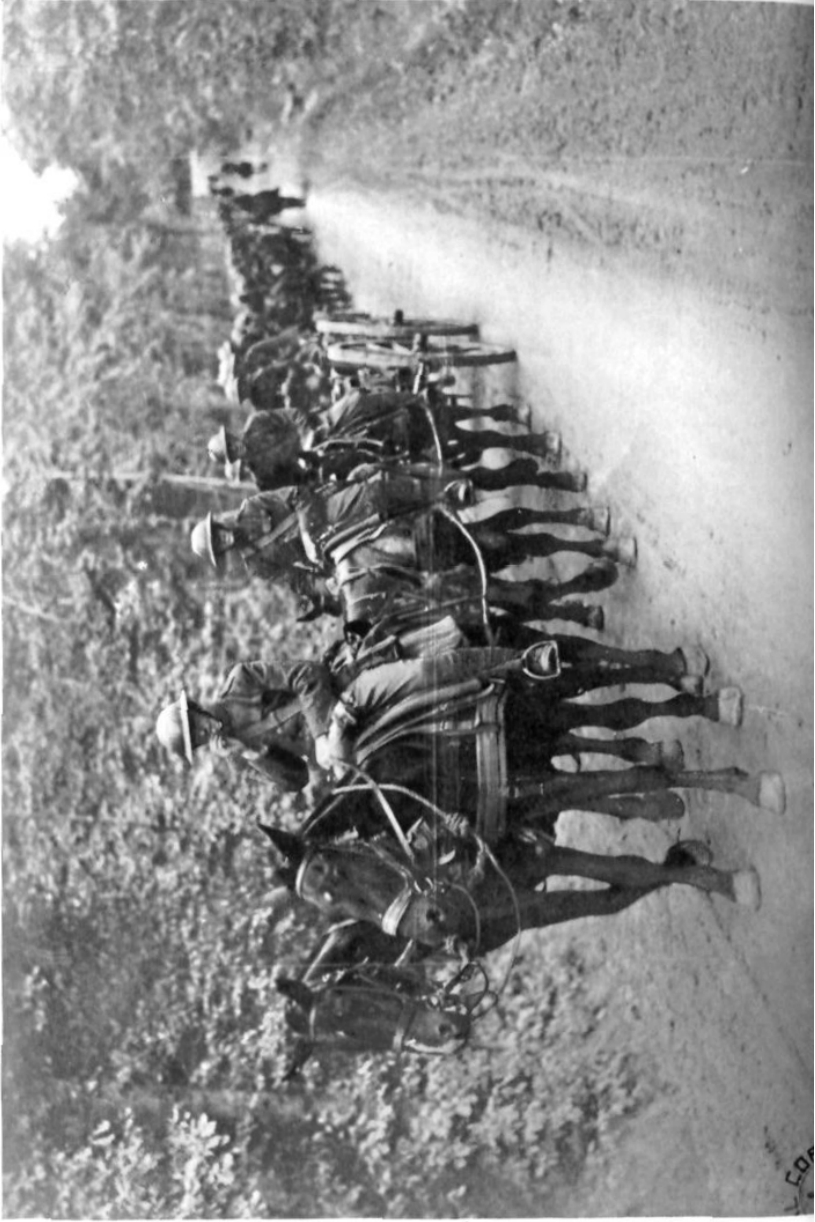


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SEVENTY-SIXTH FIELD ARTILLERY

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NO. 4

INTERESTING DIAGRAMS

BY MAJOR-GENERAL WM. J. SNOW
CHIEF OF FIELD ARTILLERY, U. S. ARMY

FOR the question "Who won the war?", which agitated Americans for some time, we now appear to be substituting the question, "Will airplanes and gas win the next war?". Maybe so, maybe not.

I think it was Patrick Henry who said, "I know of no light to guide my feet save that of history." An application of this logic would, then, require an examination of the last war, to get a line on the next one. To begin with, the writer does not claim that the Field Artillery won the war. It was done by teamwork—every allied and associated power doing its part; every arm, corps and department, within each army, doing its part; and every individual person not in an army doing his part.

But, no one can question the predominating effect of inflicting casualties. Rifles, cannon, grenades, sabres, knives, trench-mortars, etc., etc., are taken to war with this sole object in view. Each combatant strives to devise a more deadly weapon than his adversary, and each combatant uses his weapons to inflict the maximum number of casualties on the other. And, the defeated party is almost universally the one that suffers the greatest number of casualties.

Under these conditions, it is interesting to consider these questions in connection with the World War:

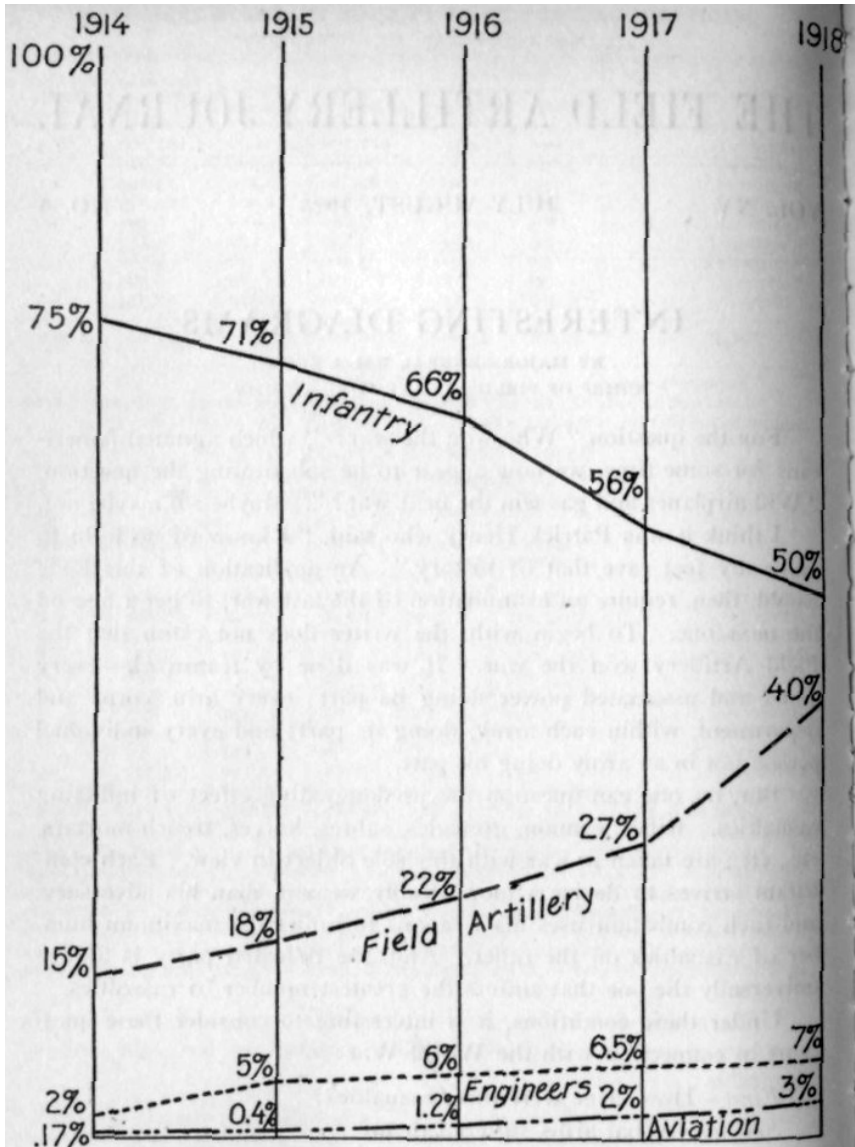
First—How large were these casualties?

Second—What arms suffered them?

Third—What arms inflicted them?

It is more especially with the third question that this article is concerned.

As to the first and second questions, the following two tables are pertinent:



**CHANGES IN PROPORTION
OF ARMS IN THE FRENCH
ARMY, 1914 TO 1918**

INTERESTING DIAGRAMS

MILITARY CASUALTIES OF FRANCE IN THE WORLD WAR

Dead and Missing—By Arm of Service

Arm of service	Commissioned		Enlisted		Total dead and missing	Per cent. of total
	Dead	Missing	Dead	Missing		
Infantry	27,020	2,240	917,400	240,600	1,187,260	87.4
Artillery	3,070	70	79,800	3,000	85,940	6.3
Engineers	670	20	25,300	2,300	28,290	2.1
Cavalry	820	45	18,800	2,600	22,265 ^a	1.6
Trains	105	.....	7,280	210	7,595	.6
Aviation	1,035	110	3,430	170	4,745	.4
Automobile	66	.....	3,460	40	3,566	.3
Balloon	33	1	550	10	594	.....
Others	1,282	12	14,880	1,370	17,544	1.3
Total*	34,100	2,500	1,070,800	250,400	1,357,800	100.0

* Figures rounded.

^a Does not include 317 cavalry officers' casualties while serving with other arms and included therein. (Statistics Branch, General Staff, May 7, 1921, No. 171.)

WORLD WAR—A. E. F., FRANCE

Battle Casualties—By Arm of Service

	Battle deaths		Total	Wounded ^d	Total battle casualties	Per cent. of total battle casualties
	Killed in action	Died of wounds				
Infantry ^b	35,173	12,602	47,775	205,833	241,006	88.5
Artillery ^c	1,152	719	1,871	9,994	11,146	4.1
Engineers ^d	923	393	1,316	7,533	8,456	3.1
Med. Corps	172	238	410	3,782	3,954	1.5
Q. M. C. ^e	109	156	265	2,072	2,136	.8
Sig. Corps	161	118	279	1,967	2,128	.8
Air Service	251	51	302	434	685	.3
Ordnance	1	6	7	112	113	.....
Cavalry	3	3	6	93	96	.....
Others ^f	302	416	618	2,190	2,392	.9
Total A. E. F.	38,147	14,702	52,849	233,965	272,112 ^g	100.0

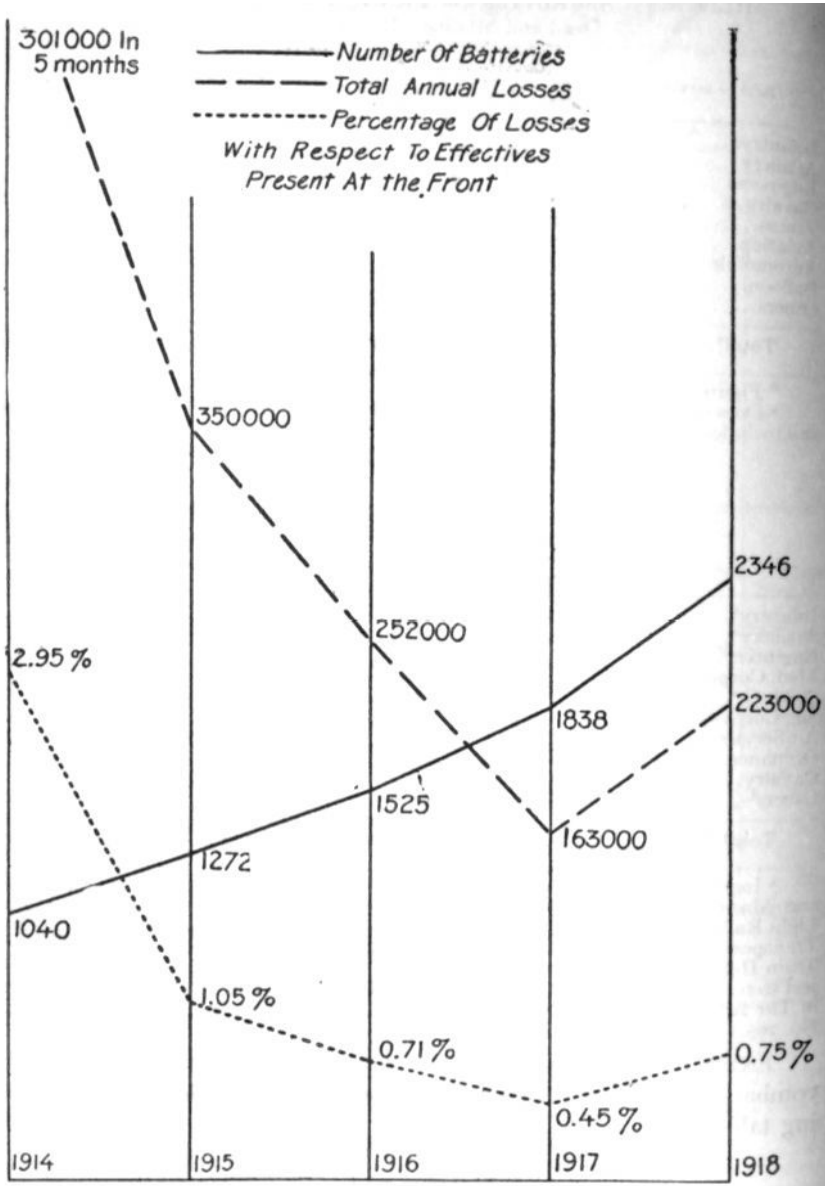
^a Includes "died of wounds." ^b Includes Machine Gun Troops, Tank Troops and Marines. ^c Includes Anti-Aircraft Artillery. ^d Includes Transportation Corps, Light Railway and Construction and Forestry. ^e Includes Ammunition Trains, Motor Transport Corps, Stevedores, and Supply Trains. ^f Includes Division Headquarters, Train Headquarters, Military Police, Service Corps and others. ^g This figure is subject to revision upon the completion of the check of individual records now in progress in The Adjutant General's Office. (Statistics Branch—General Staff, June 10, 1923, No. 205.)

