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JANUARY-MARCH

**THE
FIELD ARTILLERY
JOURNAL**

EDITED BY

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A 6-INCH BRITISH GUN IN ACTION IN FRANCE.

THE FIELD ARTILLERY JOURNAL

VOL. VII

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NO. 1

Yale at Tobyhanna*

BY ROBERT M. DANFORD, CAPTAIN, F.A.

WHEN the Yale batteries responded to the call of the President on the twentieth day of last June, the kind and length of service that was in store for them was hard to conjecture. No one who came in close contact with the men, however, could deny that they were ready and eager for any eventuality, preferably an order to Mexico. I was afraid that such an order would come—I fervently hoped that it would not. The men of the batteries could not possibly realize how unfitted or how unready they were to take the field for the most inactive kind of an active campaign. General Upton's statement, "In our country patriotism has always been expected to take the place of training," was again appropriate and in my mind grimly emphasized.

When the call was received three-fourths of the men had returned to their homes for the summer vacation. The four Yale batteries, together with the Branford and the Stamford batteries, formed the 10th Regiment Field Artillery, National Guard of Connecticut, but to call us a regiment was unfair since we lacked a colonel, lieutenant colonel, one major, the regimental adjutant, regimental supply officer, two battalion adjutants, the Headquarters Company (including the band), the Headquarters captain and first lieutenant, the Supply Company, a chaplain, two medical officers, two veterinarians, two battery commanders, two lieutenants, and approximately 150 men. It had not been deemed wise by the War Department to have us organize during the winter and spring as a regiment, but, without the regimental organization—affording, as it does,

* Reprinted from The Yale Alumni Weekly.

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the officers, noncommissioned officers, and men required for the proper supply, administration, and tactical handling of the batteries—we could not be considered fit to take the field. We had been held under the Federal minimum strength of 133 men per battery, because when the batteries were still 83 men under strength the number of National Guardsmen permitted under the laws of the state of Connecticut had been reached and recruiting had to be stopped—yet we could not be mustered into service until we had the required minimum. Without an organization, even so much as approaching that which was necessary, we were quite unlike practically every other National Guard organization in the United States, where a certain amount of experience had been gained and a certain amount of team-work had been developed in state camps or in joint camps with the regular army. We had but five officers, out of a total of 41 required, who had ever seen service in a state or joint camp, and two of these were without field artillery experience. All of the Yale batteries were without such indispensable functionaries as saddlers, horse-shoers, and cooks, and these were not to be found at the government wage of \$30 per month.

Within a few days of the call, Mexico abruptly and unexpectedly became tranquil and all of our prospective recruits assured us that they would join immediately when war was declared—but we had to have 150 more men or the Federal Government would hold us at New Haven indefinitely. On July 5 there was received from the War Department a decision to the effect that but one officer of the regular army would be allowed each regiment of the National Guard. On that day the proper recruiting, organization, and training of the 10th Field Artillery, National Guard of Connecticut, seemed to me to be all but utterly and desperately hopeless. Fortunately, however, the officers and men of the Yale batteries displayed such spirit, interest, and enthusiasm that their commanding officer was dragged and pushed along so hard and fast that he was not given the opportunity to feel discouragement.

It was early seen that the state authorities, the Eastern Department, and the Militia Bureau of the War Department

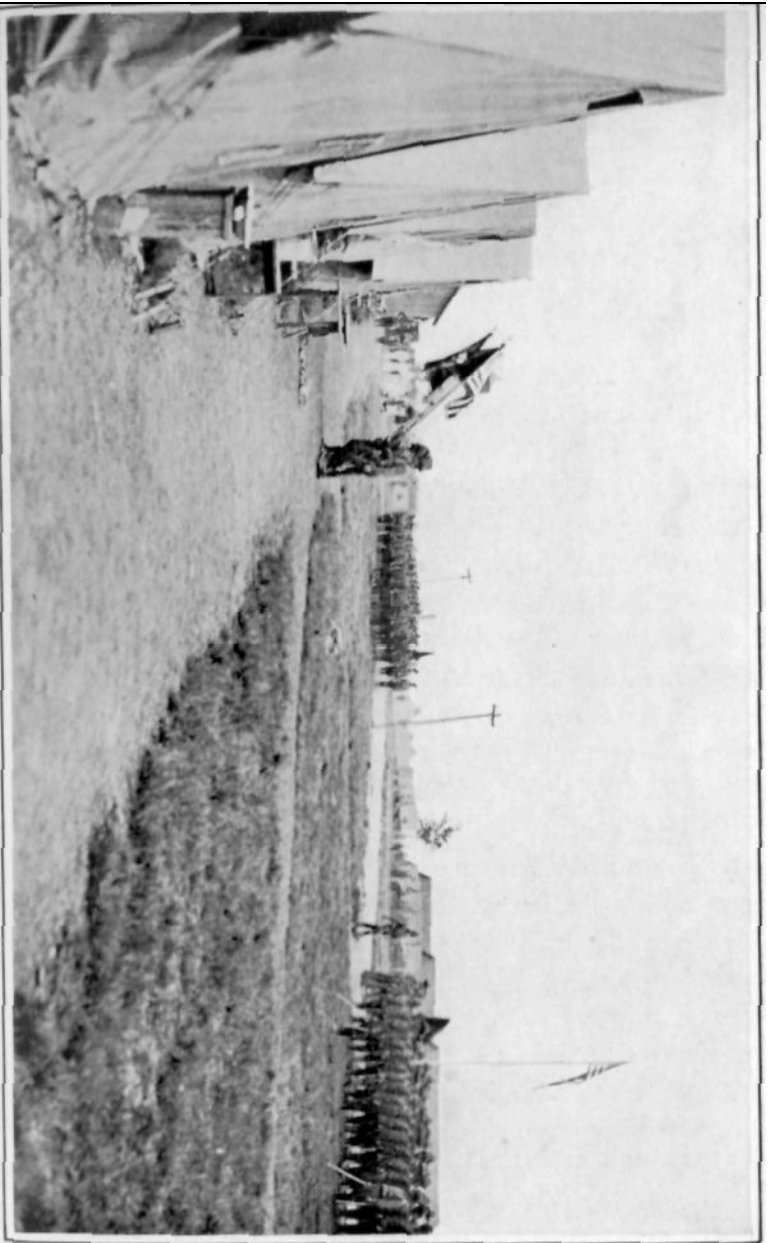


Photo by Couch.

BATTERY C RETURNING THE COLORS TO THE COLONEL'S TENT.

The three standards of colors, National, Artillery, and Yale, were accepted as the regular regimental colors. Presentation of colors by the class of 1910, on August 16.

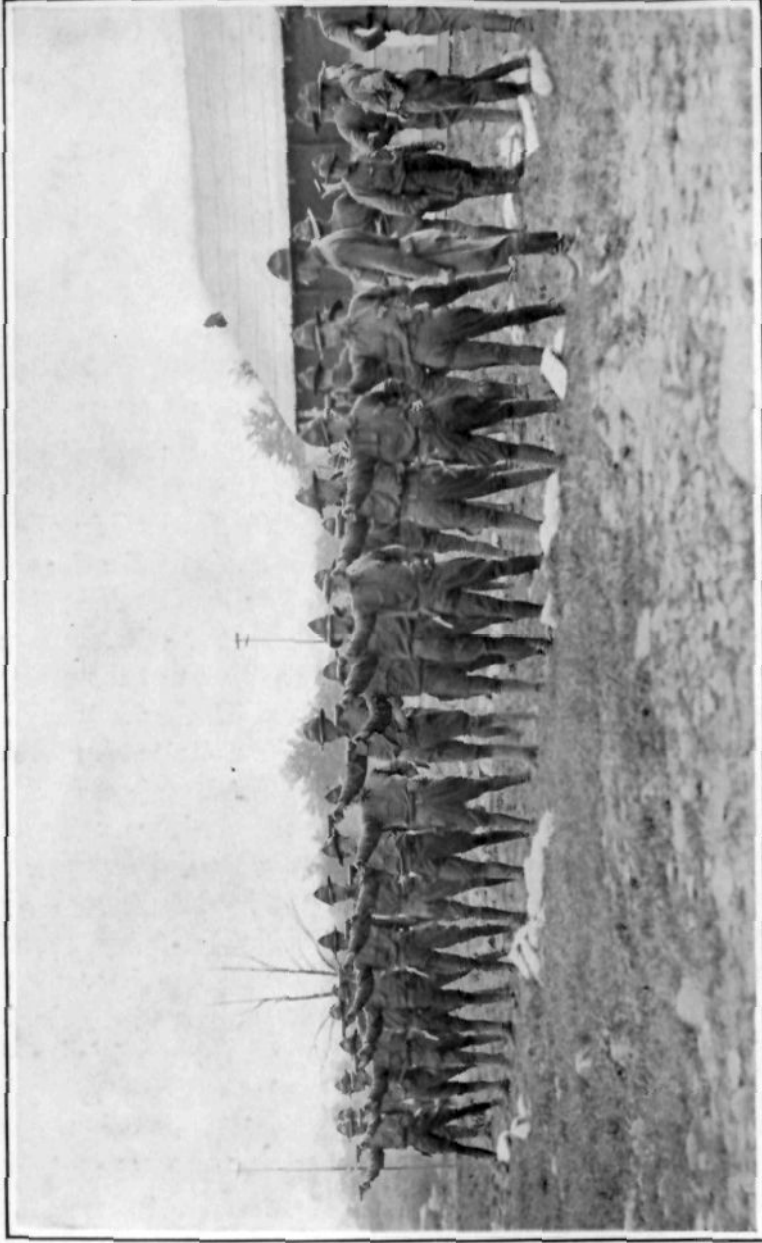


Photo by Paul Thompson.

LEARNING THE USE OF REVOLVERS.
Pointing and aiming drill preparatory to pistol practice.

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were struggling to assist us in every possible way they could. In fact, at one time, it began to look suspiciously as if we were the "favorite child." Yale alumni and the fathers of the men promptly placed a fund at our disposal with which we were enabled to cut loose from some of the slow and cumbersome official methods. With this fund we sent men to New York, Boston, and Plattsburg to carry on a vigorous campaign for recruits. Over 12,000 letters and telegrams were sent out. Practically every man in the batteries assisted energetically in this recruiting campaign, with the result that by July 14 the necessary 150 men had been secured. The fund also enabled us to hire the vitally necessary cooks and horseshoers, to add to our office equipment, and to acquire some much-needed motor transport in the form of a truck and runabout. The decision of the War Department relative to regular officers was changed, and Sherman Miles, John S. Hammond, and W. C. Potter, all captains of field artillery in the regular army, were sent by the War Department and were commissioned by the state as lieutenant colonel, major of the First Battalion, and major of the Second Battalion, respectively. Captain Ned B. Rehkopf, 5th Field Artillery, an instructor at the School of Fire, was sent to us about July 1 by the Militia Bureau. Captain E. L. Gruber, who had assisted in the instruction of the Yale batteries for a month during the winter, came to New Haven on leave and drew up the first schedule of instruction. Captain Gruber was later commissioned by the state as lieutenant colonel of the regiment, but the War Department ruled that his service could not be spared at West Point and he was not permitted to accept. First Lieutenant O. A. Dickinson, 25th Infantry, one of the army's best athletes and a champion fencer while at the Military Academy, came on a month's leave to direct the physical training of the men. He was later assigned to duty with the regiment and remained with it practically its entire service. The Eastern Department sent Second Lieutenant C. A. Selleck, 1st Field Artillery, to assist in the work at Tobyhanna, and the Militia Bureau later in the summer detailed Captains E. T. Smith and

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C. S. Blakely, Field Artillery, besides a total of eleven sergeants of field artillery, for duty with the regiment. To the above officers and noncommissioned officers the greatest measure of credit is due. They were all intensely interested in the regiment and they worked for it faithfully, diligently, and without regard to hours. Unusual credit is due Lieutenant Colonel C. P. Summerall, of the Militia Bureau, whose interest in the organization was always keen, and who never failed encouragingly to respond to every appeal for advice and assistance.

Especially qualified noncommissioned officers of long service in the regular army were secured for the staff vacancies. William H. Kennedy, squadron sergeant major of the Second Cavalry; Henry B. Barry, sergeant first class, Quartermaster Corps; Basil Conless, for nine years sergeant major of the 6th Field Artillery, and Onorio Moretti, a most successful instructor at the School of Fire, were authorized by the War Department to accept commissions as captains in the regiment and were appointed regimental adjutant, regimental supply officer, and battalion adjutants, respectively. Captain Moretti was later assigned to the command of Battery B.

Professor Hiram Bingham, '98, experienced in commissariat and supply through his extensive Peruvian exploring expeditions, was persuaded to join as captain and regimental commissary, and the high quality of food enjoyed by the entire camp was due to his untiring work and constant attention. Friends of the regiment secured for it "the best sky pilot ever seen" in the person of the Rev. Herbert D. Gallaudet, '98, who took the work of chaplain so earnestly and so faithfully that on muster-out at Niantic he immediately returned to the two batteries of the regiment which has been retained in the service. Dr. Joseph M. Flint, of the Yale Medical School, assumed the task of locating and naming medical officers of experience and proved competence. Such men were found in Drs. K. R. McAlpin and Kenneth Bulkley. The Dean of the Cornell Veterinary School was called upon for assistance in locating

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competent veterinarians, and through his efforts Drs. John D. Moore and J. W. Ardell, Cornell, '16, were added to the regimental staff. Professor E. B. Reed, '94, of the English Department; Henry W. Hobson, '14, and Kenneth L. Simpson, 1917, were appointed regimental and battalion sergeants major, respectively, and the devotion with which they performed the onerous and important duties devolving upon these officers merits special appreciation and commendation. About half of the Olympic Band at Bridgeport was induced to join us, and this formed the nucleus of what later developed into a band that added immeasurably to the enjoyment of the camp, besides rendering it possible to make ceremonies out of such formations as guard mounting and retreat.

On June 28, Battery F, Stamford, the first battery to attain its minimum strength, was ordered to the border. The same day, after strong telegraphic protest, both to the Eastern Department and to the War Department, this order was revoked, and a day or two later the entire regiment was ordered assembled at Tobyhanna. On June 20 it would have been unreasonable to hope that everything would work out so favorably. On July 16, the day the last unit reached Tobyhanna, it began to look decidedly as though we were to have a real regiment. The organization was complete. We were ready to concentrate on training.

It was our business to be ready for active service in the shortest possible time. This meant pushing the training to the limit. The daily schedules were arranged with two important objects in view—first, to set the men up and condition them physically; second, to keep every man busy—hard at work from reveille at 5.15 A.M. until retreat at 6.05 P.M. (for the officers until taps at 9.30 P.M.). This meant that there was no time for discontent or grumbling, no time for the idle soldier's pranks which frequently necessitate disciplinary action; it meant sound, refreshing sleep, induced by a not undue measure of physical and mental fatigue.

A schedule of instruction which must include the elementary

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training of battery officers and noncommissioned officers, along with that of the men, is a most difficult one to arrange. The question always arises, "What will the men do while the officers are at school?" The battery officers and noncommissioned officers are of necessity the instructors of their men, and the results we had a right to expect from their instruction was exactly the same as if at Yale. For instance, the men studying geology were instructed by one of their own number who was at the same time getting his first tutoring in the subject. In order to interfere as little as possible with the instruction of the men, the officers had to be worked "overtime," and they were held at school daily from 7.00 to 9.30 P.M.

At the outset the officers were frankly and plainly told that if any one of them convincingly demonstrated his military inefficiency he would be asked and expected to resign, this in justice to the organization, and for the good of the men under his command. Five officers were dropped in this way during the summer. No other reflection is to be charged against them, however, than that they did not possess the "military knack."

That the battery officers were not up to their men, especially in the Yale batteries, did not for a moment admit of doubt, but to the officers of these batteries belongs immeasurable credit for the hardest and most faithful and loyal kind of work, and work under trying conditions. The officers had longer hours and worked much harder than their men. It should be noted that every officer, before men are entrusted to his care and command, should have had military experience. Experience fortifies him, gives him confidence in himself, and enables him to "let himself out." Our battery officers did not have this advantage of experience. It is decidedly to be preferred that an officer do not "know" his men as an intimate, a companion, or an associate. Intimates or companions are too well acquainted with each other's powers and limitations; they know too much about what one and the other doesn't know, and they always have a tendency to resent disciplinary action as administered by the one upon the other. Thus it is hard for Captain



Photo by Paul Thompson.

TOBYHANNA BATTERY DETAIL.

The special duties of these men were in assisting the Captain in the observation and conduct of fire.

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Smith to send his intimate business associate, or fellow club member, Private Jones, to the Summary Court for repeated absences at reveille; yet if he fails to do so grumblings of favoritism, or injustice, etc., will be heard, will be well founded, and will hurt the discipline and spirit of the command. Most of our battery officers were undergraduates, or members of the Class of 1916, and as such were intimates, classmates, and associates of their men. That discipline was not perceptibly affected thereby is a noteworthy tribute both to the officers and the men. It is impossible for me to express my appreciation of the loyal work and the enthusiastic support of these officers or adequately to praise the efficiency they were developing. To give them the advantage of another camp with a new class of the same kind of men would work them to advantage, and no misgivings would need be felt concerning the results they would obtain.

At the outset all men of the command were told that discipline would be rigidly and sternly maintained, that such to my mind was vitally necessary, since loose discipline always means discontent, contempt for and dissatisfaction with one's organization, loss of *esprit*, inefficiency, disorganization, etc. They were told that it was earnestly hoped the court-martial would have nothing to do, but that, if its services proved necessary, it would be used and used hard, without fear or favoritism. The captains were counselled to be definitely certain always that no man guilty of any infraction whatever escaped the carpet for admonition, or light or severe punishment. The court-martial did prove necessary, but at the end of camp, when the records were carefully examined, it was discovered that out of some sixty cases tried, only one Yale man was included in the number, and in his case trial was on account of carelessness, not insubordination or disobedience of orders. The discipline maintained by these Yale lads during their summer's sacrifice and service was the discipline of intelligence, the discipline of the strong Yale spirit, and to my mind was a handsome tribute to this great university.

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THE TASK OF ATTAINING EFFICIENCY

In the training, effort was made to specialize every man in his particular task. Thus from the first specialized instruction for the drivers, for the cannoneers, and for the battery and headquarters details was instituted. The gun squads of the Yale batteries were already, from their winter's work at New Haven, in good shape, but at the end of the encampment they were the best I have ever seen in the regular service, barring those of the firing batteries at the School of Fire. Effort was made (by taking the prescribed examinations) to qualify the required number of officers, specialists, and gunners to entitle the batteries, under the rules of the Militia Bureau, to fire service ammunition. These examinations involved a tremendous amount of work and could not have been completed without the assistance of the large number of regular officers with the command. However, they were out of the way by September 1, and target practice was immediately begun, and about one-third completed when the batteries left for Niantic to be mustered out. The outstanding and conspicuous feature of the target practice was that the officers who conducted the fire were nowhere near up to the work of their gun squads. This, however, is no reflection on the officers or their work. Efficiency in the conduct or fire can come only with practice, and, due to the miserly allowance of ammunition at our School of Fire, we have not yet sufficiently developed this vital requirement in the officers of our regular service.

Our drivers experienced "horse power" in all its discouragements and drudgeries. We were ordered supplied with 360 horses and 44 mules—practically one-third our strength in animals. As is to be expected of "soft," sales-yard animals, shipment caused an epidemic of influenza, strangles, and shipping fever, and our drivers were horse nurses and cemetery laborers during the entire camp. About August 1 our last shipment of 75 animals was received; 45 of them arrived sick, and on that date we had over 100 sick horses in camp. This number uniformly decreased until at the end of camp

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about thirty yet remained unfit for service. Over thirty of our horses died. No one subject in camp received so much and such constant attention as the care and conditioning of our horses. Under Captain Rehkopf and Major Potter, both graduates of the Mounted Service School, our emaciated animals were nursed back to health, were conditioned and trained, and our drivers were taught equitation and driving.

To my mind the most important and gratifying victory during the Tobyhanna campaign was the victory over disease. The medical and sanitary officers tirelessly inspected for and reported every breach of sanitary rules, and sanitation, the constant fight against filth and flies, was pounded and hammered, and hammered and pounded into the officers, and they in turn were ordered to hammer and pound it into the men. The result was that not a single case of the so-called camp diseases developed. The greatest number of men in the hospital at any one time was five, and these were there on account of simple injuries. However, though the sanitation was excellent, we never attained the point where it was entirely satisfactory.

At the time orders were received for our muster-out we had been under training—the hardest and most intensive kind of training it had been possible for the regular officers to prescribe—for nearly two months, yet we were not then ready to take the field. Two-thirds of our quota of horses were yet to be received, nursed to health, trained, and conditioned for field service. We were practically without instruction in marching, and we had only begun to learn the art of shooting—yet to march and to shoot are the two essentials of effective field artillery. During this time we had cost the government in transportation, pay, subsistence, etc., over \$500,000.

The campaign at Tobyhanna was one utterly devoid of glory. The men who participated in it sacrificed, in many cases, a summer's employment—employment that was necessary to keep them in college, in other cases vacation plans of long standing. Mothers and fathers were in many cases sorely disappointed

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over the loss of a favorite son for the summer. The work was hard. It included in full measure the necessary menial tasks that cannot be spared troops that serve in the field—such as burning garbage, doing duty as kitchen police or stable police, burning out latrines, burying dead horses, etc.

THE SPIRIT OF THE MEN

The spirit and loyalty with which the Yale men attacked every task that was put up to them, and then carried it through even better than was ordered or expected, will forever be one of the most pleasant military experiences of their commanding officer. A single instance is characteristic and significant. The Department Commander, on his visit to the camp, expressed displeasure over the rocks and stones which he noted protruding out of the ground along the covered picket lines. He had hardly left the lines, where his remarks were overheard, before the men turned out with picks and shovels, and without any order from their commanding officer proceeded to dig all of the boulders out of the ground. The next day the stalls of every stable in camp were as smooth as a board floor.

For the men of the Yale batteries the summer at Tobyhanna has indeed been one of sacrifice and toil, but if my observation be correct it has been a service that every one feels has made of him a better man, a better citizen, a more loyal American, and it has been a service that, as the years go by, will be held in pride and esteem both by the individual and by Yale. Not for a single moment do I doubt that the investment, though costly, has been a profitable one for our nation. The men of these batteries will, as time goes by, be prominent men of affairs throughout the country. They will be statesmen, clergymen, lawyers, administrators, intellectual leaders, and they have learned, and learned thoroughly, some lessons vitally important to the perpetuity and welfare of our nation. They all know that the citizen who asserts that our country is safe because a "million farmers in their Fords," or "a million squirrel shooters" will spring to its defense overnight, is a military

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imbecile, dangerous to his country in direct proportion to the influence he exerts on its people. They have learned that to send men into an active campaign under officers without experience or training, to be killed through ignorance, incompetence, and neglect, is a part of the ghastly history and traditions of this country that should be ended and ended abruptly. They have learned that military service is manly service, healthy service, patriotic service, honorable service, and that such service would not be out of place in the life of every lad who is proud of being an American. They have experienced the feeling of being bound—fettered by law and oath—to serve their country, while hundreds of lads on the street are under no obligation whatever to make a similar sacrifice for their common country.

