obedience, and can be secured by a somewhat domineering attitude. Let every one turn back and peruse again the principles of General Hamilton. Then let him first seek to discipline himself along those lines. The junior officer will then find himself in the same boat as the senior. He must be a model, too. No man in ranks in these modern free-and-easy times is liable to develop a strong sense of duty or be fired to emulation unless he respects his immediate superiors. Such is particularly true for the relatively immature lads who are enlisted in such large numbers at the present.

At this point one may ask for details as to how to accomplish this. In reply we must state that each must go about it in his own fashion. Personality can never be confined within set rules or precepts. If one has the germ it will spread.

However, several basic fundamentals applicable to all may be listed. First, is efficiency. The training regulations are easy of access. Every officer should be familiar with those applicable to his own sphere of action. Every officer should be sure of his professional ability in any rôle he may be called upon to play. What can be and is more devastating to discipline than the so often visible ignorance of officers? The Army belongs to no union. Certain requirements have to be met, and there is no such thing as "overtime." If the requirements cannot be met, some other walk of life had better be tried.

Next we have conduct and appearance. Too often it appears that individual conduct and appearance are only for their effect upon seniors or to grace a social occasion. How we appear to the man in ranks is either neglected or considered of minor importance. Should not equal weight at least be given to each, if not a slight inclination towards the man in ranks? The latter is bound to have his own ideas of officers who are one thing to him and another to seniors.

In what has been said nothing is meant to be inferred that a junior officer should not secure the confidence of his men. This, after all, is a matter of his own personality and ability. Above all he should inspire them by his own example. And, if he cannot inspire them, he should at least command their respect. Improper conduct and consistently slovenly appearance are not conducive towards such. Patronizing familiarity is above all things to be avoided.

Another point which should be fundamental is ameniability to orders. Sometimes there is a spirit displayed which is prone to question either tacitly or openly orders and directions. Sometimes

it is expressed by compliance which is just within, as one might say, the law, other times by evasion of compliance, and again by simply an attitude of dissent. Here again we should be able to look first to the senior for the proper example. But whether we can look to the senior or not, consider the oath of office, the example to the man in ranks, and last the duty and loyalty to the service when this point is reflected upon. Is such a spirit conducive to true discipline? If this makes no appeal, is it not better to be a "yes" man than the opposite? No one can expect a sense of duty, a generous emulation nor esprit de corps in those beneath them, if he questions the orders of those above him in such a manner as to indicate such an attitude to his subordinates.

There is not so much more one could reasonably expect in a young officer, or any other as a matter of fact, if he were efficient, meticulous in his conduct and appearance, and amenable to orders and discipline.

Let us now examine briefly some of the contributing causes which are liable to make the application of discipline difficult.

There is the well-known American independent frame of mind which makes every man as good, if not better, than his neighbor. Without going into the subject too deeply, may we not state that in a way are we not only as good as we make ourselves? However this spirit can be made into an asset instead of being a liability if it is taken into consideration and intelligently handled. Efficiently led and given intelligent basic reasons for his actions, the average American makes the finest soldier in the world. Numerous examples in the recent war where success was due to this spirit in spite of inefficient leadership should indicate the truth of this statement. What officer who has seen action does not remember one or more situations where in the face of what appeared to be muddled or hopeless orders, due to the unforeseen demands of battle, he placed his confidence in the man in ranks to save the day.

With extensive deployment the frame-work of our modern tactics, such a trait, when properly controlled, will make our men superior to all others. Make them understand that drill is to secure mechanical perfection and then, given a reason, they can be led anywhere.

A material rather than an intellectual system of education in this country more or less contributes to our difficulties. The young are brought up and equipped not so much to contribute to life or their country's welfare, but to get as much out of it as possible. Material success is the keynote. It is difficult, therefore, to bring this viewpoint around towards that which causes a man to realize that after all there is such a thing as patriotism and that he owes something to his native land. Unless this is done it is more than difficult to instill

in such minds a sense of duty. Likewise, to the materially-minded there is liable to be no such thing as a conscience. No man not having a conscience can be guided by it.

There are other minor contributing causes such as constant changes in personnel, short-term enlistments, poor living conditions, etc. We should not use them for excuses, but endeavor to surmount them as our predecessors have done in the past.

Our real difficulties commence with ourselves. No army can be truly disciplined as we understand discipline today, unless it is led with character and idealism in addition to professional ability. It is not too much to say that character comes first, for without that, in these complicated days where one difficulty succeeds another, the others cannot be achieved. Soldiering is no longer an accomplishment attained lightly or in an off-hand manner. Only those with character are able to put their noses to the grindstone and master its intricate details.

Without idealism no cause is truly worthy. What was it that forced our forefathers to found this country and fight for it in the face of overwhelming odds? Was it not in many instances the idealism of a few who led the others on, and held them together in defeat?

The day of the mercenary soldier has gone. No more do professional armies hire out to the highest bidder. Neither, then, should we look at our profession for what we can get out of it. Having sworn to do our duty, let us do it with the best that is in us, so that in any emergency that may come upon us in the future we shall have trained ourselves and our men to accomplish what has in the past seemed to be the impossible. If our civilian brothers are prone to be careless of their son's lives and blind to the value of insurance for their country's safety, let us not follow in their footsteps and neglect our duty.

Without discipline we shall always be a mob, but with it we may be able to furnish the backbone around which a successful defense can be built.

THE PLACE OF THE NONCOMMISSIONED OFFICER IN THE NATIONAL GUARD AND HIS TRAINING

BY LIEUTENANT-COLONEL WILLIAM W. BODINE, 108TH F.A., PENNSYLVANIA NATIONAL GUARD

AN ADDRESS AT THE PENNSYLVANIA NATIONAL GUARD CONVENTION

WE too often accept as a fact the time-worn statement that the noncommissioned officer is the backbone of the Army without analyzing such a statement and without studying the means of keeping the backbone in a healthy condition so that it can properly support the rest of the structure.

In the Regular Army, with its efficient training school for officers, the education of the noncommissioned officer can be directed primarily to his perfection as such, leaving the question of further advancement to the fortunate individual endowed with the characteristics of leadership necessary in a commissioned officer. This does not mean that ability to lead men is not desirable in a noncommissioned officer, but it is a fact that without such characteristics a man technically trained in his particular subject can be an excellent noncommissioned officer in certain cases as for instance supply sergeants, clerks, and in the field artillery, gunners, mechanics, instrument and telephone men, etc.

On the other hand, in the National Guard the noncommissioned officer must be looked at not only as such, but as prospective material for a commission. As the World War Officers pass out of the service the National Guard must look largely to its own organizations for one-half its junior officers. The majority of the graduates of the R. O. T. C. and the C. M. T. C. can be expected to accept commissions in the Officers' Reserve Corps, with its lesser demands in time and energy, rather than in the National Guard.

My observations have, of necessity, been limited to one organization, but it is reasonable to believe that the problem is not dissimilar in other organizations and other branches of the service. During the period of reorganization after the war the training of noncommissioned officers in our regiment was a hit-or-miss affair and in some cases non-existent. This was overcome to a certain extent by the establishment of noncommissioned officers' schools under the supervision of the battalion commanders, in some cases by battery and in others by battalion. Such instruction as there was, was of a technical nature with the object of perfecting each man in his individual duties. The weakness of this system was not fully appreciated

until last summer's period of field training, due to the fact that prior thereto such field training was largely limited to and concentrated on the training of individual units, with special stress on the firing battery, and because, due to the inexperience of noncommissioned officers, it was necessary to follow closely their technical work. This year more opportunity was given the noncommissioned officers to exercise leadership and initiative in the field, in close order drill, and in tactical problems of a provisional regiment consisting of the headquarters battery and one battalion, six such problems having been carried out with varying degrees of success. It was clearly demonstrated that while the noncommissioned officers had the technical training to carry out their work, they lacked initiative and leadership, were often unable to make the necessary decisions when an officer was not on hand to direct them, and that they lacked ability to assume the responsibility of independent action and aggressive exercise of command. The fault is not theirs but must be placed on the system of training which during the winter months did not afford them opportunity to develop these characteristics.

I do not attempt to offer a solution as the problem is one that will vary with different organizations depending on whether all units of a regiment are together or scattered throughout the State; depending on the character of the noncommissioned officer personnel, their degree of education and military experience, the local armory facilities for training and other factors. Each organization, where this difficulty is developed, will have to study the problem in the light of the local conditions and feel its way to a certain extent in working out a remedy.

In our regiment we are trying to correct the situation through the establishment of regimental N. C. O. Schools, attended also by selected privates. These schools are held one hour a week on a night when no organization is drilling. This means, of course, that a noncommissioned officer must give up two nights a week to his national guard training and it remains to be seen whether or not they will be willing to do so. No private or N. C. O. is recommended for promotion until he has attended these schools for at least three months with an attendance record of eighty per cent., and all N. C. O.'s whose attendance falls below sixty per cent. in any quarter will be demoted, baring special circumstances. It is conceded that this is strenuous action, but it is believed that all organizations in the State have reached such a degree of efficiency and acquired such esprit de corps, that when it can be shown that it is to their own advantage the large majority of noncommissioned officers will heartily coöperate and will be willing to put in two nights a week as do the officers.

The training program of these schools is devised to stress leadership and to afford opportunity to exercise command. The first seven weeks were devoted to the school of the soldier, school of the squad and school of the battery dismounted.

Commencing with the eighth week the school is divided into various sections such as instrument men, telephone men, gunners, supply sergeants, clerks, etc., individual instruction in their own specialties being given to each group with the general instruction of the whole class in close order drill once each month. Later the monthly close order drill will be varied with calisthenics, guard duty, military courtesy, shelter tent pitching, pack rolling, hygiene, etc. Copies of Training Regulations are supplied to each N. C. O. and home work assigned each week as preparation for the next week's schedule.