Extracting from these two tables, data as regards three of the combatant services common to both armies, we have the following table:

LOSSES

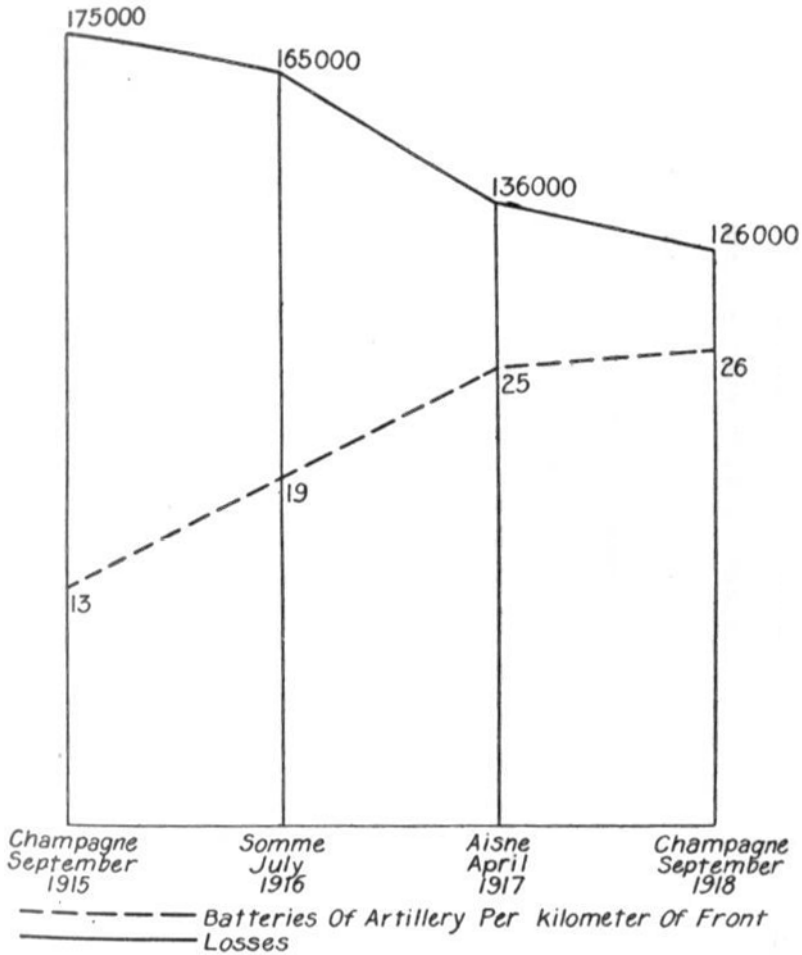
Arm of service	French Army		American Expeditionary Forces	
	Total dead and missing	Per cent. of total	Total battle casualties	Per cent. of total
Infantry	1,187,260	87.4	241,006	88.5
Artillery	85,940	6.3	11,146	4.1
Engineers	28,290	2.1	8,456	3.1

(Continued on page 329)



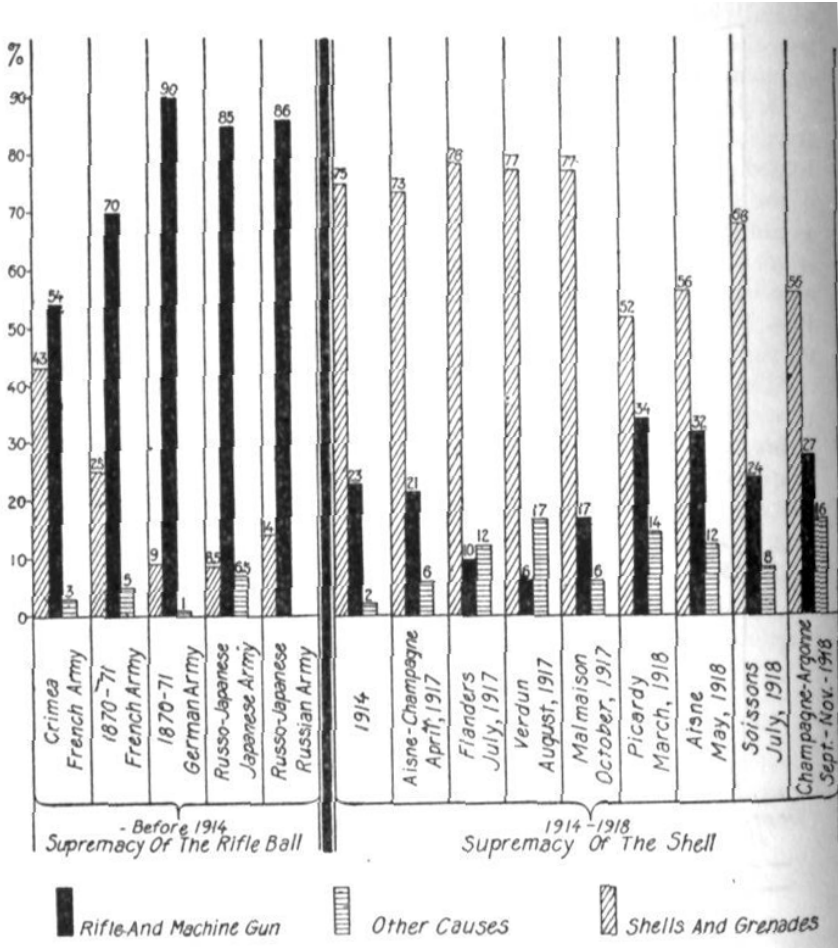
RELATION BETWEEN THE NUMBER OF BATTERIES AND PERSONNEL LOSSES IN THE FRENCH ARMY, 1914 TO 1918

INTERESTING DIAGRAMS



RELATION BETWEEN THE NUMBER OF BATTERIES PER KILOMETER OF FRONT AND PERSONNEL LOSSES IN THE FRENCH ARMY, 1914 TO 1918

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PROPORTION OF LOSSES FROM THE VARIOUS WEAPONS

INTERESTING DIAGRAMS

It will be noted in the above table that the classification for the two armies is not identical. For the French Army, we include only dead and missing, while in the American Army we do not include missing, but we do include wounded. The writer has been unable to find tables giving identical data for both armies. But, nevertheless, the data used are sufficiently closely related to be regarded as comparable, without any violence to deductions.

It may, therefore, be assumed from the last of the three tables above, that the losses sustained by the different arms in the American Expeditionary Forces were in substantially the same proportion as in the French Army—and, an additional reason for regarding this as not unreasonable lies in the fact that, in both these armies, the losses were inflicted by the same enemy—the German Army. It is only reasonable, therefore, to assume that deductions made from the French statistics apply generally to the American. Now to take up the third question, which is the principal purpose of this article.

The accompanying diagrams pertain to the French Army. But, as we have just shown, they apply equally well to the American Army, insofar as losses and their causes are concerned. The first diagram is compiled from figures given in the *La Revue d'Infanterie*, October, 1923. The other diagrams are copied from General Herr's book, "L'Artillerie, Ce Qu'Elle A Été, Ce Qu'Elle Est, Ce Qu'Elle Doit Etre."

These diagrams are illuminating—they are more; they are startling.

PROBLEMS OF MOBILITY IN MOTORIZED ARTILLERY

BY CAPTAIN W. B. DUNWOODY F.A.

THE entry of mechanical transportation into the Field Artillery has opened before us a wide vista, full of attractive possibilities in mobility of that arm. Many new ideas have been tried; some have been rejected, some retained, and some are still under consideration, with their ultimate destiny to be determined by severe tests in the using service.

The attainment of maximum mobility becomes more desirable when we consider the lighter guns, whose primary mission is to accompany and support the infantry. The fact that horse-drawn artillery is the accepted type for the light divisional guns in our army, indicates that this means of transportation fulfils best the requirements of maximum mobility under all conditions. However, experiments with tractors instead of horses for light artillery have progressed to such a point that we can begin to look upon the tractor as an entirely practicable means of transportation, and there lies ahead the limitless field of mechanical design in which to explore for more and more mobility. These experiments, conducted at Ft. Bragg and Ft. Benning, have given satisfactory results with various types of commercial tractors for drawing light guns and their caissons. The tractor, then, of the caterpillar principle is pretty well established as a load handler for the firing battery.

The next problem is to provide an equally satisfactory means of transportation for battery officers and the personnel of the battery commander's detail, and also for transportation of supplies and maintenance equipment. At a glance this seems to be well taken care of in our present equipment tables. We have a variety of good vehicles, each adapted to the use expected of it. In practice this does not give at all the desired results under certain conditions which are by no means extreme or unusual. The very diversity of vehicles is in itself an important obstacle to that complete elasticity of movement which we need.

Take as a standard the movement of a battery of light artillery, horse-drawn. Its complete organization—officers, battery commander's detail, and escort wagons, can move with about equal facility over any ground which the firing battery can traverse and that means practically anywhere that a body of troops is called upon to march, except in mountain wildernesses. It can march on narrow roads in long columns of mixed, mounted and foot troops with only moderate discomfort. It can utilize deep fords and bridges of small load capacity. The battery officers can ride alongside, ahead, or in rear of the column, or pass the column almost at will, and thereby observe

PROBLEMS OF MOBILITY IN MOTORIZED ARTILLERY

it continuously and maintain complete control and command. The speed capacity is uniform and does not require the echelonment of the command into two march columns because of the inability of one type of vehicle to maintain the same speed as another type.

Tests conducted in the summer of 1924 with a 75-mm. battery, using the small but powerful Holt T-35 two-ton tractor with one and two-axle loads, and the reconnaissance and supply vehicles prescribed for a battery under the Hawaiian Tables of equipment, demonstrated that it was possible for the tractor-drawn elements to traverse successfully and with ease the same ground as a horse-drawn battery. The supply and reconnaissance elements, however, found it necessary to detour and meet at the camping place selected in advance. But one wheeled vehicle accompanied the tractor column, a Dodge Light Repair Truck, which was towed behind a spare tractor the majority of the way to save overheating. Steep hills, with narrow rutted roads, deep sand, mud holes, swamps and streams with old weak bridges, as well as the slow speed of the column and occasional detours through the woods entirely off the roads, made it impracticable and, indeed, impossible without considerable engineering work, to have taken the cars and three-ton trucks over this route.

As for the officers, one rode in the repair truck and one on a caisson of the leading section. The battery commander rode on a caisson, or on the repair truck, wherever he happened to be. If he stopped to see the column pass a difficult obstacle, he could not reach the head of the column until the next halt, except by the difficult process of running along on foot; and control of the column from the rear was difficult or impossible along the narrow winding wooded roads. He would have been no better off with a Dodge car or motorcycle, as passage along the column was impossible in most places for these vehicles. When a reconnaissance and occupation of position was ordered, he found himself without any reconnaissance personnel or transportation and had to make the reconnaissance alone and on foot. The battery made the occupation of position with speed and without difficulty, though it was off the road and in scattered timber with many deadfalls and old logs lying about. One officer conducted the cars and supply trucks by a long detour to the camp site.

On the main highways traversed by this battery between Ft. Benning and Ft. Bragg, the equipment functioned almost ideally, unhampered by any other bodies of marching troops. By the usual expedient of making a separate column of the wheeled motor vehicles, which went ahead by bounds, and by attaching the rolling kitchen to the ration truck, a hot dinner was ready at a rendezvous point when the tractor column arrived, and later the camp was selected and made by the personnel in the battery commander's detail by the time the tractor column reached the end of the day's march.

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Even on the main highways the motorcycles presented a separate problem because of their high speed and tendency to heat up, and were towed behind carriages in the tractor column. They were cut loose in cases where it was necessary to communicate with the wheeled column ahead or to send back mechanics, spare parts, oil and food to disabled tractors and their personnel on the road.

As the situation presents itself, then, we may consider the development of command, reconnaissance and supply for tractor-drawn artillery along three general lines:

Diversity of matériel. The application of mechanical ingenuity to invent special vehicles to overcome the present difficulties.

The addition of horses for reconnaissance and command only.

Standardization of matériel. The application of the tractor only, for all motive power in the battery.

We have already gone a considerable distance along the road of diverse equipment. As now constituted, besides the tractor, we have in the battery, the touring car, repair truck, motorcycles, three-quarter-ton truck, reconnaissance car, and three-ton cargo truck. All these, with the possible exception of the motorcycles, have proved individually satisfactory. Their use in combination with tractors has presented the difficulties pointed out. Without attempting to discuss them in detail, some of the new vehicles considered, or actually in test, will give food for thought along these lines.

A Ford reconnaissance car with balloon tires and extra gear reductions, which will give it slow enough speed to run in a tractor column and power to go over almost any ground, has shown good results.

A Dodge repair truck with six wheels, driving on the four rear ones, with or without a track passing around the two rear wheels on each side, has given good results in bad going. Both these vehicles because of their width are open to the objection that they cannot pass freely up and down a column on a narrow road.

A slow motorcycle, able to maintain tractor speed, has been considered. It has the advantage of narrow width and light weight.

Various types of special reconnaissance tractors have been tried with indifferent success.

A standard type of tractor with wire reels mounted on it, is under test. It should be successful provided a sufficient amount of wire can be carried to make it superior to the present battalion reel drawn by a tractor.

PROBLEMS OF MOBILITY IN MOTORIZED ARTILLERY

An interesting development in tractors is the T-35 Holt, geared up to a speed of about fifteen miles per hour and provided with rubber tracks to take up some of the jar and wear. It has given excellent service and its possibilities come properly under later discussion.

Trucks for supply are not susceptible of much improvement for work over difficult ground as long as they carry great weight and run on four wheels. More power and greater traction are continually sought. Slow speed without damage to motors is desirable but difficult. The Militar truck has great power and ability to pull itself out of bad holes.

The general objection to the principle of diversity of matériel as exemplified by many special vehicles, is the difficulty of making repairs and carrying a sufficient supply of spare parts.

The second proposition, that of substituting horses for motors for the officers and the battery commander's detail, is understood to have been tried by the British Army in India, and has been often discussed in our army. Its advantages for reconnaissance and control of the column on the march are obvious. A mounted man can get around with facility where a motor vehicle can not. Its disadvantages are perhaps equally obvious. At first thought the very idea of combining horses and motors in the same battery is incongruous. It throws us back again on the principle of diversity. Forage must be carried, adding materially to the cargo space required. The additions of personnel for shoeing, a farrier and perhaps a veterinarian are needed. Most doubtful of all is the question of whether horses could maintain the speed of tractor-drawn artillery marching alone without other troops, day after day. On the march from Ft. Bragg to Ft. Benning the tractors averaged almost thirty-three miles a day for five hundred miles in very hot weather, and two daily marches were over forty miles. This was only a good average and in no sense a forced march. There is no doubt that further development in the tractor field will produce more speed than this. The five-ton artillery tractor with three light axles behind can consistently go seven to eight miles an hour and the writer's battery so organized in 1923 marched fifty-nine miles in twelve hours on the end of a hundred and seventy-five-mile hike.

In the third proposition, standardization of matériel, the idea is to make every vehicle in the battery a tractor. Perhaps this sounds fantastic, but at least it is worthy of consideration. True it is at a sacrifice of that extra mobility on good roads which we find so desirable in running back and forth to draw supplies, help out disabled vehicles and do the thousand errands around camp. But in the long run nothing is sacrificed. On a march the speed is only that of the slowest element. The cars and trucks may reach camp hours

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ahead of the tractor column, but they all start from the same place next day. It is the old story of the hare and the tortoise, and the tractor has decidedly the edge when it comes to country where you have to build a road to get the wheeled vehicles over and perhaps pull them by tractors at that. The writer has in mind one well-remembered day in the hills of Alabama, when it rained and the tractors chugged their way to the end of a short day's march by noon, while it took the trucks five hours with the help of tractors to make the last three miles. This was on a fairly good road which was perfectly passable for trucks in dry weather.