The Yale batteries will soon be disbanded as National Guard and will be reorganized as batteries of the Reserve Officers' Training Corps under the Act of Congress approved June 3, 1916. This is eminently appropriate and desirable. The Yale batteries have a broader field of usefulness in qualifying educated and intelligent leaders as reserve officers of field artillery. Our work begins under promising conditions; the armory is under construction, and, we hope, can be pushed to an early completion; the University is building a suitable structure for classroom and gunnery instruction, and the veterans of Tobyhanna are ready to push the work with interest and enthusiasm. It should be the policy of the War Department to hold that which has been gained at Tobyhanna this summer through affording in every way possible under the laws a military elective at Yale that will arouse and hold interest, be appreciated both by faculty and students, and so render a signal service to the nation.

The Yale batteries of the summer of 1916 are organizations for which I shall ever bear the greatest pride and affection. I give them back to the University with a pang of sadness and regret in the thought that I never again expect to have soldiers of such loyalty, intelligence, and *esprit* under my command.

What the Service Meant to the Men*

BY EDWARD B. REED

Regimental Sergeant Major, 10th F. A. N. G. Conn.

(Professor of English, Yale University)

THE midsummer supplement of the Alumni Weekly gave an account of the mustering-in of the Yale batteries and of their arrival at Tobyhanna. It now remains to write the concluding pages of their brief history.

The camp at Tobyhanna is on a rocky, treeless crest from which no trace of man is visible. About are mountains and uncultivated valleys. The village of Tobyhanna is interesting only because it contains a station that enables you to leave it. No better place for work could be found. It would have been fatal had the batteries spent the summer at Niantic within easy reach of New Haven, New London, Watch Hill, and Newport. To all practical purposes Tobyhanna is as remote as Alaska—far from friends and families; and from the strictly military point of view the value of a parent increases directly as the square of her distance from the camp. Tobyhanna was designed by nature as a place for toil.

It is no credit to the Yale batteries to say that they worked hard; what is distinctly creditable is the spirit in which they worked. There were very few slackers; and there is no glory in policing a camp of some fourteen hundred men or in grooming sick horses. In many training camps the hard and disagreeable fatigues are detailed to regulars detached for that purpose; in Tobyhanna we did our own work. But all this was part of a soldier's training, and the men accepted it.

It was interesting to observe the change two months accomplished. One saw it at the dismounted drills, at guard mount, in the riding at Sherman Field, but most of all in the firing. Here were men who a few months ago did not understand the difference between the aiming point and the target, now

* Reprinted from The Yale Alumni Weekly.

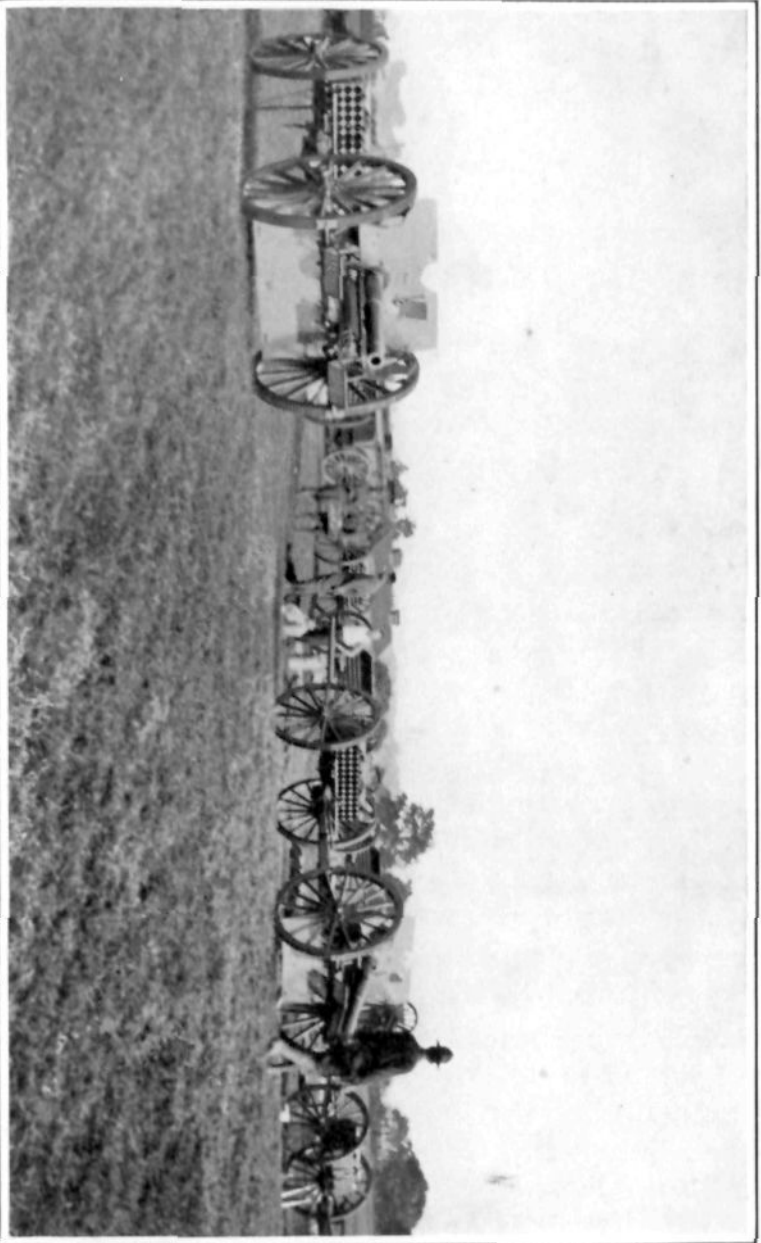


Photo by Mitchell.

AT NIANTIC IN SEPTEMBER.
Material being cleaned preparatory to its storage on mustering-out of batteries.

WHAT THE SERVICE MEANT TO THE MEN

placing their fire in very unpleasant proximity to targets hardly visible at two miles' distance. The firing of Battery B was remarkable, and Captain Moretti has every reason to be satisfied with the results of his instruction. No one who witnessed it will forget the spectacular night firing of Battery C. The targets were placed behind a huge bonfire. The shells, with tracers leaving a track of light, rose in the air and burst directly over the burning logs. The next morning a few splinters showed where the targets had stood.

Until the figures are considered, few will realize the amount of money the Government has expended on the 10th Field Artillery, National Guard of Connecticut. The pay rolls, rations, and forage amount to \$123,000; the transportation, freight, clothing, and ammunition to some \$40,000 more; the tentage and matériel which we used were valued at over \$600,000. The Government gave not only money; but sent to Tobyhanna some of its most capable officers to command the regiment and to instruct the troops. Was it all worth while?

The answer is clear. Every man in the Yale batteries received impressions he can never forget; the results of the training will be felt in college and out of college. As these student soldiers become men of affairs and have their part in the government, they will never be deceived, as are so many to-day, by the pretences of politicians. They know from experience that the Militia could never cope with a trained army; that the present militia system is undemocratic and unsound in principle, wasteful and ineffective in action. Their eyes have been opened to the absolute necessity of universal military service for this country. It must come; and we may expect Yale men to be leaders in it.

It is not inconsistent with what has been written to say that the Yale batteries—now that the crisis has past—were eager to return to college, and that there was no sadness in the popular camp song:

Danford's army am disbanded,
O Hadley, don't you mourn.

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And yet when Batteries A, C, and D at the last retreat at Niantic saw the flag slowly flutter down the pole and realized that the 10th Field Artillery was now but a memory, there must have been a tinge of regret in the minds of many despite the pleasure of home coming.

The words spoken by Major Hammond as he mustered out three of the Yale batteries deserve to be permanently recorded. At this time, when Yale's history passes in review before us, let us remember that the student of 1916 has proven himself worthy of his ancestry. To quote:

"Officers and men of Batteries A, C, and D. Your service with the Army of the United States has ended to-day, and although it has been short, there is no detail of the duties of a soldier which you have not gone through. You have trod no royal road to military instruction, yet you accepted the hardships and the difficulties of army routine in the same spirit that you have accepted the more interesting parts of your military training.

"Your record and your service throughout have been creditable in the extreme and are in keeping with the best traditions of our service and your University. As you go out of the service the best wishes of all your commanders go with you, hoping that you may have counted the summer spent with the Tenth Field Artillery as a period well worth while."

The history of the 10th Field Artillery is ended; but the story of military training at Yale is but begun. With Colonel Danford and Captain Moretti at New Haven, the graduates have a right to expect a large and efficient Officers' Training Corps. They will not be disappointed.

Military Observation Balloons

BY MAJOR C. DeF. CHANDLER, SIGNAL CORPS.

WHEN a few short years ago the airplane proved to be a successful invention, and the attention of practically all students of aeronautics was drawn to its development for military purposes, interest in the captive balloon as a means of observation waned, not only in the United States, but abroad. In our case, the lack of sufficient appropriations for the aeronautical service of our army was also largely responsible for our failure to develop this valuable auxiliary.

The present war in Europe has demonstrated that the airplane, while of the greatest value for aerial reconnaissance, is not able to replace the captive balloon. Though it possesses the advantage of mobility and the ability to pass directly over the positions to be observed, the results of its reconnaissance must be reported by radiotelegraphy, by special codes of visual signals, or by a return to the starting point to drop written messages.

The great advantage of the captive balloon is derived from the fact that the observer is constantly in direct telephonic communication with the artillery commanders in his vicinity; constant and thorough inspection of the enemy's positions with the aid of powerful glasses and telescopes reveals every movement of bodies of troops or anything new that has appeared during the previous night, and the targets thus presented can be immediately taken under fire. Continuous and searching observation of the same sector enables an observer to note even slight changes in the color of the earth and to make important deductions therefrom. Changes in trench construction can thus be easily detected.

One observer on the western battle front in France states

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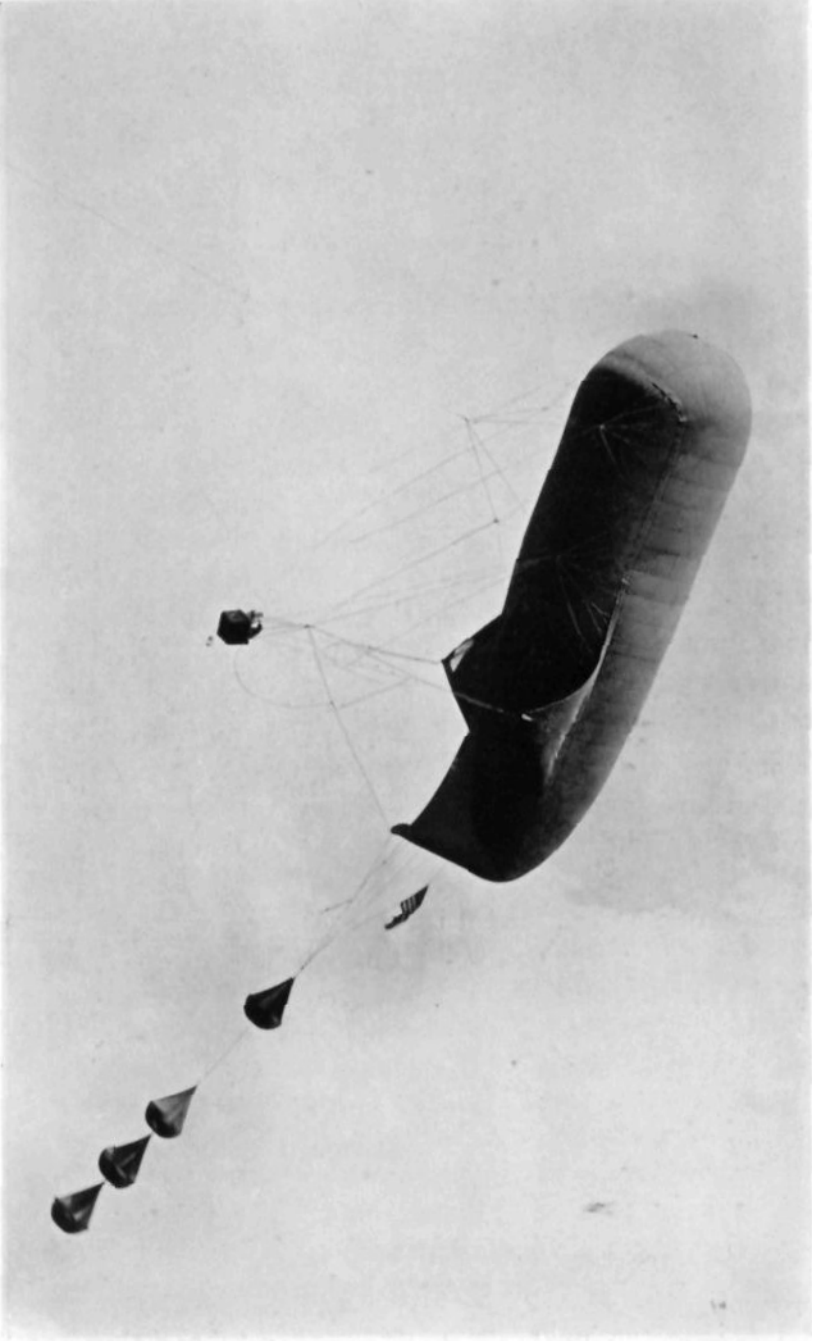
that he was able to count twenty-six balloons in sight at one time; this is convincing testimony of their extensive use. It is an interesting development of the present war that battle type airplanes are assigned for the protection of the captive balloons and for this purpose cruise about at a height of several thousand feet above the balloon ready to swoop down upon any enemy airplanes that attempt to destroy it.

The spherical type of captive balloon has been abandoned in favor of the kite type, often referred to as "sausage" or "drachen" (German for sausage) balloon, since the latter type has much greater steadiness in winds; the pressure of the moving air against the under side of the balloon holds it steady in the same manner as in the case of the common paper kite.

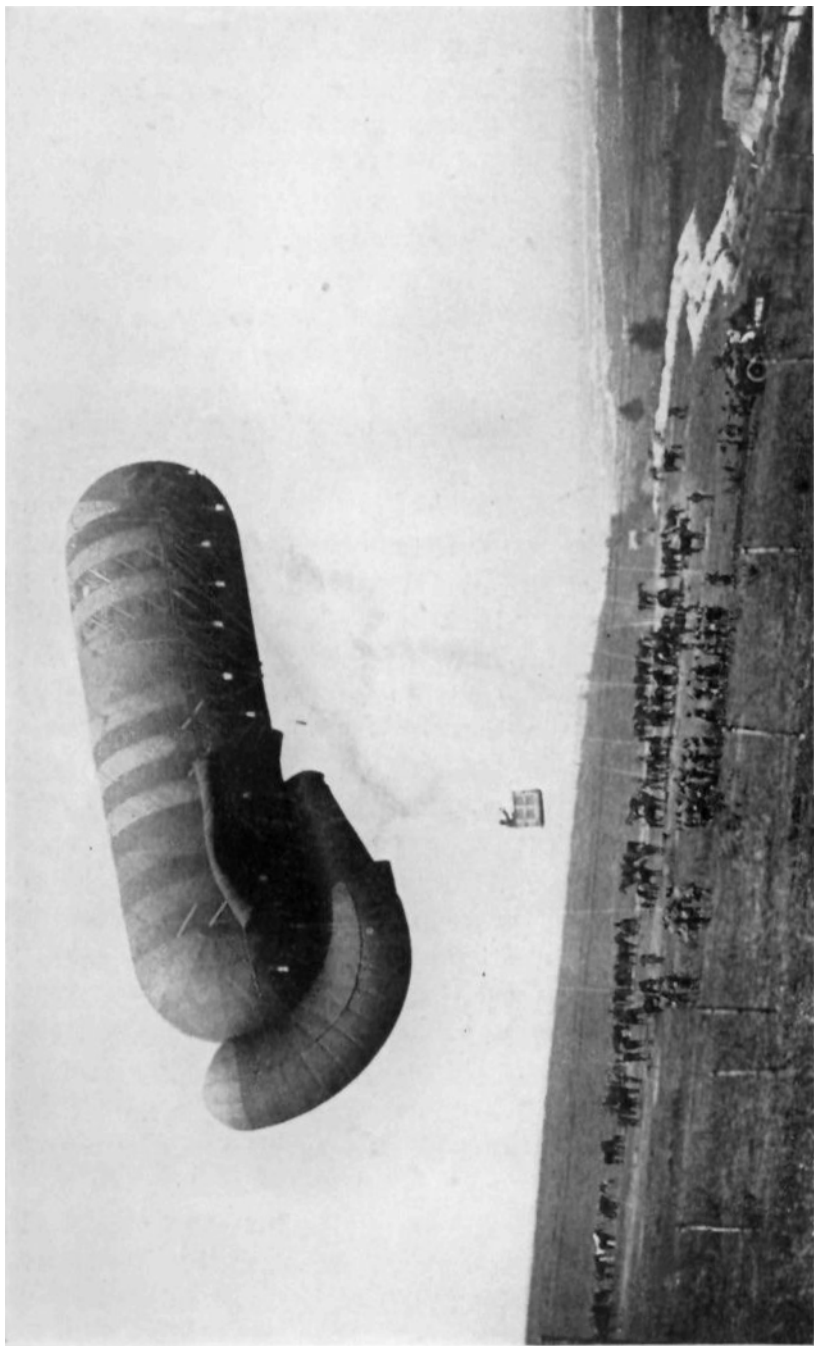
The kite balloon is fitted with a tail consisting of several conical canvas cups, to assist in maintaining its stability, with the same result as is secured by affixing a tail to the toy kite.

In Europe the observation balloons are placed about four miles in rear of the line of trenches, and are separated by intervals of approximately six miles. The altitude at which they are held is dependent upon the atmospheric conditions and upon the distance of the enemy's artillery. They are usually sent up at daylight, and remain in the air until dark, being drawn down every few hours to change observers. Occasionally they remain up at night, and it is frequently found that enemy guns that are not visible by daylight may be located at night by their flashes. Even after dark it has been found that observers who have studied every feature of the ground for days are able to see enough to fix accurately the position of the flashes. The strain of constant observation with high power glasses or telescopes makes it advisable to change the observers at frequent intervals.

It is customary to have two officers in the car of the balloon, and they are connected with the ground by telephone. One method is to have an insulated telephone wire in the centre of the cable which holds the balloon; another method is to drop a strong, light-weight wire from the basket of the balloon to connect



GOODYEAR KITE BALLOON.



BRITISH OBSERVATION BALLOON IN FRANCE.

MILITARY OBSERVATION BALLOONS

with the telephone circuits directly underneath. In both cases the steel wires of the holding cable serve to complete the electric circuit for the telephones.

Balloon companies are provided with telephone switchboards so that the observer in the basket can communicate directly with any battery or higher artillery commander in his vicinity.

Buildings, hills, or specially constructed towers concealed by trees are frequently utilized in conjunction with captive balloons to provide an auxiliary observing station, so that the two may serve as the end stations of a base line for the accurate location of targets. In some cases another balloon is used as the second observing station.

It has been learned that at the beginning of the war various special codes of signals were experimented with for the purpose of enabling observers to report the error in the fall of shots, but these have been discontinued in favor of the brief announcement of "over," "short," "right," and "left." Perhaps this simplification is largely due to the accuracy with which the prospective target is first located by means of the two observing stations on the base line.

For service with the mobile army it was customary in Europe before the war to have highly trained balloon companies, able to inflate a balloon and have it, with its observers, several thousand feet in the air in about twenty minutes after the organization had halted; this speed was attained by using compressed hydrogen carried in special vehicles. The information of three or more years ago indicated that the peace strength of the balloon companies in Europe averaged about sixty men. The arduous and continuous service that has been required during the war has necessitated an increase in the number, there being at the present time in some cases 160 officers and men assigned to one kite balloon; this number provides for three reliefs for the captive balloon, the observation tower personnel, the telephone switchboard operators, and details for the manufacture of hydrogen.

Since the service along the western battle front has been

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in the nature of siege warfare, it has been practicable to supply hydrogen from portable field generators, instead of furnishing it compressed in cylinders.

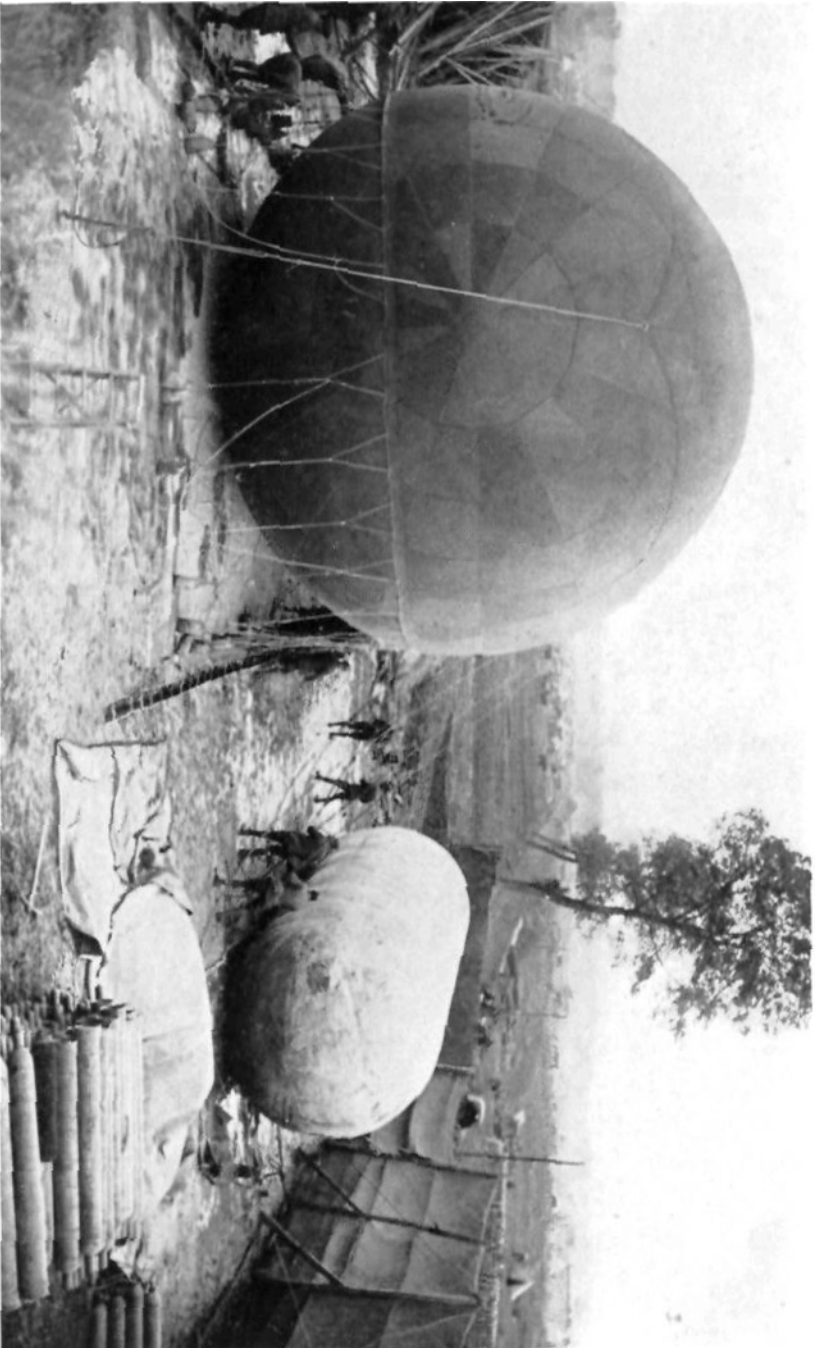
The average capacity of the kite balloon is 28,000 cubic feet. There is continuous loss of hydrogen due to leakage through the fabric and to losses from expansion at high altitudes; these losses are ordinarily replaced at night. A common method of replacing gas is to fill small balloons called "nurses" at the nearest field generating plant; a small detachment of men can easily conduct this supply balloon to the hangar and transfer hydrogen from the "nurse" to the captive balloon as it may be required.