The two difficulties encountered to date are, first, unsatisfactory attendance and, secondly, the difficulty of making many of the noncommissioned officers realize the importance of the general instruction designed to give them an opportunity to exercise command and so develop themselves in leadership. It is hard for some to appreciate the fact that a noncommissioned officer, well-grounded in the technic of his specialty, is not necessarily a good noncommissioned officer, and that technical ability in one subject only without general knowledge, and in particular without the qualities necessary in efficient exercise of command, will not make an officer.

Immediate results cannot be anticipated and the test of the plan will come only after much experimentation. Whether successful or not the plain fact remains that in the future the National Guard must look largely to its own units for its officer personnel and that some means must be found which will afford the opportunity of developing the qualities of willingness and ability to assume responsibility and energetic exercise of command essential in true leadership. Uncoupled with these qualities the technical knowledge of an officer is as valueless in the military service as the technical ability of an engineer in civil life.

GUNS TO THE FRONT

BY LIEUTENANT-COLONEL JOSEPH W. KELLER, 310TH F.A., O.R.C.

IN the days of our great grandfathers when the cry of "Guns to the Front" rang down the column, the blood coursed faster in the veins of all who heard the command. It meant that the commander intended to smash through and was calling on the Field Artillery to help. Today, when the equivalent of that thrilling, ancient command flashes back to us through air or wire, many of us—but, wait, let us begin the present state of affairs at its birth.

During the World War when the advantage seemed largely a matter of numerical man power, there grew up among many military men the strong conviction that operations had become permanently immobilized and that ultimate victory would perch on the banners of the side having the greatest endurance. From this thought there sprung a peculiar military philosophy, utterly unwarranted by history, which gave rise to many new and peculiar practices and teachings in which the Field Artillery shared.

Fortunately, American military leaders never became so imbued with the idea that "the day of mobile warfare is past." All our forces were trained in the practices of open warfare and the wisdom and foresight of this move was amply demonstrated in the records and efficiency of our troops when the break came.

Since the War the writer in discussion with many field artillerymen, in numerous field exercises, critiques and map problems, has noted a continuing tendency on the part of many officers to base their actions on the false premises that grew up during the war as a logical result of the exhaustion of forces, nerve and hope. One place in which this is particularly noticeable is in the question of selection of offensive positions for light guns.

It is a military maxim that the advantage always lies with the offensive and that no great victory ever came from a defensive campaign. It is difficult to conceive how any decisive result could ever have come to opposing armies that were permanently immobilized. Offense and victory are military synonyms, so offensive tactics assume double value.

It is in the artillery role of supporting the infantry on the offensive, that the writer finds his greatest criticism of some recent teaching. Many of our officers still choose their positions with a view of supporting entrenched troops rather than those that intend to go forward. As a result there is a marked disposition on the part of many to choose and to recommend gun positions that are too

far to the rear. Justifiable boldness and its attendant advantages are sacrificed in favor of problems chiefly of supply.

Let us analyze the relative offensive advantages of positions well to the rear as against those fairly well forward. To the score of the advantages of rearward positions we can credit greater ease of supply, a real advantage. Coupled with this is a somewhat increased ease of manœuvre, particularly in withdrawal. But when one considers that those officers upon whom devolves the questions of selection of position, generally have a manœuvre sector that is very narrow and that in case of forward displacement the rearward position is inferior, it immediately becomes apparent that in this respect the manœuvre advantage of the rearward position is more theoretical than actual.

Further than heretofore stated, all the advantages of well-chosen positions boldly to the front seem preponderant, and post-war development of matériel has served to further increase them. In the first place, the farther forward the greater your range into the enemy territory. With our new 75-mm. guns having a promised range of about 15,000 yards, an even greater increase of power, importance of mission attaches itself to the light guns. With 75s such as we used during the war, even the maximum range was such that they frequently were unable to reach some of the deeper and more distant lines of entrenchment and logical targets. Indeed, there are cases on record where from their positions they were even unable to provide barrages deep enough into the enemy territory to satisfy a normal infantry plan. With our new guns and positions well up, it is almost inconceivable that any situation usual to an offensive could arise where matériel and proper support could not be afforded. Moreover, such positions allow the field artillery to keep the enemy "a'rollin' along" with a sustained maximum fire delivery, once a break is started. At a critical battle stage such as this, every extra shot that can be fired and every extra foot you can pursue a withdrawing foe with your fire before you have to make forward displacement, is vital.

A legitimate objection to our argument for forward position, which was formerly raised by those who took an opposite stand, was that in many cases the flat trajectory of our 75-mm. guns prevented the clearance of natural masks and obstacles, and was in some short range cases so low as to endanger our own troops, unless, the guns were set far enough back to give a more plunging aspect to their fire. Any former merit of this objection has been removed by the supply of reduced charge ammunition which even in the new long-range guns gives a more howitzer-like fire than former service ammunition in the old guns. Except in unusually rolling country

the foregoing objection can no longer be held valid as against well-chosen advanced gun positions.

On the score of observation much is in favor of the advanced site. A low hill that hides one from the enemy's view is as effective as a mountain range against terrestrial observation. Against enemy aircraft, moving one's guns back even a mile or so means nothing. The only way one can hope to escape aerial observation is to have our own air force dominate the air and exercise strict camouflage discipline. From the standpoint of our observation the forward position is predominantly desirable. It means shorter wire lines, a vital advantage seeing the uncanny ways lines have of being cut or rendered ineffective; shorter and, therefore, safer distances for runners or officers to traverse in the conduct of fire. In some cases it will even allow of the battery commander's and observation posts being consolidated, a practice that has many advantages in offensive work, and always puts the light gun commanders nearer and in closer touch with the infantry they are supporting.

It is self-apparent that in the successful offensive the farther forward one's original position the longer forward displacement may be put off and then, once decided, the easier it will be. For thousands of yards behind battle lines there are a hundred and one conditions and obstacles that make difficult artillery advance. The farther up one is to begin with, the easier it is to advance.

Of course, should a withdrawal be necessary, it is true it would have to be begun earlier in the case of a forward position, but there are few positions at any time that offer equal advantages in both offensive and defensive work. No officer engaged in offensive warfare has the right to let the minor advantages of a defensive possibility overweigh the superior and dominant offensive requirements.

Too much emphasis, in the opinion of the writer, has been placed on the false statement that "every good commander always has a line of retreat open." No more harmful or misleading statement was ever made. No good commander ever thinks of retreat; retreats are always disastrous. What is true is this, every good commander is always prepared with an alternative for use in the case of local reverse. But no man can "plan a retreat" since it is always attended by disorganization and demoralization, as even the great Napoleon could attest. Orderly withdrawals are not retreats, but are frequently converted into strategic moves that result in ultimate victory. Timidity must never enter the thought of the field artillery; boldness and unswerving support of the infantry must always be its attributes.

In the choice of offensive positions the tendency of many young artillery officers is to think too much about the work of others and too little about their own jobs. The gun commanders allow questions

of ammunition supply, which is no longer one of their funetions, to influence their choice of position; they choose rearward positions because it makes it easier for them to move, a tactical question that is not theirs to determine; they consider the increased safety of their command when they should subordinate it to the most effective execution of their mission. We must wipe out many of the teachings of the World War and teach as of yore the sound principles of choice of position that we formerly used and which are founded on actual military history. A lot of queer things that were done with apparent justification during the last war have taken on quite a different complexion during the past five years of calm dispassionate dissection.

It should be remembered that this plea is written primarily for the more forward choice of position for light guns in the offensive only. The writer has no desire to see a return to the extreme that characterized the front-line position of Cushing's heroic battery at Gettysburg, but he does believe that it is sounder tactics, safer teaching and better obedience to orders that when the word is "Guns to the Front" they be brought up and boldly but intelligently placed with the confident assumption that we are going forward, and with but one thought in mind, namely, "How can I best execute my mission?"

TEST MARCH OF PORTÉE ARTILLERY IN HAWAII

BY CAPTAIN CHARLES W. MAYS, 13TH F.A.

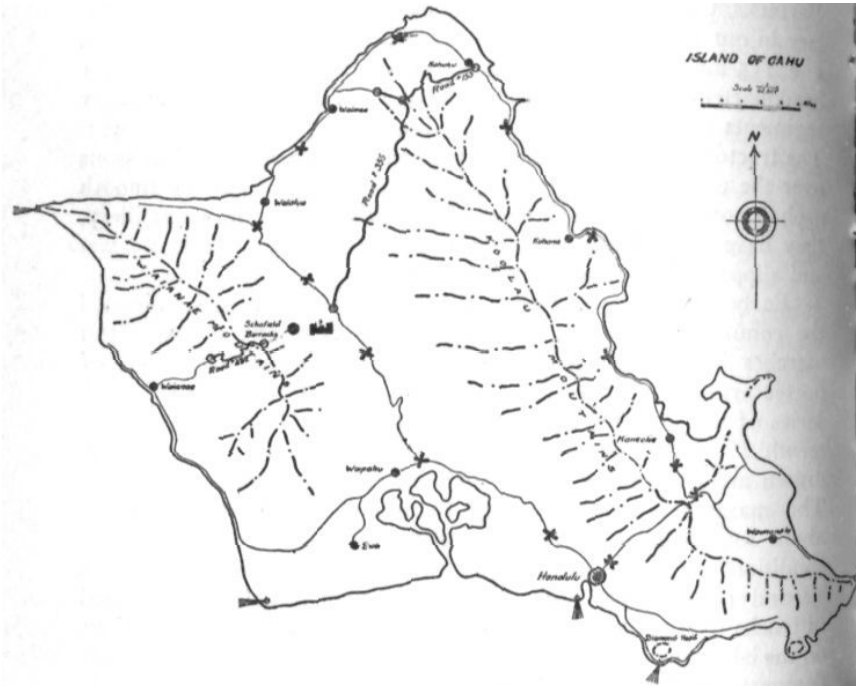
THE Eleventh Field Artillery Brigade stationed at Schofield Barracks, Oahu, T. H., is the only motorized brigade of field artillery in our army. The brigade consists of two 75-mm. regiments, one 155-mm. howitzer regiment, ammunition train and brigade headquarters detachment—all motorized. The three field artillery regiments are tractor drawn (five-ton Holt Caterpillar tractors). The tractors are satisfactory for manœuvring the guns and caissons over the coral and dirt roads and across country. On the smooth asphalt roads, while much more efficient than horse-drawn artillery, they have considerable difficulty, not only when the roads are wet and slippery, but when the roads are dry.