Consider again the horse-drawn battery. It can move as a unit and supply itself in the field or in garrison without great difficulty and without the necessity of having some elements move at a separate speed or over a different route.

To give the tractor-drawn battery the same unity of mobility, it is only necessary to provide cargo trailers for supplies and a personnel trailer for the battery commander's detail. For the officers, provide each with a tractor of the same make as the rest of the battery, with the rubber tracks and a speed up to fifteen miles per hour. The T-35 tractor is admirably adapted for this sort of organization with light guns. Its narrow width will take it through places where even the Ford reconnaissance car cannot go. At least this is better than riding a caisson or the tractor of the first section or on the repair truck at the tail of the column or going ahead by bounds in a car or motorcycle, or running along on foot to control the column when the wheeled vehicles are out of the picture.

In this scheme we would have to maintain and repair only one type of machine with the reduction of an innumerable variety of spare parts and no tire trouble. Reconnaissance could be carried out in much the same way as with horses. The additional number of tractors required would be about the same as the cars, motorcycles, and trucks replaced. War-time production and issue of vehicles would be greatly simplified if a commercial model such as the Holt T-35 were adapted and used for the complete equipment of light batteries. It is understood of course that the remarks herein would not apply equally well to heavier tractors and heavy guns.

Of the various schemes discussed above, the one of standardized matériel, looking to one type of tractor for all motive power in the battery, seems to have the best of the argument. It has not, to the writer's knowledge, had a complete tryout. Undoubtedly it has disadvantages which have been overlooked or undiscovered. At least it seems worthy of trial; at the same time experimentation in new and special vehicles should be made in the hope of attaining still more mobility, even though it require greater diversity of matériel.

THE DEFENSE POLICY OF THE UNITED STATES UNDER THE NATIONAL DEFENSE ACT OF 1916 AND WHY OUR DEFENSE PLANS SHOULD BE TESTED ANNUALLY BY THE WAR DEPARTMENT

(A COMPILATION AND STUDY)

BY MAJOR J. R. BRABSON, FIELD ARTILLERY

ON September 12th of 1924 an interesting and, for America, a novel experiment was tried out by the War Department. It was like a fire drill in a school. Plans for mobilizing the military strength of the country in trained and partly trained soldiers and in supply, had been worked out by the General Staff on the basis of the experience of the late war. A machinery had been set up. On that day this machine was set in motion, in so far as practicable and necessary, to see how it would work. Orders to mobilize had been sent out. Guard and reserve officers, line and staff, were ordered to gather at concentration points. The organization of supply throughout the United States, put itself in readiness to act upon orders. In short, the first step toward grand mobilization had been taken. The success of this test was beyond the hope of the most optimistic, for more than ten million individuals took some part in this Defense Test throughout the United States.

This test of the condition and organization of the national defense, and it should be undertaken annually, promises to be one of the most interesting experiments ever undertaken. Yearly, under the plans of the War Department, the country will hold a stocktaking, not only of its military forces, but also of the commercial and industrial resources which would be called upon in case of war. No event of recent years has been more misunderstood and misinterpreted than the War Department Annual Defense Test. The idea has gotten abroad that it is a surreptitious militaristic gesture, designed in some mysterious way to interfere with liberty here, and excite wonder and suspicion abroad. There never has been sound basis for this conception; indeed, the facts from the start have been few, simple and generally known. It is only surprising ignorance or maliciousness that could have forgotten or ignored them.

Defense Day goes back to an effort, universally commended, to make an intelligent use of existing means for protection. Supported in 1920 by republicans and democrats alike, indorsed by a democratic president and sanctioned later by a republican president,

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the Defense Act of June 3, 1916, under which Defense Day has been established, was supposed to represent the triumph of public common sense over an ancient disorganization of resources. The backbone of the idea was the creation of one army where there had been two and sometimes three. This was to be done by making the standing army and the National Guard parts of the same organization and by associating with them the Organized Reserves. It was the logical remedy for an impossible situation in which our regular troops and our National Guard had had no relation to one another.

General Pershing, upon his return from France in 1919, was intrusted with the task of coördination. In addition to studying the unification of the forces, he was also to study the relation of these forces to business and industry. He has carried forward this work. Annually a test should be held to determine the ability of the Regular Army, the National Guard and the Reserves to assemble as one force.

That is all there is to Defense Day. Whatever part business and industry take in it will be voluntary. The test will concern officially the so-called "skeleton army." It will be designed to show whether this army, mostly a volunteer force, has promise of being an effective nucleus in case of an emergency. The nation long ago approved the idea of such a test.

The alternative to a "skeleton army" are two: (1) the ancient and dishonored policy of maintaining a small standing army, uncoördinated with the militia, and (2) the policy of maintaining a formal standing army of considerable size on the European plan.

The country has never tolerated the later policy. Nor, after fighting five wars in which disorganization and lack of experience took a toll in honor, sickness and life, should it longer tolerate an alternative "pacifism" both expensive and unintelligent. The new type of preparedness which Defense Day typifies is better than either of these. It does not call for a large army. It merely requires a thoughtful use of available resources. This is what the country asked for immediately after the war. It is the least militaristic of policies and need not be misunderstood here or abroad.

When the United States was plunged into war in 1917 everything had to be improvised at high pressure. Troops had to be drafted and trained, transport organized, and munitions and war stores supplied by the millions of tons. The result was a national effort such as no other nation ever made in such a short space of time, and one that excited the admiration of the world. But when the great crisis was over, and the effort made was passed in review by technical men, the terrible and astounding cost of such an improvisation was realized.

DEFENSE POLICY OF THE UNITED STATES

The expenditure which it entailed had been doubled, tripled, and quadrupled by the necessity for haste and speed. Everything had to be created and organized from the ground up. If the nation had every reason to be proud of the marvellous achievements to which the crisis gave birth, little could be said in favor of the condition in which the country found itself when called upon to mobilize its every resource.

It is with a view to preventing any recurrence of this state of things that a plan has been worked out by which not only the military man power of the nation will be prepared for action, but also all the commercial and industrial resources of the country will have their place indicated in the general scheme of national defense. The great commercial and industrial organizations have been informed of what they will be required to furnish if ever again the peace of the world is broken. They are called on to study this plan and make their preparations to transform their plants and organizations to meet the military necessities of the country.

The test which it is proposed to hold annually is designed to show that every man is at his post and that from one day to the next, the needs of the country for national defense will be supplied. This will eliminate the necessity for hasty improvization at the last minute, which necessarily entails a huge waste of the country's finances. Such a peaceful demonstration of preparedness is, of course, a menace to no one. It is merely the periodic stocktaking operations of the business man, applied to the organization of national defense.

The value of this is clear. In 1917 we had no plans for mobilization. There was no personnel and no preparation to act. We have since worked out plans and begun to create and assign a personnel and agencies of coördination and supply. But these plans and agencies are untried. Annually these different agencies should be set in motion or else we cannot know wherein they are defective and inadequate. Yearly trials are of great importance.

When we have made several trials, we shall have taken one of the longest steps toward preparedness for—and against—war ever taken in our history. We shall have ended the old costly folly of waiting until war is with us to begin the tremendous synthesis of national energy which war demands. We shall have assured the saving of billions in expenditure and of thousands of lives, otherwise to be sacrificed to haste and lack of preparation.

This annual test can in no sense be construed as an evidence of militarism, as it merely seeks to avert some of the endless confusion which resulted at the start of our participation in the World War. It is intended solely for defensive purposes, and hence should be loyally supported by all American citizens. General Pershing realized,

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perhaps more than others, the handicaps which the country faced in the serious business of mobilizing the nation's manpower, and he is greatly interested in the success of this test. The confusion throughout the United States in 1917 was inevitable, as the skeleton organization maintained by the War Department had never faced anything approaching the problems which demanded immediate action. After a waste of six months, masses of men were herded together in a few quickly and expensively constructed cantonments, sorted into units and trained with the utmost difficulty.

The same thing would be repeated under similar conditions, unless the nation prepares in time of peace for such an emergency. Any person opposing such a test might be expected to be inspired by motives of disloyalty to the government. It simply calls for the assembly, on one day annually, of the Regular Army, the National Guard and the officers enrolled in the reserve units. The people should become interested in the local unit and realize the expediency and the necessity of exercising some kind of foresight in the matter.

Under the revised plans of the War Department for the Defense Test, hospital and Red Cross units, Boy Scout organizations as well as those who belong to the army's reserve organizations will be expected to report for duty. The extent to which members of all such groups respond to the call will reflect the degree of interest which prevails throughout the country in safeguarding the nation's security.

The object of the War Department Defense Plans is to prepare for war and to take the profit out of the war. An attractive proposition. Everybody is for it.

Recently a national commission was proposed, to sit at the National Capitol to help put the proposition into practice. How? By a plan that, however fair the purpose, is full of business dynamite and perhaps disaster. This fact should be faced now, at once, before resolutions of laws are passed and the country is handicapped with leaden weights.

The writer passed many weeks in Washington after the war in examining the reports and estimates of war costs. These reports and estimates show one thing above all others,—that straight profiteering by capital and labor accounts for only a small part of the cost of the war. Waste was and is the great item. A billion spent for unused aircraft, another billion or two for unused guns and ammunition, another billion or two for unnecessary camp sites and power plants and powder plants, and so on—these expenditures are what built up the vast totals of American war costs to twenty billions in nineteen months.

DEFENSE POLICY OF THE UNITED STATES

At least \$7,000,000,000 of those costs were waste. That was, and is, the common estimate.

If all the net income of all the corporations in the United States for the chief war year of 1918 had been confiscated, if not only their net war income but also their net peace income had been taken by the Government, it would not have paid the bill for this waste—would not have come within half a billion of paying it.

That is a business fact.

What is the businesslike way to avoid this waste in the future? A man of large business interests is telling the people his remedy. It is to put in office a lot of "industrial-strategists" to manage the industries of the United States in case of war—to regulate production, to hold down or abolish profits, to prevent any rise in wages.

Yet in the last war this country had all this machinery. The names of the dollar-a-year men in charge would fill several columns. And today American taxpayers are carrying fully \$7,000,000,000 of national debt for the waste that these gentlemen failed to prevent.

But why couldn't they prevent the waste? Why couldn't "industrial-strategists" prevent it in the future? Simply because the waste was, and is, too big for them. Even in peace times there is no dozen, or score of men, big enough to manage the business of the whole United States from Washington, or to fix and hold fast on a level, the wages of some twenty million handworkers in this vast country.

So the "industrial-strategists" would not solve the business problem in war. Well, then, how about confiscating all wartime profits?

In the two years 1914 and 1915 the net income of all American business corporations was about \$9,000,000,000. In the two years we were in the war the net income was \$15,000,000,000. Roughly, those figures indicate that the extra war profits of all American corporations were \$6,000,000,000 for the two years, or \$3,000,000,000 a year. Three billion is a vast sum, but would not pay for half a war, as wars go today.

There is far more to be said on this subject from the mere business viewpoint.

Corporation business paid in two years \$5,500,000,000 in taxes to carry on the war. If it did not do its full share, it did a mighty big share, and, as money is the sinews of war, some regard has got to be had for business soundness and progress in any future conflict. Business might bear higher taxes, but is not to be plucked like a fat goose.

However, that is another story. The main lesson for business and government is different. What is it?

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This lesson is that no hocus-pocus by "industrial-strategists," no new magic in the handling of taxes, no mere formula about "taking the profit out of war" will help American welfare and save American money from the ravages of war, if war comes. The only thing that can help is straightaway businesslike preparedness—the gradual insurance of the nation, year by year, against the mistakes of 1917 and 1918, through the maintenance of an army and navy strong enough to protect the nation's welfare and an annual test of the plans of the War Department and the Navy Department for National Defense, to determine if these plans are sound and furnish our country a full measure of protection.

It is a curious fact that during the last few years the movement for world-wide peace has produced advocates who well might be termed professionals. All sorts of schemes have been proposed, including the abandonment of all means for defense.

Everybody wants peace and nobody wants war. That may be accepted as a fundamental truth. There is, however, some difference of opinion as to how peace may be made secure. Somebody has divided the peace advocates into two classes, those who desire a peace of preparedness and those who desire a peace of unpreparedness.

The informal poll taken by *The Outlook*, to test public thought on a score of debatable subjects, shows some interesting results. It shows among other things that the thoughtful voter is well prepared to express an opinion on most questions which affect the welfare of the country. One conclusion, permissible from the figures, is that the American people believe in adequate preparedness for the nation's defense.

In summarizing the views expressed in the poll that periodical says:

"The people voting show few, if any, signs of pacifism. The farmer in the central agriculture section votes with the merchants on the Atlantic and Pacific seaboard for the extension of the Navy up to the standards set by the naval armament treaty. With them he would expand the Air Service and develop the air mail. He would, as they would, strengthen the Monroe Doctrine, in which a threat of war is implicit. More than three-fourths of the men and women marking the ballot have indorsed all preparedness measures as planks in their party platforms. Contrary opinion is practically negligible."

If Defense Day should become a day for annual examinations as to personal fitness, its contribution to the welfare of the nation would be of inestimable value aside from the primary purpose of national defense. However, the two proposed uses of the day are intimately related. The military strength of the nation depends

DEFENSE POLICY OF THE UNITED STATES

greatly on the physical condition of the citizenship, both mature and immature. It is entirely appropriate that physical tests, either on Defense Day or in close connection with the other purposes of that day, should be had.

Perhaps, however, the strongest appeal for physical tests is the personal appeal. No man or woman willingly becomes sub-normal. All desire to be in first-class health and condition. Yet a large percentage of both men and women are defective, some of them without consciousness of impairment. In most instances cures may be quickly effected or abnormalities corrected if timely attention is given.

It was a revelation to the country when enrollments for the World War showed nearly 47 per cent. of the men of serviceable age were defective, and 29 per cent. had to be rejected as unfit for unlimited service. It should be remembered that these tests were applied to what should be the healthiest ages. If applied to all who made themselves useful in the war, the percentage doubtless would have been still higher. This was not a good showing for a nation wont to pride itself on the vigor of its manhood and womanhood.