The most modern type of windlass for holding captive balloons consists of a winding drum constructed on a motor truck, taking power from the truck engine.

Whenever enemy aircraft attempt to destroy a captive balloon, it is customary to haul it down rapidly or to keep it moving around the field, to lessen the chances of its being hit. The moving is often done by using twenty-five or more men, each having a rope attached to a snatch block, through which the cable is passed. These men then walk to various points in the field, and their movement changes the position of the balloon not only horizontally but vertically as well.

Captive balloons are occasionally destroyed by incendiary bullets, arrows, or bombs dropped by aviators. Destruction in this manner is not necessarily fatal to the observers, as they are usually provided with parachutes attached to safety belts, which permit their safe descent to the ground.

About eight years ago, while Fort Omaha was garrisoned by signal corps troops only, a large balloon hangar was constructed at that point, together with a plant for generating hydrogen by the electrolysis of water and the machinery for compressing the gas. After its completion, the equipment was used for about two years for free and captive balloon instruction, but its employment for this purpose was later discontinued for the reasons previously given.



BRITISH OBSERVATION BALLOON WITH ITS "NURSE."
Note the tubes of compressed hydrogen at the right of the photo.

MILITARY OBSERVATION BALLOONS

The U. S. Army Balloon School is now being established at Fort Omaha, all old serviceable equipment being used and much new material of every kind being added. It will not be long before the first balloon company will have everything that is needed, of the most modern type, including specially designed motor trucks for carrying compressed hydrogen.

In addition to organizing and equipping balloon companies for service with the mobile army, the school will probably be called upon to train officers and men in the handling of captive balloons at coast fortifications.

In case the cable holding a captive balloon should break, it then becomes necessary for the observer to descend and land in the same manner as in manoeuvring the ordinary free balloon, for which reason an essential part of the preliminary training of students at the Balloon School will consist of the navigation of free balloons and qualifying as pilots thereof.

A tentative plan for the organization and equipment of balloon companies and battalions has been prepared, which will be tried practically at Fort Omaha before action is taken with a view to its official adoption. In order to reduce the impedimenta of balloon companies without impairment of their mobility, it is probable that field hydrogen generators and compressors will be carried only by one supply company in each balloon battalion.

There are several types of hydrogen generators suitable for field service, all of which should be thoroughly tried before the adoption of any one type or method. There is need also of larger types of generators and compressing machinery installed in railroad cars, which may be placed at the nearest rail points to the balloon companies as a refilling station for hydrogen cylinders.

Observation balloons are necessary for both field and coast artillery, but the mobile balloon companies are principally for the service of the field artillery. In Europe the observers are almost without exception field artillery officers, and it is natural that such should be the case in view of their training and experience

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in the location of targets and the observation of fire. It is therefore hoped that the field artillery officers of our army will become interested in this new auxiliary to their arm of the service.

In time of peace, details to the Balloon School, like those to the Aviation Schools, are made only upon the application of the officers through military channels. A physical examination, similar to that prescribed for applicants for aviation duty, is required. The student officers for the Balloon School are not, however, limited as to age and grade. Some field officers will be needed for administrative duties with the balloon division of the Aviation Section, and in order to be fully qualified for such positions they should be graduates of the Balloon School.

Contemporaneous Notes On Belgian Artillery

BY GEORGE NESTLER TRICOCHÉ, LATE LIEUTENANT, FRENCH FOOT ARTILLERY

(In a previous article we gave a brief account of the work performed by a battalion of Belgian Field Artillery on the Yser.¹ The following notes, although incomplete and somewhat disconnected, may throw some light upon the situation of the artillery of that country in July or August, 1916, one year and nine months after the events above mentioned. They have been completed by information gathered in November, 1916.)

THE peculiar conditions under which the Belgian Army has been fighting from the beginning of the war has led to a very great decentralization of the component parts of the commands. As military operations went on, the "composite system," formerly applied to the brigades only, extended itself to regiments and even battalions. In other words, very small commands are now organized so as to be independent from one another and from the division or even the brigade.

Therefore, field artillery is scattered to an extraordinary extent. One may see single platoons detailed with infantry battalions. Just as the machine gun squads of the different companies get together in case of need to constitute companies and also battalions of their own, field artillery platoons are linked with each other to make up batteries, and the latter united to constitute battalions when the opportunity arises. It may be worth noticing, in that connection, that the French, at the beginning of the war, have shown a tendency to divide field batteries, mostly during a retreat; at least, as regards horse batteries attached to Independent Cavalry Divisions, single platoons have been used to cover a retrograde movement by *echelons*.

¹ FIELD ARTILLERY JOURNAL, January-March, 1916.

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In respect to matériel, Belgian Artillery has greatly improved since the end of 1915; and this is so much the more remarkable because the ordnance service of that country is operating under the most severe handicaps. Not only the army, at the present time, is abundantly supplied with heavy guns—including the 380 mm.—but it has even created new types of guns, such as the short range mortar, which is used also by the French in their trenches.

The Belgians, very early in this war, began to use *automitrailleuses*, that is, machine guns mounted on armored cars. The first model turned out by the Minerva factory at Antwerp did not afford sufficient protection to the crew; and it was decided to superimpose on the turret a steel dome. This proved most satisfactory. The *automitrailleuses* did good work; it was reported by an American war correspondent—Mr. E. Alexander Powell—that they quickly became "a nightmare to the Germans." Of course, since trench warfare began, these armored cars have not been very useful. It is interesting to note that the Belgians were the first to construct a truly practical and efficient armored car for machine gun; the fact is particularly striking because of the size of the military establishment of that nation. However, we must remember that it is not the first time that a militia country shows the way, as regards matériel, at least, to great military powers. Switzerland adopted a breech-loading field gun while France was still armed with the obsolete 4- and 12-pounders; and it was the first nation to organize machine gun squads of the modern type.²

The Belgians were not so successful with their *armored train*, consisting of four trucks carrying each a 4.7 naval gun, and separated by baggage cars used for ammunition. Although the train belonged to the Belgian Army and the guns were served by Belgian artillerymen, the noncommissioned officers and, it seems, some of the officers, if not all, were English.

² We call Belgium a militia country (although the term can hardly be applied to a nation whose men serve continually for one year or more), because that power, relying upon the so-called guarantees of neutrality, fell under the influence of the antimilitarists and never was seriously organized for war.

NOTES ON BELGIAN ARTILLERY

The pieces had been lent by the British Navy. At a time when Belgium had no heavy field guns, the armored train was a great improvement. Yet the 4.7 calibre was easily outranged by the German guns; and the efficiency of the contrivance was necessarily very limited. At any rate, and generally speaking, there does not seem to be much room on the battlefield of to-day for armored trains, except under extraordinary circumstances, such as those which developed during the defense of the Dardanelles by the Turkish forces.

The latest innovation adopted by the Belgian Artillery was the *autocannon*—a field gun mounted on an automobile. It is somewhat heavy, but much more effective than the armored train. The Autocannon Corps is at present loaned to the Russians.

As regards personnel, it may be said that professional artillerists do not constitute any more a majority among officers of that arm. Many of the old officers have been killed, disabled or taken by the Germans; moreover, a not inconsiderable number of them have been retired for different reasons, but mostly because they were deficient in energy or physical strength. A very large proportion of lieutenants, captains, majors, and even some colonels were, before the war, either civilians, or national guardsmen (*Gardes Civiques*); many subalterns of to-day are ex-privates or noncommissioned officers promoted for bravery, or graduates from the military schools opened since the beginning of the war. One might think, at first sight, that, in these conditions, the Artillery should be poorly officered; but it is not so. The corps of officers has been sifted, so to speak. It has got rid of many encumbrances; it is now younger, healthier and, most likely, more efficient than it was at the time of the mobilization. However, it would be very unfair not to pay a tribute of admiration to the artillerists of 1914, who, for months, without any heavy batteries, and nearly always outnumbered or outranged, have been able to keep up the struggle and even to score some advantages. The artillery, just as the other arms in the Belgian Army, was

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greatly hampered at the beginning of the war by an incomplete, ill-devised recruiting law.³ It was also at a disadvantage in respect to uniforms, although the latter were not as conspicuous or uncomfortable as that of the Carabineers or the Guides, for instance; it was not suitable for modern warfare, especially against a foe so well protected by neutral colored clothing that, as a war correspondent puts it, "a hundred yards away, a regiment seemed to melt into the landscape."

The rank and file of Belgian Artillery always made a good impression upon the observer who saw them either at drill or in barracks, or on the street. Young privates and gray-haired "noncoms" alike seemed to be a composite of the British, German and French types of soldiers. They had the "smart" appearance of the English, with something of the German heaviness of motion, and a great deal of the Frenchman's temperament and democratic tendencies.

When the writer had the opportunity of seeing Belgian batteries, before the war, he noticed particularly the fine condition of the matériel, harness and accoutrements, which, as regards cleanliness, could only be compared to the similar objects in the Guard Artillery of the Prussian troops. The gun teams, bought mostly in the Ardennes and the Luxembourg, were splendid specimens of light draught horses. As for mobility, it might have been better, although it was certainly superior to that of Dutch batteries seen in the same kind of work. But one had a distinct impression that when the Belgian gunners "get there," they are there to stay. And that is what they did, without buoyant enthusiasm, yet without fear, and in that matter-of-fact way which is truly Flemish.

³ According to reports published lately by the Belgian War Office now at Le Havre, France, out of a population of 7,600,000, there were no more than 190,000 men in the regular army when the war broke out. To this should be added the special troops of the Civic Guard that could be mobilized; but these men (4000) had to be mustered out as early as the middle of October, 1914. As for the Volunteers, only 18,000 to 20,000 could be mustered in, out of the 45,000 who had applied for enlistment.

New Field Artillery Classification

THE development of the war in Europe has given rise to what is practically a reclassification of field artillery matériel. The former classification into light and heavy field artillery and siege artillery has virtually disappeared.

No gun or howitzer is too heavy for use in field operations or to be classified as field artillery. The problem of mobility has been solved by the use of the tractor and the railroads to the extent that the heavy pieces are, to all intents and purposes, as mobile as the light field gun wherever the roads and the general condition of the terrain permit the passage of the tractor, or where railroad tracks permit the approach of those mounted on railway carriages to within effective range of the fighting line.

The guns and howitzers are still classified according to weight, though the main difference lies in their employment.

1. *Light Artillery.*

In the class of light artillery are the light field gun and its corresponding howitzer.

In spite of the fact that the demand in war is for greater calibre and greater range, the light field pieces have found their rôle on the battlefield to be an essential one, and there seems to be no thought of doing away with these types.

In the class are included the type field gun of about three inches calibre and the howitzer of approximately four inches. These types correspond closely to the pieces that we have destined for service as divisional artillery, the 3-inch gun and the 3.8-inch howitzer.

The light field gun is now used largely for cutting the barbed wire entanglements, for which it has apparently been found the most effective weapon. It is of slight effect upon intrenchments, except when these are in the form of breastworks,

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vulnerable to the light, high explosive shell. It is also used extensively in counter-battery work, and in the establishment of barrages, for the purpose of isolating an attack or checking a counter attack.

The number employed is usually estimated at one gun for each twenty yards of front to be attacked.

The light howitzer is used for the destruction of the lighter defenses, for the blocking of communicating trenches, and for counter-battery work. With gas shells they may be effectively used to form the gas barrage, which has been used at various times with great success in stopping a counter-attack.

2. *The Medium Calibres.*

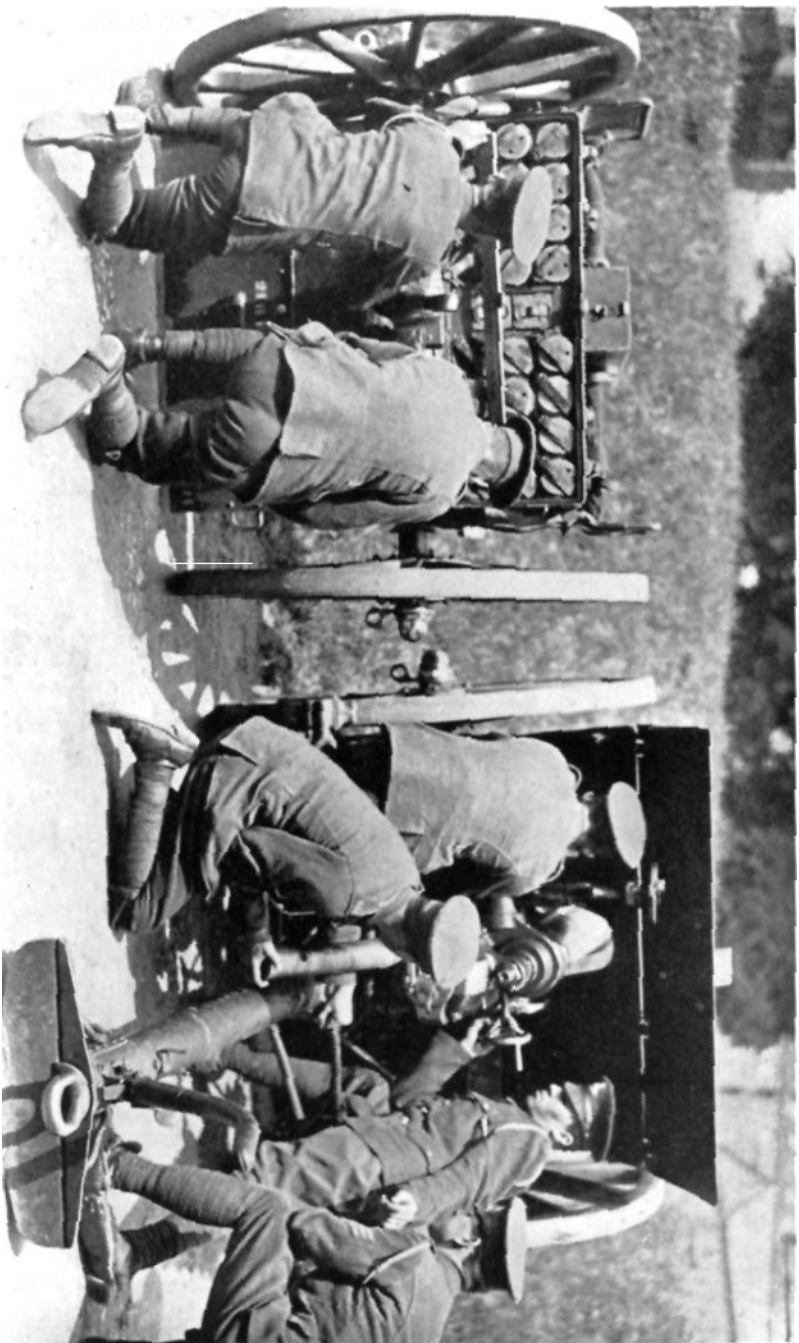
In this category are included guns and howitzers closely corresponding to our 4.7-inch gun and howitzer and 6-inch howitzer. They include the 105-mm. gun and 155-mm. gun and howitzer of the French, the 4.7-inch and 60-pounder guns and the 6-inch howitzer of the British, and the corresponding calibres of the Germans, the 105-mm. gun, 15-cm. howitzer, and similar calibres.

These pieces are largely used for counter-battery work and for the destruction of the lighter trenches. In the latter work the 6-inch howitzer excels. The medium calibres are also employed in laying a barrage, both in attack and defense.

3. *Heavy Artillery.*

It is in the case of the heavy artillery that the most surprising developments of the war have come. At the outbreak of hostilities it was known that Germany possessed field howitzers of 21 cm. (8.3 inches), but the report that the Teutonic forces were using mortars of 30.5 cm. (12 inches) and 42 cm. (16.5 inches) was for some time disbelieved.

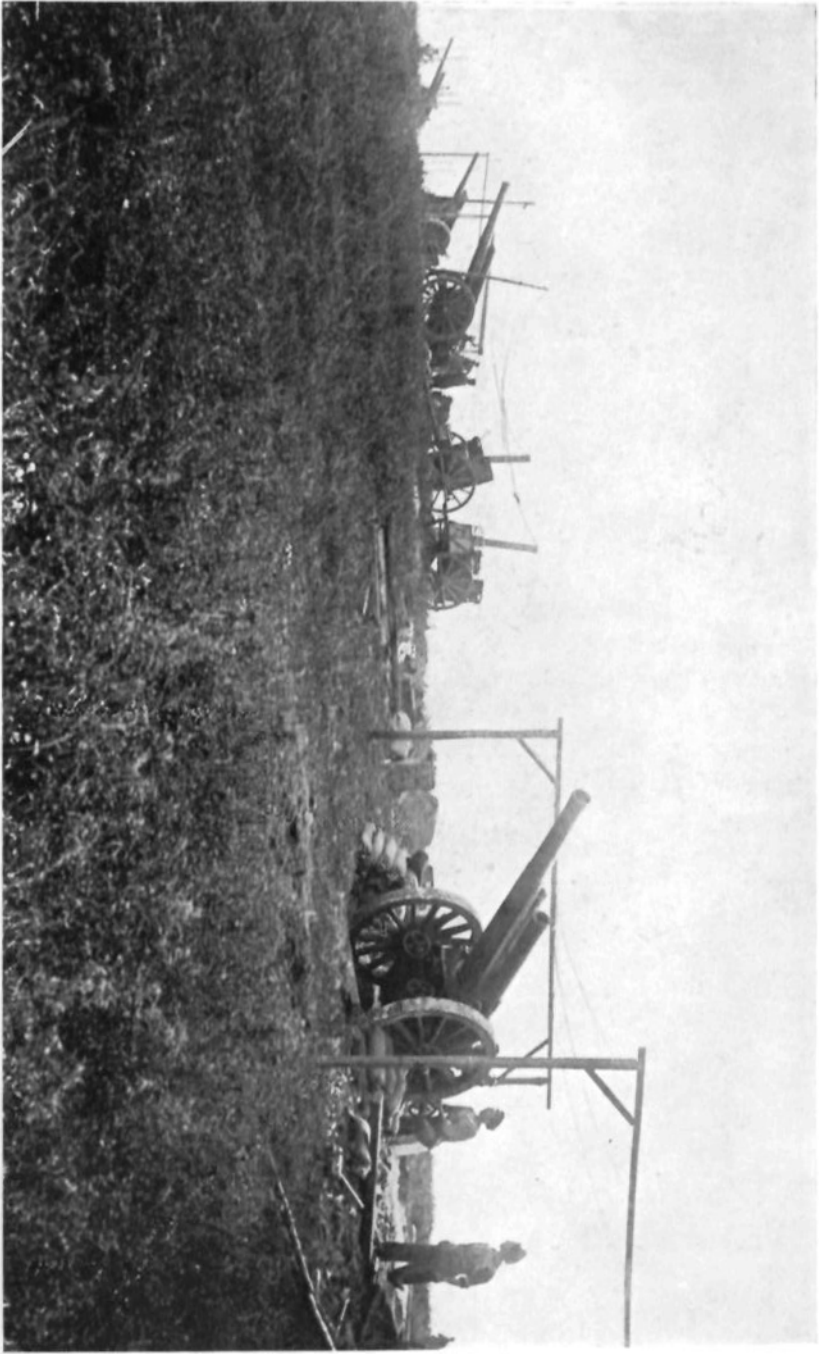
Very quickly, however, after the truth became known, the Allies began to produce the major calibres. The dearth of heavy artillery, which almost led to disaster in the early days of the war, was little by little supplied. Guns of 6-inch calibre,



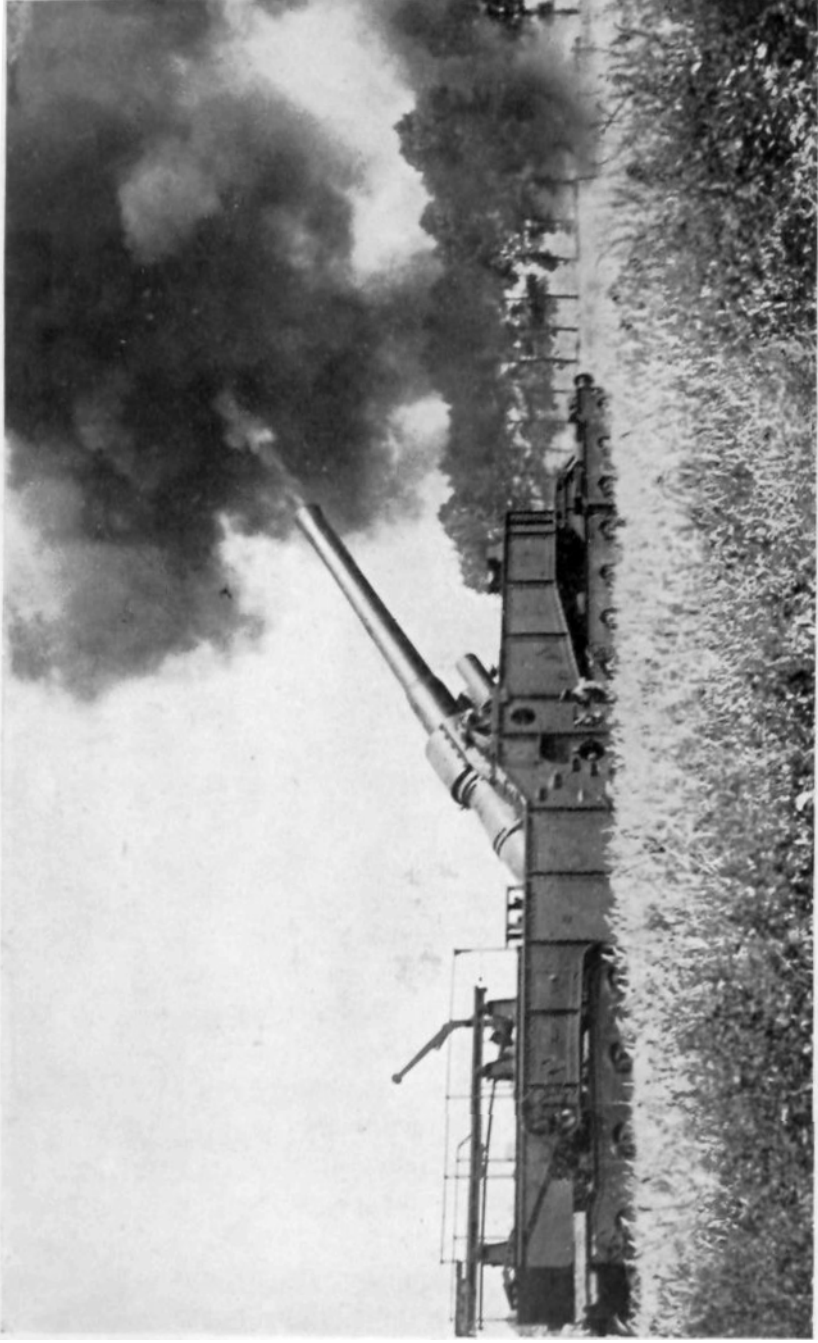
BRITISH 18-POUNDER FIELD GUN IN ACTION.



HEAVY BRITISH HOWITZER BEING MOVED BY TRACTOR.



60-POUNDER BATTERY IN POSITION.



GUNS ON RAILWAY MOUNT. APPEARS TO BE OBSOLETE NAVAL TYPE FIRING BLACK OR BROWN PRISMATIC POWDER.

NEW FIELD ARTILLERY CLASSIFICATION

howitzers of 8 and 9.2 inches were produced by the British, corresponding calibres being manufactured by the French.

These are the powerful artillery that at the present time are able to counter-batter the heaviest German guns, destroy their strong supporting points, and penetrate their dugouts.