Early in the spring of 1924, the department commander directed the commanding officer, Thirteenth Field Artillery, to make test marches in order to determine the capabilities and limitations of portée artillery as it applies to service in the Island of Oahu. A series of test marches was conducted by Battery "B" of the Thirteenth Field Artillery. It is an acknowledged fact that tractordrawn artillery cannot march with infantry transported in trucks. The maximum sustained speed of tractor-drawn artillery being about four miles per hour on good roads and under ideal weather conditions. On the other hand, the trucks can average between 12 and 15 miles per hour. If the infantry must be transported in trucks to reach a threatened point in time to repel hostile landings on the island, why not the field artillery? The tests conducted clearly demonstrate that light field artillery can be transported as rapidly as infantry.

In order to understand some of the difficulties encountered, it is necessary to know something concerning road conditions. There are certain gulches over which a tractor cannot pull its load, if the road is wet, without considerable trouble and caution which seriously delays a battery in going into position. A hard-surfaced road extends around the Island. It consists of asphalt, concrete, macadam and coral. Most of the coral road is rough, due to the action of rain and heavy trucks. It is badly in need of repair. The other roads are in good condition. The red dirt, on the interior of the island, forms kind of a grease film on the road in wet weather. Since it frequently rains in localities, part of the road may be wet and other parts dry. I remember once it rained so hard in the artillery area that the battery kitchen was flooded and the water in the street

nearly reached the running boards of my automobile. Ten minutes later I was playing polo in the lower post on a dusty field.

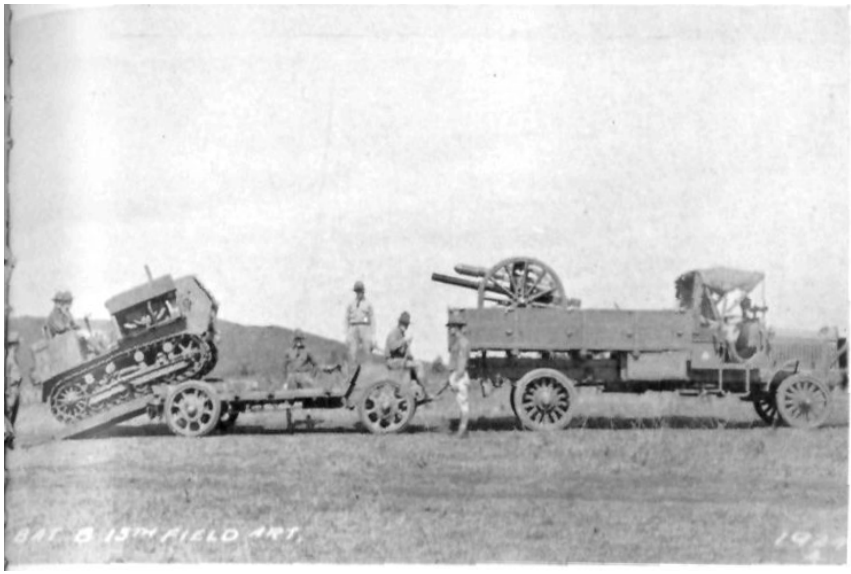
The nature of the terrain on the island of Oahu presents obstacles and problems of every conceivable kind. The route covered, in addition to many deep gulches, included the crossing of the Nuuanu Pali, where the road winds along the side of the mountains. This road is a mere shelf cut in the side of a perpendicular cliff. On one side is a wall of



ISLAND OF OAHU
Crosses mark the route taken by the battery.

rock; on the other is a steep drop of hundreds of feet. The road on the top of this pass is usually wet and slippery, due to the presence of clouds which seem to settle down at this point. Coupled with slippery roads and steep grades there are numerous hair-pin turns. The descent, of about a thousand feet in two miles, requires the highest degree of skill on the part of the driver of a section, in addition to a cool head and plenty of courage.

Instructions were given to march around the island with four gun sections, truck and trailer drawn, *via* Honolulu-Kahuku-Haliewa; a total distance of 87.5 miles. The battery left the transformer gate at 4:00 A.M. This enabled it to get through Honolulu



LOADING A SECTION

READY TO MOVE

VIEW FROM THE PALI

before the narrow streets became congested with traffic. The sections were to march in convoy with about 50 yards distance. It was necessary to have this much distance in order to enable one section to halt in case of an accident to the preceding section.

The matériel consisted of one motorcycle for the use of the battery commander, one Dodge light repair truck, one standard "B" truck, to be used as a spare truck into which were loaded the ramps and two drums of gasoline, and four gun sections. Each gun section consisted of one standard "B" truck, one 75-mm. gun, one five-ton tractor, one three-ton Ordnance trailer and 55 rounds of shrapnel. The gun and ammunition were loaded into the truck and the truck limbered to the trailer on which was carried the tractor. The personnel of each section consisted of one noncommissioned officer, one truck driver, one tractor driver and five cannoneers. The first section carried an extra pair of tractor ramps.

The weather conditions were bad. A light rain blew into the drivers' faces and interfered, considerably, with their vision and also with their confidence of staying on the road. There was considerable skidding and several times the vehicles went off the hard-surfaced road. In places it was impossible to go more than three miles per hour. The road from Schofield Barracks to Kipapa Gulch was very slippery. The road from Kipapa Gulch to the Nuuanu Pali was good. While it was wet, it was raining hard enough to wash all the dirt from the road. On the top of the Pali the road was being repaired. It was covered with about six inches of gravel for a distance of one hundred yards. The trucks could not pull their load. The first section tractor was unloaded and assisted each section through. The Pali was wet but not unusually slippery. From the bottom of the Pali the road was dry for a distance of fourteen miles. There were about sixty-two miles of wet road.

The battery was loaded the afternoon before the march. One set of tractor ramps and one set of gun ramps were used. The total time of loading and limbering was seven minutes and fifty-five seconds. This time could be lowered considerably with a set of ramps for each section.

It was planned to make only two stops before reaching the Pali. There each section was to unload its tractor and take it down under its own power. It was proved on a previous march that each section could go down intact if the road was dry, but if the road was wet there was too much danger of skidding and causing unnecessary delay. This plan was followed and the sections went down with but one slight accident. The men were fed and the trucks received gas and oil at this point.

The entire time on the road averaged 9.51 miles per hour. The entire running time was 11.84 miles per hour. From the Pali

to Schofield Barracks, a distance of 53.09 miles, the entire time on the road averaged 14.08 miles per hour and the running time was 15.39 miles per hour. From the bottom of the Pali a speed of 28 miles per hour was maintained for a distance of 14 miles.

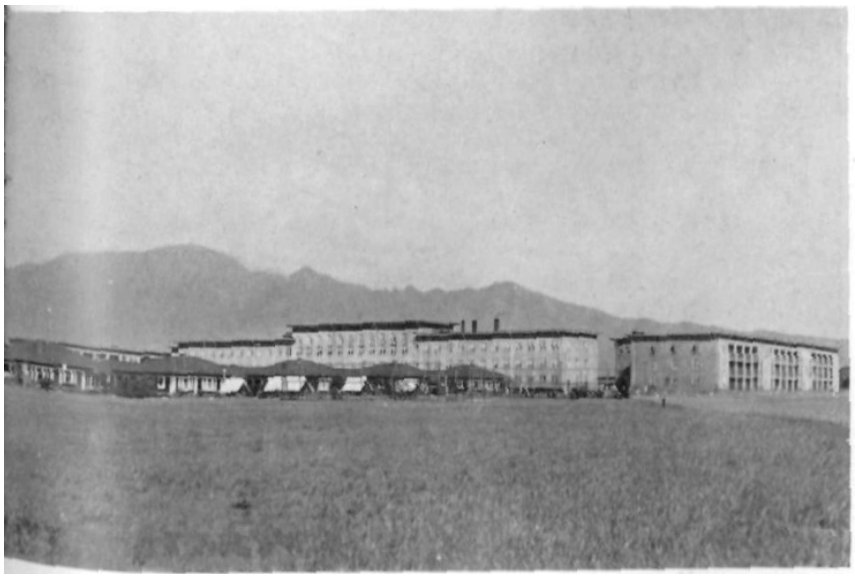
The morale of the men was good. They were not tired and at the end of the march were in condition to do heavy duty, such as digging emplacements, shelter, etc. It is much less fatiguing riding in trucks than on caissons and tractors.

While it is evident that the speed was entirely too fast for this type of vehicle, the test was made to determine what could be expected in case of a forced march. It demonstrated that a battery can be transported from Schofield Barracks to any part of the island in approximately four hours. Over a difficult road, or in going into position, the tractors could be unloaded and used with their sections and the trucks sent back for supplies. There is sufficient room on each trailer to carry 100 rounds of ammunition.