There ought to be at least one general survey each year of the physical fitness of the nation by individual tests. The best time would be in connection with Defense Day. The popularity or unpopularity of the "Annual Defense Test" can only be judged by the number of men, women and children who on September 12th of 1924 took part in some form in the "Test" which was called by the President of the United States on that date. After all reports were received from the nine Corps Areas and from the Philippines, Hawaii and Panama, it was found that more than 10,000,000 individuals answered the call. Men came from all walks of life—the banker fell in line with the farmer, and the miner marched shoulder to shoulder with the college graduate, and all had but one idea in mind, and that was to make "Defense Day" a success and put it across throughout the United States. As stated above, results speak for themselves and the "Annual Defense Test" has stood the acid test of trial by the people of the country and has received from them its stamp of whole-hearted approval.

Because America has not listened to the subtle propagandists who advocate disarming their country physically and morally, we are today in a position to take care of ourselves. So long as we are prepared, no power, or combination of powers, no matter how militaristic, can harm us. That is because of our plans for the national defense, although it must be said that our military and naval establishments are less than the country needs. If we do not try out these plans annually, we will have no means of determining

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their adequacy or inadequacy and we will soon be in the same condition in regard to preparedness as we were in at the beginning of the World War, which, as everyone knows, was deplorable.

In his address at the recent meeting of the National Institute of Social Sciences, held in New York, Secretary of State Hughes described America's enviable position in the world in the following language:

"There is no occasion to vindicate our proper authority, for no one challenges it. There is no reason to demonstrate our ability to take care of ourselves, for no one doubts it."

Who would be so foolish as to believe that such a condition would exist if America were helpless, or that she could play the rôle of the nation among the world powers, unarmed? By making prudent preparations America is "a disinterested lover of peace" and prudent preparations most surely include an Annual Test of the Defense Plans of our Nation.

NOTE: Acknowledgment is made to the *Chicago Tribune*, *War Department Press Review*, *Philadelphia Ledger*, and *The Outlook*, for certain subject matter contained herein.

THE COLEMAN FOUR WHEEL DRIVE TRUCK

BY A. W. HERRINGTON, CONSULTING ENGINEER, MOTOR TRANSPORT DIVISION OF
THE QUARTERMASTER CORPS

FIELD ARTILLERY officers who have served at Fort Bragg are intimately familiar with the capabilities of the Militor, or Type "TTH" four-wheel-drive cargo truck, forming part of the equipment of the 13th Field Artillery Brigade. Those who have not had the opportunity of seeing these vehicles in action, have undoubtedly read the account by Lieutenant Willis S. Bryant, 5th Field Artillery, which appeared in the March-April JOURNAL last year, describing his trip with the exhibition battery in 1923.

The Militor is essentially a military design. Its development was originally started by the Ordnance Department during the recent emergency.

Upon the formation of the Motor Transport Corps, the design was turned over to the new corps, and after the armistice seventy-five of these four-wheel-drive, three-ton, cargo trucks were built. This construction work, after a checkered career in the hands of two companies, who were unable to complete the contract, was finally completed by the Winther Motor Truck Company, of Kenosha, Wisconsin. Most of these trucks are now at Fort Bragg.

The field service tests of the Militor revealed some mechanical deficiencies which would require correction in future models. Some of these were so serious that a complete re-design of the vehicle would be necessary. This fact, however, does not detract at all from the actual experience that this vehicle is infinitely superior to either of the commercial four-wheel-drive types used during the recent emergency, and that the Militor in its present form gives an order of performance which neither of the older commercial types could ever attain.

Since 1919 the production of one of these commercial types has been discontinued, and the changes which have been made by the company producing the other type are of very minor character and have not contributed in any respect to an increased performance ability.

The mechanical deficiencies of the Militor are as follows:

Motor of T-head design and unsuited to use with present-day fuels.

Insufficient oil capacity in motor base and impossibility of correcting same due to lack of clearance over front axle differential housing.

Motor main shaft and connecting rod bearings too small for heavy duty required.

Wheel bearings not sufficiently protected by dirt closures.

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Wheel bearings extremely hard to adjust due to use of tapered roller type bearing requiring slight play, and to exceptionally heavy wheel assembly.

Vehicle only provided with four speeds. These are not low enough to give best possible low-gear performance and are not high enough to give sufficient road speed for ordinary good road work. As a result this vehicle does not work well in convoys with other army vehicles.

General design very inaccessible and difficult to accomplish necessary field repairs.

The belt fan drive is of insufficient capacity to properly drive the fan. This has been corrected by installing V-belt drive on all vehicles of this type.

Insufficient cooling capacity.

Vehicle very hard to steer.

The last three items could be corrected in the present vehicles, but the balance of the items would necessitate a re-design.

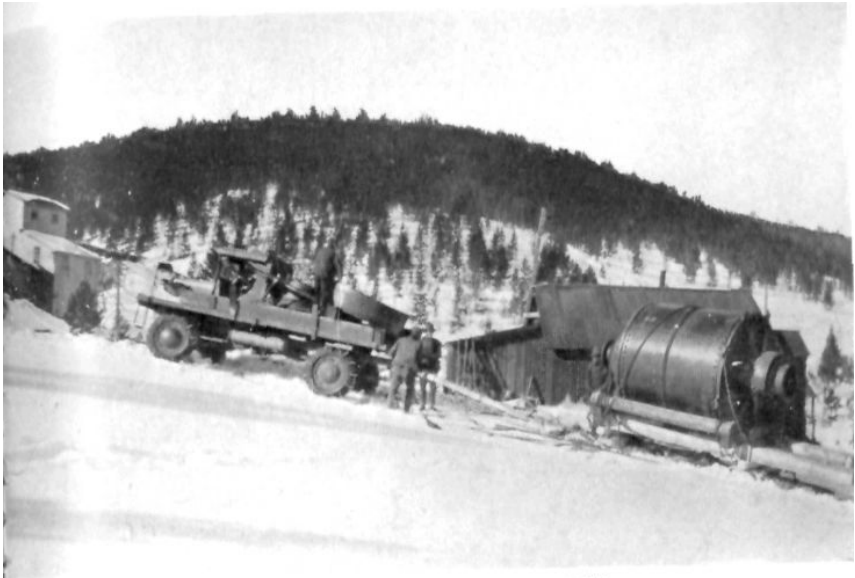
Even with these defects, the comparatively excellent results obtained from these vehicles in field service resulted in a recommendation about a year ago that the type be approved and adopted as the standard four-wheel-drive cargo truck of the Army.

The final approval of the Office of the Secretary of War could never be obtained to this recommendation, however, because the design is so special in its character and is of such a very expensive type of construction, that it could never attain a successful civilian commercial application. It is a very pretty theory to work up special designs for army transportation use, but in any extensive defensive operation in our country, our need of equipment would be immediate and we would not be permitted to take a year to eighteen months to prepare ourselves as we did in the recent emergency.

Faced with this problem the Engineering Section, Motor Transport Division, Office of the Quartermaster General, located at Camp Holabird, Maryland, has been attempting to solve it in two ways: first, to encourage some commercial company to enter into production of a suitable model, or second, to find some commercially available design which would give a corresponding order of performance. Following out this line of endeavor, the deficiencies of the Militor were all considered and the design of the 1½–2 ton four-wheel-drive or Type "TTL" (described in detail in the August 7, 1924, issue of *Automotive Industries*) was developed.

While this latter vehicle was in development, the Engineering Section came into contact with the Coleman Motors Corporation of Littleton, Colorado.

This company at that time was building a new four-wheel-drive five-ton cargo truck, and they had found that the features which were so necessary to the military application of a vehicle of this type, also produced a vehicle type which had a very wide application in the



THE END OF THE HAUL TO THE MINE



CLIMBING OUT OF A GULLY



PASSING THROUGH A BAD MUD HOLE



LEAVING THE MUD HOLE

THE COLEMAN FOUR WHEEL DRIVE TRUCK

lumber, mining and oil industries. The result of coöperation with this company has resulted in the production of a standard commercial model, which has in its preliminary field tests demonstrated a marked superiority over the Militor type.

Before proceeding further with the consideration of the military aspects of the present Coleman, it will be interesting here to consider some of its experiences in commercial application, which I have pointed out above is an important item from a military point of view. An accompanying picture shows the Coleman Truck, with five and one-half tons on the truck, and eight and one-half tons on a sled trailer. This load was carried from an altitude of 7450 feet at Idaho Springs, Colorado, up six and one-half miles to the mouth of the mine tunnel, shown in the picture, at an altitude of 10,840 feet. A twenty-two horse team tried and failed to handle this load up this severe grade. The trail is so steep for the last two and one-half miles (a rise from an altitude of 8620 feet to an altitude of 10,840 feet) that no motor vehicle of any description had ever been able to climb it.

The mine formerly handled their hauling by trucking up to the Mountain House, four miles from Idaho Springs, by trucks of four-wheel-drive design. Here the load was transferred to a six-line team for the last two and one-half-mile haul. The Coleman Truck now makes the complete journey both ways, and carries its full load. A comparison of costs per ton-mile is given below.

BY THE OLD SYSTEM

Idaho Springs to Mountain House and return:

Up 3000 pounds for 4 miles = 6.00 ton-miles.
Down 6000 pounds for 4 miles = 12.00 ton-miles.

18.00 ton-miles.

The cost of the four-wheel-drive trucks formerly used was fifty dollars per day, or twenty-five dollars for one round trip, as either of the models used made two trips per day to the Mountain House. Eighteen ton-miles at \$25.00 per half day equals \$1.39 per ton-mile.

Mountain House to the mine and return:

Up 3000 pounds for 2½ miles = 3.75 ton-miles.
Down 6000 pounds for 2½ miles = 7.50 ton-miles.

11.25 ton-miles.

The cost of the six-line team was \$35.00 per day.

11.25 ton-mile at \$35.00=\$3.11 per ton-mile.

Combined cost of team and truck = \$60.00.

3000 pounds up 6½ miles = 9.75 ton-miles.
6000 pounds down 6½ miles = 19.50 ton-miles.

29.25 ton-miles.

29.25 ton-miles at \$60.00 = \$2.05 per ton mile, by the old system of combined animal and motor transportation.

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WITH THE COLEMAN TRUCK

Cost of Coleman Truck = \$75.00 per day.	
10,000 pounds up 6½ miles	= 32.50 ton-miles.
10,000 pounds down 6½ miles	= 32.50 ton-miles.
10,000 pounds up 6½ miles	= 32.50 ton-miles.
10,000 pounds down 6½ miles	= 32.50 ton-miles.

	130.00 ton-miles.
130 ton-miles at \$75.00 per day	= \$0.5769 per ton-mile.

The use of the Coleman truck made it profitable to bring down ore which could not be handled at a profit under the old system; furthermore, it increased the daily tonnage handled and also made it possible to operate the mine twelve months of the year instead of six.

At the time the vehicle was inspected, in February, 1925, it had been in daily operation, except Sundays and holidays, since October 1, 1924. The original tires and brake linings were still on it—this in spite of the terrible climb over jagged rocks, which necessitated the entire trip, both up and down, being made in low and second speeds. This truck for fifty per cent, of its life had been driven in these two speeds; it had covered 6700 miles since October 1st, of which 3380 miles had been on this mountain grade.

The general specifications of this vehicle demonstrate that it is made up of standard sub-assemblies, and for that reason its production in time of emergency would be rapidly expandible, would not be confined to the parent company, and would be limited only by the capabilities of the unit assembly purveyors.

SPECIFICATIONS

Engine:

Four-cylinder, four-cycle, L-head detachable head, 4½ bore, 6" stroke, Buda Model YBU, counter-weighted crank-shaft. Pressure oil feed to all bearings from submerged gear pump. Horse-power 51 at 1400 R.P.M.

Radiator:

Rome Turney tubular core. Pump circulation; 22" fan driven by 2" flat belt.

Carburetor:

Stomberg standard 1¼" S.A.E. equipped with air cleaner.

Ignition:

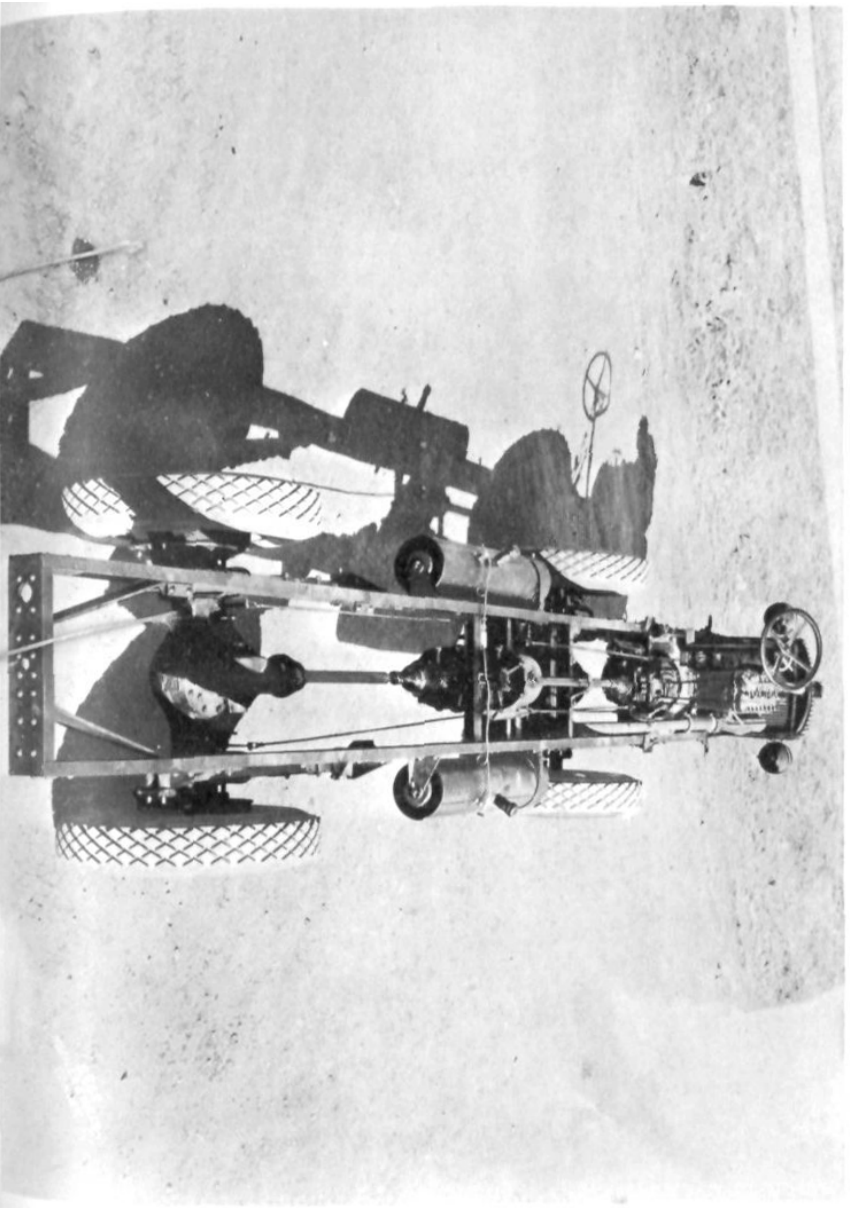
Magneto. American Bosch impulse starter.