They are drawn by tractors, and are thus able to pass over the torn and desolated terrain that has been the scene of battle for over two years. Made mobile through the introduction of mechanical traction, they have been able to follow the troops, though slowly, and to support them in the attack.

The numbers of these calibres that are now in service in France cannot even be estimated, but reliable report indicates that the 8-inch and 9.2-inch howitzers are being manufactured at the rate of one per day of each calibre.

4. *The Very Heavy Artillery*, including guns and howitzers mounted on railway carriages.

In this class are included the 15-inch mortars and similar pieces and the guns and howitzers mounted on railroad cars.

The latter are not a new invention, as guns were mounted on railroad carriages as far back as our Civil War. In this war, however, the heaviest calibres have been so utilized. Guns up to 12-inch calibre are known to be so mounted, and it is reported that larger types, even up to 50 cm. (20 inches), are to be used.

From the appearance of the photographs of some of these guns, one is led to believe that many of them are types of naval guns that have been removed from obsolete battleships. This belief is strengthened by the fact that some of them produce a great cloud of smoke on discharge, indicating the use of the brown powder used just prior to the introduction of smokeless powder.

These types are used to bombard important points in rear of the hostile lines, to destroy the heaviest works, and to fire on the railroads and lines of communication.

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Some of these pieces have a comparatively wide arc of fire and are provided with long recoil mechanism, making it possible to fix the platform in position; others must be pointed in the direction of the railroad, and recoil is taken up in part by the movement of the cars along the track.

The use of these pieces in conjunction with aircraft and the captive observation balloon makes the assembling of reserves and supplies within a short distance of the lines extremely dangerous.

Anti-aircraft Guns.

The use of aircraft in reconnaissance over the lines has caused the development of the anti-aircraft pieces. These are generally of small calibre, though guns up to 4-inch calibre are reported to be used against airplanes.

Two classes of mounts appear to be used—a fixed pivot mount that gives an all-round fire, and the automobile mount. The former are generally located at important points, such as depots, the vicinity of observation balloons, etc., for their protection against attacks or reconnaissance by airplanes.

The latter are mobile in the highest degree and are utilized for driving enemy planes off in order to cover movements of troops.

THE AMMUNITION SUPPLY

Without an adequate ammunition supply the guns would be helpless, and in the conditions that frequently prevail in France, when the terrain becomes almost impassable after rains, especially in conjunction with the terrific ploughing by shells to which it has been subjected during the past two years, the supply would fail if the only means of transport were the motor truck and the horse-drawn carriage.

The solution of the problem has been the light field, or Decauville, railway. With its light track, made in sections about twelve feet in length, it can be laid rapidly over almost any kind of ground, and its small cars, drawn by motor-driven



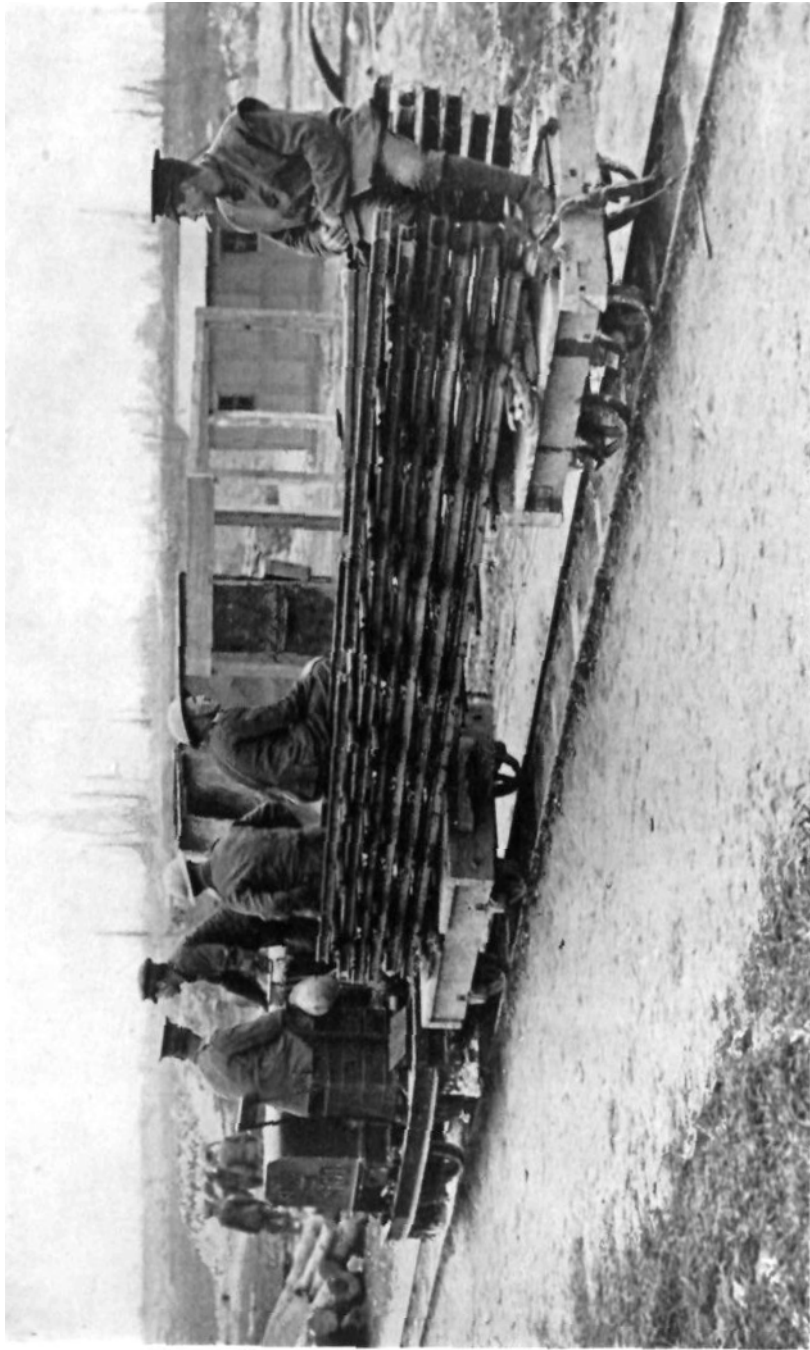
ANTI-AIRCRAFT GUN ON MOTOR TRUCK MOUNT.



AUSTRALIANS GALLOPING UP WITH AMMUNITION.



AMMUNITION SUPPLY FOR THE LIGHT FIELD GUNS.



DECAUVILLE LIGHT FIELD RAILWAY. THE SOLUTION OF THE AMMUNITION SUPPLY PROBLEM.

NEW FIELD ARTILLERY CLASSIFICATION

locomotives, can keep up the supply of shells to the guns when the terrain is impassable to other forms of transport.

It has been reported that in many sections of the line there are in the neighborhood of ten miles of Decauville road for every mile of first line trench.

OBSERVATIONS

These are some of the developments in artillery that have resulted from the present war. New guns have been produced, not only singly, but in great quantity. New methods have been evolved, to meet the special conditions of trench warfare. Doubtless the same matériel will be adapted to manœuvre war, should it supervene. In almost every sense the doctrine of Field Artillery has advanced. The progress of the arm has been unprecedented, so that the organization and methods of three years ago are now in many respects obsolete.

New schools have been established in England and France, where the latest methods are taught intensively to officers, who, upon completing their courses, are sent to the battle lines to put their lessons into practice. They are taught not only the former methods, but new and more accurate ones, the application of ballistic tables to secure accurate fire, calibration of guns, wireless telegraphy, telephony, balloon observation, the use and care of motor transport, the use and management of the light field railway, and many other things that are now esteemed essential to the education of a field artillery officer.

During this time the United States Field Artillery has stood still. At first the definite information was not available. It can now be used for the instruction of our troops, but there is no School of Fire and no directing Field Artillery Board to digest the information and select the essential elements to be disseminated. There are things to be done, and we cannot afford to stand idle.

The situation assumes an aspect even more serious in view of the fact that we may have to prepare an army of from 500,000 to 1,000,000 men in the near future. We cannot entrust

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the field artillery, even in the smaller commands, to untrained and unskilled hands, unless we are prepared for total inefficiency for a considerable period of time. If we are obliged to seek for the higher commanders for brigades, regiments, and battalions from among those who have no technical experience with the arm, it will amount to a positive disaster.

We should therefore act in the present, and the training of the present commissioned personnel in all the technique of the arm, including those subjects that have been found by the experience of the present war to be essential, should commence at once, lest we repeat the experience of the Civil War and the war with Spain.

Expenditure of Ammunition

THAT the expenditure of Field Artillery ammunition in the present war has been enormous, and beyond any conception based upon previous experience, is well known, but, like many other matters of importance, exact data have not generally been available.

The following, taken from General Sixt von Arnim's report concerning the battle of the Somme, July, 1916, are extremely interesting, in that they give the maximum expended in any one day of twenty-four hours, and the average daily expenditure during the entire month of July, 1916:

1. Maximum artillery ammunition expended in any one day of 24 hours:

77-mm. field gun	322 rounds per gun
105-mm. field howitzer	479 rounds per gun
150-mm. howitzer	233 rounds per gun
105-mm. gun	321 rounds per gun
210-mm. mortar	116 rounds per gun

2. Daily average (24 hours) during July, 1916:

77-mm. field gun	145 rounds per gun
105-mm. field howitzer	170 rounds per gun
150-mm. howitzer	119 rounds per gun
105-mm. gun	118 rounds per gun
210-mm. mortar	51 rounds per gun

3. One field battery (howitzers) expended in one day 3500 gas shells.

The actual number of guns in action is not known. The best information gives a probable number of one field gun, exclusive of heavy types, for every twenty yards of front. The approximate frontage of the Somme battle was forty miles, so that the number of field guns engaged numbered in the vicinity of 3500. Each gun fired 145 projectiles per day,

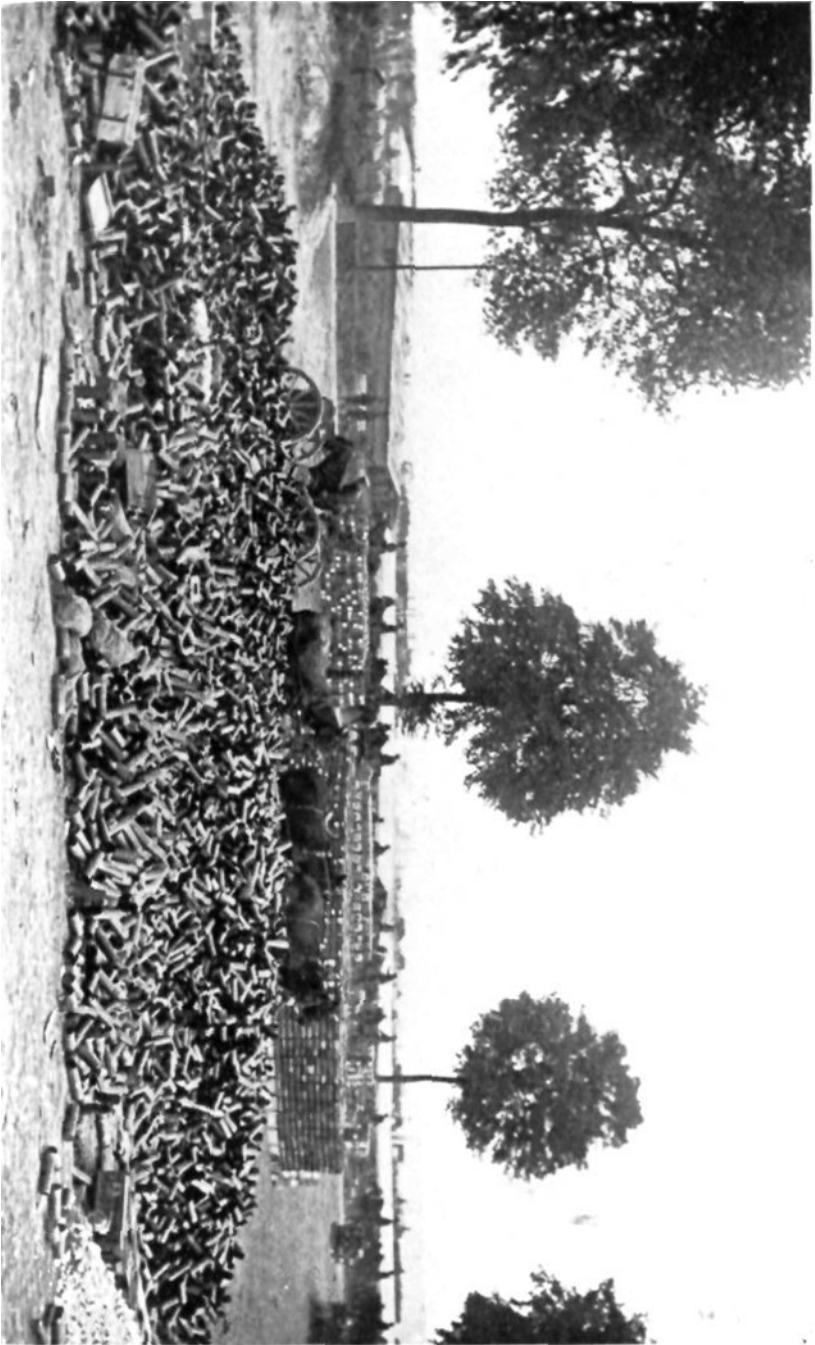
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or a total of 4495 for the month, and the total fired becomes 15,732,500.

The German 77-mm. projectile weighs seven kilograms, or 15.4 pounds, so that the total weight fired was 242,280,500 pounds, or 121,140.25 tons. The computed weight of the heavy artillery ammunition would probably more than double this amount.

Such figures only serve to demonstrate the vastness of the conflict in Europe, and to point out to us the enormous difficulties of ammunition supply, both in manufacture and carriage to the guns. And we must remember that in the battle of the Somme the Germans were on the defensive and lost ground, so that the above expenditure does not even represent a successful defense.

The figures also point out the difficulties in the way of a rapid advance after a line of fortifications has been pierced. First the guns must be moved forward, in itself a slow and difficult task, over the broken and shell-torn ground; then, over the same ground, roads must be constructed, or the light field railway must be laid and a new ammunition supply established. The time necessary for these operations is much longer than that necessary for the defense to establish a new trench line, and the attacking infantry in modern war dare not go beyond the support of its artillery.



A HEAP OF EMPTY METALS ON THE SOMME FRONT AFTER A BOMBARDMENT.



BRITISH 6-INCH GUN. (HEAVY ARTILLERY.)

How a Battery Was Supplied Under Fire

BY PAUL W.—

SINCE our departure from Souain in October we have been in the neighborhood of Verdun. Having been for some time attached to the ammunition section (or combat train), I stayed at Verdun while the pieces went forward to take up a provisional position and finally were stationed about 200 metres from the village of B——.

At nine o'clock on the evening of the nineteenth we were ordered to supply the pieces immediately, the second section to prepare to start at four o'clock in the morning and take up the position indicated for the permanent supply. I belonged to this second section, the departure was delayed and it was not until 6 o'clock in the morning that we left. We arrived at B—— without mishap, without even suspecting the attack, at V—— also, but on passing this village the German bombardment began. At this point the shells fell at some distance from us and we arrived at the indicated point sheltered in the ravine formed by the road from B—— to B—— and the road to L——.

Unfortunately, this did not last long. Little by little the shells approached. They fell at 100 metres, then 50, right, left and over. We were showered with dirt and débris of all sorts, though without any casualties. The afternoon passed under a steady rain of projectiles and in the evening we began to think of digging holes to shelter us a bit from the bursts. One man from each carriage stayed with the horses while the rest of us tried to sleep, in our rather uncertain shelters. With the aid of a comrade I placed over our trench some solid logs to avoid being buried by a heavy burst; if a direct shot should arrive so much the worse, but we might escape the shrapnel burst. I slept as best I could and my friend also. The idea

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once came to us to change our place but, on thinking it over, some decision had to be made and, if we were going to be killed, we might as well be killed here as at any place, so that in perfect agreement on that question we said "let us go to sleep again."

A few minutes later a shell falling too near us, woke us up, then we heard the others shouting our names. A shell had fallen on one of the wagons and killed two horses, the others had run away, and we had to run after them; somehow or other we found them. Unfortunately, another projectile fell, wounding three men and killing four horses, one of which I was holding by the bridle. The adjutant (first sergeant), then decided we must look for a better place. Snow began to fall and it became intensely cold. Our new position not far from the first was better for the moment. It was four o'clock in the morning. The adjutant ordered me to strip the harness from the horse that had been killed while I was holding him. I went to do so in spite of the shells which were falling pretty thickly. During this difficult operation, for moving a dead horse about is not easy, I had to lie prone at least fifty times, sheltering myself behind the carcass. And now what we dreaded happened; shells began to fall on our new position, five or six at a time. How can I describe this spectacle? It was a regular pudding of dead horses. Every one was covered with the blood and débris of these poor beasts. Some of them prostrate, kicked their legs desperately, others crawled away with limbs half torn off or their heads cut in two. It was a hash of horses, blood and entrails.

The first shower passed, and we tried to restore some order. Unfortunately, several of our comrades had also been caught. The machine guns were beating on the route to B———. Everywhere were corpses of men and horses, and at each shower of projectiles the ravines were black with smoke. Several times we were forced to put on our gas masks as we were treated to lachrimatory gas shells.

During this time a cruel tragedy was passing at the firing

HOW A BATTERY WAS SUPPLIED UNDER FIRE

battery. Most of the gun crews were demolished, only five being left intact with orders to hold on to the last. I will not describe the desperate moments they went through, but this day was for them, as for us, infernal, and I never dreamed of coming through.

The twenty-second, the same day, at four o'clock in the afternoon, the order came for us to fall back by way of L——— in the direction of B——— in a ravine the name of which I did not know. Under the shell fire it was necessary for us to get some kind of order and, in spite of the dead horses, to carry off the matériel. We managed it, but what a bloody cavalcade we made while the Germans pursued us with their shrapnel. The Germans were gaining ground, but our friends still held. Only the combat train withdrew to reorganize a bit. Having no horse, I followed on foot, beating one unfortunate wounded animal which could not keep up, but which we had to keep working, cost him what it might. Horses too severely wounded we shot.

Here we are then at nightfall installed in a ravine. I took the team of a wounded driver, but none of us knew what we were going to do. In my overcoat and blanket I lay down on the ground with the others, overcome with fatigue. Shall I be able to sleep? The cold and snow we had forgotten. No shell fell here except on the road where carriages and horses were being bowled over, but these projectiles were intended for B———.

Our sleep did not last. After a time that I could not count, we were awakened. Men were detailed to take the wounded horses to the barracks at Verdun. The others were ordered to mount. I took the place of a wounded driver. During all this time the battery was still firing. Word came that the Germans were getting nearer and, cost what it might, we must bring out the pieces. There was nothing to smile about; we could not leave our unfortunate comrades who had already destroyed all their papers. The road to reach them lay by L——— and straight across to B———, to avoid unnecessary detours. This

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route was under a terrible bombardment. Here circumstances and the necessity of passing through the shell fire made us wish we had chosen the path where they seemed to fall the least. But to add to our misfortunes, the brigadier (sergeant) who conducted us did not know the country and at night, illuminated only by shell bursts, it would have been idiotic to attempt an adventure. We arrived at L———. Halt! We talked it over and decided to take the road we knew best. We descended then the ravine which we had occupied in the morning. It was obstructed with bodies of horses and just at this part are the cross roads from B——— to B———; the path was dangerous but we passed it without misfortune at a gallop! The main road that we followed from now on was encumbered with corpses of all sorts and débris of wagons. It was being shelled by the German 380's. Each burst offered us a terrible spectacle. At a fast trot we rolled along without worrying about the projectiles which fell like hail. It is true that in such a storm one must be a fatalist and go ahead. Finally we arrived in another ravine still more dangerous than the first, on one of the flanks of which a narrow path led to our pieces. Here they are and we must get to them as best we can. The route was almost accomplished, when another shell bursts, knocks over the lead horses while the wheelers stumble into a shell hole. The entire column was arriving and we must get out of the way. You may imagine the picture under this rain of iron. We did it, however, leaving a few dead. Further on another wagon or rather a whole section turned over completely. Finally after many emotions we got there, to the great joy of the gunners. While we were limbering, two shells struck near by, without, however, causing any damage. I had nevertheless time to notice a great log from a shelter pass over my head with the grace of a tennis ball.

Before parting, the Lieutenant, who had stayed by the pieces, asked if the ravine was under fire. On our affirmative he said, "Mes enfants, so much the worse; we must get out of here." And now we are off, descending the same path to rejoin

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the rest of the battery. All went well, with neither upsets nor wounded. We then cut across the fields directly to L———. I pass over in silence the emotion of the return. Not having enough horses and the ground being all steep hills, it was necessary at times to make teams of ten horses, leave the pieces and bring them one by one to the stretches flat enough to conduct them with the normal team of six horses. On arriving at our point of departure, it was necessary to go back and bring up the caissons. The same route, the same emotions in the famous ravine, new upsets and new deaths; but on arriving at the caissons the Germans established a curtain of fire with incendiary shells so rapid that we could hardly see on account of the smoke. Luckily, in spite of the storm of shrapnel, no one was hurt. It was my task with six horses and a heavy caisson to descend the narrow, steep path filled with shell holes, having to lead the lead horse, trembling with fear, and at the same time hold back the wheel horses to prevent the load from getting away from them. Finally we took the same route to rejoin. All this under a hellish bombardment. When we arrived it was daybreak. During this terrible night two neighboring batteries that had prepared to blow up their pieces were saved from this extreme by their drivers, like ours, coming to bring them out. For them it was equally terrible, dead and wounded.

Our pieces were saved, but it was just nip and tuck; happily we were able, as you see, to get them back.

We were back at daybreak, nothing in our stomachs. If only we had some hot coffee. Above all we were worn with fatigue and the lack of sleep. We lined up with the remains of the other batteries in this ravine along the B——— L——— road. Reinforcements of infantry arrived.

After an hour's rest, a battery was organized of the pieces that remained intact and two others, and started off to take up a position, not far away this time, but on the hill that dominated the ravine. Already several batteries of the —— army group are there. Our guns are to be placed in some

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little dilapidated trees that ornament a rather bare portion on the summit of this hill. To get the caissons there are needed twelve horses each, so you may judge the steepness of the ascent. That, however, was nothing. The day passed normally; the bombardment right here was not severe. In front of our pieces at three kilometres could be seen L———. The night was rather calm, but we passed it without sleep, supplying the pieces with shells. On the same plateau, one kilometre to the right, a battery of the —— is in position. The next day the German artillery again sprayed this corner, and the —— of which I have spoken was copiously served. Our battery for the moment was spared. My comrades and I arrived with six caissons, and by chance being the first caisson to arrive, I received the order to move further forward under the conduct of a brigadier (chief of section). This "further forward" seems rather vague and as I did not understand, I questioned the brigadier. He replied, "You see where those shells fall, that is where it is."

Naturally there was nothing to do but to accept. We marched then in that direction a few metres more and were under a rain of steel. We dismounted in order to have the shelter of our horses. On arriving there, or rather just before arriving, I said to the drivers ahead of me, "To avoid an awful mix-up, as soon as we have reached the pieces, unhitch and gallop off, leave the wheel driver with me. You can carry off the empty caissons with your horses." I said this for the good reason that there was nothing else to do.

My comrades, I assure you, did not dispute it and in an instant they had disappeared with their animals. This operation was accomplished under a hail of shells, there was no hesitancy. The cannoneers of the —— were too busy to help, we had to count on ourselves.