There are so many landing places that it is impracticable to have sufficient guns to cover every probable place of attack. I believe this kind of transportation is especially adapted for conditions prevailing here. It would enable a gun to be fired at the enemy regardless of what part of the island he made his attack.

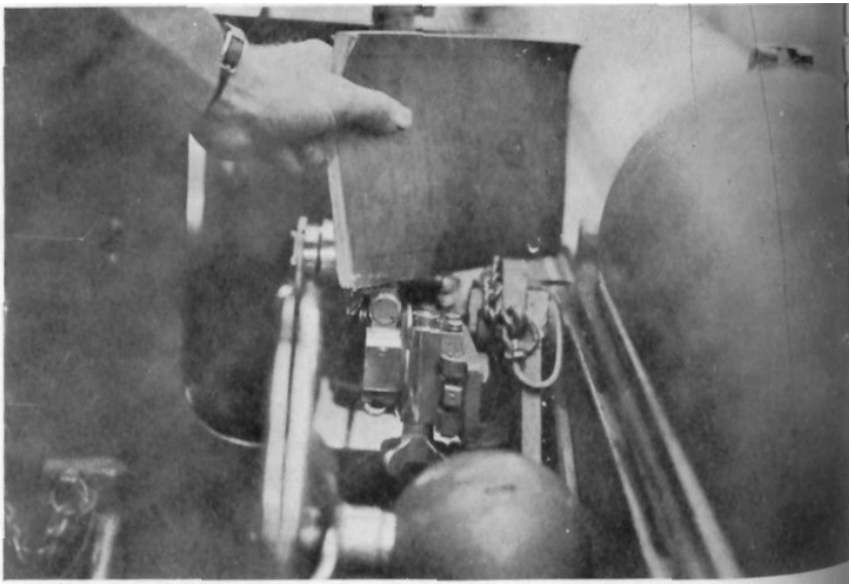
Two Standard "B" trucks and two F. W. D. trucks were taken in the first two test marches. This was to test the adaptability of two classes of trucks for this kind of work. The F. W. D. trucks were found to be unsuitable. They were capable of making the complete march, but had to be assisted in going up two wet grades. All tests were made over hard-surfaced roads.

CREST OF THE NUUANU PALI



BARRACKS AND PARADE GROUNDS OF THE THIRTEENTH FIELD ARTILLERY

"GET READY"
A trial in indirect laying.



TEACHING DEFLECTION AND DEFLECTION DIFFERENCE CHANGES

NOTES ON THE TRAINING OF GUNNERS FRENCH 75 MATÉRIEL

BY LIEUTENANT C. R. GILDART. F. A. (D. O. L.)

THE artilleryman who has noted the percentages of qualified riflemen that infantry organizations are able to muster, and has attempted, at his annual gunners' examination, to attain in his own battery the same results, must have become discouraged at the enormity of his task. A man may be introduced with comparative ease to the appearance of a "six-o'clock sight," but to teach an illiterate driver, scarcely able, perhaps, to speak English, an operation that involves considerable mental arithmetic, is a task that consumes a great amount of time—enough to make almost any executive throw up his hands in dismay and to concentrate on proven sergeants and corporals for his qualification results.

And he can scarcely be blamed for his discouragement. Those of us who have been engaged in the summer training periods with the training of civilian officers, realize that it is often a little difficult to initiate men of superior intelligence into the mysteries of the French sight. How much more arduous, then, the training of the recent immigrant, for example, who in multiplying ten by two, will with startling frequency, obtain the product of thirty by the operation.

However that may be, the same executive will agree that the field artillery officer owes it to the enlisted artilleryman to bring him as much in the way of extra pay, as he is latently capable of earning, and to approach as closely as possible the percentage records made with the rifle by dismounted troops. To do this every advantage must be taken of short cuts in computation and manipulation. The purpose of this article is to collect and codify the tricks in time-saving and methods for obtaining accuracy that have been used with success in the organization with which the writer has recently served.

PRELIMINARY MEASURES

The examination as it is prescribed in Special Regulations 53, War Department, 1921, is so difficult for the average enlisted man, that every condition under which he takes the test should be made as nearly perfect as possible. The present system of civilian training keeps officers and men engaged with exterior projects, usually until the last of August. From then on, as a general rule, emphasis is laid on pistol practice and gunners' instruction. Both are important,

but as the man receives his extra pay for proficiency in the latter, it is evidently intended that this subject should be given the preference. To this end, gunners' instruction should be scheduled to take place while the weather is still warm, for the best gunner in the battery will fail when he tries to turn a drum with numbed fingers, and to look through a sight with eyes that are watery from an icy wind. For him, at least, it is more economical to do his shivering on the pistol range. A minor point (though not as unimportant as a hasty consideration would indicate) lies in the supersensitiveness of the site-level bubble in cold weather, due to the contraction of the liquid and the consequent increased size of the bubble. Laying for elevation is thereby slowed up by no small amount.

Training for laying should take place with the carriage wheels resting on the same sort of surface as that on which they will stand during the examination. Hard gravel is the ideal surface for this purpose. It will prevent the sinking of the wheels and will allow trail-shifting to be developed into an exact science. A further improvement should be made for the trail, consisting of a plank surface at least one foot wide and five feet long. Without this the candidate, having carefully directed his piece on the aiming stake and brought the bubble to level, is likely to find that the point of the trail spade has slipped into some groove—even very slightly, but sufficiently to throw off the vertical hair and the bubble—and that, through no fault of his own, a perfectly good score has been disallowed.

Where the test requires a series of several commands, as in indirect laying, the candidate is likely to forget what data has been given by the time he is ready to set it off. To avoid this, the executive gives his whole series in a loud tone, repeats in a lower tone the latter elements of the series, and again repeats the final data. For example: in a loud tone, *"Right 25; On Number 2, Close 10; Site Plus 5,"* then in a lower tone, "On Number 2, Close 10; Site plus 5," and then a third time, and in the lower tone, "Site plus 5." The tone in which the deflection difference is given the second time indicates to the listener that it is simply a repetition and not a cumulative operation.

The natural aiming point, as directed by Paragraph 10 of the regulations, must be to the front. In fairness to the candidate, arrangements should be made so that the aiming point may be used with plateau 2, 0 or 14, as it is impossible to do the fast work required by these regulations, with an aiming point further than 300 mils from the normal to the battery front.

Another difficulty confronting the battery commander and the executive, is the problem of handling the men in the instruction so

that the minimum of time is wasted and the maximum of men are at all times receiving some sort of practice. This obstacle assumes considerable proportions when the matériel of only one battery is available. Often it is possible to make arrangements so that one battery may borrow the guns of another during its period of instruction and examination. Where a group of forty men or more are being trained in one battery, eight guns are necessary for efficient instruction. The commanding officers of national guard batteries are usually ready to help out when called upon for assistance of this character.

In handling a large group, an officer sometimes does not become intimately acquainted with the ability of each individual. To assist him in this, a card for each individual may be made out, and on this his record in the various preliminary tests may be kept. A survey of the cards a week or so before the arrival of the examining board will reveal the fact that Ducrot, for example, needs a little more instruction on the quadrant; that Dumbguard's weak point is indirect laying—and so on throughout the battery.

With good instructors, eight guns and warm weather, six weeks are necessary to give every man of a full battery a fair chance to qualify. About two weeks before the date the examination is scheduled, a preliminary examination should have been completed, in order to determine who are eligible for the final test. Candidates who fail to earn forty or fifty per cent. in any test, should at once be eliminated, to afford opportunity for concentration of instruction on the most deserving. The remaining two weeks prior to the examination should be devoted as exclusively as possible to the training of the successful men, in an effort to qualify the entire group. As a matter of fact, if the preliminary examination has been as lenient as contemplated in this article, not over 75 per cent. of those who pass it can be counted on to qualify in the final test.

It is not to be thought from the space given in this article to the methods of economizing on time, that accuracy is to be ranked second in importance to speed. It is necessary to go slowly at first, to familiarize the candidate with the requirements of the regulations as to accuracy, and later, when mistakes become less frequent, to develop the speed necessary for qualification. After six weeks' training the candidate seldom exceeds in a trial, the time limit allowed. His greatest losses will be from small inaccuracies which result from too hurried work. No matter how rapid the man may be, he receives zero for his trial if the niceties of laying have been disregarded.

Parallax in setting the scales and in leveling the bubble is a most treacherous enemy to accuracy. To combat this, the eyes should

be as close as possible to the scale, and to the bubble, and the line of vision should approach as nearly as possible to the normal to the surface under observation.

So much for preliminary and general considerations. Now to take up the various tests in detail.

INDIRECT LAYING

In indirect laying, the two operations which consume the greatest amount of time are traversing the piece and leveling the bubble. Let us give attention to the first.

With the preparations made as explained above, conditions are such that practically all of the laying for direction may be accomplished by the assistant at the trail. To enable him to do this the candidate leans over the tie rod and stanchion, back to the wheel, being careful not to obscure the sight with his body, as shown in the accompanying picture. Just previous to announcing a series of data, the executive should give the warning command, "Get Ready." At this, the candidate places his left hand on the drum (or sight column, if a first trial) and his assistant leans over the trail, his eyes fixed on the sight and aiming point. The executive announces his data, the candidate sets off the deflection, deflection difference, and site. As soon as the first two have been set, the assistant (looking through the collimator cover from his position) by shifting the trail, places the vertical hair exactly on the aiming point and calls "On" to the candidate, who by that time is ready to pass on to the leveling of the bubble. If the board deems it necessary, the candidate may, just previous to calling "Get Ready," verify the setting of the vertical hair. Men may be trained with very little difficulty exactly to place the vertical hair by shifting the trail.