Clutch:

Fuller multiple disc type in bell housing bolted to engine.

Transmission:

Fuller selective four-speed GU 8, mounted as unit with motor. Also drop-gear case amidships, giving 1-1 and 3-1 reductions with separate shift lever. Eight speeds forward and two reverse, ranging from 8.57 to 1 in high to 139 to 1 in low. Air pump mounted on side of transmission.



CHASSIS OF THE COLEMAN FOUR WHEEL DRIVE TRUCK



HAULING 10,000 POUNDS OF CEMENT THROUGH LOOSE GRAVEL AND SAND



FRONT VIEW OF THE COLEMAN TRUCK REACHING THE TOP OF A GRADE WITH THE
LOAD OF CEMENT

THE COLEMAN FOUR WHEEL DRIVE TRUCK

Steering Gear:

Ross Cam and Lever type.

Controls:

Hand throttle and foot acceleration for carburetor, and centrally located gear shift and emergency brake lever. Left-hand drive.

Starter:

American Bosch, S.A.E. mounting.

Battery:

Exide.

Gasoline Tanks:

Two cylindrical steel tanks, one mounted on each side member of frame. Capacity 43 gallons. Stewart vacuum tank feed.

Frame:

7" × 9¾ lb. standard steel channel, full flexible. Cross-braced for towing hook.

Springs:

Semi-elliptic, 48" long in front, 54" in rear. Silico manganese steel, 3½" wide.

Front Axle:

Wisconsin axle, double reduction type, full floating. Front wheel forms large universal joint centre point steering for steering member.

Rear Axle:

Wisconsin axle, double reduction, full floating type. Same axle shaft fits front and rear axles. Shaft of 3140 S.A.E. steel.

Axle Clearance:

15" front and rear.

Tires:

42 × 9 Pneumatic, front and rear.

Wheels:

Cast steel, spoke type rear.

Brakes:

Service brake upon propeller shaft operates on all four wheels; drum 10" diameter, 5" face. Emergency brake, two independent drums on each rear wheel, 20" and 15" in diameter. Fully equalized.

Drive:

Hotchkiss front and rear.

Weight:

Chassis without cab or body, 7780 lbs.

Dimensions:

Tread 56". Wheel base 144". Frame width 30". Frame length 22' 6". Frame length back of cab 14'.

Speed:

With 42 × 9 tires and engine at 1400 R.P.M.—21½ miles per hour.

Pay Load Capacity:

10,000 pounds.

The provision of eight speeds forward and two reverse has been worked out as a result of Militor experience. It is necessary to provide a low-gear range for duty off of the hard road. Under favorable conditions a higher range is provided so that the driver does not have to overspeed his engine to maintain average convoy speed. The lowest gear ratio, 135 to 1, is more than sufficient to

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turn all four wheels under any possible condition, without forcing the motor. The reason for this low combination is that the Engineering Section has found from experience that a vehicle of this type must have a very low wheel-peripheral speed when in soft going if it is to be prevented from digging in. When it becomes necessary with an ordinary ratio to "snatch" or "kick" the motor, the resultant momentary speeding up of the driving wheels, causes the vehicle to dig in rather than move forward.

The Quartermaster Corps has been conducting competitive tests both at Camp Holabird and in conjunction with the Ordnance Department at Aberdeen Proving Ground. During these tests the Coleman has carried 10,000 pounds, whereas, the Militor has carried a 6000-pound load. The results of this preliminary work has demonstrated the following points of superiority of the Coleman over the Militor:

- Greater hill-climbing ability, even with excess load.

- Better traction due to pneumatic tires.

- Very easy to shift gears and steer.

- Very much faster due to upper range of four speeds for hard road service.

- Greater economy due to same reason.

- Increased number of standard unit sub-assemblies, making production problem more simple.

- Decreased cost. The cost of the Coleman is less than 50 per cent. of the cost of the Militor.

- Adequate cooling.

- Standard 56" tread will fit in sand ruts.

- Increased draw bar pull.

- Very accessible for field servicing operations. Any unit subassembly can be removed complete without interfering with any other unit.

These field service tests are being continued at Camp Holabird, Aberdeen Proving Ground, Camp Meade, and McCook Field, and it has been recommended by the Engineering Section that a few of these vehicles be purchased and placed in field service at Fort Bragg, so that a parallel comparison may be made by the Field Artillery, of the relative merits of the two types.

The automotive industry is so closely related to the defense system of our country that it may be considered an integral part of it. It is very gratifying to all of the using services to find that there is a commercial field for a special army type of vehicle, which fact removes the special designation of the type and insures its availability in time of emergency.

THE AEROPLANE

A MEANS OF TRANSPORT WITH SPECIAL REFERENCE TO ITS ADAPTION TO THE CONDUCT
OF WAR

BY MAJOR RICHARD COKE BURLERSON, F.A.

THE aeroplane must be considered only as a means of transport. To treat the subject on any other assumption is false and thereby leads to faulty deductions. This statement will probably shock the reader. However, before this paper is thrown down in disgust, I would invite the reader to call forth from the dormant recesses of his brain, the many claimants for the throne in the scheme of war, which have been presented in the last two score of years.

Within my very short life, there have been presented in this country, as relates to naval warfare, three princes:

First.—The late lamented pneumatic, gun which would hurl enormous darts loaded with dynamite. This found its climax in the naval vessel *Vesuvius*. Fortunately before many such vessels were constructed and the money of the people wasted, the Spanish-American War of 1898 came along and this type of war destroyer had its test in battle, where the final verdict is always rendered. How dismally it failed is shown by the absence of the name of such a vessel in the popular stories of that war.

Second.—The torpedo boat arrived with its high speed and armed with enormous torpedoes carrying large charges of high explosives. This new instrument of warfare was, according to its proponents, to sweep the high seas of all battleships. However, we find that it met its master in a new development, the torpedo boat destroyer, and did not have to wait for final judgment in battle.

Third.—The submarine was revived. (Almost everyone is aware that such weapons were used during the late unpleasantness between the North and the South.) This time it was to be the Nemesis of its valiant predecessors and would wipe the hated enemy, the battleship, off the map. However, the naval engagements of the last great war clearly demonstrated that this could not be accomplished.

I would invite the reader's attention to the fact that these palladia have failed dismally or, when of value, have only resulted in complicating the conduct of war.

In the field of land warfare we will find the same situation. If we desire we may delve into the mist of mediæval times, and there we will find that history records that for many years the armored knight, mounted upon his armored horse, was the ruler of the field of battle. However, necessity, feeling the spur, produced the long

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bowmen of England and the results of the competition on the field of battle at Crecy are well known.

During the past century, the machine gun has been developed. When it was first made practical for use upon the field of battle, we find the French attempting to use it in batteries as field artillery, and during the Franco-Prussian War of 1870 they had the temerity to pit them against the field guns of the German Army. The results of that competition are well known. Subsequently the machine gun found its rightful place in the scheme of things military and we find it now a part and parcel of the Queen of Battle, the Infantry. Thus we find the inventions which prove of value to the land forces are adopted and are adapted to the needs of that force.

The aeroplane in the final analysis is only a means of transportation. We find it used in practically every field of that service, along with the other developed means of conveyance. It carries personnel, express, mail and freight. And it is as such that it will find its eventual use in the armed service of the nation.

On account of its very limited weight-carrying capacity, the aeroplane cannot be self-sustaining for any considerable period of time, and therefore must be assisted by the other parts of the human machine with which war is conducted. In this it reveals its common characteristic with the other tools of war, for it is the human elements upon which the war machine is built, and the material elements are only agencies by which the human elements accomplish the task which the approved scheme of organization assigns to them.

When one nation declares war and enters into armed conflict with another nation, the directing head of the armed forces must have information regarding the size, organization and location of the armed forces of his adversary in order that he may inflict his will upon them and thereby gain the victory for his nation. A great deal of this information will be obtained by spies, working before and after the declaration of war. However, from time immemorial, the latest information, and more reliable since it is not obtained by spies, has been obtained by the mounted troops, the cavalry.

In carrying out this mission, the friendly cavalry has an accompanying mission, that of preventing the hostile cavalry from obtaining information relative to the size, organization, and location of our own forces. To do this certain localities must be held by armed troops which are capable of offering combat in place. From these located masses, small patrols, generally under the command of noncommissioned officers, are sent out to obtain the necessary information. These located masses, with their covering patrols, form

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what is generally called the cavalry screen, which protects the friendly forces from observation and disturbance.

The next development will undoubtedly be that these ground patrols will be assisted by air patrols working from, and a part of, the located masses. For certainly we will not think of placing the ground man under the command of the air man; and since both of these patrols must be organized, maintained and directed by one head, the natural result will be that the observer who rides one means of transport in the air, the aeroplane, and the observer who accomplishes his task in a more laborious manner on the back of his faithful friend, the horse, will both be cavalrymen.

How similar! The horse, an agency of transport, has heretofore carried the cavalryman about his lowly task of obtaining the necessary information for the leader of the armed forces of the nation. Now he will be assisted by another agency of transport, a machine—the aeroplane. No one has ever had the temerity to suggest that the horse was other than a means of transport, certainly not since the dawn of history. This we have known for even centuries before Alexander crossed over into Asia on his campaign of conquest. Therefore we must not lose our sense of values and consider the aeroplane other than a means of transport simply because it has been developed within the past two decades.

Has anyone ever suggested that these armed riders of the horse must have the grade of officers and that they should be organized into a separate branch of the army? No, we found centuries ago in the campaigns of Alexander and of other military leaders in early history, that the rider was only an important part of the military unit which was assigned the task of obtaining the first information of the enemy. So, too, will we find that the air patrolman is only an integral and necessary part of the military unit and that there is no reason why he should outrank his compatriot on the ground. Of course it will be advanced that the man in the air is in the greatest danger. Admitting this to be true, that is certainly not an argument for giving the man in the air commissioned rank. Everyone will admit that the soldiers of the infantry suffer more casualties than their associates who drive the wagons in the quartermaster train, miles from actual contact with the armed enemy. Still, no one has the colossal effrontery to propose that all front-line fighters should be given the highest commissioned rank, and that rank should decrease as one proceeds to the rear. No! Centuries of development has shown that the question of rank depends not upon the element of danger, but rather upon the ability of the person and his aptitude, as shown by the position of responsibility intrusted to him.

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The military leader having obtained the necessary information upon which to base a scheme of manœuvre, then attempts to so move his forces as to place those of the adversary at a disadvantage. These movements result in the cavalry being pushed aside, and the main reliance of the war machine, the infantry of the opposing forces, comes into contact.

At this time the leader, to consummate his project, must obtain still further information, in order that he may so use the forces at his disposition that the chances of success will be on his side.

Heretofore this search for further information has been carried out by small infantry patrols working forward from located masses of infantry and generally commanded by noncommissioned officers. In this search for information, stealth is one of the most important factors, as the leader desires to conceal from the adversary the size and units in his forces, and every precaution is taken to prevent members of the patrols from falling into the hands of the enemy. These patrols, as a rule, do not fight, as fighting produces casualties and casualties in small patrols, some distance from the main bodies, generally fall into the hands of the enemy. Since these patrols cover the entire front of the army, a number of captures or casualties on different parts of the line would give to the opposing leader a very good picture of the composition of the forces.

In the future wars these patrols will be assisted to a limited extent by air patrols,—limited by the precautions of secrecy, as it is impossible to conceal an aeroplane. The use of any considerable number of aeroplanes on such missions would disclose the intentions of the commander and lose to him that greatest element of warfare, surprise; that great element of tactics which is practically necessary to insure success to the attackers.

Has anyone suggested that the infantry noncommissioned officers should belong to a separate branch of the service and be detailed to the regiments, battalions and companies when some task involving danger and requiring initiative and ability devolved upon the unit? No, we have learned through the experiences of warfare that they are only an important part of the infantry units and must serve with them at all times.

Does the fact that a man rides in an aeroplane in his search for information make him any different or assign to him any greater duty simply because we have not yet made the thing so that it is reasonably fool-proof? Why, of course, not! The searcher after information for the infantry must belong to the same unit, whether he rides the clean air or crawls through the slush and slime of the field of battle in his search. Certainly we would not consider for

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one instant a proposition to change the infantry into the air service and of course the one and only answer is—the air observer for the infantry belongs to the infantry.

The leader having obtained all possible information relative to the forces of the adversary, gives battle in such a manner as to best facilitate the endeavor to defeat him. To do so, advantage must be taken of all of our forces available. Prior to and during the battle, the artillery must deliver such fires upon the enemy as will best assist our infantry to advance to, and occupy, the places held by him, thereby defeating him, imposing the will of the leader upon him and gaining the victory.

To do this with modern artillery, which has been so highly developed within the past decade that its ranges now exceed greatly ten thousand yards, is a very complicated problem. The targets for the artillery extend from the nearest enemy to all that are within range of the guns. To deliver the fire of the artillery with any degree of certainty upon the target, the target must be seen by some one who is in communication with the guns firing; and since the range often exceeds ten thousand yards the problem is generally quite difficult to solve. This difficulty is met by the simple solution of transporting the person observing and directing the firing, to within sight of the target. The only means we have today which will enable us to do this for the more distant targets, is the aeroplane. Since the aeroplane, in this instance, is used for the transportation of the personnel who are responsible for the control of the firing, and who are field artillerymen, the aeroplane itself and all personnel in it must also be of the same arm, field artillerymen.

The person who controlled the firing of artillery when the ranges were so short that he could stand alongside the guns and see his targets, as in the Spanish-American War, was a field artilleryman. The person who controlled the firing of artillery when the ranges of the guns were increased so much as to require the controlling officer to walk or ride to some height at a distance from the guns in order that he could see the target, as in the first part of the World War, was a field artilleryman. Why, when the ranges have increased so greatly that the person controlling the firing of the guns must elevate and transport himself to within sight of his targets by means of that excellent agent of transport, the aeroplane, should this be changed? I do not believe that even the most rabid proponent of the air service could seriously propose such a thing. The recommendations of practically all boards of inquiry upon this subject have been very positive that the person observing and controlling artillery fire from an aeroplane must be an artilleryman.

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Likewise it follows that the person who operates this means of transport—call him a chauffeur, driver or what not—must be under the control of the observer, who is the only one in the aeroplane having a real mission. This control can best be obtained while the operator of the aeroplane and the observer are from the same unit.