A frightful whistle, a tremendous detonation and a shell struck in front of the horses as the brigadier and I opened the caisson. Nothing broken, but the driver had disappeared. The frightened horses ran off threatening to scatter shells behind

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them. The brigadier and I rushed after them, stopped them, and brought them back. On a sign from the captain of the —— we stopped at fifty metres from the pieces. We then had to carry the shells by hand to the battery; only four could we carry at a time, an exercise that precluded all chance of falling prone to avoid bursts. During this time a cannoneer came to hold the horses. Finally when the 32 shells were unloaded I ran to my carriage, and once more, as at B——, I drove it back alone.

Modern Gun Carriages

FROM "LaNATURE," FEBRUARY 20, 1915

THE recoil of cannon is one of the most important questions that gunners have to solve. As every one knows, when the shell is fired the barrel is thrown violently back. This motive energy must be absorbed without the body of the machine receiving a shock which would result in the alteration of its direction of aim. This sums up the problem of gun carriages.

The rigid gun carriages for sustaining the entire firing shock (percussion du tir) transmitted directly from the gun, must have special resisting qualities. Thanks to the progress realized since 1870, in the manufacture of steel, it has been possible to obtain in these gun carriages the maximum efficiency, but their weight, inevitably high, did not give to field pieces sufficient mobility.

Furthermore, the handling was laborious and slow owing to the recoil of the gun carriage, which necessitated each time the replacement of the gun by hand over a distance varying from one to two metres according to the ground.

It was only after the Russo-Turkish War of 1878, when smokeless powder and the perfections realized in the manufacture of projectiles brought up the question of the rapidity of firing, that it was realized that it was absolutely essential to avoid the recoil and to keep the gun in its place while being fired. The first actual quick firing field gun, which, owing to its complete stability when in action, permitted a constant direction of aim, was the French cannon of 75, 1897 model.

The principle on which quick firing weapons are based is the principle of the long recoil of the barrel on the carriage. An elastic bond (hydraulic brake with recuperator) interposed between the cradle and the gun no longer transmits to the frame, and thence to the pivot, the whole of the firing shock, but

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instead only a very weak effort, the size of which depends on the length allowed for the recoil.

With field material calling for frequent and quick displacements, it is first of all necessary to assure the fixed immobility of one point of the carriage. Recourse was had to an arrangement in imitation of the hooked carriages of the fifteenth century, which consisted in fixing the gun carriage to the ground by means of a trail spade which imbedded itself in the ground by the very action of firing. The spade has received a rational form which causes it to become firmly fixed after having penetrated into the ground through the effect of the first shot. The resistance of support "b" is practically normal to the resultant of the pressures sustained by the trail during the firing and the sole-plate "c" compresses the soil and prevents the earth from rising under the action of the trail spade "a." To increase the adhesion and also to permit a larger range of angular firing the trail is double in the Italian Depot Matériel.¹

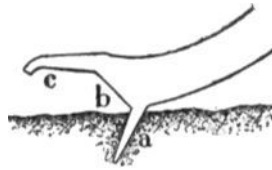


FIG. 1.—TRAIL-SPADE

What was the situation before Colonel Deport's long recoil invention? The first practical realization of a carriage with recoil checking device is due to the Russian Colonel Engelhardt in 1876. The mass sustaining the shock has a very considerable value in relation to the total weight of the whole. This mass comprises the barrel and the cheeks of the gun carriage, while the point which receives the shock simply comprises the axle and the tie-rods attaching it to the cheeks through the intermediary of elastic rubber pads. When the shot is fired the cheeks recoil in relation to the axle compressing the rubber and the wheels then revolve in their turn. The recoil is thus reduced

¹ See "La Nature" No. 2160, February 20, 1915, page 121.

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to about 30 cm. When the recoil is finished the cheeks are brought back to their normal position in relation to the axle.

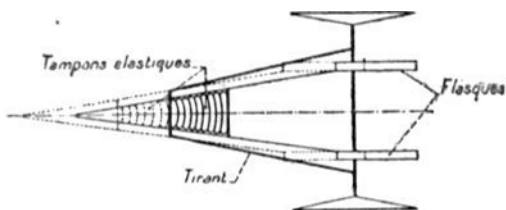


FIG. 2.—GUN CARRIAGE ENGELHARDT, THE DOTTED LINES SHOW THE POSITION OF THE CARRIAGE AFTER RECOIL.

In the Canet gun carriage for 75 guns (1889) the cheeks are attached to the axle by means of a sleeve A and by a hydraulic brake with spring recuperators.

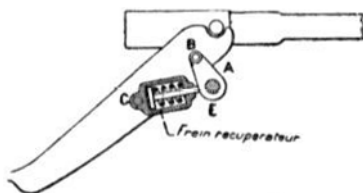
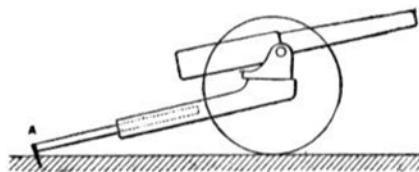


FIG. 3.—CARRIAGE OF FIELD GUN 75, CANET SYSTEM.

An articulated triangle B E C is thus obtained, two sides of which have a fixed length and the third is variable. The gun carriage has a wheel brake but no spades.



TELESCOPIC GUN CARRIAGE, CANET SYSTEM, 1895.

The same engineer, in another type of gun carriage (1895) forms the trail of two tubes, one of which is placed within the other and constituting in their arrangement a hydropneumatic brake. In this system, the recoiling mass includes the chief part of the gun carriage with the exception of plunger tube A.

Whatever inconveniences these gun carriages may present, as long as the recoil was only a few centimetres, the aiming

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was easy to correct and the rapidity of the firing was able to reach five to six shots a minute; they therefore permitted of accelerated firing.

It is in the 120 and 155 short models 1890 guns that the hydropneumatic brake and air recuperator first made their appearance, invented by Colonel Locard of Bourges, and which later on, in 1897, in the hands of Colonel Deport assured the success of the "75."

A hydraulic brake consists of a steel pump body attached to the gun, an air reservoir or recuperator in bronze and of a piston and rod solid with the recuperator.

The piston rod is hollow, with large openings near the piston.

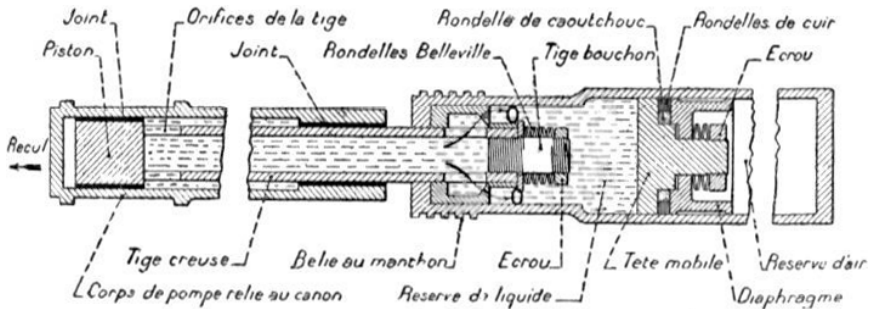


FIG. 5.—SCHEMA OF A HYDROPNEUMATIC BRAKE.

At its outlet into the reservoir the central hole is closed by a stopper. A diaphragm, or movable piston, separates the liquid from the compressed air, the initial pressure of which is 110 atmospheres.

The pump body recoils with the cannon. At the end of the recoil the expansion of the air causes the liquid to enter the pump body by two orifices "O" arranged around the stopper, which, per contra, is firmly fixed on its seat and the gun reverts to its normal position. The recuperator which we have spoken of above aims at storing a part of the energy of the recoil in a form which permits its use to restore the gun quickly back to its normal position, while the hydraulic brake absorbs a part of the energy of recoil in transforming it into heat.

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The division between these two parts of the total energy to be absorbed should, on the one hand, be just sufficient to overcome the working resistance of the return in battery, as any excess is harmful and would result in a shock upsetting the aim, and, on the other hand, it is desirable to give the greatest importance possible to the work of the brake, as this part alone serves as a regulator. Therefore, one is obliged to add to the recoil brake a regulating brake.

In the hydropneumatic brake which we have just described, the regulation of the recoil takes place by means of different diameters of the valve orifices.

When, in 1900, they wished to apply the long recoil principle

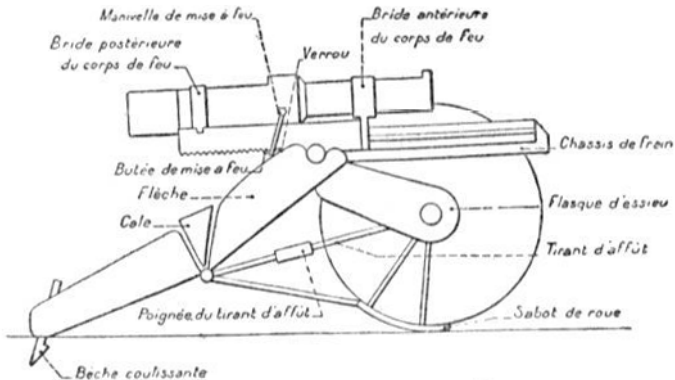


FIG. 6.—SCHEMA OF A 65 MOUNTAIN CANNON GUN CARRIAGE

to mountain cannons, a new difficulty cropped up. Mountain guns must be able to shoot at high angles, and also be very low on the gun carriages, 60 to 80 cm., to lessen the weight. If a recoil of 1 m., for instance, was adopted, it was feared that the breech might touch the ground under high inclinations. To remedy this inconvenience various solutions have been considered: bent axle, automatic recoil varying with the angle of aim, finally (and this is the solution adopted for French 65 mountain cannons (1908) and the Schneider and Deport materials), by giving a forward movement to the gun.

The principle of throwing the gun forward is as follows: A certain forward velocity is given to the gun and it is then

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fired. This is how the 65 mountain cannon works: The gun carriage comprises two axle cheeks jointed at the trunnions with the trail which is itself composed of two pieces jointed together at a hinged axis. The range of the latter articulation is assured by means of wedges which permit the shortening or lengthening of the gun carriage by altering the tie-rod and modifying the inclination of the two articulated pieces. The firing angle can thus vary from 24° to 35° .

A trunnion frame, attached to the carriage by a double screw, supports the hydraulic brake and a double recuperator formed by two telescopic springs arranged at the right and left of the brake cylinder. Finally, a ratchet placed under the brake cylinder secures the immobility, by means of a bolt, of the recoiling mass in its position for aiming.

Thus arranged the cannon is ready and the springs of the recuperator are compressed. In disengaging the bolt by the use of the firing lever, the gun is thrown forward and the firing takes place automatically at the moment the trigger is actuated by the firing lug fixed to the frame. When the recoil is finished, the gun is stopped by the bolt which engages itself in one of the teeth of the ratchet. The shooting finished, the very effect of the gun being sprung forward produces the tearing out of the spade.

It is, of course, necessary before firing to employ labor by hand to bring the gun to its firing position in compressing the springs of the recuperator. The recuperators which we have described above are of air, but in most of the foreign artillery (German, Austrian, Russian) spring recuperators are used, nearly always in the form of tungsten steel, or of silicon steel spirals of round or rectangular section. A single spring is, moreover, never used, but a series of springs (generally two) wound one within the other (marine guns). The two springs, the winding diameters of which are different, work parallel, adding their resistances and undergoing the same shortening. Telescopic springs are also used which are much less cumbersome and especially employed in the navy.

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As a matter of fact, it is possible on warships to use very heavy gun carriages, capable of absorbing the formidable recoil of the weapons deadened only by very powerful springs; which is fortunate, as one could not, in a turret, allow for a recoil of more than 30 to 40 centimetres.

It is from the perfections and combinations of the various apparatus we have described that the 75 has been evolved, and one of its most brilliant performances in the present war is the marvellous fashion in which its gun carriage keeps in good order; after firing several thousand shots its stability has remained completely the same. As our gunners say: a halfpenny placed on the wheel does not move when the shot is fired.

This accordingly allows us to fire with startling precision, which is not possible for the Germans, whose matériel alters its direction of aim with each shot fired.

² La Nature No. 2181, July 17, 1915.

Organization and Training of the New Armies

WAR COLLEGE DIVISION, GENERAL STAFF

PRELIMINARY

THE army that went out to Mons in the early days of August, 1914, was probably the best-trained army that has ever left England. Cromwell's Ironsides and Wellington's Peninsular Veterans are, of course, out of comparison, for their fine spirit had been tempered by the experience of war. But, so far as peace training can do, the regimental officers and men of the Expeditionary Force could hardly have been improved. For the first time, too, in our history we had at the beginning of the war a staff with a high training in staff duties. The high state of efficiency in our field army was almost entirely due to the great improvements in organization and training made since the South African War. This long-drawn-out war, in which what were then believed to be all the resources of the Empire were pitted against a foe numerically very inferior, had awakened the army and to some extent the nation to the shortcomings of the old army system. The twelve years' interval had been well spent in organizing an army on some settled principle, in creating a general staff, and in improving the training of both officers and men. The number of officers who took a keen interest in their profession, who talked about it and studied its problems, instead of being in a minority, as was at times the case in the last century, was almost equal to their total number; and the opportunities given them to pursue military studies in the Staff Colleges at Camberly and Quetta, the Cavalry School, the School of Musketry, the Schools of Gunnery at Shoeburyness and Lydd, the Ordnance College, or the School of Military Engineering had been greatly

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enlarged and developed. The training of part of the Expeditionary Force at Aldershot, under the commanders who themselves led it into action, was training such as never had been seen in England. The endurance and marching power, the skill at arms, the intelligence, and, above all, the morale of the soldiers of this fine body of men, had been brought to the pitch which enabled them to add another laurel to England's military record in the great retreat from Mons.

The high standard then set by the Expeditionary Force was that which those training the new armies had before them as an ideal. Naturally, it was in some respects an unattainable ideal. The Expeditionary Force had the country's best soldiers to train them: nearly all these had gone abroad, and so were not available for training the new recruits. Again, while the old army's training was a matter of years, the new armies had to get what training they could in hardly more than months. There were also other great difficulties, as will appear in the following pages. But that the difficulties were in a great measure overcome is evident from the account which the new armies have given of themselves before the enemy.

In any account of the new armies' training it is necessary to distinguish broadly between the earlier and later stage of the system of training adopted for recruits. The earlier stage corresponds roughly with the first 17 months of the war, from August, 1914, to the end of 1915; the latter stage from the beginning of 1916 onward. In the first period, before the Military Service Acts had come into force, the system of training, as we have seen was the case with recruiting, had to be conducted very much on a hand-to-mouth policy. In the first place, until Lord Derby's group system was introduced in October, 1915, the numbers of recruits on any day could never be estimated beforehand, and those who came in had to be trained at once, so that the distribution of men into categories according to their stage of training was often impossible. Secondly, the need of men for strengthening the lines in the many fronts we were occupying was so imperative that a very prolonged

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training was out of the question. Further, in those first 17 months of the war the scarcity of equipment and of thoroughly efficient instructors was more marked than in the succeeding period. In a word, owing to the stress of circumstances during the first period, the training of the new armies was necessarily not so well organized and systematized as it had become in the second period. Since the beginning of 1916 the numbers of recruits to be trained at any given period can be calculated with fair accuracy; there has not been the same urgent need to send out fresh divisions as complete units, and it has become much more a question of carefully training drafts or units for home defense, or even retraining officers and men whose previous training was inadequate; equipment and skilled instructors, if still not adequate, have been forthcoming to a much greater extent; and, lastly, there has been time to look round, profit by the mistakes of the past, and consider the needs of training large armies more scientifically. But, while it is important to bear in mind the distinction between these two periods, it must be remembered that it is only a rough distinction. Many of the improvements and more scientific methods of training were evolved in the earlier period, and in the later some of the defects from want of adequate resources still remain. In fact, the training system of the new armies had been gradually improving all the time and is still developing; so that at no moment can one say that the system is complete. *E pur si muove.*

One characteristic, however, is common to both periods: the spirit which animates the teaching of military duties. The British Army has in the past been a very small army compared with that of any other Continental nation, but in military experience of small operations it has far surpassed all others. The small wars and the semi-military, semi-civil duties which have fallen to the lot of our soldiers in almost every quarter of the globe have not, perhaps, been the best training for war on the vast Continental scale, but at least they have taught the officers and men the qualities of resource, independence, and self-reliance,

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which go to make the best soldier in the long run. This practical training helps the British soldier to his inestimable quality of never knowing that he is beaten; common also, it may be remarked, to the French—a quality of which the German Chancellor recently complained when all the cards seemed to be in the Central Powers' hands, and which accounts for that Russian saying that the English never win more than one victory in a war—but that is the last. Another peculiarity of the British Army is its strong regimental feeling. In the armies of other nations there is generally to be found a great *esprit de corps* in some picked regiments like the Prussian Guard, the French Chasseurs, or the Italian Bersaglieri; but, as a rule, the loyalty of the Continental soldier is primarily to his army rather than to his regiment. Both forms of loyalty have their advantages and disadvantages; and there have been distinguished soldiers in the British Army who have wished to break down some of this regimental feeling for a more direct army feeling. But whether for good or evil, this regimental feeling exists and is not likely to be broken down even with the hugely increased army and the hugely increased regiments that we now have. Nor must it be imagined that the regimental loyalty excludes army loyalty; it stands first, indeed, but in itself leads to army loyalty just as a man's love for his own particular countryside helps him in his devotion to

"This blessed plot, this earth, this realm, this England,

• • • • • •
This land of such dear souls, this dear, dear land."

One great advantage of this regimental feeling is that it tends to make of officers and men one happy family, proud of themselves, proud of their regimental home, wherever it may be—in tents, or huts, or bivouacs, or in the trenches—keen to make themselves and that temporary home smart, as a sign of the alert spirit within, and jointly anxious to make that regiment a glory to the British Army. Lastly, the British Army, in spite of even recent Military Service Acts, is in character fundamentally a volunteer army. By long tradition the men

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who join it are treated as men who have joined it of their free choice, men to whom the army has to be made attractive by their being treated with courtesy and consideration by those in command of them and as sensible beings, who work all the better for understanding fully what is required of them; and this tradition has not been impaired by conscription.

The spirit of the training given to the British Army is a result of these characteristics. It is a spirit of self-reliance, loyalty, and kindness, all based on a strong sense of discipline and community of interest. The essence of this spirit is to be found in our Field Service Regulations, but has perhaps been best summarized by that great soldier, Lord Wolseley, in his "Soldiers' Pocket Book," in such injunctions to officers as¹—

"Make a man proud of himself and of his corps and he can always be depended upon."

"An officer should sympathize with their (the men's) likes and dislikes, their pleasures and annoyances, . . . until at last they regard him as one of themselves, a companion and a friend. For and with such a man they will brave any danger and endure any amount of privation."

"No man who knew soldiers or their peculiar ways of thinking . . . would ever deprive a soldier of a peculiarity that he prided himself on without having some overpowering reason for doing so."

"The soldier is a peculiar being that can alone be brought to the highest efficiency by inducing him to believe that he belongs to a regiment that is infinitely superior to the others round him."

Such and similar sentiments are those which made the first six divisions¹ what they were and have animated the training of the new armies throughout from the early days of perforce more rough-and-ready methods to the present more scientific system. It is a broad-minded and tolerant method, which insists on smartness, on duty and discipline, and high courage and courtesy, but not on hate. In the early days it was taught by voice and precept to the young officers and their men by

¹ The same remark is true of the Seventh and Eighth Divisions, composed of the old army soldiers, though they did not go abroad with the original Expeditionary Force.

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the few men of the old army left to train them; now it has become a code of morality, one may almost call it, taught systematically in the training establishments for officers and noncommissioned officers at home and in France, and thence permeating the whole army. In some of these schools the code is an unwritten one; sometimes it is set out in the form of notes on morale, discipline, leadership. A set of such notes, prepared for one of the army schools in France, in their practical common-sense combined with high ideals of conduct, all set out in homely language, might well be given as a standard of conduct to every boy and girl in England; for it is a compendium of civic no less than military virtue. Take, for example, this extract from a passage of patriotism:

"What is patriotism? It is the spirit of the nation; it is one of the grandest forces on earth. Think of 90,000 Boers fighting the whole British Empire, a quarter of the globe, for two and a half years. Here is fine patriotism, a true fighting spirit."

Or this on the more homely subject of comfort in billets:

"Officers should inspect their men's billets before their own. Even if nothing can be done, always visit them. The mere fact of showing yourselves will prove to them that their comfort is your first consideration."

Or, lastly, what could be better common-sense and finer teaching than this:

"When a man joins your company, you must make him feel 'at home'; then you must tell him of the company he has joined, but it is no good telling him that it is the best in the regiment if it is the worst, or that his regiment is unequalled if the men are slack and slovenly, for he will soon detect the fraud and simply consider you a fool. See that it is the best, that it is unequalled, and then impress on him that he belongs to the finest army in the world and the finest regiment in the army."

The men who came into the army as recruits were of the kind who are ready to respond to such training. No one who

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watched the long columns of recruits in the early days of the war being marched off to their depots would have failed to perceive this. Dressed in all manner of civilian clothes, in caps, in straw hats, or bare-headed, they looked motley enough crowds; but the individuals composing them had that straight, brave look in the eyes, as they marched on with head erect to the fate in store for them, which promised well for their acceptance of the British Army's glorious traditions. In the later stages of the Derby recruits and conscripts that look of absolute certainty was perhaps not so universally apparent at first, but a day or two with the army soon brought it in the faces of those who lacked it at first.

The subject of training the new armies will be treated on the following plan: Part I will deal with the first period of less well-organized training, which roughly covered the period from August, 1914, to the end of 1915; in this part also will be indicated some of the many difficulties which interfered with the training, such as want of equipment and instructors, etc., though the way in which those difficulties have been gradually overcome will be left over to another section.

Part II will deal with the general training of the new armies as it has been organized into a system since the beginning of 1916. Part III will deal with the development and training of special corps, such as the R.E., the R.A., the Machine Gun Corps, etc.; this part will to a certain extent overlap Parts I and II.

PART I

TRAINING TROOPS UNDER DIFFICULTIES, 1914-'15

PAR. 1.—SUMMARY OF THE DIFFICULTIES TO BE OVERCOME

The least difficulty found in creating the new armies was in obtaining the men. Indeed, at first more recruits volunteered than could be adequately dealt with. Before the hosts of raw

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recruits were converted into the armies which have given a good account of themselves in France, the Dardanelles, Egypt, and Mesopotamia, they had to be housed, fed, clothed, armed, equipped, distributed into units, and taught drill, discipline, and the technical skill needed of modern soldiers; in a word, animated with *esprit de corps* and the true military spirit. The last named requisite, which may be called the moral element, is the most important of all, but depends to a large extent on the adequate fulfilment of the other needs. You cannot, for example, obtain good work out of a soldier unless he is properly housed and fed; the uniform helps to turn a mob into a corporate body, and encourages a feeling of pride in the military profession. Again, without proper arms and equipment drill very soon loses its power of sustaining interest and makes it impossible to attain the technical skill needed.

Lastly, without leaders expert themselves it is difficult to obtain a high standard either of skill or enthusiasm from those whom they are to lead.

PAR. 2.—QUARTERING

At the outbreak of war the accommodation available for single men in barracks in the British Isles amounted altogether to hardly 175,000 units, but arrangements were at once made to clear all married quarters, the women being sent to their homes, and by this means and by utilizing accessory buildings the accommodation was increased to 262,000.