Let us now take up the second time-losing operation: leveling the bubble. A large bubble, one which is equal to, or only slightly smaller in length than the space between the lines of the level vial, is excessively difficult of leveling. The slightest touch of the handwheel throws it out of the limits set by the regulations. This condition results in a large proportion of the time of laying being consumed in endless "see-sawing" of the handwheel. As noted above, most bubbles are not oversensitive in warm weather. If the examination takes place in cold weather, the size of the bubble may be made normal by immersing the vial in warm water just before the candidate is required to stand his test.

The application of deflection and deflection difference changes, is a subject wherein accuracy is paramount. During instruction prior to a recent examination, the following three systems were successively given trial:

1. The candidate was taught that "to go to the right is to subtract;

to go to the left is to add." This was imprinted on his mind by the suggestion of the initials "r" and "s" of "right" and "subtract" and the association of the operation with the alphabetical juxtaposition of the initials.

2. The candidate was then taught that the French words, *"A droite,"* etched on the drum, mean "To the right," and refer to the direction indicated by the arrow which they label.

These two systems, in themselves, were only mildly successful, but when supplemented by the third, brought very good results.

3. The third system, the most easily taught and the most flexible in practice, depended for its success on the exercise of the powers of imagination of the candidate. The latter was instructed in some such manner as this: "Imagine that the mounting of this sight support body, instead of being as it is, parallel to the axis of the bore, is set in at an angle like this (with a cardboard, a book or the hand, illustrating the imaginary position as in the picture at the beginning of this article). Then imagine that in your hand and in this drum you have sufficient power to push the gun over to the right when you turn the drum into the piece, and to pull the gun toward you when you turn the drum in the opposite direction. Now, at the command 'Right,' *shove* the gun over by turning the drum into the tube, and at 'Left,' *pull* the gun toward you by means of the drum. Suppose you are Number 3. You hear the command, 'On Number 1, Close 5.' You wish to *shove* your piece over toward Number 1, ten mils. Turn your drum into the tube that amount—the direction will always be remembered when you imagine you are forcing the gun over. To close on Number 4, simply *pull* the drum toward you, imagining that you are dragging the piece after it."

This explanation is easily communicated to men of all degrees of intelligence and brings the best results, for it assists the gunner to translate right and left into front and rear on the sight, a thing that was unnecessary on the 3-inch panoramic sight, where the ratchet mounting is in a plane perpendicular to the axis of the bore. To give the intimate acquaintance with the sight that the candidate must have, all three systems should be taught, laying greatest emphasis on the last.

DIRECT LAYING

The same scheme of traversing by means of the trail should be carried out in direct laying. The system calls for speed on the part of the assistant, but he soon becomes expert at the work. Attention of members of the board should be called by the executive to the part of Paragraph 9 of the regulations, which provides that the handwheel will be turned "slightly" after checking a trial. Evidently,

it is contemplated that the handwheel will be disturbed not to exceed a half a turn.

THE QUADRANT

A test on the quadrant consists essentially of two operations: setting the data and leveling the bubble. The following is suggested as the most expeditious method of accomplishing the first:

Announce some setting within 35 mils of the data for the first record trial, and cause the bubbles to be leveled. This is done as a preliminary measure, so that the first record trial will not require a change greater than that prescribed as a maximum in the regulations. (Par. 8, S. R. 53, W. D. 1921.)

It will be noted (Par. 8d) that trials with the quadrant call for changes in multiples of five. It should be required, therefore, that the candidate bring the vernier slide back to the five-mil setting before every trial, and that the clamp be loosened only enough to permit its sliding readily. The candidate should stand close to the breech, quadrant in hand, fingers of the right hand on the spring clamp. The next command must, by regulation, end in 0 or 5. Suppose it be 150. He moves the clamp up to 150, slides the vernier back to the stop, tightens it (without looking at it if the slide is in good condition) and is ready to level the bubble. Suppose the command end in 5, for instance 155. His vernier already set at 5, he simply moves the spring clamp to 150, tightens the vernier thumb screw, and is ready to level the bubble. The point of this precaution is this: it is much more facile for the candidate to move the vernier from 5 to 0 than from 0 to 5, for he can, without looking at the quadrant, slide the vernier left to the stop and it will rest exactly on 0, but in moving from 0 to 5, he will always "see-saw" in the vicinity of the five-mil mark until he either exceeds the time limit, or else fails to get a coincidence of the mark and index.

The method of saving time on the remainder of the operation—the leveling of the bubble—is equally simple. While the candidate is setting the data announced, he makes a mental observation as to whether the new number is higher or lower than the next previous; he places the quadrant on the seat with the right hand and grasps the handwheel with the left, knowing as he does so, as a result of his observation, in which direction he is going to turn the wheel; he immediately changes the elevation in the correct direction and properly brings the bubble to rest.

It will be observed from the regulations (Par. 11c) that more leeway is given in the leveling of the quadrant bubble than in that of the angle of site—the executive should make certain that the board does not confuse the two.

Setting the range on the drum requires very little training and eliminates only a few men.

FUZE-SETTER

The assistant holds the drill cartridge only a few inches from the fuze-setter, the rotating pin turned so that it will readily slip into its notch. The candidate in setting his scales will obtain the best results by standing on the right of the fuze-setter so as not to interfere with the assistant who holds the round directly in rear of it, and by rotating his head and shoulders until he looks down on it, squarely from the rear, his eyes not more than a foot from the scales.

There are so few trials (five) in this test that the candidate can in none of them afford to sacrifice accuracy for speed. The maximum credit for any trial in fuze-setting is two. Even though expert percentages are gained on all other tests, the candidate will fail to obtain the percentage required for the rating of expert first-class gunner if one zero is received in fuze-setting.

MATÉRIEL

The most satisfactory method of teaching matériel is by the aid of a booklet for each man, giving the questions prescribed in the regulations and the answers therefor. With a textbook of this kind the class may be handled by a noncommissioned officer or the battery mechanic. These books are obtainable, written in language easily understood by the average enlisted man.

The following table shows the improvement that has been made in this particular phase of artillery instruction in a battery in which this scheme of instruction has been in use since 1922:

Year	No. men in battery	No candidates qualified	Per cent.
1921	75	0	0
1922	114	13	11.4
1923	103	25	24.5
1924	105	51	48.6

Much of the foregoing is undoubtedly being used by experienced executives throughout the Army. It will be of less assistance and is written less especially for them than for the lieutenant who suddenly finds himself transferred from the "heavies" to the "lights," from the "3-inch" to the "75," or from Department B to A within the battery. The time-saving and accuracy-insuring tricks of the trade will help Kaspriziski, Hanson, Coscarelli and DuBois to earn the coveted badge.

FOREIGN MILITARY JOURNALS
A CURRENT RÉSUMÉ

ITALY

"Rivista di Artiglieria e Genio," October, 1924

MAJOR ITALO CARACCIOLO'S article on fire for effect without previous adjustment is concluded in this number. He claims that in the following cases the artillery should always go to fire for effect without adjustment, provided maps are available:

(*a*) Against targets which have considerable depth.

(*b*) When conditions are such that fire for effect can be observed, *i.e.*, when there are not so many batteries firing on the same target as to make it impossible to recognize the fire of one's own battery.

(*c*) When it is necessary to put the guns in positions where cover or defilade is inadequate.

(*d*) When the batteries have not been located by the enemy.

The author suggests that in order to be able to distinguish the fire of the different batteries of a battalion when many guns are firing on the same target at the same time, it might be well to provide each battery of a battalion with ammunition which would give bursts of a distinctive color.

Artillery support for cavalry is the subject of an article by Captain Mario Badino, Cavalry, in which the author shows that the limited amount of artillery support which was given to the cavalry before and during the early stages of the war, is now entirely inadequate. Cavalry not only needs more artillery for its larger units, but in addition it must be supported by larger guns. It is interesting to note that in the break-through at the Battle of Vittorio Veneto, the Italians attached heavy motorized artillery to at least one of their cavalry divisions.

A discussion of the possibility of generating "death rays" is contributed by Signor G. Vanni, Director of the Military Radio and Electro-Mechanical Institute. He says that such vibrations may possibly exist in the unknown part of the scale of vibrations, which lies between the heat-light rays and the electro-magnetic rays.

Under Miscellaneous the following are of interest:

Translation of the German regulations of 1918, concerning the employment of anti-aircraft artillery in war of movement;

A translation of Captain Perré's work on anti-tank defense, published in the *Revue Militaire Francaise*.

"Rivista di Artiglieria e Genio," November, 1924

Captain Badino's article on artillery support for cavalry is given the leading place in this number, where it is concluded. The author advocates a minimum of one battery with each cavalry brigade and two battalions of artillery with each cavalry division, as organic artillery. He claims that these units should be armed with either a 75-mm. Deport, with slight modifications, or preferably a very mobile 100-mm. howitzer. These batteries should manœuvre with and give close material support to their cavalry. In addition, heavier types of guns with longer ranges, but still with considerable manœuvreability, should be sent along to reënforce the organic artillery according to circumstances.

A thorough explanation of the organization, training, personnel and equipment of Italian-African Colonial batteries is given by Lieutenant Giovanni Campagna. The officers and some of the noncommissioned officers in these batteries are white, but the privates are colored or Arabs. It is interesting to note that these pack batteries, which are constantly campaigning in most uncivilized areas, are equipped with both pack and motorized field and combat trains, the motorized train of six trucks being used wherever practicable.