There are constantly arising during the battle, situations concerning which the commanders of the higher units must have reliable information with the least possible delay, in order that they may take advantage of the favorable opportunity while the situation continues. Since these commanders will be those in control of the higher units, such as divisions, corps and armies, the information desired is that obtained by following the situation as a whole and, therefore, that which can best be obtained by officers of considerable training and experience.

Heretofore this information has been obtained by staff officers or the commanders themselves, who have gone to the different points of observation by the use of such means of transport as the litter, the sedan chair, the chariot, the horse, or the automobile. During all the centuries that this has been done no one is recorded as having advocated that the carriers of the litters or sedan chairs, the drivers of the chariots or automobiles, should be organized into a separate branch of the armed forces. We must admit that they, too, have been armed and have gone into places where the danger of losing their life was considerable.

Now we will take advantage of the latest development in the field of transport and use the aeroplane for carrying the observers to their points of vantage.

While this information could be obtained by the use of partially trained military men by employing a large number of observers, each required to report upon a specific thing, and their reports then being entered upon a map, which would show to the trained military man the situation in so far as it could be determined, a great deal of time would be required and the opportunities on the field of battle are extremely fleeting.

This information can best be obtained by the commander, his executive officer (chief of staff), or his operations officer, because they can see at a glance, viewing the situation as a whole, the conditions, and instantly the solution required by such would be known. This statement is borne out by calling the attention of the reader to the number of lost opportunities during the World War, which were lost because the commander or some highly trained officer was

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not in position to see the situation as a whole and to immediately take advantage of it.

Among the more important are:

First.—The true situation at the First Battle of the Marne, when the German High Command, through a young and inexperienced staff officer, directed the unnecessary withdrawal which lost to the Germans their last opportunity to win the war.

Second.—The true situation resulting from the launching of the first gas attack by the Germans in Flanders. It is now well known that the German Army could have marched straight through to the Channel ports, so demoralized were the British, caught as they were without any means of defense against such an insidious weapon.

Third.—The true situation at the Battle of Cambrai, in 1917, when the British launched the tanks in mass for the first time in an attack. It is now well known that the British broke completely through the defenses of the Germans and, had the commander of the British known the situation, his reserves, launched in an attack through this breach, would have, at least, greatly changed the military situation and might have won the war.

Fourth.—The true situation in the British Fifth Army after the German attack of March 21, 1918. Here the Germans after several days' attack finally completely ruptured the line at its juncture between the French and the British. Had this information been immediately available to the German High Command, there can be no doubt that we would now be paying tribute to the German Empire instead of trying to find some means by which the Dawes Plan might be enforced.

Fifth.—In the operations of the American forces in France there will be found to have been three most favorable opportunities to inflict great harm upon the enemy. At Soissons, in July, at St. Mihiel in September, and at Varennes in the Argonne. Complete ruptures of the German lines were made and in none of these instances were any German reserves available to stop the advance of American reserves, had the advance of the American reserves been ordered at the time of the rupture and shortly thereafter.

One can safely state without fear of contradiction that, had trained military men been observing in the command planes, these favorable situations would have been seized. Such conditions demand that the aeroplanes assigned to the headquarters of a unit for command observation purposes, be in the same category as the horse and automobile have been up to this time. The function of all these means of transport is that of carrying personnel, and they do not differ basically from one another. They are all used to increase

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the efficiency of the armed forces and for that reason, and only that reason, do we find them utilized by such forces.

The development of the military systems of the different countries has been so great within the past century that the contending forces of any of the first-class powers in any war of importance in the future will number more than half a million men. To maintain such numbers in the field with the present complications due to the many instruments of destruction, there will be required very large supply centres, stretching from near the battle front to many miles to the rear and served by many lines of communications, such as roads, railroads, rivers, steamship lines, etc.

As can be easily seen, the destruction or serious interruption of the system of supply will force the enemy to withdraw, and any force during the process of withdrawal is in a very serious situation. If attacked in such a situation, it is liable to suffer a serious defeat. Thus it will be seen that it is of great importance to attack the supply system of the enemy.

The supply centres and communication systems which serve them, are generally located beyond the range of artillery which will accompany an army into the field. Then to reach these important targets, some method by which large explosive charges can be placed with accuracy upon them must be used.

In its present development, the bombing aeroplane is greatly handicapped. During the World War its effects can be limited to that on the morale of the armed forces, as the material damage effected was either negligible or easily repaired. The average reader has been led to believe through clever propaganda that the bombers wiped out large cities and buried the railroads in a mass of broken parts. However, I am forced to call attention to the facts that the ports of Ostend and Zeebrugge, which were used during 1916–18 as bases for submarines by the Germans, were within approximately eleven and twenty-five miles, respectively, of the front line, and that they were bombed throughout these years. In spite of all this bombing, it was found necessary to resort to the old methods and raid these places from the sea during 1918 with a very large naval force, which utilized a number of vessels and hundreds of men.

An examination of the facts will also show that although the Allied forces rained tons of explosives upon, or at, the German railroads, they were found to be practically uninjured when they were taken over by the Allies after the Armistice. It has been reported by eyewitnesses that the bombing of the great railroad junction of Montmedy resulted only in the destruction of a few cars of cabbage.

In its present development, the bombing aeroplane is seriously handicapped, first, by lack of speed, since it is a weight-carrying

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machine, and, second, by lack of climbing power due to the same cause.

The first handicap makes it a prey of the swift pursuit plane and requires that the bombers be protected by friendly pursuit planes.

The second handicap makes it the prey of the anti-aircraft artillery. It is often stated that the anti-aircraft is very inefficient, and that during the World War pursuit pilots, desiring a thrill, would go out and play with the enemy anti-aircraft artillery. Of course the proverbial grain of salt must be taken with such tales and one must remember that with the years the daring bravery (?) of these pilots will undoubtedly increase. It is a well-known fact that once the anti-aircraft artillery opened up on the plane that the plane suddenly found business elsewhere. That is perfectly natural. The plane did not have any means of positive defense against the gun and could not be expected to take any chances of accidents (?).

Undoubtedly the bombing aeroplane will increase in efficiency; however, we must not forget that the increase in efficiency of the pursuit plane will probably be greater, as it is not handicapped by weight-carrying requirements. Likewise the anti-aircraft artillery will greatly increase in efficiency. In this connection it will be well to remember that the anti-aircraft artillery is a later development than the plane, and that here again we have the same old problem which has been with us since the dawn of history, OFFENSE vs. DEFENSE. We must remember that victory in this struggle has, until the present time, rested first on one and then on the other, and that we must expect this teetering of the balance to continue.

Still the problem of placing the bomb upon a supply centre, on some important part of the lines of communication, or on any other equally important target, is simply a problem of transportation; and in the solution of that problem we must consider the aeroplane only as a means of transport or there will enter into the solution the destroyer of so many excellent plans—the false premise.

In my limited studies on the bombing aeroplane, I have not finally, in my mind, placed this means of transport in the scheme of things military. However, even a superficial study shows that the bombing aeroplane has many things in common with the modern artillery. The more deeply this study is continued the more I find similarities. I find the following things are now used in common:

The use of gasoline engine propelled vehicles.

The use of ammunition trains handling high-explosive projectiles of great weight and power.

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The use of instruments for casting upon the enemy large explosive projectiles from great distances.

I am thoroughly convinced that the development of the bombing aeroplane and its enemy, the anti-aircraft artillery, can best be carried out by a thorough understanding of both; and it is believed that this understanding will best be reached by associating the two together in their development.

It must be realized from the beginning that the proponents in their enthusiasm are liable to claim great things for their favorite child, and that the greatest dissipator of myths is the record of the past. A study of the records of the bombing aeroplanes of the American forces in France shows that they were very unreliable agencies of destruction, to say the least.

The records show that, with few exceptions, the day bombing aeroplanes flew at heights exceeding 10,000 feet, and that practically all of the bombing was against targets which were within range of the artillery of the forces with which they were operating.

The records also show that these instruments of transport are very similar to all other such instruments. We find that they were constantly getting out of repair. In fact, they were so faulty in this respect that we find that only approximately seventy-six per cent. were available for use on this account. We also find that they greatly resembled that other means of transport, the automobile in its early days of development; for we find that only sixty-eight per cent. of those started on bombing missions were able to reach their targets, and were found disabled along the countryside for one reason or another. We also find that they were handicapped greatly by weather conditions, as on twenty-five of forty-seven days of the Meuse-Argonne operation they were unable to participate on account of this handicap.

The records also show a remarkable tendency to stay away from the target assigned. Often when it is reported that the clouds prevented the bombing of the assigned objective, we find that they were able to bomb some other towns only a few miles away. One is led to think that the clouds in which they were operating were very peculiar—the evil-minded might suggest that the clouds were formed either from the bursting shells of the anti-aircraft artillery or by the wings of the hostile pursuit aeroplanes.

Thus we see that the aeroplane in all its adaptations to the armed land forces of the nation is only a means of transport and that its future development, which undoubtedly will be great, must be pushed with that end in view.

THE HARDBOILED C.O.

BY MARTIN GALE

CORPORAL TUERNEY first heard the glad news when he carried the morning report to headquarters; an hour later it had spread through the battery. One man would stop another with, "Heard the news?", and at the answering "Naw," a face would be wreathed in smiles. "Old Treat-'Em-Rough's outward bound—the B.C. is ordered away. Oh, Boy!" And both would break into jig steps to show their pleasure. Even old Mess Sergeant Brummler, a perpetual grouch, was seen to smile. The battery rejoiced. Only the top cutter and Sergeants Maroney and Huyles said nothing, but then the only times that they talked much was when they bawled out the sections.

That night in the day room the battery went into the matter at length. As always, wild rumors were rife, until Corporal Tuerney declared that he had heard the Captain say that he had been ordered to school.

"D'ya think he'll come back?" asked a rookie.

"Naw," answered Tuerney. "They never come back to the same outfits now. He'll go to some other outfit or to the Reserves, when he gets through school."

"Oh, Boy," said Private Filley. "Maybe we'll get a B.C. like B Batt'ry's got, a guy that won't always be ridin' us, an'll let us have a little time of our own."

Sergeant Maroney spat scornfully. "An' I suppose ye'd like to have this outfit like B Batt'ry—a bunch o' Bolsheviks wit' dirty equipment an' dirty harness, always gettin' bawled out by the Colonel." There was no answer.

At noon the next day Sergeant Huyles coming out of the mess hall ran into a group of the older men of the battery, gathered on the porch. As he approached he heard Brummler say in a voice intended for the Captain's, "'Brummler,' he says, 'if you don't put out a better mess I'll bust you.' The trouble makin' old crocodile!"

Sergeant Huyles broke into the centre of the circle. "Brummler," he said, "you know, an' everyone else knows, that if the Skipper didn't ride you you'd never get off your bunk, an' we'd never eat. If he rode you twict as hard you'd be a good mess sergeant. Lay off knocking him. He's made this the best outfit in the regiment, an' you all kick because he won't let you loaf. There ain't one of you guys got any kick comin' an' there's lots he's done things for, when you needed it. Brummler, who lent you the money to go home when your sister was sick? Hickery, didn't he go down an' get you out of

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jail? Brun, who sat up all night with you when you was run over? Ya make me sick, you bunch o' Bolsheviks!"

The following morning, after drill, A Battery stamped into barracks in a high state of elation. Corporal Block, assisted by an excited crowd of privates, gave the good news to the supply sergeant, who had spent the morning among the memorandum receipts. "Boy, ya'd orta seen us put it over today," he exclaimed. "The Colonel was out, an' F Batt'ry put on a drill for him. Ya know how good they think they are. Then he come over to us an' we put on a drill, an' by Gee, ya'd orta seen how we done it. The Colonel told the Skipper it was the best mounted drill he'd seen in the regiment. I'm goin' over to F Batt'ry to see what they got to say."

The battery had just settled down after supper when two men from B Battery visited the barracks and loudly made their presence known. "Say, when does that hard-boiled ol' mutt of a C.O. o' yours git out?" asked one, expecting an approving answer.

Corporal Swiftney rose and approached belligerently. "See here, guy," he ordered, "lay off that knockin'. Our C.O. is the best in the regiment. He's hard-boiled, an' so are we. If you had a captain like him, you wouldn't be the rotten bunch you are. Shut your trap or I'll ram my fist down it." And all the men in the room nodded approval. Then and there a new idea was presented and spread like wildfire through the battery.

On the day before he left the post, the Captain took retreat for the last time. As the final notes of the bugles died away, he swung about, facing his men, and made the first speech of his career. "Men, I'm leaving you tonight. You're a good outfit, and I'm proud of you. First Sergeant, dismiss the battery."

The first sergeant saluted and stepped forward. "Captain, the battery wants to give you something so you won't forget us. For all that you've done for us." Sergeant Brummle came from behind the line of men, bearing a silver-mounted saber.

The Captain took it from him. He tried to speak and failed. With eyes full of tears he held out his arms toward his battery and turned away.

Then it was that A Battery's cheering brought heads to every window in the post.

WHAT THE GERMANS THINK OF THE FRENCH ARTILLERY

BY COMMANDANT DE CASTELNAU

TRANSLATED FROM THE "REVUE MILITAIRE GÉNÉRALE," BY MAJOR F. T. ARMSTRONG, F.A.

EVEN after a war as long as that through which we have just passed, real difficulties are encountered in attempting to appreciate the true worth of the French Army; especially in determining in what and why it was superior or inferior to its adversaries. In truth, we are both judge and an interested party; and, although the facts are usually well established and well known, their interpretation is always extremely elastic and can serve to uphold the most opposed theses. Therefore, it is of value to know what our enemies think of us, no one being more qualified to judge of an action than the one who has received the effect of it.

It is for this reason that it seems interesting to study the judgments which the Germans have passed on the French artillery during the course of the war. It should be understood that it is not intended to accept their opinion without question for, with them as with us, hasty judgments, superficial criticism, and prejudiced works abound. Consequently, we shall confine ourselves to the appraisals of competent persons and those well situated to know the facts. But, here also, it is important to make a careful selection, for the German is a pastmaster in presenting the facts to suit his case; and upon a subject which is so close to the dogma of the infallibility of their High Command, their good faith can scarcely, and their critical spirit cannot at all, be counted upon. Therefore, we shall utilize only documents supported by precise facts—notably orders given during the war, when the gravity of the situation forbade recourse to the usual recantations and when the sole means of obtaining from the executants the necessary efforts was by placing brutally before them the truth.