Reservists poured in from the outset, at times as many as 45,000 a week, while the Territorial Force completed its numbers in four days, and continued to grow *pari passu* with the Regular forces. Canada early in the war sent large expeditionary forces for training in England; those of Australia and New Zealand were at first trained in Egypt, but after the fighting in Gallipoli ceased these also were brought to the Mother Country, as well as South Africans, West Indians, and Nova Scotians.

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In the early days of the war a mass of troops, numbering perhaps 800,000, were housed in hired buildings and billets, and as such conditions had never previously been contemplated, new rules and regulations had to be compiled and entire machinery of quartering committees and machinery for assessing rents, values, and damages had to be constructed.

Though there is little objection to the housing of troops in training in hired buildings, ordinary billets with or without subsistence were open to many objections, and the difficulty of assembling men from billets scattered over wide areas, and the distances from training centres, were found often prohibitive of this method.

All such makeshift methods took considerable time to organize, while the strong tide of recruiting continued to flow in. A good deal of discomfort was inseparable from these conditions, which were aggravated when bad weather followed the fine months of the opening of the campaign.

Troops were then withdrawn wherever possible from the camps, and in some cases were put into huts not yet completed, and through which rain percolated to some extent, no other accommodation being available. These cases were, however, rare. Some overcrowding also took place, and this and the depressing conditions of rain and deep mud were responsible for some sickness.

Happily, the first three months of the war, when the difficulties were at their greatest, had been exceptionally fine. Moreover, the enthusiasm and courage of the new soldiers carried them triumphantly through much hardship.

The only satisfactory method of housing the large numbers that had to be dealt with was in hutments built in camps near the training grounds; and the building of these huts was decided on in the first week of the war, the first plans being ready by August 14, 1914. At first it was proposed to build huts for half a million men, but after the programme was increased to hutments for nearly a million, besides large remount establishments, store sheds, aeroplane sheds, hospital

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huts, and rifle ranges. For this vast programme there were difficulties enough in obtaining timber and other requisites, labor and an adequate inspection staff, but these were not all. To all the camps water and gas or electric light, drainage, and telephones had to be laid on, and sometimes in remote districts entirely new plants had to be set up for these purposes. Old roads had to be repaired and new ones laid out for carrying all the heavy building material needed for these building operations, and all the larger camps were fed by specially laid lines of railway. Within a year huts to hold three-quarters of a million men, with water and light laid on, had been built, besides various enormous depots for stores, remounts, etc. These huts seem to spring up in every part of the country; one great, bare moorland in the Midlands, uninhabited since the dawn of history, has now been covered with new roads, railways, pumping establishments, power stations, and huts for some 40,000 individuals.

NOTE.—In the succeeding paragraphs 2-5 the material difficulties which interfered with the early stages of training are indicated. A fuller account of these difficulties and how they were overcome will be described in later sections.

Much relief also was given to the War Office by the condition laid down for the numerous "Pals' Battalions" that they should be temporarily housed by those responsible for raising them. By this means a large number of recruits were housed in their own homes, or in town halls and other local buildings, while in several cases large camps were built by private enterprise and were afterwards taken over by the Government.

The difficulty of housing the new armies is not entirely overcome even yet, for a number of troops have still to be accommodated by the least satisfactory method of billets; but within a year of the declaration of war the problem of quartering the troops in the chief training centres had been solved. How important that was for proper training may be seen by

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the importance attached to this matter by the inspectors of training, who in their early reports had constantly to complain of the bad accommodation for troops as a cause of bad discipline and slovenly training, and who testified to a corresponding improvement in the men as soon as they could be decently accommodated.

PAR. 3.—FEEDING

The only branch of army supply which appears never to have suffered from a lack of material is that of food. At the beginning there were, of course, defects of organization in the distribution of food, but these were at worst short-lived, and after the first few weeks the chief complaint about the food seems to have been that it was excessive, some of it being wasted, and that, owing to a temporary shortage of appliances and cooks trained to military methods, the cooking of it was in some instances bad. The general subject of supplies is dealt with in another portion of this book; here the subjects of regimental supplies and regimental cooking in England only are dealt with.

The adequacy of the food supply illustrates the value of forethought in organization, for, though armies of the size we raised had never been contemplated, a system for feeding troops on a war basis had been elaborated two years before the war, and that system proved fully satisfactory. The chief method of supply employed was by the depot system. There are certain base depots which feed other advanced depots, from which, in turn, all large formations of troops are fed. Some of the base depots feed as many as 250,000 men—even more. The issues from some of the advanced depots are on almost as vast a scale. One of them, for example, sends out full rations for 100,000 troops and part rations for 40,000 more, 340 issues of rations to so many separate units being made daily from this one storehouse. Among the rations sent out from this advanced depot is bread, which is all baked in one central bakery. At one period, when there were 150,000 troops to be fed in

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this area, the daily output from this bakery amounted to 75,000 loaves.

This system of issue has been the main method of feeding the army since the beginning of the war. It is economical, because all the contracts are placed directly by one central authority at the War Office and no middlemen's profits are involved; it is conducted on so huge a scale that there is always food available for each unit as it comes within the area of any given advance depot; and it has this additional advantage, that it is the same system as that carried out on active service, so that the A.S.C. supply officers are trained from the first for their duties at the front.

At the outset this system could not be carried out as completely as it can now. When units were springing up all over the country, and had to be housed wherever there happened to be room, while they were waiting for their proper camps, much of the feeding had to be done by local arrangements. For two months the County Association provided the food for the Territorials, and the numerous units raised by municipalities and private individuals were for several months fed by their "raisers" on allowances fixed by the War Office. In certain cases local contracts were authorized for Service battalions. But in a surprisingly short time the system sketched above was brought into almost universal use.

Unfortunately, at first waste was unavoidable. In the first place, the allowance of certain articles of food, especially meat, was found to be excessive. This matter, however, was very soon taken in by the Quartermaster-General's Department. The meat ration was reduced, and instruction handbooks for the systematic handling of the soldier's ration were issued to all units of the new armies, which had the effect of improving the soldier's dietary as well as reducing its cost. There was still much to contend with, however; the chief requisites were more appliances for the military cook-houses and the training in military methods of the new army cooks. Unfortunately,

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in the past there had sometimes been a tendency to regard army cooks as persons of little consequence, and in some regiments men who were indifferent soldiers in other respects were detailed to cook their comrades' rations. This tendency was noted in certain units of the new armies. It is perhaps natural when every man capable of taking his place in the fighting line is required there, but such a policy is nevertheless very unfortunate, and, indeed, short-sighted, for on the efforts of the regimental cook depends in a large measure the fighting efficiency of the whole unit. Moreover, the duties of a regimental cook are exceedingly arduous, and the man who is indifferent in other duties is hardly likely under any circumstances to prove useful in the regimental cook-house. Where this policy of detailing the indifferent soldiers for cooking duties is followed, the excellent food provided by the Government is invariably served in a slovenly, unappetizing way, and much of it wasted in consequence. To make matters worse, the Army School of Cookery, which had been gradually raising the standard of cooking in the old army, was disbanded on the outbreak of war, when it was more needed than ever.

It was not long, however, before the wastefulness of this system, both in the health and well-being of the men and in the misuse of foods, was realized, and strenuous efforts were made to improve matters. Schools of instruction in cookery were reëstablished in all home commands, and commanding officers were encouraged to lay stress on variety in the cooking of food, on cleanliness, and on economy. These measures gradually bore fruit, with the result that there have been great improvements in the variety and wholesomeness of the meals given to soldiers, while the cost of feeding them has greatly diminished.

PAR. 4.—CLOTHING, BOOTS, ETC.

Very soon after the war started it was seen that millions of suits of uniform, pairs of boots, articles of underclothing, and other necessaries for the soldier would be required, and that the

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stock previously authorized, as in the case of almost everything else, was calculated for an army reckoned in tens instead of hundreds of thousands. To meet the vastly increased demand very few manufacturers had the requisite knowledge or plant for making the numerous articles of military clothing and equipment according to regulation patterns; to supply them the manufacturing resources of the country had to be largely modified and reorganized. At the first the War Office left the clothing and equipment of the Territorial Force and the locally raised units entirely to the County Associations and the local bodies who raised the latter, confining itself entirely to the needs of the expeditionary force and the new Service battalions. This led to some competition for the same supplies between the War Office and these local bodies, but, generally speaking, the distribution of duties was an advantage in opening out further sources of supply.

Nevertheless, for the first few months of the war the difficulties of clothing the recruits were very great. The available stocks in the country were soon exhausted; and machinery and the supply of dyes, cloth, leather, etc., for the manufacture of new stocks could not be improvised in a week or two, while the dozen manufacturers of khaki cloth before the war were being expanded to 200. In this dilemma, the best expedients possible had to be devised. Civilian overcoats were bought up and served to soldiers; recruits who could produce a good suit of their own clothes were told to wear it, and received an allowance to cover the wear and tear. A coöperative society was discovered able to provide 400,000 emergency blue suits at short notice, and these were quickly secured; and large orders for suits and underclothing were placed in America. Army boots—that all-important part of a soldier's equipment—were for a long time sadly deficient; as makeshifts, civilian boots, which had not the lasting power of the army pattern, were served out. For though, as in the case of uniforms, the number of firms making army boots was very soon enlarged—from 25

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to 350—the erection of new plant and instruction in the methods of manufacture were slow and laborious processes. The early enthusiasm of many recruits was considerably dampened by being obliged to march and drill in public, attired in all sorts of garments, some in khaki, some in blue, some in civilian clothes of varying hues and cut. Constant complaints were heard from commanding officers and inspectors of training as to the difficulty of instilling smartness into the men while this tatterdemalion stage lasted. With clothes and boots, as with everything else, the men at the front had first to be supplied, and, though these never suffered, the men at home had often to wait a long time for their needs to be supplied.

With time, however, the War Office was able to surmount the difficulty of providing sufficient uniforms, boots, and other equipment, as will be related in another section, and by the end of the year 1915 not only was the whole army as well shod and clothed as any had been before, but we were able very materially to help our Allies with clothing and boots. Nevertheless, the long months of insufficient clothing and comparatively bad boots were a grave though unavoidable handicap in the early stages of training. That it was not a more serious handicap is a great tribute to the men's spirit.

PAR. 5.—ARMING AND EQUIPMENT

The most serious material deficiency for the training of the new armies was the lack of guns, rifles, and other ordnance stores.

(a) *Rifles*.—When the war started the country possessed less than 800,000 rifles, of which little more than half were of the new short pattern, and many of these were in process of being re-sighted for the improved mark of ammunition. When the original force, mobilized on August 4, 1914, had been armed, there remained the authorized reserve of 150,000 rifles. That reserve would have met the wastage of rifles of the Expeditionary Force alone, but was soon exhausted when drawn upon

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for the additional troops raised. Moreover, a large number of them required to be re-sighted. Naturally, when the need of the men at the front was so great, the recruits in training had to wait their turn until the new supplies could be turned out in sufficient quantities. When the war started the weekly output of rifles in the United Kingdom was under 2000, and though with night shifts and full use of plant this number was considerably increased, the amount turned out was infinitesimal compared with the needs of the new armies. Unfortunately, the rifle, though needed in larger quantities than any other weapon for an army, requires longer time than any other before its manufacture with new plant can be started, owing largely to the number of gauges of extreme accuracy required in the process; consequently the recruits had to wait long.

How serious this state of things was may be seen from the records of training in the new armies. The first and second new armies, containing the earliest recruits, did comparatively well, since by January, 1915, the first new army had about 400 Service rifles per battalion, and the second about 100, and by March they were beginning to be fully armed; but the third army and later-formed armies were much worse off. Of course, a certain amount of rifle drill and musketry could be accomplished by changing around the few Service rifles in each battalion, much as the three Fates handed around their solitary eye in the story of Perseus, and by using as makeshifts Service rifles, the barrels of many of which were too worn to shoot with sufficient accuracy to allow musketry to be carried out with them. The troops were also provided with a proportion of rifles not quite of the Service pattern and technically known as D.P. rifles. But it was a highly unsatisfactory method of training, especially as each man in a battalion ought to be taught to take a personal pride in his own rifle and to know its idiosyncrasies. As was reported of one of the divisions of the third new army: "The men joined the Service under the impression that after a few months they would get their chance

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at the front, but they have now been hard at work training day after day for seven months, mainly with an insufficient number of D. P. rifles; and this to a keen man must be depressing, as he never feels he is getting nearer his goal." However, depressing or not at the time, this lack of rifles does not in the long run appear to have seriously affected the spirit or capacity of the men of the new armies, to judge from their achievements. Happily, there was no lack of ranges for firing musketry courses, since the large number of new ranges that had to be set up were so expeditiously finished that they were always ready, at least as soon as the men required men. But undoubtedly the scarcity of rifles in the early days prolonged the necessary period of training. Fortunately, the difficulty was finally overcome, and by this time an adequate supply of rifles is available not only for ourselves but also for some of our Allies. How this was effected is described in another section of this book.

(b) *Artillery*.—The story of the supply of guns for training is very much the same as that of rifles. The position briefly was that at the outbreak of war we had enough guns for eight divisions, with the authorized reserve for wastage, and that our normal requirements were so small that we had no means of immediately accelerating the supply, since the plant laid down in the Government factory and the few outside ordnance firms was only calculated for the normal supply. The War Office took immediate steps to increase the production by every possible means, laying down extra plant in their own factory and encouraging private firms to do the same. But, even so, the supply of guns was for a long time barely sufficient to satisfy the ever-growing demands for artillery of every calibre at the various fronts. The consequence was that all the guns, as they were turned out, had to be sent across to France, Egypt, Gallipoli; and as the needs of the artillery at the front progressively increased, owing to the nature of the trench warfare, so the prospects of artillery in training in the United Kingdom seemed

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ever to recede. In October, 1914, the artillery of one division of the first new army had only six 18-pounders altogether, instead of its full complement of 54; another had only a few of the obsolete 15-pounders; in March, 1915, some divisions had only two guns per battery; even in May, when the full complement of guns had arrived for the first new army divisions, the equipment of dial sights, etc., for indirect laying was still deficient. The second new army was at that date in very much the same state, except that in its case the howitzer brigade had not been delivered. The third and fourth new armies were still worse off.

In respect of arms the artillery was thus even worse off than the infantry. Some idea of the look and mechanism of a rifle could be obtained by the infantrymen from the earliest days of training; but for months the gunner in some divisions had to try and learn his far more complicated duties without even seeing, still less working or firing, the gun to which he was being trained. Some attempt was made to remedy the defect by various substitutes for the service gun. Dummy wooden guns were made or purchased by enthusiastic officers with which to teach their men the positions and motions of loading and firing; obsolete 15-pounders, 12-pounders, and antiquated French 90-mm. were utilized for the same purpose; but even when some such guns as these were available, there were no artillery instruments, such as dial sights, range-finders, directors, and so on, without which a modern battery is almost helpless, except those that could be improvised by an ingenious limber-gunner. Similarly horses, harness, and the proper wagons were hardly ever complete for any battery of the first three armies till on the very eve of its departure overseas.

We have now happily passed those depressing days, but it is important to remember that period of anxiety in Great Britain, due to our absolute want of preparedness for war such as we are now waging. It is all the more necessary to remember it, since it helps to explain our inability to help

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in certain critical periods. We have now by unparalleled exertions—related in another part of this work—developed our supply of guns and ammunition sufficiently to keep our men at the various fronts at something more nearly approaching their proper quota, to be able to train our own men more effectively, and even to supply our Allies with some of their needs. But this consummation has been long delayed, and it is well, when we see training batteries at home well equipped and infantry battalions in the camps all fully armed with rifles, to remember the unexampled difficulties of training in the first year and more of the war, and the spirit which must have animated instructors and the men under them to enable them to conquer their difficulties and learn their business as well as they did.

(Continued in April-June Number.)

Current Field Artillery Notes

LIFE OF GERMAN ARTILLERY

1. With the enormous development of artillery fire during the present war the question of the useful life of the various types and calibres of guns has acquired a considerable importance. For some time past more or less vague and scattered reports have claimed for the German artillery a life far in excess of what has heretofore been generally accepted. These reports have until now lacked the desired degree of reliability. It is now possible to present some facts and figures which may be of interest in this connection.

2. During a recent visit to the Krupp Works the statement was made that a number of the German field guns (7.7 cm.) and light field howitzers (10.5 cm.) had attained a record of over 18,000 rounds per gun in the war, and were still serviceable. For the 15-cm. heavy field howitzers records in excess of 15,000 rounds per gun had been reached and for the 21-cm. mortar records in excess of 9000 rounds per gun. These statements have been in part confirmed by other statements made by different staff officers at Army Headquarters.

3. This exceptionally high record is attributed in the first instance to the excellence of the Krupp gun steel. Whether this is due to some special alloy or merely to careful workmanship is not known. That the steel is tough is plainly shown by the accompanying newspaper illustration showing the effect of a premature burst in the barrel of a 15-cm. gun. Another factor in the life of the German gun is the care of the gun, particularly the rifling, while in the field. The rifling is subjected to frequent examinations, and the first signs of erosion are removed by dressing the eroded surfaces smooth with a file or special tool, thus keeping the lands and grooves of the rifling smooth and clean at all times. It is understood, further, that whenever erosion has made its appearance to any considerable extent the gun is sent back for more thorough overhauling in one of the field ordnance repair shops, one of which is usually maintained for each field army. It is not improbable, also, that the quality of the German powder may be a factor in prolonging the life of guns.

4. The Krupps guarantee a life of 10,000 rounds for the 15-cm. heavy field howitzer, and of 6000 rounds for the 21-cm. mortar. The

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records made greatly exceed the guarantees, and it is expected that if the war lasts long enough a record of 30,000 rounds will be reached for the field gun.

5. As examples of the extreme demands imposed upon field artillery in the present war it may be mentioned that, according to the statement of a German officer, a German 4-gun field battery fired 2800 rounds in 24 hours in the Champagne offensive in the fall of 1915. Quite recently a war correspondent on the east front reports four Austrian batteries (24 guns) as having fired in excess of 20,000 rounds in 24 hours in repelling a repeated mass assault of the Russians. Eleven years ago, at the battle of Mukden, it was regarded as something of a record when the guns of a Japanese artillery brigade fired away an average of 500 rounds each in ten days' fighting.

GERMAN GUNS AT VERDUN

1. It is reported in the press that as the result of an investigation made in competent quarters as to the guns used by the Germans at Verdun, the following facts have come to light.

2. Up to May 25 the Germans had before Verdun 561 batteries. They were not all arranged in batteries of four pieces; those of large calibre were worked singly or in sections of two.

The 561 batteries comprised about 2000 cannon. Of these, some 40 were of large calibre (10 of 17-in. and others of 14-in. and 12-in.); 700 pieces of heavy artillery, of which, approximately, 55 were 5-in., 215 were 8-in., and 430 were 6-in.; and 1260 guns of medium or small calibre (860 mortars of 4-in. and 400 guns of 3-in.).

The number of divisions on the Verdun front was about 20; the normal allotment of artillery was therefore increased by one-fifth.

FIELD ARTILLERY PROGRESS ABROAD

THE following notes concerning field artillery have been gleaned from reliable sources:

1. Shrapnel, 60 per cent., H. E. shell, 40 per cent., is now regarded as the proper proportion in which 3-inch ammunition should be furnished.

2. Single-type projectiles (*i.e.*, combined shrapnel and shell) are not, it is claimed, being used by any of the powers. Not clear, though, whether this is because of objection on the score of inefficiency of such projectiles in general, or because no satisfactory model has yet been obtained.

3. The question now is to get guns built fast enough to keep up with

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the supply of ammunition. For trench warfare effort is now being concentrated on the manufacture of larger calibre howitzers—12-inch, 9.2-inch, 8-inch, and 6-inch—and a surprisingly large number are being turned out. But the 3-inch field gun, with its shrapnel, is still of the utmost importance.

4. In the case of one country, at least, the number of guns has been increased about fifteen-fold, as compared with pre-war conditions. What this means in guns per 1000 rifles cannot be determined with any accuracy.

5. Reserve to be kept on hand in peace time, assuming that it will take war-time factories from four to six months to turn out the matériel in quantities:

Guns and howitzers	100 per cent.
3-inch ammunition	3000 rounds per gun
Medium howitzer ammunition	2500 rounds per gun
Large-calibre	2000 rounds per gun

A NEW IDEA

BY 1ST LIEUTENANT WILLIAM E. BURR, FIELD ARTILLERY.

THIS idea suggested below is new in Field Artillery. It is one, however, which has been tried by other departments of the government with apparent success, but, if tried in the Field Artillery, would require considerable adaptation and change, in order to serve our needs.

The idea itself is simple: merely to bring the instruction of officers and noncommissioned officers, now carried on at the School of Fire, to the different units, instead of detaching these men from their units and sending them away for instruction.

The government has been successful with its "Farming Trains," in bringing new ideas and instruction to the farmers, and the fact that the "class-room" has been brought to the farmer in a practical manner is shown in many ways. It is understood, too, that the Department of Commerce operates a "Safety First" train for the miners, combining assistance with instruction.

Is there any reason why there cannot be organized a School of Fire on wheels, figuratively speaking, which would visit each unit in turn during the year and take up the actual instruction of not only the officers but also the units and organizations themselves?

One advantage which, it is believed, would be attained would be the real instruction which the units themselves would receive. For instance, instead of one or two batteries, at the present school, firing the whole allowance of ammunition, under this new scheme it would be somewhat more equally distributed, and the benefit, resulting to the

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organization as a whole, worth thinking about; also, the ideas and training disseminated throughout the Field Artillery would be much more standardized.

It can be argued that the time that the ordinary routine in an organization consumes would still have to be consumed, and that such a factor would operate to waste a considerable part of the "Travelling School's" time. It is believed, though, that if the time spent at the purely necessary routine work be summed up, it will be found that, with a little ingenuity and quickness of brain, this could be cut down—for a period, anyway.

Another disadvantage which can be argued is the equipment necessary for such a school. It is not believed that this would be a serious drawback, though, for, since each organization would be trained in the use of its own equipment, very little property would have to be moved about.

To come to the advantages, the following are some which it is thought would result from such an innovation:

1. The systematic training of not only the officers, for short and frequent periods, but also the benefits accruing to the organizations themselves in being used in such training. Of course, the system in vogue at the present school would have to be changed considerably, to allow the organizations to share in the results. By this it is not meant that second class privates would be instructed in probabilities, but it is believed that the results which are achieved at the present school can be achieved in a more practical method, benefiting not only the officers but the batteries, battalions, etc., themselves.

2. The fact that officers would receive instruction in the different types and calibres with which they were serving. It is well known that the present school devotes itself primarily to the three-inch matériel. Of course, the principles taught in its use apply, in the most part, to all the others. Still, the varied number of types which are being acquired renders a little differentiation possible. There is a good deal of difference between the three-inch and some of the others.

3. That the instruction would come regularly to every officer serving with troops. Such a condition as is had now, which permits officers to attend the school once every six or seven years, and then stagnate a good deal, would be bettered considerably. The conflict of ideas between those returning to their regiments from the school, and the "stay-at-homes," would be practically eliminated. New ideas would be disseminated promptly, in practical instruction, instead of through pamphlets whose actual use is merely speculative. An officer would realize that he would come under the eyes of the school, along with his

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inferiors and superiors, at least once a year, in a more or less competitive way, and would be stimulated accordingly. A better and more up-to-date knowledge of the commissioned personnel could be acquired.

4. The work of this suggested school would not be held up by such conditions as are now had on the border, for each unit could still be visited and instruction given.

There has been no attempt made to go into the details of this new idea. It is offered simply as a starter, and one which discussion may prove of value.