Under Miscellaneous the following are of interest:

An article on bombing from airplanes translated from the *Revue de l'Aeronautique Militaire;*

A discussion on the subject of France's reserves of signal equipment;

A description of Armstrong and Whitworth's new bi-plane designed to carry twenty-five infantrymen completely equipped.

FRANCE

"Revue d'Artillerie," September 15, 1924

"Scientific Education and Military Schools" is a word added by General Vouillemin to the discussion which has been carried on for some time as to the best type of military education, scientific or classical. General Vouillemin states in no uncertain terms: "I am a firm adherent of scientific education, for the saying, 'Troops bravely and energetically led surmount all obstacles,' *is false*. Preparation determines the success of the smallest operation in war. The soldier, very wisely, relies more upon a leader who never leaves anything to chance than he does on a less careful one,

however sublime be his heroism. . . . I believe that the ideal officer should have the temperament of an engineer, as well as the spirit of an apostle and the character of a paladin."

"Corrector and Height of Burst in Time Fire, 155-mm. Schneider Howitzer," by Lieutenant J. Anselme, gives a method for determining the relation between the changes of the corrector and the resulting changes in height of burst for this weapon. As there are two types of time fuzes, two types of shell, seven charges for each, it will be seen that this data is quite necessary for handling the height of burst. The author has reduced the data to a set of curves, from which the necessary corrector setting may be read.

"Enemies of the Tank" is a study by Captain H. Bouvier, of the obstacles which will confront the tank, both in stabilized and in open situations. Tank tactics are discussed briefly, and also the measures which may be taken to counteract this weapon, particularly by the artillery. The author's conclusions are that though the tank has done valuable work in the past, it should not be considered the supreme weapon of the future. The tank will never replace the infantry, and is but a valuable auxiliary for them. In the future its value will depend upon its ability to overcome the numerous and powerful obstacles which will menace it.

"Maps and Charts for Garrison Instruction," by General H. Lebel. In many parts of France, other than those which form the battlefields of the World War, there is no system of control points tabulated for artillery topographical operations, nor gridded maps for use in firing, or in liaison exercises with other arms. The author lists the data obtainable from the Topographical Service—geographic coördinates for triangulation stations, etc., and gives formulæ and methods of computation whereby accurate Lambert coördinates may be obtained for all important points. From these data it is possible to obtain: (1) accurate gridding of the 1:50,000 map; (2) a table of coördinates for geodetic signals and bench marks—a base for accurate orienting work; (3) declinating stations at garrisons and firing ranges; and (4) 1:20,000 firing charts for the firing areas, which may be filled in with more or less detail from airplane photographs or ground reconnaissance. These operations may be made in a regiment without much difficulty, and give a system which is satisfactory for firing and work with other arms.

Under the heading "Varied Notes" are some interesting changes in the German Field Artillery Drill Regulations.

A new command has been added: "ON THE FIRST (SECOND,

THIRD, FOURTH) PIECE, CONVERGE BY THE INTERVAL (NACH ZWISCHENRAUM)." At this command each piece, except the one designated, moves as indicated by the amount of parallax, at the target, of the interval separating it from the base piece. One command converges the fire of the battery, regardless of the intervals at which they may be placed.

The new regulations direct that the pieces should be echeloned irregularly, and placed at unequal intervals—which should be large—so as to adapt the battery to the terrain, and to utilize cover. The command post, formerly placed at one flank, is now chosen so as best to facilitate command and supervision, and give protection to telephonic communications. The executive determines the corrections for the individual guns, due to their echelonment and to meteorological conditions, and makes sure that the chiefs of sections apply them properly.

A new method of zone fire has been adopted. The old zone fire (Gruppenfeuer) was a series of volleys fired at increasing or diminishing ranges. Now the command may be given "ODD PIECES, 2800 to 3300; EVEN PIECES, 3300 to 2800."

There is an interesting change in the march formation of artillery in the deployment. "As nothing discloses so quickly an artillery column to aerial observation as order in column, this formation should be broken as soon as air reconnaissance is to be feared. The artillery divides into small groups, even single carriages, which reach the battery position by different routes. A previous reconnaissance by chiefs of sections is essential."

In another note, it is stated that the Harness Board of the Swiss Army has recommended a system of artillery harness, in which the collar is normal, but with a percentage of breast collars for horses injured by the collars.

"Revue d'Artillerie," October 15, 1924

"Recollections of an Artilleryman, 1874–1914," by Lieutenant-Colonel E. Mayer, is the first part of an article tracing the evolution of command and instruction in the French artillery from the Franco-Prussian War to the World War, principally by means of personal reminiscences and anecdotes. Colonel Mayer gives an amusing account of his joining the 21st Regiment of Artillery, at La Rochelle, in 1874. The upper half of his class was graduated some eight months early, and he reported one Sunday late in October. Sunday at that time was no day of rest in the artillery, and the Colonel and his staff were in the office. After welcoming him, the Colonel asked, among other things, his class standing, and seemed much pleased that it was forty-nine.

"I don't want the highest rankers," said he, "nor do I want the lowest. I don't know why, but heretofore I have always seemed to get tail enders in my regiment. Forty-nine is a good number, not too high, not too low. By the way, how many were there in your class?"

"Fifty, sir" . . .

The regiment was composed of an indefinite number of batteries, twelve in the 21st at that time. The colonel had general supervision over all instruction and administration. The lieutenant-colonel was an assistant who passed upon all programs of instruction, and the schedules carrying them out. The majors—batteries were not grouped into battalions—took turns as officers of the week, when they supervised the training of the regiment as a whole. All this supervision was of troops other than recruits, and as most of the old men were on fatigue or special duty, it was confined largely to administration.

Practically all the instruction of the new class of recruits was carried on by two officers, the captain in charge of mounted instruction, and the artillery instructor. The battery commanders had little to do beside supervise the administration of their batteries.

The first battery commander impressed upon the young lieutenant that an officer's chief duty was to command, and that he should never forget that he was an officer. Though there were no other lieutenants with the battery, the battery commander would not allow him to rotate duties with the senior noncommissioned officers, although this was a general practice at the time. "The noncommissioned officers are under you, and you are authorized to delegate your duties to the senior if you have to be absent for any good reason, but I will have no routine relief."

"A Study of High Burst Ranging," by Major L. Camps, makes suggestions for getting greater accuracy with regulation methods.

"Some Remarks of the Tangent Reticule Method," by Lieutenant M. Tarbouriech, bring out defects in the regulation methods, and indicate some desirable precautions not mentioned in the regulations.

"The Problem of the Azimuth of the Sun," by Captain E. Brock, discusses several methods of laying a gun from an azimuth sight on the sun. Calculations give accurate results, but require too much time. Nomograms, which are regulation, apply only when the sun is low. Graphical constructions are not particularly accurate and do not save time. Azimuth tables, which cut the time of calculation one-half to one-third, are sufficiently accurate, and seem the most desirable to use. The author desires to direct study to this

problem, and hopes that more accurate and quicker methods may be evolved.

"Battle Charts without Maps, and Weather Corrections without Meteorological Stations," by Major J. Heriard-Dubreuil, explains a method of locating targets and guns with reasonable accuracy on a firing chart, when lack of time prevents careful topographical work. Two observation posts are established, and the flank guns of a battalion are adjusted on a well-defined base point by the approximate bilateral method. This gives the ranges gun-target; the azimuths of the gun-target lines may be determined by calibrated aiming circles, and also those of the observation post target lines. The distances observation post target may be determined by observing the apparent change due to known change in the range or a series of rounds. The batteries are now linked in with the flank guns by a simple traverse, and all plotted on a grid system. The method is dependent on good communications.

The meteorological corrections for direction may be obtained from a high burst, visible from the gun, which gives the deviation from the plane of fire. Approximate corrections for range may be obtained by adjusting on a known point, and stripping of all constant corrections, the difference being the desired correction.

"A Note on Approximate Bilateral Observation," by Major E. de Montjamont, amplifies the regulation method, and gives a means of adjusting the battery very quickly after the adjusting piece has been adjusted.

"Revue Militaire Générale," October and November, 1924

General Camon draws some interesting conclusions in completing his continued article on "Ludendorff's Battles on the Russian Front, 1914–1915." The author gives accounts of the battles of Tannenburg and Insterburg (often referred to as the battle of the Mazurian Lakes), the manœuvring of Lodz and the battle of Augustovo.

In the first battle, the German chief followed Hannibal's Cannæ plan, Napoleon's manœuvre against the hostile rear at Insterburg, and again at Augustovo, where the greater part of the 10th Russian Army was captured—the method of the Carthaginian leader. To justify his latter action, Ludendorff wrote: "The experience at Tannenburg and the Mazurian Lakes (Insterburg) showed that a great and rapid success can only be obtained by attacking both flanks at once." General Camon doubts the validity of this conclusion.

With a force very much inferior to that of Samsanov, Ludendorff was able to destroy and capture—at least, in part—the former's army. His adoption of the Cannæ plan was judicious in that it

was not put into effect against the principle Russian front until the hostile flank corps had been forced to retreat. But it is of importance to note that the Germans knew the Russian plans exactly, due to their possession of the latter's wireless code; and Samsanov committed suicide instead of attacking one of the turning forces and escaping the encirclement. Furthermore, the aim of the Russian flank corps, when reorganized, was to put themselves at a greater distance from the enemy.

Against the twelve Russian divisions occupying a fortified line, Ludendorff could not consider the double envelopment of Cannæ; and the results of the first battle of the Marne might have influenced the German leader to adopt Napoleon's plan for the battle of Insterburg. The holding attack, however, did not know how to keep the Russians in position. On realizing the turning movement, Rennenkampf thought only of retiring at once and, even then, left 45,000 prisoners and immense stores behind.