We possess information of the first order as to what the German high command thought of our artillery before the war. It is known that there existed in Germany a special body, the Great General Staff, the rôle of which was only to study and draw up plans of operations. Depository of the traditions of the conquerors of 1813 and 1870, responsible directly to the Emperor and consequently independent not only of the Reichstag but also of the minister of war, it was composed of the élite of the army and drew from its most illustrious chief. Marshall von Moltke, this prideful appreciation: "Our enemies can envy us for it; they do not possess its equal."

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The Great General Staff included, among other services, a section charged especially with studying the French Army. Of course, the reports which it made were secret—intended for the Emperor and the principle chiefs of the army—and reflected, therefore, with all possible exactitude the opinion of Berlin on our military situation. A recent work of General von Kuhl, former Chief of Staff of von Kluck, gives us a résumé of a report drawn by the Great General Staff at the beginning of 1914. The organization, instruction, tactics and the eventual plan of campaign of the French were studied in great detail and with real solicitude for objectivity. The different arms were successively considered and appraised as much from the point of view of their value as of their tendencies. As to the artillery, General von Kuhl commences with an account of the ideas which were then held:

"One of the most discussed questions during the years preceding the war was the tactical employment of the French artillery.

"The Great General Staff issued numerous reports and articles in which were studied the development of theories on the employment of artillery in France. These brought out the differences of opinion which marked the partisans and adversaries of the well-known General of Artillery, Percin, who did not believe in the efficacy of the artillery duel and thought that the principal task of the artillery was the immediate support of the infantry. His opponents recommended putting the hostile batteries *hors de combat*, and criticised Percin's thesis as bringing on a scattering of the artillery effort. The 1910 regulations were not clear—they did not state that the artillery duel could be decisive but enjoined, nevertheless, attempting to destroy hostile batteries whenever possible without too great a consumption of ammunition. They attached the greatest importance to the maintenance of the closest liaison between the artillery and the infantry.

"In battle, Percin thought that the artillery should not be assigned to infantry organizations but to the large combat units. His adversaries did not give up their idea of seeking the decision in the artillery duel and refused to place the artillery systematically in support of the infantry as the General demanded. To them it was not only possible, but indispensable, to master the hostile artillery if the infantry attack was to succeed. They drew an argument from the progress of aviation which permitted the reconnaissance and observation of defiladed enemy batteries. They held that it was necessary to engage the whole of the artillery after a coördinated plan and that Percin's doctrine tended to employ it piecemeal. In the observations which he drew up following the 1911 grand manoeuvres, General Joffre, who was then Chief of the French General Staff, clearly decided against this alleged dispersion of effort

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and in favor of engaging the large artillery units as a whole after a coordinated plan. In order to facilitate fire against defiladed objectives and the occupation of defiladed battery positions, field pieces were designed with a view to fire with very curved trajectories. For the destruction of the hostile artillery, the amount of heavy artillery was greatly increased. These new tactical considerations were not always presented clearly in the regulations; but in practice, they were more and more employed as the use of air observation for artillery fire increased. It was only a short time before the war that instructions relative to fire with air observation against defiladed batteries were added to the field artillery drill regulations. There resulted correlative modifications in the employment of the arm which necessitated the insertion of extra pages in the regulations. Since the development of aviation seemed to furnish the means of destroying defiladed batteries, there was a renewed tendency to seek the decision by the artillery duel."

After the foregoing theoretical discussion, General von Kuhl proceeded to an appraisal of the artillery before and during the war, expressing himself as follows:

"The French artillery was the *arm d'élite*. During the war it proved itself deserving of the reputation it had acquired in time of peace. The French have always been considered very clever from the technical point of view. They not only invented the cannon protected by an armored shield and with long recoil, but they knew how to determine with great perspicacity the modifications in the employment of artillery brought about by new matériel. Eminent artillerymen did not hesitate to tread new paths and discovered at the proper time how to keep abreast of the constant development in technique. This was not the case with us. Both from the angle of the construction of new matériel as well as the changes thus brought about in the realm of tactics, we followed the trail blazed by the French with much hesitation. The adoption of long recoil pieces, the systematic use of defilade, the abandonment of the employment in mass and of the artillery duel, and close liaison with the infantry—all of these, and many others, were adopted by us very cautiously. Our young artillerymen were generally won by the French theories but the regulations were changed very slowly.

"During the war, we were able to discover that we had very many things to learn from the French artillery.

"As to field artillery matériel, we thought before the war that we were about on a par with the French. Advantages and disadvantages balanced. The calibres were comparable—77 mm. for us and 75 mm. in France. From the ballistic point of view, the French field gun was superior to ours—its muzzle velocity was 529 metres per second as compared to our 465 metres. The independent

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line of sight constituted an advantage for the French as it materially speeds up the laying. On the other hand, the German gun was lighter, especially in battery. The 75 required the use of a brake for the first shot. The war has once more confirmed the experience of all campaigns—in time of peace, mobility is the important desideratum; in war, ballistic efficiency is of greater importance than lightness of matériel. The French piece was superior to ours—we learned this from hard experience.

"It was only in 1914 that the French began the development of heavy artillery. The Rimailho 155-mm. howitzer, model 1904, was out of date and the piece which was to replace it was not yet in service. A new 105-mm. gun had been adopted but was only beginning to be manufactured. It was necessary to manufacture all the heavy artillery after the start of the War."

We see that the Great German Staff followed very closely the intellectual development of the French artillery before the war, but, not being sufficiently familiar with the new and fecund ideas, it hesitated to deliberately adopt them. It was only during the progress of the war that the sanction of experience, according to the author we have just quoted, has led it to see that we were correct.

Leaving out of consideration the heavy artillery, which we shall have occasion to take up later, the superiority of the French artillery is manifest. This is the formal conclusion reached by General von Kuhl. It must have hurt his pride as a Prussian officer considerably and he made up for it by appraising our other arms very much less highly and sometimes in a way even quite devoid of benevolence.

The well-known General Rohne, in a series of ringing articles in the *Artilleristische Monatshefte*, considered the same subject and arrived at the same conclusion. "The French artillery," he writes, "adopted long before the German the combination fuze, smokeless powder, explosive shell and the long recoil piece which, thanks to its ballistic efficiency, to the large busting charge, and especially to its independent line of sight, has great advantages over the German field gun. The French have likewise adopted in good time the tapered ogive and the stream-lined base with a view to decreasing the air resistance. Before us, they have realized the important consequences which these new inventions have brought about from the point of view of the organization and the employment of artillery. They have deduced the fact that defiladed positions were necessary and have adopted appropriate methods of fire. The German artillery followed them only with hesitation. At the right time, the French decreased the number of pieces in a battery from six to four, having correctly decided that some rapid fire guns well provided with ammunition are of more value than a great number of pieces insufficiently supplied. They studied thoroughly the difficulties

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which are met with in laying in defiladed positions and the problem of the covering mass. They endeavored particularly to prepare their fire with a view to its opening by surprise and to passing to fire for effect as soon as possible. They recognized that it is only exceptionally that the latter fire would take the form of precision fire; and that it is more effective to cover the terrain rapidly with a rain of projectiles. Finally, the French have applied before us the method of adjusting time fire."

The German field artillery is not content with giving us credit only in the matters just mentioned but adopted during the War solutions of other questions of the greatest importance. Thus, after our example, it replaced its combination projectile by two different projectiles—shrapnel and shell. And like us, it has formed field artillery regiments unassigned to divisions.

General Rohne does not hesitate to conclude: "The War has formally shown that the French field artillery greatly surpassed the German not only from the point of view of matériel but also—which is of importance—from the point of view of its employment. If the German field artillery was able to hold its own, it owes it in part to the superiority of our heavy artillery."

A close study of the orders of the High Command which have fallen into our hands prove that the French not only knew how to maintain their initial advantage but that the Germans were not long in losing their lead in respect to the heavy artillery. On several occasions, Ludendorff referred to the insufficiency of the results obtained by his artillerymen and to the superiority of fire of ours. In January, 1918, when he was preparing for his supreme offensives, he did not hesitate to pass severe judgment upon the efficiency of his artillery during the preceding years. "An increase in the effectiveness of our artillery fire," he writes, "is of decisive importance to the success of the battles we are to fight in the spring." Later, he complains of their inferiority in counter-battery: "In one month, the fire of the enemy has completely destroyed, in round numbers, 13 per cent. of the pieces engaged in the battle. This figure illustrates clearly the value of an efficient system of counter-battery. Consequently I request the making of such arrangements that, on our side also, we employ all available means to the end that counter-battery be pushed with all possible energy." The failure of the German counter-battery was due in large part to the lack of scientific instruction of the officers which prevented them, until the end, from making full use of air observation. Complaints on this subject abound. With respect to the battles of July, 1918, in the Champagne, one German army did not hesitate to publish the following criticism in one of its orders: "Occurrences of July 15th and 16th have been the same as those of the preceding offensive battles.

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Numerous attempts to adjust fire by wireless with air observations have failed. . . . Wireless details, both officers and men, have not been up to their job. The incapacity of the artillery to utilize the reports of the artillery observers was apparent and flagrant." Thus, it is not without reason that General von Hoepfner, Chief of the German Air Service, uttered the following bitter recriminations: "The artillery showed slight comprehension of the services which the air service could give it. It was not unusual to see wireless sets which did not keep up with the advance of the troops, panels which were not used for signalling, and batteries which did not possess maps indispensable for the designation of objectives. And the information gathered by aviators at the risk of their lives, only too often remained unutilized."

There was the same resistance and the same incomprehension on the part of the artillery when it was a question of employing for adjustments, the information furnished by the meteorological service. On this subject, Ludendorff issued a severe order: "There is frequent complaint of the deficiencies of our artillery in spite of the many adjustments—for example, too much firing on the infantry. These complaints are justified It is probable that hundreds of thousands of projectiles are wasted each month, without any effect. In spite of the great consumption of ammunition, there is no guarantee as to the efficacy of the fire It is necessary to obtain a knowledge of ballistic matters more complete than that possessed by most of our officers—it is also indispensable to have good firing tables." And the order of the General ends thus: "It seems that the French, whom our troops have many times declared superior to us in the art of firing, are making efforts in the same direction (utilization of meteorological data for the preparation of fire), and are seeking to perfect the accuracy of their fire. We must not let them surpass us." This is a singularly flattering appreciation of the French artillery when it is considered that it came from the General-in-Chief himself and was brought to the attention of all artillery units.

The inferiority of the German artilleryman seems thus to be well established if one believes the great chiefs of their Army. There remains, then, to explain how it happened that the same Army, which reasoned so badly as regards the field artillery, reasoned so well in the case of the heavy artillery and was able to put into line from the very beginning a great proportion of batteries of large calibre which was certainly one of the factors in their early victories.

At first this question seems difficult, but it suddenly clears up if the genesis of this artillery is studied. Contrary to what was the case in France; in Germany the heavy artillery and the field

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artillery constituted two quite distinct arms between which there existed no relationship and which developed independently of each other. But while the field artillery disdained scientific questions and remained obstinately attached to obsolete methods, the heavy artillery was forced, and not without success, to develop the mathematical instruction of its officers and to interest them in questions of fire. It is undeniable that, with regard to organization, armament, and methods of employment, it was more advanced than the heavy artillery of most other countries. But, if the cause of this superiority is sought, the conclusion is certain, though unexpected, that the German heavy artillery was really the result of the efforts of two general officers who were not artillerymen—General von Waldersee, an infantryman, and Marshal von Schlieffen, a cavalryman; and that not only have the artillerymen not participated in its creation but have opposed it with all their power up to the last moment.

We have absolute proof of this. It emanates from General von Freytag-Loringhoven, a military writer highly thought of in Germany, who is particularly well informed in what concerns the Great General Staff where he served during his whole career and of which he was the chief during a part of the War. He informs us that the heavy artillery began to be important during the epoch when Count von Waldersee was chief of the Great General Staff. It was then destined to reduce the French frontier forts. But it is Count von Schlieffen, successor to Waldersee, who deserves credit for having developed a more complete and much broader idea of the rôle which this arm could play. This remarkable officer understood the principle that the strength of obstacles is increased directly as the weapons designed to attack them, and that, consequently, it was necessary to bring on the battlefield a piece capable of destroying them. As to the opposition he encountered before his ideas triumphed, Freytag-Loringhoven writes as follows:

"The task in which Count von Schlieffen met the greatest difficulties was in the organization of the heavy artillery of the Army, such as it exists today. The beginnings of this arm take us back to the time when Count von Waldersee was chief of the general staff of the Army. . . . But as a matter of fact, at this epoch its development was limited to increasing the mobility of the small trains of siege artillery charged with attacking the frontier forts and the possibility was foreseen of eventually utilizing some batteries detached from these formations for other missions. But when Count von Schlieffen wished to arrange that all the foot artillery, which could be made available, be capable of participating not only in attacking the frontier forts but also in the execution of all other missions on the battlefield, he encountered increasing and general opposition.

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"The difficulties emanated in the first place from all the artillery services in the Ministry of War. The state of mind which reigned then in these spheres may be characterized by a marginal note, following three interrogation signs and three exclamation marks, which was written on a *mémoire* of the Great General Staff which the minister of war had just returned. This note, the author of which was an officer who later had a fine career, ran thus: 'Does the Chief of the General Staff of the Army pretend to transform foot artillery into a mobile body?' Count von Schlieffen was content to write below this the single clear reply: 'Exactly.' At that time, as a matter of fact, the foot artillery did not form part of the mobile army, properly called, but of the fixed forces and other analogous formations. Farther on, the same *mémoire* demanded for the heavy artillery a modern steel piece, and a marginal note replied that bronze was perfectly satisfactory.

"Despite the opposition of his subordinates, the minister of war ended by approving most of the recommendations of Count von Schlieffen. And it is only just to add that, when the artillery commission was charged by the minister with designing a piece of the type indicated, it went right to its goal and succeeded, with remarkable rapidity, in offering a steel howitzer to the heavy artillery which was considered a model piece for a long time.

"The field artillery was also put out when it was seen that the foot artillery, which it had always treated as a poor relative, was going to demand its portion of the cake. Its had humor was understandable for it was very disagreeable for it to hear continually that the field artillery was no longer able to carry out its mission alone and that it had to have the support of the heavy artillery.

"Among engineer officers, the new conceptions had some partisans, a great majority were indifferent, and there were a certain number of determined opponents. There were not lacking jokers who made fun agreeably of the 'horse-drawn siege artillery' which presumed to escape from the pigeon hole where the theories of fortress warfare had, until then, prudently relegated it.

"But the strongest resistance came from the foot artillery itself. This arm did not know how this revivifying action was going to contribute to its development; and, of its officers, those who had reached a certain age assumed a skeptical and surly attitude. Count von Schlieffen often expressed his astonishment at this hostility encountered in the foot artillery itself.