EDITORIAL DEPARTMENT

The Field Artillery Board

ONE of the pressing necessities that confront the Field Artillery at the present time is the reconstitution of the Field Artillery Board. It is of the utmost importance that it should function immediately. Our technical information from the war abroad is of such a character that it should be passed upon by Field Artillery officers of the highest professional talent, digested, and that which is applicable to our service put in such form that it can be published to the service and put into practice.

Among the subjects that require immediate attention may be mentioned the increased importance of accurate firing, the employment of the various calibres, light, medium, and heavy, in attack and defense in trench warfare, the changes in ammunition, wire cutting by field artillery, and provision for the increased ammunition supply demanded by the conditions of modern war.

Our observers abroad have acquired up to the present time a great mass of valuable information, which can only in this manner be adapted to the necessities of our own service.

Furthermore, a new weapon (or it may be an old weapon in a new rôle), the trench mortar, has been developed. At the present time we have none of these, and it is quite probable that, without urgent effort on the part of some authoritative body like the Field Artillery Board, it will be a long time before we are so provided. It is our history. Some one must take up the matter and push it through. Initiative must come from the arm of the service, or it is doubtful if it ever comes at all.

Since the Board automatically went out of existence in the spring of 1916 the Field Artillery has been professionally dormant. Systematic professional research has ceased. Instruction is based upon the drill regulations, of course, but there

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is no authoritative interpreter of the drill regulations, so that instruction is at the whim of the individual who happens to be in a position to interpret. It may be easily imagined how soon system, and with it the teamwork of the arm, will be lost.

No individual can replace the Board. Individual ability, coupled with energetic research, makes for progress, but the work of the individual may be, and frequently is, of such a character that it must be revised by a proper tribunal, to harmonize it with the other elements that make for teamwork, and the Field Artillery Board is eminently the proper tribunal for such revision. It serves as a balance wheel to the individual, and acts as a check upon the erratic.

At the same time it forms the centre to which come all progressive ideas for trial, and from which emanates the doctrine of our arm.

At the present time, when a great crisis is upon us; when we are not ready; when, due to a great war, the doctrine of Field Artillery is undergoing evolution and material change, the need for the Board is imperative. By all means let us have it.

The Journal

EDITING the FIELD ARTILLERY JOURNAL is a labor of love in every sense of the word. It is a pleasure to serve the Association, a pleasure to prepare the publication, and a pleasure to see it in print after the work is done.

At the same time, a little coöperation on the part of the members would materially assist the Editor in the work, and would relieve him from a great deal of the gratuitous labor that has recently fallen to his lot.

One of the essentials to the editing of any magazine is copy, and of that the editor has none. Prior to this issue a request was sent to a number of selected members for contributions; in the last issue a request was also made for contributions. To these requests one substantial answer was returned, and that by an officer of the Signal Corps.

EDITORIAL DEPARTMENT

It has therefore been incumbent upon the Editor to seek for manuscript elsewhere or to write it himself. He has done both in this issue, but the time and labor devoted to the work have been excessive.

Since this is the organ of the Field Artillery Association, it should be maintained by the Association. No one person can produce a continuously interesting journal; it would be one-sided, uninteresting, and could in no way represent the professional thought of the Field Artillery arm.

The Editor therefore desires to again ask the coöperation of the Association in the production of the JOURNAL if it is to be regularly published. Without that coöperation it might as well go out of existence.

The School of Fire

It is a serious commentary upon our military policy, or lack of the same, that, whenever any emergency arises, such as has been the situation on the Mexican border for the past ten months, the first act to meet the emergency is to suspend our schools, and keep them suspended until the trouble has passed.

Such was the fate of the School of Fire for Field Artillery. It is now nearly a year since the school was broken up, the instructors and students relieved from duty therewith, and the instruction batteries sent to the border.

A year ago it was a school of which our service could well be proud. The technique of field artillery fire was there taught in a manner not excelled by that of any other school of its kind in the world. Its effects were felt throughout the Field Artillery in the improvement in firing, the material progress that officers of all grades were making in their profession, and in a marked advance in the general efficiency of the arm.

Under the supervision of the Field Artillery Board, the school was producing in our service a teamwork that would have made itself felt had the regiments, battalions, and batteries been called into active service.

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No doubt the officers who have attended the course of instruction at the school have permanently benefited thereby, and are able, even during the present dark ages, to apply this instruction to the troops with which they may be serving, but, unless the way be mapped by the central instructional point, the system will be lost, instruction will vary according to the interpretation of the commander, and teamwork will disappear.

Furthermore, the Field Artillery has been materially increased. Between fifty and a hundred new officers have been added to the arm, either by transfer or by original appointment, none of whom have more than a rather general conception of the new duties that confront them, most of them being totally ignorant of their newly-chosen profession.

If these officers are sent to join organizations, they must rely for their technical training on the ordinary routine instruction, and must perform immediately and without preliminary training the duties of their grades, for which none of them are in any way prepared.

In addition, their technical training will be materially interfered with by the usual administrative duties. Their efficiency will materially suffer, and it will not be long before many of them will be impressed by the idea that professional efficiency is measured by the manner in which an officer performs his routine duties, rather than by his ability to handle troops of his arm in battle, an impression that unfortunately prevails in many quarters in our service.

For the future efficiency of the Field Artillery arm it is to be hoped that the School of Fire will be reopened at once and kept in operation until all the officers of the arm shall have had the benefits of the instruction. If things drag on as they have during the past year, the professional future of the arm is dark.

At a time when we are talking universal training, intensive training, and the like, nothing is being done to prepare officers for the duty of instruction, nothing to prepare them professionally for their duties in war. We talk preparedness and remain unprepared.

BOOK REVIEWS

OPERATION ORDERS: FIELD ARTILLERY. A study in the Technique of Battle Orders. By Lieutenant Colonel H. G. Bishop, Eighth Field Artillery, U. S. Army. George Banta Publishing Company, Menasha, Wis.

The volume opens a fruitful field in the training of officers. Taking a tactical decision, good, bad, or indifferent, the author carries through the execution of the decision by a series of operation orders, developing the methods that should prevail in their formulation.

The giving of proper battle orders is an art. They should be clear, concise, and definite, and in consequence should not admit of more than one interpretation.

The habit of giving such orders, whether in a fragmentary or complete state, may be acquired by practice, and the training of our officers should always involve such practice.

Colonel Bishop's study clearly indicates the need of a training manual on such orders for our service and its application in the education of our officers.

The work is timely and is favorably recommended to all officers.

WHY PREPAREDNESS? The Observations of an American Officer in Europe, 1914-1915. By Captain Henry J. Reilly. With an Introduction by Major General Leonard Wood. Daughaday & Company, Chicago, 1916.

The author was fortunate in being able to get into the war zone in France during the stirring days of the autumn of 1914, though he was too late for the battle of the Marne.

Coupling the trained powers of the professional observer with the acuteness of the correspondent, he was able to see and appreciate much more than the average correspondent, and to draw from his observations logical deductions as to what should be our own military policy.

Later experiences with the armies of the Central Powers served but to accentuate that which had been observed in France with the French and English forces. Our pitiful plight as regards preparedness for defense became especially clear, and seems to be the main lesson that was impressed upon the author.

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The whole story is told in a very entertaining manner, with little touches of human interest everywhere to attract the average reader, but with enough of the technical to draw the attention of the soldier.

The well-prepared condition of Germany at the outbreak of war, the partial preparation of France, and the almost total unpreparedness of Great Britain in all but a naval way, stand out as salient points. Events have justified practically all of the author's observations. Unpreparedness is paid for by an outlay of blood and treasure that ultimately surpasses the total cost of adequate preparation through a long period of years, while the suffering and agony, not only of the wounded, but of the friends and families at home, cannot be measured in the ordinary terms of cost.

Such works serve the country in bringing before our people the price of unpreparedness, and the author is deserving of praise in thus spreading the propaganda of national defense.

MILITARY SKETCHING AND MAP READING. By Captain Loren C. Grieves, Infantry. United States Infantry Association, 1917.

A short treatise in elementary language on sketching and map reading, for use in educational institutions operating under the War Department, for candidates for commissions in the Regular Army and the Reserve Officers' Training Corps, and for militia officers and others in summer training camps.

The subject is simply yet interestingly treated, and it is believed that by a careful study of the work a good practical knowledge of military sketching and map reading can be attained. The construction of a relief map is so simply described that it may easily be done by a person with no experience, while a clear comprehension of contours, slopes, and general ground configuration may incidentally be attained.

The work is highly recommended for the purpose expressed by the author, and it is believed that it will admirably fulfil its object.

SPANISH FOR SOLDIERS. By Major Jas. A. Moss, U. S. Army, and Lieutenant John W. Lang, U. S. Army. Introduction by Colonel Cornelius DeW. Willcox, Professor of Modern Languages, U. S. Military Academy. Price, \$1.00, postpaid.

The purpose of the book is expressed to be:

"1. To assist the beginner in acquiring a fair working knowledge of conversational military Spanish.

"2. For use as a *handy reference phrase-book* for officers and soldiers who already have a fairly good knowledge of Spanish."

In these respects it may be said that the work fulfils its purpose.

BOOK REVIEWS

However, in the matter of pronunciation, there are fundamental errors, such as the pronunciation of the vowel *e* as *a* is pronounced in *bale*, and that of *i* as *ee* in *me*. Such pronunciation gives rise to what may be termed the American pronunciation. Our inaccuracy in the appreciation of vowel sounds, due to the ordinary slovenly pronunciation of our own language, causes the average American, even though he have a fair command of a language, to pronounce the words with such an accent that his origin is immediately recognizable.

The essential grammatical principles have been included, as no language can be taught or learned correctly without the use of the grammar as a reference work. The personal accusative is omitted, though it is used (its sign being given without the accent). The explanation of the use of the reflexive as a substitute for the passive voice is not good, though it has had presumably high authority in military circles. The subjunctive tenses are translated with *that*, though the essential *oue* is not given in the form.

With the exception of the above and a few other minor matters, the book is a very good compilation. The glossary and exercises are quite extensive, and a study of them would familiarize an officer or enlisted man with most of the ordinary military terms.

INFANTRY DRILL REGULATIONS, UNITED STATES ARMY, 1911. Simplified Edition, with Annotations, Illustrations, and Index. By Major Jas. A. Moss, U. S. Army. Geo. Banta Publishing Company, Menasha, Wis. Price, 75 cents.

The author has included changes up to No. 16, August 25, 1916, so that the work is practically up to date. The annotations are very desirable explanations of mooted points, and make the text clear even to the inexperienced.

The illustrations are extremely valuable, both to the professional soldier and to the National Guardsman or volunteer, and present a standard that can easily be attained with the minimum of explanation or expert instruction. Such illustrations materially assist in obtaining uniformity of instruction throughout the service.

However, by far the most valuable part of the work is the index. Hitherto it has been difficult to find any special point or paragraph bearing on a special subject in the drill regulations without scanning a great deal of matter not pertinent to the issue, with a consequent loss of time. By the use of this index, any subject can be readily and rapidly found. It is thus a material aid in the study of the regulations. The book is recommended to all officers and noncommissioned officers as a valuable auxiliary.

Index to Current Field Artillery Literature

Compiled from monthly list of military information carded from books, periodicals and other sources furnished by the War College Division, General Staff.

Officers requesting information will please give the number of the entry and the date of the list. For officers on duty in Washington, D. C., a formal call is not necessary; a telephone call will be sufficient. When a book is called for, the title and author will be given in the language in which it is printed. The material here listed is not available for general loan outside of the U. S. Army.

Aerial navigation—France—European war.—American airmen on the Somme, November, 1916.

Report on methods and types of machines. (Times Weekly Edition, November 17, 1916, p. 927.)

Aerial navigation—France—training.—Testing airmen in France and the means employed.

Illustrated. (Literary Digest, November 18, 1916, p. 1324.)

Aerial navigation—Great Britain.—The air board and what it has done. Army and navy types of aircraft, etc. (Edinburgh Review, July, 1916, p. 137.)

Aerial navigation—Great Britain—European war.—Training of military aviators. (From Gazette de Lauzanne, October 24, 1916. Filed Envelope Case—Aerial navigation—Great Britain—European war.)

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Aerial navigation—U. S.—Report of National Aeroplane Fund. Work accomplished, funds received, aircraft obtained, etc. (Advance news from the Aero Club of America, November, 1916. Filed Envelope Case—Aerial navigation—U. S.)

Aerial navigation—U. S.—What is being done by way of bringing the U. S. Army's air service up to the mark. (Scientific American, November 25, 1916, p. 474.)

Aerial navigation—U. S.—What has been done for aviation in the navy. Qualifications of an aviator, etc. (Marine Corps Gazette, December, 1916, p. 333.)

Aerial navigation—U. S.—Work of Aero Club of America in raising funds, etc. French and German airfleets built by public interest. (Letter of A. R. Hawley, President of Aero Club of America, May 27, 1916. Filed Envelope Case—Aerial navigation—U. S.)

Aerial navigation.—Flying by night. Signals for landing. (Literary Digest, November, 1916, p. 1170.)

Aerial navigation.—The flying service, from a medical point of view. (Scientific American Supplement, November 18, 1916, p. 331.)

Aerial navigation—Colombia.—Provision for establishment of military aviation in law of September 7, 1916. (Filed Env. Case—Officers sent abroad—Colombia.)

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Aerial navigation—France—European war.—Organization and employment of aeroplanes. (La Guerra y Su Preparacion, September, 1916, pp. 531–537.)

Aerial navigation—Great Britain.—Statement that 500,000 people are engaged in the British air service, and other notes. (Flying, November, 1916, p. 411.)

Aerial navigation—Great Britain—plotter.—Details of a plotter approved for use in aircraft observation of artillery fire. (List of changes in War Matériel, September 1, 1916, p. 664.)

Aerial navigation—U. S.—Equipment for aero units of the aviation section. (Aerial Age Weekly, November 13, 1916, p. 226.)

Aerial navigation—U. S.—Plans for the military and naval air service. What is being done and what will be done. Illustrated. (World's Work, November, 1916, p. 80.)

Aerial troops.—The flying service, from a medical point of view. (Scientific American Supplement, November 18, 1916, p. 331.)

Aerial troops—U. S.—Tentative organization and requirements for officers of aviation reserve corps section, and civilian schools for aviators. (Gen. Order 55—War Dept., October 16, 1916.)

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- Ammunition expended in battle—European war—art*.—Consumption in 77 days estimated at 1,500,000 tons. Exhausted of nitrate, etc. (South American Journal, November 4, 1916, p. 363.)
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- Ammunition supply—Great Britain—European war*.—Transport of artillery ammunition by means steam-tractor with trailer. View. (Illustrated War News, November 29, 1916, p. 39.)
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- Ammunition supply—Great Britain—European war*.—Picture showing pack transportation device for keeping up supply to field guns. (Illustrated London News, November 4, 1916, p. 539.)
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- Armament—Germany*.—The cost of German armament. Details of expenditures, of growth, and governmental methods. (P. 193. The Causes and Consequences of the War. By Yves Guyot. London, 1916. D516 G98.)
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- Armies—U. S.*—Bureaucracy and the army. Functions of the war department and general staff. (Forum, November, 1916, p. 619.)
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- Armored cars.*—Picture of a British armored road train used in the Boer war, 1902. (Illustrated War News, November 29, 1916, p. 11. Also in Illustrated London News, December 2, 1916, p. 667.)
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- Armored cars—European war.*—The evolution of the "tanks." (Engineering, October 20, 1916, p. 386.)
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- Artillery.*—Prototypes of modern artillery. Cannon of several centuries ago were based on same principles as present-day pieces. Illustrated. (Scientific American, October 28, 1916, p. 391.)
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- Artillery—U. S.*—Use of railway batteries in the civil war, 1862. (P. 57. Mobilizable Fortifications and Their Controlling Influence in War. By J. L. Brent, Baltimore, 1916. UG403 B83.)
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Field Artillery Directory

REGULAR ARMY

FIRST FIELD ARTILLERY (Light.)

Schofield Barracks, Hawaii

Colonel.

Snow, William J.

Lieutenant Colonel.

Horn, Tiemann N.

Majors.

Austin, Fred T.

Lloyd, Charles R. (D. O. L.)

Chaplain.

Fealy, Ignatius (1 lieu.)

Captains.

McIntyre, Augustine

Currie, Dennis H.

Hoyle, René E. De R

Miles, Sherman.

First Lieutenants.

McCleave, William

Daly, Charles D

Stewart, Frederick W.

Ahern, Leo J.

Arnold, Archibald B.

Frankenberger, Bertram

Thurber, Phipp L.

Andrus, Clift. (D. O. L.)

Greenwald, Karl C. (D. O. L.)

Eager, John M. (D. O. L.)

Second Lieutenants.

Heyser, Marvin C.

McLendon, Indus R.

Veterinarians.

Stokes, Wilfred J.

Haynes, James R.

SECOND FIELD ARTILLERY (Mountain.)

Philippine Islands.

Colonel.

Van Deusen, George W.

Lieutenant Colonel.

.....

Majors.

Spaulding, Oliver L., Jr.

Boiseau, Louis T. (D. O. L.)

Chaplain.

Houlihan, James F. (1 lieu.)

Captains.

Barnos, Joseph F

Fuger, Albert S.

Baker, Scott

SECOND FIELD ARTILLERY (Mountain)—Continued.

Captains

Pennell, Ralph McT. (att.)

Hall, Albert L.

Thorp, Frank, jr., (att.)

Randol, Marshall G.

Mort, John E.

Higley, Harvey D.

King, Edward P., Jr.

Allin, Geo. R. (D. O. L.)

First Lieutenants.

Hopkins, Samuel R.

Hayden, Herbert B.

Johnson, Thomas J.

Hayes, Philip.

McDowell, John M.

Oliphant, Thos. G. M.

Breton, Lewis H.

Polk, Newton N.

McConkey, Clyde J.

Anderson, Jonathan W.

Cole, Leon R.

Armstrong, Francis T.

McBride, Allan C. (D. O. L.)

Wallace, Fred C. (D. O. L.)

Wrona, William J. (D. O. L.)

Bloom, Frank. D. O. L.)

Jones, Lloyd E. (D. O. L.)

Bailey, Wesley M. (D. O. L.)

Austin, Raymond B. (D. O. L.)

Second Lieutenants.

Kiser, Sherman L.

Yeager, Emer.

McCollister, John J.

Veterinarians.

Gage, Fred B.

Gould, John H.

THIRD FIELD ARTILLERY (Light.)

Permanent Stations:

Hdqrs. and 1 Battn., Ft. Sam

Houston, Tex.

2 Battn., Ft. Myer, Va.

Present Station:

Batty, D Eagle Pass, Tex.

Battys, E and F, Laredo, Tex.

Colonel.

Millar, Edward A.

Lieutenant Colonel.

McCloskey, Manus

Major.

Farrar, Henry B.

Chaplain.

Perry, Barton W. (maj.)

THIRD FIELD ARTILLERY (Light)—Continued.

Captains.

Herran, Charles D.

Bunker, Charles M.

Jones, Clarence N.

Michel, William N

Jones, William F.

Mortimer, Charles G.

Margetts, Nelson E.

Smith, Edwin De L.

Lyerly, Ballard.

Lewis, Robert H.

Welsh, Robert S. (D. O. L.)

Burleson, Richard C. (D. O. L.)

First Lieutenants.

Kirkwood, Robert G.

Brabson, Joe R.

Watson, Edwin M.

Baehr, Carl A.

Wycke, Ira T.

Millar, Edward A., jr.

Malony, Harry J.

Daly, Joseph O.

Beukems, Herman

Waldron, Albert W.

Wallace, John H.

Hudnutt, Dean

Hibbs, Louis E.

Harris, Arthur R. (D. O. L.)

Second Lieutenants.

Fibich, Michael J.

Brady, Sidney G.

Alexander, William D.

Hervey, Harcourt.

Bond, Oliver J., Jr.

Parker, Henry B.

Fielding-Reid, Francis.

Pitney, John B.

Veterinarians.

Griffin, Gerald E.

Mitchell, Aquila

FOURTH FIELD ARTILLERY (Mountain.)

Permanent stations:

Hdqrs. and 1 Battn., Ft. D. A.

Russell, Wyo.

2 Battn., Corozal, Canal Zone.

Present Stations:

Hdqrs. 1 Battn., El Paso, Tex.

Batty D, Brownsville, Tex.

Colonels.

Irwin, George Le R.

Berry, Lueien G. (D. O. L.)

Lieutenant Colonel.

Ly on, LeRoy S.

Majors.

Merrill, Thomas E.

Hall, Harrison.

McMaster, Richard H. (D. O. L.)

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FIELD ARTILLERY DIRECTORY—Continued.

FOURTH FIELD ARTILLERY (Mountain)—Continued.

Chaplain.

Captains.

Faulkner, Albert U.
Apple, George M.
Lawson, Laurin L.
Mason, Roger O.
Brewster, Alden F.
Wheeler, Ernest S.
McNair, Lesley J.
Kelly, John R.
Cubbison, Donald C.
Maul, John C.
Collins, Leroy P.

First Lieutenants.

Rumbough, Joseph W.
Rogers, Joseph A.
Griffith, Charles T.
Lee, Raymond E.
Arnemann, George E.
Lang, Clarence D.
Hyatt, Robert F.
Parker, Edwin P., Jr.
Scott, Richard C.
Eager, Howard
Craig, Louis A.
Dunigan, Francis J.
Busbee, Charles M.
Maguire, Hamilton E.
Jones, Henry C.
Bateman, Harold H. (D. O. L.)

Second Lieutenants.

Pollin, George A.
Finkbiner David E.
Ennis, Robert H.
Ristine, Harold H.
Tate, Clifford H.

Veterinarian.

Sproule, William A.

FIFTH FIELD ARTILLERY

(Heavy.)

Permanent station:
Ft. Sill, Okla.
Present stations:
Hdqs. 1 Bttn. and Batty, E. Camp
Ft. Bliss, Tex.
Batty, D. Ft. Ringgold, Tex.
Batty, F. Brownsville, Tex.

Colonel.

Menoher, Charles T

Lieutenant Colonel.

Bowley, Albert J.

Majors.

Smith, Wright
Starbird, Alfred A
Lanza, Conrad H. (D. O. L.)

Chaplain.

Clemens, Joseph (capt.)

Captains.

Mosley, George V. H.
Donnelly, Edward T
Robinson, James P.

FIFTH FIELD ARTILLERY (Heavy)—Continued.

Captains.

Wood, Norton E
Davis, Robert
Glassford, Pelham D.
Davis, Joseph R.
Booker, Phillip W.
Murray, Maxwell.
Capron, Webster A.
Perkins, Kenneth S.
Brooke, George M. (D. O. L.)

First Lieutenants.

Crane, John A.
Prince, Frederick A.
Sandeford, Alvan C.
Templeton, Hamilton
Gruber, William R.
Spencer, Eugene T.
Wyeth, John C.
Burr, John G.
Lester, James A.
Struble, Herbert S.
Reinhart, Stanley E.
Woodward, William R.
Reynolds, Charles C. (D. O. L.)
Meyer, Vincent. (D. O. L.)
Barnes, Julian F. (D. O. L.)
Burr, William E. (D. O. L.)

Second Lieutenants.

Ruoff, Chauncey F.
Dollarhide, Erskine S.
Bryan, Stanley F.
Jones, William J.
Carter, Benjamin E.
Edwards, Edmund B.
O'Donnell, Ottomar

Veterinarians.

Williams, Herbert S.
Power, Richard H.

SIXTH FIELD ARTILLERY

(Horse.)