The success of the two battles based upon Hannibal's plan might lead us to believe that it is more suited to present-day warfare than Napoleon's. But we must not forget that, if the Russian soldiers fought bravely, the high command did not function well; and Ludendorff was always perfectly informed of the hostile dispositions.

It is obvious also, that as the length of the hostile front increases, the difficulty of surrounding the enemy is enhanced; and, at the same time, there is a greater opportunity of defeating one of the turning forces while merely holding the other.

The only nations which have armies of real efficiency are France and Japan. This statement is made by N. Lucien Bec in an article on the "Japanese Army." For a long period under German influence, since the war the Japanese have looked to France for their guidance. It is not to be thought, however, that they have progressed insufficiently in a military way to develop their own principles and doctrines, the most important of which might be thus epitomized: "Victory is only obtained by the offensive; it is necessary to attack always, especially if numerically inferior." An outstanding principle is the importance of the spirit of initiative which they have developed even in the individual soldier. With them, war is not an art, but a science—only the execution justifies strategic plans, and this execution raises technical problems which must be solved. Less trust is placed in matériel than with us, and there is a resignation to sacrificing infantry in large numbers.

At present, the Japanese are weak in reconnaissance as their cavalry is numerically inferior, due principally to lack of horses, and their aviation is of comparatively recent development. However, great effort is being made to improve the latter service.

Of interest are the age limits of the higher ranks, which are as follows: major, 50 years; lieutenant-colonel, 53 years; colonel, 55 years; brigadier-general, 58 years; major-general, 62 years; and lieutenant-general, 65 years. In 1921, there were 228 general officers, 2882 superior officers, and 12,686 subalterns in the regular army.

The division is composed of two infantry brigades or a total of twelve battalions of 600 men each; a regiment of cavalry of 300 to 400 sabres; a regiment of field artillery of six four-gun batteries; a battalion of engineers of three companies of 150 men each; and about 300 soldiers for the auxiliary services. In time of peace, there are twenty divisions, two of which are in Korea.

The artillery strength of the Japanese Army by present law is as follows:

One battalion of horse artillery.
Nineteen regiments of field artillery.
Four regiments and two separate batteries of mountain artillery.
Three regiments and eight separate batteries of heavy artillery.

Lieutenant-Colonel Lucas emphasizes the necessity of close liaison between neighboring units in battle and of coöperation, not only between the different arms and various components of a unit, but also between adjoining units belonging to different large commands, such as armies. He relates the facts to sustain this thesis in the "Tenth Corps and the 42nd Division on the Marne, September 6th and 7th, 1914." The 42nd Division was a part of the 9th Army, and the Tenth Corps, of the 5th Army.

Pointing out that the status of G-4 of the general staff of an army is even today not definite, Commandant S. Raoult explains the reason for the modest title of his article—"Essay on G-4 of the General Staff of an Army." The history of the development of this section is sketched; and its attributes, composition, and functioning at the end of the war are explained.

Squadron Commander Perney gives greatest credit to the artillery and air service in his article entitled "The Ouaouizert Column of 1922." Artillery fire alone was sufficient to drive the Moroccans from their positions in the mountains of the Atlas range; and it is of interest to note that the batteries usually went into position practically in the front line.

The conclusion of Commandant Padovani's "Infantry in Open Warfare," appears in the October number.

CURRENT FIELD ARTILLERY NOTES

Reappointment for General Snow

MAJOR-GENERAL WILLIAM J. SNOW has been reappointed Chief of Field Artillery for another four years. This is his second term under the National Defense Act. He was originally appointed as the first Chief of Field Artillery when the office was created during the war, in February, 1918. When this war-time post was continued as part of our post-war defense plan, he was confirmed for further duty as Chief and he has discharged the responsibilities of the office continually since.

General Snow has had a distinguished career in the Army. He has served with troops in every rank from second lieutenant to general officer. Before the World War, besides his duty with troops, he served as Secretary of the Mounted Service School during an important formative period of that institution, 1906–1907, and in the War Department and Militia Bureau. He was graduated from the War College in 1908. As a captain of field artillery in 1910, his energy and initiative made possible the organization of the Field Artillery Association.

During the World War he commanded a field artillery brigade; was first commandant of the Field Artillery School and initiated its war organization; and later was Chief of Field Artillery. In this latter capacity he not only directed the organization, equipment and training of the Field Artillery in the World War, but also laid the foundation for the Field Artillery of our present Army. Under his guidance the efficiency of the arm has improved steadily.

Upon the close of the war, a stupendous task of reconstruction existed. Uncoördinated development of matériel, and lack of standardization in training methods were to be noted particularly. To these problems the Chief applied his most earnest efforts, with a result with which the arm is now fully acquainted. Furthermore, he has built up a spirit of confidence and coöperation throughout the three components of the Field Artillery that may well serve as a model for every branch of the Service. News of his acceptance of his reappointment has been received with extreme gratification throughout the Field Artillery Service.

War Department Training Plans for Next Summer

The annual letter from the War Department to corps area commanders, outlining the training plans for next summer, was sent out November 28th and the details of preparation are now

under way. A marked emphasis is revealed throughout the proposed scheme, upon early notification of the officers who will be concerned and their early preparation of their plans, programs, schedules, etc., which should do much toward providing a smoothly running machine this year.

Corps area commanders are to designate their camp commanders early in January. These latter officers are to submit their estimates for training and administrative personnel, supplies, equipment and funds for their camps in such time that the consolidated estimates may be in the War Department by March first.

Training and administrative personnel are to be ordered to their respective camps sufficiently in advance of the opening date to set up and test the administrative and supply arrangements before the arrival of the trainees. It is contemplated that training camp schedules will be completed two months prior to the opening of the camps, and that all officers associated therewith will be furnished with copies of pertinent parts thereof, and statements of their respective duties thereunder, so that they may make suitable preparation.

Another point that is markedly emphasized as regards the National Guard and Reserves, is a proper regard for the actual status of organization and development of different units, in planning their work for this year. The ultimate goal for every unit of the army is, of course, to attain that degree of efficiency in mobilization and combat training expected of it on M-day of any war emergency. But in the growth of our army, units of the civilian components naturally find themselves with varying degrees of preparation. Corps area commanders are enjoined to recognize this fact and to avoid assignment of general training missions applicable to all units in their areas. This policy, though not easy of execution, should produce practical results.

Unit, Group and Individual Training

In all cases *unit* training is to be stressed in preference to group training and, in general, individuals are to be trained in their appropriate units. This means, for instance, that the 313th F. A. (Organized Reserves) may go to camp under its reserve commander and function with its own staff, battery commanders, etc. Where vacancies exist, due to officers of the 313th not attending camp, or for other reason, these places may be filled by officers not assigned to the 313th, whose own regiments may not be ordered to camp this year. Furthermore: "The Primary objective of training (for the Organized Reserves) for this year will be the organization and functioning of regiments, smaller units, and installations, so as to produce homogeneous teams, *commanded, lead and administered by their respective unit commanders and staffs";* and again, "The

National Guard will conduct its own training, both in the armory and in the field——"; and further, "It is essential that all commanders exercise constant personal supervision over the training of their commands."

The interpretation of these directives by the corps area commanders cannot fail to clarify the working organization that must be developed if our training efforts are to function. In the Reserves especially, this should make for improvement. It is too much, perhaps, to expect the reserve officer, who is busy in his civil pursuit, to prepare schedules and make preliminary arrangements for his unit in camp. But with his schedule prepared and delivered to him, or prepared under his supervision by his regular army staff officer, he should come to camp ready to direct the training of his unit, and to employ efficiently the regular personnel and the matériel placed at his disposal. The relation of the reserve unit commander, the detailed regular army instructor, and the regular army commander of training camp troops, should become clearer; and with the clarifying of the responsibility of the reserve unit commander will come *esprit de corps* in the units and incentive to progress.

In the Basic Training Directive for the National Guard, it is specifically directed that national guard unit commanders assume responsibility for preparation of their own programs and schedules, utilizing their regular army instructors in an advisory capacity only. This is sound policy, as the actual preparation of programs and schedules is a function of command. However, while a maximum responsibility in preparing training schedules would be desirable on the part of reserve unit commanders, for obvious reasons this cannot be required of them to the same degree as in the Guard, the former being on active duty status only for the fifteen days of the summer camp.

In connection with the reserve regimental unit training, it is to be noted that in these camps, the use of specialist, group or student methods of training is to be avoided. On the contrary, stress is laid upon the normal methods of instruction of a unit commander commanding his unit.

Illustrating this aspect of training in the past, inspectors have reported cases where capable and efficient reserve commanders were present in camp with their units; capable and efficient regular army officers, detailed for duty with the reserve unit were present; capable and efficient officers were present commanding the regular troops:—but, investigation failed to reveal any clear sense among the three as to which one was responsible for the initiation of the various steps in the training in progress. This cannot work for efficiency. Under the present directive, the reserve unit commander can take up a schedule covering blackboard firing, service practice, terrain

rides, tactical problems, etc., and put his unit through it. His will be the responsibility, as it would be in war, and the development of this policy should build a working machine. It is the duty of the regular officers to offer their advice and assistance at all times, but in their relations with the commander, rather as staff officers than as instructors.

The Regular Army

The dual mission of regular units is emphasized—a training mission for themselves and an instruction mission for the civilian components. It is contemplated that not more than three months will be spent in camp by these units, nor more than two months of these three, on their instruction mission.

Recent inspections have revealed a lack of uniformity in training recruits. It is directed that hereafter recruits will be trained in special recruit units. This is for better training of the recruits, and also to avoid retarding the progress of the organizations.

In an effort to remedy the demands of fatigue and special duty, which has been so seriously sapping the vitality of the reduced regular units, post and other commanders are directed to reduce or rearrange these duties, so that each combat unit will have its full strength for training at least two half-days per week.

National Guard

The plans for the National Guard this summer are largely contained in the Special Training Directive for this component. The War Department provides for training national guard divisional headquarters as units and emphasizes the development of leadership, tactical training, and the application of correct tactical principles in the field for smaller units.

It is to be noted that the wording is changed from last year as regards duplicating armory training while in camp. Last year it was forbidden. This year it is to be guarded against. Of course it is highly desirable that there be no such repetition, and it is to be hoped we can come to a condition when it can be avoided. But it seems almost an inherent fact that many recruits for the guard are enlisted just before camp. Some instruction for these men, that is properly classed as armory instruction, is often unavoidable.

In the National Guard Training Directive, a period of not less than four days is recommended as a supplementary training period for officers and specially selected enlisted men, before the camp proper. This period is for the preparation of programs and schedules and study in how best to carry them out and conduct the work

mapped out. These programs relate to both the approaching camp and the subsequent armory year.

Organized Reserves

As stated above, the greatest emphasis is to be placed on *unit* training of regiments and lower units this summer. Provision is made, however, for details with regular units, branch assignment camps, details to general and special service schools, instructors at C.M.T. camps, attachment to national guard units, etc., etc.

Active duty for reserve units is divided into three types of training:

The first type is duty with regular army units. This consists in associating organized reserve units with regular army units for actual command and practical combat training.

The second type is duty at C.M.T. camps. This is for actual command and practical mobilization training. It is to be noted that the reserves would take over the C.M.T.C. candidates only during the latter's first week in camp.

The third type is duty at general and local unit camps. General camps comprise troops of different arms of the service and this duty gives practical training in the use of the combined arms. Local unit camps are for the training of unit cadres.

It will be noted that if a reserve regiment takes one of the three types of duty indicated above, this year, another type at a later camp; and the third type at still a later camp, it will have experienced something of all the duties it must experience after M-day of any war emergency. Such a rotation is contemplated by the War Department.

Training of the reserves while on an inactive status is of course voluntary with the officers concerned. However, this year's program recommends that each unit should, as far as practicable, be prepared for the training mission contemplated for its next active duty tour. The means that may be available for such preparation are correspondence courses, conference courses, demonstrations and lectures. This may seem to be expecting much from the reserve officers. However, the patriotism of these men, upon which our National Defense Act is so largely based, is justifying the trust. Many reserve regiments are holding regular meetings during this winter. The 313th F.A. in Washington and Baltimore holds regular monthly meetings conducted by its reserve colonel. Last fall the officers of the regiment were assigned subjects, and at each meeting one of these regimental officers conducts an appropriate conference on his subject. It happens that this regiment up to very recently has

had no regular field artillery officer detailed for duty with it; but this regiment is preparing itself as a regiment.

The 310th F.A. in Philadelphia holds weekly luncheons in conjunction with which regimental progress is effected. The field work of the 302nd F.A., both alone and with the 103rd F.A. of the Rhode Island National Guard, has frequently been mentioned in the JOURNAL. The Round Table of the 361st F.A. in Portland, Oregon, is developing both valuable instruction and regimental *esprit* and efficiency. These units are cited only as examples of what the reserve officers are doing, and will do, to carry on their share.

R.O.T.C.

Provision is made for the training of R.O.T.C. units of one corps area in another corps area "if adequate personnel, matériel or facilities for the successful execution of the prescribed training program for any branch of the service are lacking in any corps area, or if it will be to the interest of economy to train a particular unit outside a corps area." This is important to the Field Artillery, whose successful camp work for the R.O.T.C. requires the horses and matériel of regular units, of which we have so few. Furthermore, the concentration of units in larger camps facilitates a more economical and better use of our instructor personnel and encourages a healthy rivalry between units. Last year the units were quite advantageously located, except in one or two instances.

C.M.T.C.

It is to be noted that reserve units are to be used only one week for training with the C.M.T.C. There are a number of observers who are of the opinion that this is all for the benefit of the reserves; the C.M.T.C. candidates might fare better if they were not considered as material for the training of their senior civilian component.

The War Department's program for C.M.T. camps includes this year, for the first time, a basic field artillery course. For the past few years all C.M.T.C. candidates have taken an infantry basic course the first year. Even this year the Field Artillery is not given a quota. However, it is provided that when basic candidates are under instruction at camps or posts where only field artillery or cavalry regular troops are present for their instruction, the field artillery or cavalry basic course (or both) will be given. At other camps or posts the basic course (meaning the usual infantry basic course) will be given. But this is a marked advance for the Field Artillery.

Heretofore, candidates first completed the infantry basic course and then went to an infantry, field artillery, cavalry, etc., red course the second year. Facts cannot of course be cited, but the natural

inference is that men who did well in the basic infantry course (good men) were inclined to go back the second year to the red course of the infantry, in which branch they had already tasted success. An equally natural inference is that, while the majority of those who left the infantry for another branch were naturally interested in the new arm, there were many who had not done particularly well in the basic camp and these latter may not have been good men. If we are to develop reserve officers from the C.M.T.C., we must have the same opportunity given to the Infantry. Furthermore, four summer camps are none too many for the development of a field artillery reserve officer, even with full opportunity of selection from the best material. The standard of the Officers' Reserve Corps must be high, and must so remain, if the best types of our citizens are to feel it worth while to continue their membership.

Testing Improvised Signal Equipment

The improvised communications equipment shown in the accompanying pictures was made and used in the Seventy-sixth Field Artillery of Fort D. A. Russell. The carrier for the SCR 77-A radio set was used recently by the mounted liaison detail acting with the cavalry in manœuvres at the post, with marked success. The device for mounting a spare reel of wire on the regimental reel cart has also proven highly successful in tests conducted by the regiment. It will handle the issue reel and can be used to lay wire, pick it up, or wind to the reel cart direct.

Fort Sill Library

Last August the Library at the Field Artillery School caught fire and only by heroic efforts was the valuable collection belonging to the post of Fort Sill and the School saved. As it was a number of files and volumes were lost. It is to be regretted that funds have not been available for properly housing in a fireproof structure, so many sources and records of which much could never be replaced in case of loss.

Since the fire last fall many organizations and officers have been unselfishly donating books, and papers to replace those burned. Any such contributions have been gratefully accepted by the School and anyone who may be able to make further contributions may be assured their gifts will serve a useful and appreciated purpose.

Convention of National Guard State Adjutants General

A meeting of all the adjutants general of the several states was held in the Militia Bureau in Washington last year. Another such meeting is called for March 5th to 10th this year. This meeting is a very important one for the Guard. It enables the problems of the

units in the field to be presented and discussed, and it enables the Militia Bureau to make clear the ends they are working for and the means available. With the experience gained last year and a clearer knowledge of the mutual problems brought out by last year's discussions, this year's convention is expected to produce still more valuable results.

Polo

International Military Championship

Two years ago, in the summer of 1923, a representative polo team from the American Army met a representative team from the British Army, at Meadowbrook, Long Island. The American team carried off the International Military Championship by a comfortable margin, the scores of the three games being respectively 10–7, 12–10 and 10–3, with America winning the first and third games.

At the close of that series supporters of American polo began planning for the return series, to take place in the summer of 1925. It was evident the demands of duty would remove some of the first-string men before 1925. Moreover, the healthy growth of our polo demanded the utilization of our younger players. Consequently the Army team, which defended the Junior Championship Cup last summer (1924) contained several new players. The Junior Championship was lost, but our team was developing the material which will have to meet England this summer, and it is conceded the plans which we have followed are sound.

The following is a list of players now on the squad:

Major L. A. Beard, Q.M.C. (Team Captain)	Handicap	6
Major A. H. Wilson, Cav.	"	5
Captain P. P. Rodes, F.A.	"	3
Captain C. H. Gerhardt, Cav.	"	3
Captain R. E. Craig, Cav.	"	3
Lieutenant E. McGinley, F.A.	"	3

Of the above officers only Majors Beard and Wilson played against England in 1923.

The squad, excepting Major Wilson, assembled at Miami, Florida, on January 25th, for preliminary training. Major Wilson joined February 12th. Reports to date indicate the team is making most satisfactory progress. Local officials and prominent civilians are going out of their way and giving out of their pockets to assist in the preparation of the team, and the thanks of the entire Service is due them for their interest. The help of these men is also felt in another and important way; a strong team cannot be developed without

strong opposition. We are fortunate in having present and playing at Miami, opponents who can muster a 25-goal team.

Only the highest class of mounts can be considered for the team, because only 25 can be taken overseas. There is still need for six or eight ponies to complete the strength. If anyone wishes to offer assistance by furnishing a private or public mount, they should communicate with the team captain.

The team will sail on the *Minnetonka* of the Atlantic Transport Line on March 14th, and will continue training at Aldershot, Hurlingham and Raneleigh. The final series will be played June 20th, 24th and 27th (if a third game is necessary).

San Antonio Mid-winter Tournament

The annual Mid-winter Tournament, held under the auspices of the Eighth Corps Area and the San Antonio Chamber of Commerce, is being held from February 15th to March 1st this year. The tournament consists of three events: a low-goal handicap open to teams whose aggregate handicap does not exceed five goals; the Southwest Circuit Cup; and the Southwestern Elimination Contest. Teams from as far as Detroit, the Pacific Coast and Mexico, as well as the Army posts of the Eighth Corps Area, are expected.