Permanent station:
Ft. Riley, Kans.
Present stations:
Hdqs. 1 Bttn. and Battys. E. and F.
Douglas, Aris.
Batty, D. Nogales, Ariz.

Colonel.

McNair, William S.

Lieutenant Colonel.

Payne, Brooke

Major

Pulis, Charles C.

Chaplain.

Dickson, Thomas J. (maj.).

Captains.

Bundel, Charles M.
Yule, Edgar H.
Birmie, Upton, jr.
Griffin, Francis W.
Myers, Joseph E.
Wood, William S.
Dodds, William H., jr.
Bishop, Albert T.
Starkey, John R.
Marley, James P.

SIXTH FIELD ARTILLERY (Horse)—Continued.

First Lieutenants

Martin, Truby C.
Beere, Donald M.
Miner, Harold E.
Conolly, Whitman R.
Ferron, Paul L.
Houghton, William C.
Anderson, John B.
Zundel, Edwin A.
Marsh, Raymond
Rutherford, Ray C.
King, Alfred K.
Taliaferro, Lucien H. (D. O. L.)
Clarkson, Herbert S. (D. O. L.)
Helmick, Charles G. (D. O. L.)

Second Lieutenants

Davis, Erwin C. W.
Legge, Barnwell R.
Haines, Oliver L.
Vesely, Yarrow D.
Gruhn, Osear L.
Winslow, John S.

Veterinarians.

Hill, William P.
Mason, Alfred L. (att.)

SEVENTH FIELD ARTILLERY

(Light.)

Permanent station:
Ft. Sam Houston, Tex.

Colonel.

Sturgis, Samuel D.

Lieutenant Colonel.

Farr, Otho W. B.

Major.

Holbrook, Lucius R.

Chaplain.

Joyee, Francis P. (capt.)

Captains.

Landers, Howard L.
Howze, Marion W.
McKinlay, Louis H.
Mack, Jacob A.
Bailey, Benjamin M.
Sands, Alfred L. P.
Brunzell, Otto L.
Harlow, Charles W.
Greely, John N.
Barrows, Frederick M.
Parrott, Roger S.
Dunn, William E. (D. O. L.)

First Lieutenants.

Rogers, Wilbur.
Kennedy, John T.
Turner, Frank A.
Lewis, Burton O.
Dawley, Ernest J.
Peyton, Bernard R.
Magruder, John
Nance, Curtis H.
Franke, Gustav H.
Larned, William E.
Batson, Roscoe C.
Heard, Falkner
Tarpley, Jesse F.
Proctor, Mert. (D. O. L.)

FIELD ARTILLERY DIRECTORY

FIELD ARTILLERY DIRECTORY—Continued

SEVENTH FIELD ARTILLERY (Light)—Continued

Second Lieutenants.

De Coen, Emile G.
 Roberts, Frank A.
 Lee, Herbert L.
 Daniels, Robert W.
 Handy, Thomas T.
 Gates, Oscar I.
 Dose, Frederic C.
 Wrenn, Theodore W.
 Echols, Oliver P.

Veterinarian.

Foster, Frederick

EIGHTH FIELD ARTILLERY (Light.)

Permanent Station:
 Ft. Bliss, Tex.

Colonel.

March, Peyton C.

Lieutenant Colonel.

Bishop, Harry G.

Majors.

Hopkins, Frank E.
 Lambdin, William McK.

Chaplain.

Smith, Samuel J. (maj.)

Captains.

Westerfelt, William I.
 Locke, Morris. E.
 Bryson, James H.
 Quinn, Leo P.

EIGHTH FIELD ARTILLERY (Light)—Continued

Captains.

Neal, Carroll W.
 Osborne, Thomas D.
 Sturgill, Walter S.
 Kieffer, Pierre V.
 George, Charles P.
 Shepard, William H.
 Rucker, William H. (D. O. L.)
 Gottschalk, Telesphor G. (D.O.L.)

First Lieutenants.

Bane, Thurman H.
 Seaman, George G.
 Austin, Jacob McV.
 Byrne, Charles L.
 Hobbs, Harvey M.
 Spalding, Isaac.
 Hochwalt, Earl B.
 Swing, Joseph M.
 McBride, Horace L.
 Bradburn, Clarence E.
 Goetz, Robt. C. F. (D. O. L.)
 Morrow, Norman P. (D. O. L.)
 Deshon, Perey. (D. O. L.)
 von Holtzendorff, John D. (D. O. L.)

Second Lieutenants.

White, Arthur N.
 Marshall Richard J.
 Heard, Ralph T.
 Sheppard, Francis W.
 Tipton, Frank B. Jr.
 Brower, Gerald E.
 Thomas, Charles B.
 Rehm, Harold W.
 Ripley Clement.

Veterinarian.

NINTH FIELD ARTILLERY (Heavy.)

Permanent Station:
 Schofield Barracks, Hawaii.

Colonel.

McMahon, John E.

Lieutenant Colonel

Guignard, William S.

Major.

Butner, Henry W.

Chaplain.

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Captains.

Kilbreth, John W., jr.
 Foy, Robert C.
 Browning, William S.
 Pratt, Raymond S.
 Corey, John B. W.
 Frankenberger, Samuel
 Kilbourne, Henry S., jr.
 Paine, George H.

First Lieutenants.

Dickinson, Oliver A.
 Erlenkotter, Herman
 Devers, Jacob L.
 Gay, George S.
 Vanderveer, Harold C.
 Hauser, John N.
 Selleck, Clyde A. (D. O. L.)
 Cain, David E. (D. O. L.)
 Sedlacek, Ernst. (D. O. L.)

Second Lieutenants.

Lynch, Patrick L.
 Bradley, Ivan N.

Veterinarian.

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THE FIELD ARTILLERY JOURNAL

FIELD ARTILLERY DIRECTORY—Continued.

LINEAL RANK*

No. Name, rank, and date of rank.

Colonels.

1 Van Deusen, G. W.	7 sept. 11
2 Millar, E. A.	1 dec.
3 Sturgis, S. D.	27 dec. 12
4 Berry, L. G.	16 mar. 13
5 McMahon, J. E.	3 june, 16
6 Menoher, C. T.	1 july,
7 Hinds, E.	1 july,
8 March P. C.	1 july,
9 Kenly, W. L.	1 july,
10 McGlachlin E. F., Jr.	1 july,
11 Lassiter, W.	1 july,
12 Irwin, G. Le R.	1 july,
13 McNair, W. S.	1 july,
14 Snow, W. J.	1 july,

Lieutenant Colonels.

1 Gatley, G. G.	12 june, 16
2 Lyon, Le R. S.	1 july,
3 Horn, T. N.	1 july,
4 Sumnerall, C. P.	1 july,
5 Cruikshank, W. M.	1 july,
6 Farr, O. W. B.	1 july,
7 Aultman, D. E.	1 july,
8 Fleming, A. S.	1 july,
9 Payne, B.	1 july,
10 Guignard, W. S.	1 july,
11 Bowley, A. J.	1 july,
12 Bishop, H. G.	1 july,
13 Newbill, W. D.	26 july,
14 McCloskey, M.	26 july,

Majors.

1 McMaster, R. H.	18 nov. 14
2 Stephens J. E.	3 june, 16
3 Merrill, T. E.	12 june,
4 Conner, F.	1 july,
5 Butner, H. W.	1 july,
6 Newbold, H. L.	1 july,
7 Scott, E. D.	1 july,
8 Holbrook, L. R.	1 july,
9 Hall, H.	1 july,
10 Smith, W.	1 july,
11 Starbird, A. A.	1 july,
12 Lloyd, C. R.	1 july,
13 Spaulding, O. L., jr.	1 july,
14 Lanza, C. H.	1 july,
15 Farrar, H. B.	1 july,
16 Granger, R. S.	1 july,
17 Moore, D. T.	1 july,
18 Hopkins, F. E.	1 july,
19 Austin, F. T.	1 july,
20 Pulis, C. C.	1 july,
21 Boiseau, L. T.	1 july,
22 Lambdin, W. McK.	1 july,

Captains.

1 Moseley, G. V. H.	22 sept. 05
2 Bundel, C. M.	20 oct. 06
3 Herron, C. D.	2 nov.
4 Foy, R. C.	25 jan. 07
5 Stuart, E. A.	25 jan. 07
6 Donnelly, E. T.	25 jan.
7 Brooke, G. M.	25 jan.

No. Name, rank, and date of rank.

Captains—Continued.

8 Williams, H. C.	25 jan.
9 Faulkner, A. U.	25 jan.
10 Apple, G. M.	25 jan.
11 Yule, E. H.	25 jan.
12 Westervelt, W. I.	25 jan. 07
13 Birnie, U., jr.	25 jan.
14 Deems, C., jr.	25 jan.
15 Doyle, F. C.	25 jan.
16 Robison, J. P.	25 jan.
17 McIntyre, A.	25 jan.
18 Greene, G. R.	25 jan.
19 Briggs R. W.	25 jan.
20 Bunker, C. M.	25 jan.
21 Griffin, F. W.	25 jan.
22 Welsh, R. S.	25 jan.
23 Campbell, T.	25 jan.
24 Craig D. F.	25 jan.
25 Warfield, A. B.	25 jan.
26 Landers, H. L.	25 jan.
27 Burt, W. H.	12 june.
28 Jones, C. N.	25 feb. 08
29 Hennessy, F. B.	26 july, 07
30 Lawson, L. L.	12 aug.
31 Locke, M. E.	25 aug. 08
32 Kilbreth, J. W., jr.	1 apr. 04
33 Bryson, J. H.	10 sept. 09
34 Mason, R. O.	30 sept.
35 Browning, W. S.	15 nov. 10
36 Barnes, J. F.	3 mar. 11
37 Ennis, W. P.	11 mar.
38 Currie, D. H.	11 mar.
39 Browne, B. F.	11 mar. 11
40 Pratt, R. S.	11 mar.
41 Brewster, A. F.	11 mar.
42 De Armond, E. H.	11 mar.
43 Wood, N. E.	11 mar.
44 Fuger, A. S.	11 mar.
45 Michel, W. N.	11 mar.
46 Wheeler, E. S.	11 mar.
47 Hollyday, T. W.	11 mar.
48 Corey, J. B. W.	13 apr.
49 Churchill, M.	13 apr.
50 Jones, W. F.	13 apr.
51 Mortimer, C. G.	26 may,
52 Margetts, N. E.	26 may,
53 Davis, R.	7 june,
54 Myers, J. E.	7 sept.
55 Wood, W. S.	8 sept.
56 Frankenberger, S.	18 oct.
57 Morrison, W. F.	9 feb. 12
58 Ferris, C. J.	26 aug.
59 Rehkopf, N. B.	11 july, 13
60 Baker, S.	9 oct.
61 Howze, M. W.	24 oct.
62 Kilbourne, H.S., jr.	22 nov.
63 McNair, L. J.	19 apr. 14
64 Allin, G. R.	13 june,
65 Kelly, J. R.	11 nov.
66 Glassford, P. D.	18 nov.
67 Bryden W.	10 jan. 15
68 Honeycutt, F. W.	27 june,
69 Hand, D. W.	25 jan. 07
70 Blakely, C. S.	4 nov. 15
71 Smith, E. T.	3 june, 16
72 Danford, R. M.	12 june,
73 Quinn, L. P.	12 june,

No. Name, rank, and date of rank.

Captains—Continued

74 Gruber, E. L.	1 july,
75 Neal, C. W.	1 july,
76 Cubbison, D. C.	1 july,
77 Mack, J. A.	1 july,
78 McKinlay, L. H.	1 july,
79 Osborne, T. D.	1 july,
80 Dodds, W. H., jr.	1 july,
81 Hammond, J. S.	1 july,
82 Bishop, A. T.	1 july,
83 Prosser, W. E.	1 july,
84 Huntley, H. W.	1 july,
85 Smith, E. De L.	1 july,
86 Pennell, R. McT.	1 july,
87 Sturgill, W. S.	1 july,
88 Miles, S.	1 july,
89 Parker, C.	1 july,
90 Burleson, R. C.	1 july,
91 Davis, J. R.	1 july,
92 Starkey, J. R.	1 july,
93 Hoyle, R. E. DeR.	1 july,
94 Olmstead, D.	1 july,
95 Maul, J. C.	1 july,
96 Hall, A. L.	1 july,
97 Paine, G. H.	1 july,
98 Collins, L. P.	1 july,
99 Lyerly, B.	1 july,
100 Lewis, R. H.	1 july,
101 Booker, P. W.	1 july,
102 Cruse, F. T.	1 july,
103 Marley, J. P.	1 july,
104 Potter, W. C.	1 july,
105 Downer, J. W.	1 july,
106 Bailey, B. M.	1 july,
107 Sharp, W. F.	1 july,
108 Thorp, F., jr.	1 july,
109 Tyndall, J. G.	1 july,
110 Brunzell, O. L.	1 july,
111 Kieffer, P. V.	1 july,
112 Murray, M.	1 july,
113 Sands, A. L. P.	1 july,
114 George, C. P.	1 july,
115 Harlow, C. W.	1 july,
116 Rucker, W. H.	1 july,
117 Shepherd, W. H.	1 july,
118 Randol, M. G.	1 july,
119 Greely, J. N.	1 july,
120 Capron, W. A.	1 july,
121 Mort, J. E.	1 july,
122 Barrows, F. M.	1 july,
123 Dunn, W. E.	1 july,
124 Burns, J. H.	1 july,
125 Hughes E. S.	1 july,
126 Smith T. J.	1 july,
127 Parrott, R. S.	1 july,
128 Gotschalk, T. G.	1 july,
128 Higley, H. D.	1 july,
130 King, E. P., jr.	1 july,
131 Perkins, K. S.	1 july,

First Lieutenants.

1 Kirkwood, R. G.	13 apr. 11
2 Marr, H. E.	26 may,
3 Rumbough, J. W.	7 june,
4 McCleave, W.	13 june,
5 McBride, A. C.	20 june,

*NOTE:—Names of officers detailed from the line for service in the staff departments under section 26, act of February 2, 1901, acts of March 2, 1903, June 25, 1906, March 2, 1907, March 23, 1910, or July 18, 1914 and officers detached from their proper commands under act of March 3, 1911, or July 18, 1914, are printed in italics.

FIELD ARTILLERY DIRECTORY

FIELD ARTILLERY DIRECTORY—Continued

No. Name, rank, and date of rank.

First Lieutenants—Continued

6 Brabson, J. R. 20 june,
 7 Sparks, L. C. 1 july,
 8 Crane, J. A. 1 july,
 9 Prince, F. A. 1 apr. 12
 10 Magruder, M. 28 may,
 11 Martin, T. C. 31 may,
 12 Rogers, W. 31 july,
 13 Dougherty, L. R. 22 aug.
 14 Hopkins, S. R. 26 aug.
 15 Hollingsworth, C. P. 6 sept. 12
 16 Daly, C. D. 5 mar. 13
 17 Bane, T. H. 23 sept.
 18 Palmer, A. K. C. 22 nov.
 19 Dickinson, A. O. 5 june, 14
 20 Stewart, F. W. 13 june, 14
 21 Hayden, H. B. 18 nov.
 22 Kennedy, J. T. 8 dec.
 23 Johnson, T. J. 8 dec.
 54 Ahern, L. J. 10 jan. 15
 25 Beere, D. M. 10 jan.
 26 Erlenkotter, H. 12 may,
 27 Thummel, C. B. 15 may,
 28 Watson, E. M. 15 sept.
 29 Miner, H. E. 4 nov.
 30 Rogers, J. A. 22 jan. 16
 31 Griffith, C. T. 21 feb.
 32 Devers, J. L. 1 apr.
 33 Taliaferro, L. H. 8 may,
 34 Bateman, H. H. 8 may,
 35 Turner, F. A. 3 june,
 36 Seaman, G. G. 12 june,
 37 Reynolds, C. C. 12 june,
 38 Gay, G. S. 20 june,
 39 Wallace, F. C. 20 june,
 40 Hayes, P. 1 july,
 41 Doniat, F. A. 1 july,
 42 Baehr, C. A. 1 july,
 43 McDowell, J. M. 1 july,
 44 Lee, R. E. 1 july,
 45 Austin, J. McV. 1 july,
 46 Lewis, B. O. 1 july,
 47 Odell, H. R. 1 july,
 48 Selleck, C. A. 1 july,
 49 Dawley, E. J. 1 july,
 50 Beard, L. A. 1 july,
 51 Jones, I. 1 july,
 52 Pendleton, W. A. 1 july,
 53 Goetz, R. C. F. 1 july,
 54 Peyton, B. R. 1 july,
 55 Magruder, J. 1 july,
 56 Conolly, W. R. 1 july,
 57 Riggs, E. F. 1 july,
 58 Nance, C. H. 1 july,
 59 Bowley, F. W. 1 july,
 60 Franke, G. H. 1 july,
 61 Beatty, J. C. 1 july,
 62 Stanton, H. G. 1 july,
 63 Hatch, J. E. 1 july,
 64 Walker, C. A., jr. 1 july,
 65 Simpson, B. W. 1 july,
 66 Finch, N. B. 1 july,
 67 Larned, W. E. 1 july,
 68 Byrne, C. L. 1 july,
 69 Batson, R. C. 1 july,
 70 Standeford, A. C. 1 july,
 71 Wyche, I. T. 1 july,
 72 Hobbs, H. M. 1 july,
 73 Andrews, J. 1 july,
 74 Oliphant, T. G. M. 1 july,
 75 Proctor, M. 1 july,

No. Name, rank, and date of rank.

First Lieutenants—Continued

76 Wrona, W. J. 1 july,
 77 Brereton, L. H. 1 july,
 78 Erwin, V. P. 1 july,
 79 Bloom, F. 1 july,
 80 Meyer, V. 1 july,
 81 Hicks, E. H. 1 july,
 82 Morrow, N. P. 1 july,
 83 Jones, L. E. 1 july,
 84 Polk, N. N. 1 july,
 85 Millar, E. A. jr. 1 july,
 86 McConkey, C. J. 1 july,
 87 Bradley, F. 1 july,
 88 Andreson, R. E. 1 july,
 89 Oberly, R. S. 1 july,
 90 Cole, L. R. 1 july,
 91 Ferron, P. L. 1 july,
 92 Deshon, P. 1 july,
 93 Barnes, J. F. 1 july,
 94 Vanderveer, H. C. 1 july,
 95 Andrus, C. 1 july,
 96 Armemann, G. E. 1 july,
 97 Lang, C. D. 1 july,
 98 Maxwell, R. L. 1 july,
 99 Browne, C. J. 1 july,
 100 Hauser, J. N. 1 july,
 101 Greenwald, K. C. 1 july,
 102 Anderson, R. E. 1 july,
 103 Gillespie, J. A. 1 july,
 104 Bailey, W. M. 1 july,
 105 Spalding, I. 1 july,
 106 Malony, H. J. 1 july,
 107 Hyatt, R. F. 1 july,
 108 Arnold, A. V. 1 july,
 109 Hochwalt, E. B. 1 july,
 110 vonHoltzendorff, J. D. 1 july,
 111 Winton, W. F. 1 july,
 112 Armstrong, F. T. 1 july,
 113 Templeton, H. 1 july,
 114 Frankenberger, B. 1 july,
 115 Austin, R. B. 1 july,
 116 Daly, J. O. 1 july,
 117 Parker, E. P., jr. 1 july,
 118 Eager, J. M. 1 july,
 119 Gruber, W. R. 1 july,
 120 Scott, R. C. 1 july,
 121 Eager, H. 1 july,
 122 Young, W. C. 1 july,
 123 Crane, W. C., jr. 1 july,
 124 Brewer, C. 1 july,
 125 Cain, D. E. 1 july,
 126 Mc Mahon, J. E. jr. 1 july,
 127 Spencer, E. T. 1 july,
 128 Heard, F. 1 july,
 129 Clarkson, H. S. 1 july,
 130 Craig, L. A. 1 july,
 131 Helmick, C. G. 1 july,
 132 Sedlacek, E. 1 july,
 133 Thurber, P. L. 1 july,
 134 Houghton, W. C. 1 july,
 135 Wyeth, J. C. 1 july,
 136 Harris, A. R. 1 july,
 137 Burr, J. G. 1 july,
 138 Anderson, J. B. 1 july,
 139 Burr, W. E. 1 july,
 140 Lester, J. A. 1 july,
 141 Beukema, H. 1 july,
 142 Strubble, H. S. 1 july,
 143 Dunigan, F. J. 1 july,
 144 Zende, E. A. 1 july,
 145 Howard, C. W. 1 july,

No. Name, rank, and date of rank.

First Lieutenants—Continued

146 Busbee, C. M. 1 july,
 147 Waldron, A. W. 1 july,
 148 Wallace, J. H. 1 july,
 149 Marsh, R. 1 july,
 150 Swing, J. M. 1 july,
 151 Reinhart, S. E. 1 july,
 152 Hudnutt, D. 1 july,
 153 Hibbs, L. E. 1 july,
 154 Tarpley, J. F., jr. 1 july,
 155 McBride, H. L. 1 july,
 156 Maguire, H. E. 1 july,
 157 Rutherford, R. C. 1 july,
 158 Woodward, W. R. 1 july,
 159 King, A. K. 1 july,
 160 Jones, H. C. 1 july,
 161 Bradburn, C. E. 17 aug.

Second Lieutenants.

1 Kiser, S. L. 26 nov. 16
 2 Yeager, E. 26 nov.
 3 Heyser, M. C. 26 nov.
 4 McLendon, I. R. 26 nov.
 5 Fibich, M. J. 26 nov.
 6 Brady, S. F. 26 nov.
 7 Pollin, G. A. 26 nov.
 8 Finkbiner, D. E. 26 nov.
 9 Ruoff, C. F. 26 nov.
 10 Davis, E. C. W. 26 nov.
 11 DeCoen, E. G. 25 nov.
 12 White, A. N. 26 nov.
 13 Lynch, P. L. 26 nov.
 14 Bradley, I. N. 26 nov.
 15 McCollister, J. J. 27 nov.
 16 Roberts, F. A. 27 nov.
 17 Alexander, W. D. 28 nov.
 18 Lee, H. L. 28 nov.
 19 Marshall, R. J. 28 nov.
 20 Heard, R. T. 28 nov.
 21 Hervey, H. 29 nov.
 22 Sheppard, F. W. 29 nov.
 23 Daniels, R. W. 29 nov.
 24 Winslow, J. S. 30 nov.
 25 Dollarhide, E. S. 30 nov.
 26 Legge, B. R. 30 nov.
 27 Handy, T. T. 30 nov.
 28 Tipton, F. B., jr. 30 nov.
 29 Bryan, S. F. 30 nov.
 30 Haines, O. F. 30 nov.
 31 Gates, O. I. 30 nov.
 32 Brower, G. E. 30 nov.
 33 Jones, W. J. 30 nov.
 34 Vesely, Y. D. 30 nov.
 35 Dose, F. C. 30 nov.
 36 Thomas, C. B. 30 nov.
 37 Bond, O. J., jr. 30 nov.
 38 Ennis, R. H. 30 nov.
 39 Carter, B. E. 30 nov.
 40 Parker, H. B. 30 nov.
 41 Fielding-Reid, F. 30 nov.
 42 Ristine, H. H. 30 nov.
 43 Edwards, E. B. 30 nov.
 44 Gruhn, O. L. 30 nov.
 45 Wrenn, T. W. 30 nov.
 46 Rehm, H. W. 30 nov.
 47 Pitney, J. B. 30 nov.
 48 Tate, C. H. 30 nov.
 49 O'Donnell, O. 30 nov.
 50 Echols, O. P. 30 nov.
 51 Ripley, C. 30 nov.