"There were times when it appeared that the efforts of the Chief of the General Staff had come to naught. He said of such occasions: 'In the face of this general resistance, I often ask myself if we are on the right track.' It might have been answered that when a correct conception is reached, it must be hammered through

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against all opposition and such was the conviction of the Count von Schlieffen.

"That is why the fight was pushed. Resistance ceased progressively, even in the foot artillery. This was particularly due to General von der Planitz, Inspector General of that arm, who succeeded by indefatigable activity in interesting the corps commanders and the other arms more and more in the heavy artillery."

There is nothing that can be added to this account made by an ocular witness of unusual authority. Not only was the heavy field artillery not the work of German artillerymen but it was brought into being in spite of them; and, from the lowest to the highest ranks, they exhibited an obstinate incomprehension right up to the the end.

Thus the conclusion to which we have brought this study of German documents is clear. The French artillerymen were superior to those of Germany and the enemy high command has admitted the fact—an admission all the more remarkable because it is unique. In the case of all the other arms and services without any exception (high command, general staff, infantry, cavalry, air service, etc.), the Germans, although giving credit quite frequently to their adversaries, believe, or pretend to believe, that theirs were without equal during the whole War. And in this case, moreover, it is not a question of a temporary superiority as was the case, for example, with respect to the German machine guns the ascendancy of which, very clear at the beginning of the campaign, disappeared from the day when we adopted their organization (the grouping of sections in companies) and their methods (the systematic seeking for enfilade fire, concentration of fire, etc.). Not only was the German artillery in second place at the start but Ludendorff's orders show that it was never able to get on even terms.

Necessarily, then, there was a permanent element of superiority in the case of the French artillery. And it is not without interest to discover the reason for it.

It is not simply a question of matériel. As a matter of fact, the heavy matériels, constructed by private manufacture on both sides, were about equal. As to the 75, whose superiority is recognized by all—which honors to the utmost the officers who constructed it—it is not sufficient to have given this advantage. And history proves that the efficiency of artillery depends not only on the value of its matériel but also, to a great extent, on the manner of handling it.

Therefore, we must seek the cause of the inequality in another direction. Since it cannot be charged to the matériel, it must be charged to the personnel. It is difficult, however, to hold that the personnel of the German artillery were inferior to ours. The German soldier possesses to a high degree the first quality of the cannoneer—discipline.

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His lack of initiative, besides being relative to a degree, is of less consequence in the artillery than in the other arms. All his training tends to raise his morale and mechanize his reflexes which brings about the same obedience on the battle field as on the drill ground. His under-officers were almost all professional soldiers and knew their business perfectly. Finally, the means of instruction available to the artillery were much more complete in Germany than in France, in that each army corps possessed in its area an instruction camp of sufficient size for the manœuvres of a division. Some even had two such camps. Each year, all the artillery regiments took part in joint manœuvres and held schools of fire at camps as vast and as well managed as the best of ours—Sissonne, La Courtine, or Mailly.

But, if the troop personnel were comparable, the officers were not; and the contrary would have been surprising. The French and German artillery had absolutely different ideas in all that concerns the recruitment, instruction, and utilization of their officers. Germany had before the war the system of the single military school. To be commissioned it was necessary to graduate either from the cadet school or military schools called "schools of war" which were analogous to Saint Cyr. The principle characteristic of these institutions was that each of them was composed of young men destined for all arms and gave to all the same instruction. The apprenticeship period terminated eventually in the regiment and in diverse schools of application. Here was a system which it is astonishing to find in a nation the whole organization of which was based on the narrowest specialization; and two consequences resulted that were regrettable for the artillery. On the one hand, the infantry, because of its prestige and its rôle on the field of battle, and the cavalry, because of its traditions and the attraction of its service, called the most brilliant of the young men desiring a military career; and, on the other hand, the officers commissioned in the auxilliary arms had only a quite summary scientific training, like their comrades of the other arms, and there was nothing to lead one to believe that they had the taste or the means to develop it later.

Germany did not have, as in France, two schools, one of which was specially charged with furnishing the artillery with officers endowed with the scientific spirit and with giving the army a body of valuable men who, without this training, would have turned to other careers. With this system, from a military viewpoint, our enemy was only able to utilize very incompletely the numerical and intellectual resources which they could find in their youth. Their single military school was only able to attract those of a certain class which, by heredity or education, was the traditional and almost exclusive source of officer material. Nothing was done to attract

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candidates from the rest of the nation and, in particular, from the increasingly numerous class of young men which the magnificent industrial growth of modern Germany attracted to the study of the pure and applied sciences. One and the same source supplied the corps of officers. From this, it followed that in order to raise the level of one arm it would be necessary to lower that of the others; and especially, that the improvement of the artillery would have been to the detriment of the infantry.

It is this lack of mathematical training which explains the incomprehension, and, even, the repulsion which was manifested by the German artillery whenever its chiefs demanded that it utilize and put in practice the discoveries of modern science. Typical examples have been given above in connection with air observation using wireless, and corrections of the moment. Furthermore, it follows that, with so limited a scientific equipment, the German artillerymen were not able to construct their own matériel; and that this was left to the engineers of Krupp and Ehrhard. They were content with keeping it in good condition and with manœuvring it, conforming to the regulations; but they scarcely attempted to perfect or develop it since these researches manifestly exceeded their ability. This line of demarcation between those who manufacture the matériel and those who use it has been a bad thing for the German artillery and, in spite of efforts to establish liaison and a fecund collaboration between them, contact between the regiments and the constructing establishments necessarily remained weak and distant. The former lacked the science; the latter, the experience. Except for rare exceptions, the officers were quite ignorant of the manufacture since they did not participate in it in any way. It was not astonishing that they were scarcely interested in their matériel and an artilleryman who does not take a passionate interest in his matériel is like a cavalryman who is disinterested in his horse.

The ideal artilleryman ought to be both a theoretical and practical man, a scholar and a man of action, a technician and a tactician. To find all these qualities combined in one man is extremely rare. But such men do exist; and it was a very happy solution for us to try and combine these qualities in the entire arm. From this system, resulted the continuous ebullition of ideas which manifested itself in the French artillery and which, thanks to the presence of a technical ferment, brought about new and fecund realizations. There was nothing like it in the German artillery. Its officers were conscientious, profoundly military men, knowing and applying their regulations exactly, but incapable, as events have shown, of directing the evolution of their arm, and forced to await directions from the High Command, which they were sometimes slow in understanding, or to follow the lead of others, in particular the French artillery.

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Inferior on the intellectual and social scale to their comrades in the cavalry, the aristocratic arm, and the infantry, the arm of great traditions in Prussia, they have given to the German Army none of its great chiefs and have only affected its development slightly. In all their history, we vainly seek names comparable to those of Langlois, de Miribel, and de Bange to speak only of the dead. Their most brilliant officers left the arm where their intellectual activity had scarcely an outlet and entered the General Staff. This was true in the case of General von Gallwitz, the only German artilleryman who reached a high station during the War. These general staff officers were able to give valuable service in that capacity; but they were none the less lost to their arm. When an artillery leaves to others the construction of its matériel, much interest in its technical side is sacrificed; and it is thereby deprived of the most certain means of retaining its best officers.

This reason for its weakness has furthermore not escaped all the German military writers and General Rohne, in particular, has brought this out in a series of recent articles in the *Artilleristische Monatshefte* which have aroused lively polemics beyond the Rhine.

"Since 1913," he writes, "I have held that it is because of the low scientific standard of German field artillery officers that the French artillery has forged ahead; and very serious efforts are necessary to overtake their lead. . . . Since private industry furnishes the army its matériel, the rôle of the technical officer has changed. He no longer has to draw up projects with respect to cannon, projectiles, carriages, etc., but he must be sufficiently familiar with their construction that he will not make impossible demands and that he can give an exact opinion on propositions submitted. This requires a very considerable knowledge; and I could cite cases where officers, occupying posts which called for good technical learning, have made impossible assertions, which have moreover been accepted shortly after, or have rejected quite logical propositions.

"The officer who has to pass judgment on a proposition must be capable of deciding if it deserves being given consideration or if it should be rejected at once. It often happens that it is based on a false conception or, indeed that it affirms nothing new. Only an officer thoroughly grounded in his profession will be able to give a sound judgment on a proposition. It is indispensable to have good artillery knowledge in order to carry out experiments which attain the end sought in the minimum of time, effort and cost. . . .

"At the beginning of the War, the French field artillery was incontestably superior to the German. This was due principally to the superiority in mathematical and scientific knowledge which their higher officers possessed from the fact that they were almost all graduates of the *École Polytechnique*."

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In short, it was admitted by the enemy high command that the German artillery was of far less worth than the other arms and, in particular, the infantry. It was the weak point, or to put it differently, the least strong point in that Army otherwise so formidable.

On the whole, the French artillery was superior during the War. According to the words of the Marshal von Hindenburg himself, "the troops and their chiefs recognized in it their principal adversary."

The inferiority of the German artillery can only be ascribed to the inferior scientific training of its officers which was due to their incorrect system of recruitment which sought to throw all officers into the same mould and failed to attract the youths drawn by temperament towards the pure or applied sciences. The consequence of this state of thing was that the German artillerymen did not themselves construct their own matériel and were consequently only slightly interested in it, knew it too superficially to exploit its capabilities to their limit, were incapable of orienting and guiding the activity of its constructors, and evinced a natural aversion to the scientific methods of fire which are being more and more employed.

These remarks are perhaps not without value at the time when there is a proposal to establish in France a single school and take from the artillerymen their traditional rôle as constructors of their own matériel which will definitely deprive the French artillery of its two principal elements of superiority from which it has benefited during the War.

War becomes more and more scientific. To speak truly, this is not an absolutely new phenomenon, for the higher one goes, the more he sees that the military art is ceaselessly drawing on all innovations and appropriating to itself all the discoveries of the human mind. But the progress made in less than a century has been of such disconcerting rapidity that the conditions of life are entirely different and that, to this profound transformation, has corresponded a parallel transformation in the methods, if not the principles, of War. In arms, as in industry, the era which has just begun is one of mechanism. It is a verity, which four long years of warfare have shown, that there is an inevitable necessity of an immense amount of matériel, extremely varied and so complex that it can only be trusted to a personnel carefully instructed and narrowly specialized. Scientific knowledge, specialization—these are the characteristics which the corps of officers should possess in the future to a much greater degree than in the past. This is assuredly to be regretted but should none the less be recognized. But experience has shown that the system adopted by the French artillery responds in a more than satisfactory way to these requirements and only those can be surprised at this who do not know that this system,

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the broad lines of which have scarcely varied during more than a century, was the work of an artilleryman named Napoleon. To the adverse criticisms of a theoretical kind which have been brought against it, there is only one reply to make: this is that during the Great War, it has once more and brilliantly—been proven. It is not at the time when the enemy has rendered the significant homage, which I have outlined above, that it can appear opportune to upset the recruitment of officers, by sacrificing on the altar of levelling prejudices that incomparable builder of artillerymen, which the Emperor once called his "layer of gold eggs," and to renounce, for a result, the least that can be said of which is that it is uncertain, an organization which, to take Taine's formula, has the immense merit of being the result, not of logic, but of history.

BIG GAME HUNTING IN INDO-CHINA

BY LIEUTENANT JOHN C. GRABLE, 24th FIELD ARTILLERY, (P.S.)

OFFICERS fortunate enough to draw the Philippines for their foreign service tour have a splendid opportunity to do some big game hunting at comparatively small expense. Those interested in big game will make the most of that opportunity, even if they have to sacrifice all the sight-seeing trips, oriental rugs and other forms of amusements while in the Islands.

French Indo-China, located on the Malay Peninsula, about five days by steamer from Manila, is a hunter's paradise. Over half of the country is covered with virgin forests and jungles. Tigers, elephants, leopards, banting, sleidang, caraboa or water buffalo, wild boar, deer and small game are plentiful in Cambodia, Annam and Laos provinces. The fact that it has not been generally known as a big game country as compared with India and Africa and that it is not so accessible to any except the people living in the Orient, have conserved the game to a great extent. Neither have professional hunters exterminated the animals to any noticeable degree.

There are no restrictions on shooting in the province of Annam, except in what is known as the Dalat Plateau preserve. Inside the preserve a license from the French authorities is necessary and a limit is placed on the killing of some animals. The limit is very generous, however, and the permit is not expensive. The province of Cambodia also requires hunters to take out permits and prohibits the shooting of elephants except under a special license and a heavy tax on each elephant shot. The reason for that, is because elephants are more or less sacred to the natives.

I made a trip into Annam with Lieutenant J. I. Lambert, 26th Cavalry, during February of this year. In the country we traveled over there are no restrictions whatever, and as an inducement for

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hunting, the government pays bounties on tigers and leopards. We spent a little over three weeks in the jungles and consider that we have had an experience of a lifetime, although I had the misfortune to miss a perfect shot at a tiger. As a result I came home without a tiger skin rug, but Lambert secured a beautiful male tiger. Both of us obtained excellent specimens of banting, deer and small game.

Tiger hunting is not as exciting as the majority of people believe, except at rare times such as the case of Captain Arthur Vollmer, 26th Cavalry, who was on a trip through Cambodia last year with three other officers from Camp Stotsenburg. He was out with a native coolie one day and shot a tiger that sprang out of the brush in front of him. Just as he fired, two more tigers leaped out about twenty yards to his left. By a second quick shot he killed one of them while the third escaped. In my case, just at daybreak, I was on my way to visit a bait in a thick patch of jungle, when I came face to face with a big tiger that had dragged the bait out from behind the shooting blind. I had to make a quick shot at him in the dim light from about seventy yards. Apparently I inflicted only a flesh wound, because all I have to show for it is the memory of a roar and a bit of blood-stained grass that we found about ten yards from the bait. These cases are thrilling but the usual ones which I shall describe to you are not.

Where small game is plentiful, the usual method is to bait the tigers with large deer or banting, or, if luck is with you, an elephant. Tame bullocks or caraboa can be purchased occasionally from the natives. They are taken to a likely place and shot for bait. This method is used because of the tiger's habits.

Tigers do not show themselves to any extent in the daytime and do very little feeding, except at night. Almost invariably they visit a large kill one or more times during the day, and often sleep within a radius of one or two hundred yards if they are near water. Those visits presumably enable them to protect the kill from other animals. Elephants are their favorite meat, but any large animal will attract them.

A buma and blind are constructed within ten or twenty yards of the kill. The kill is visited by the hunter early in the morning and late in the afternoon of each day, until the bait shows signs of having been touched. The buma is a cage about five feet square constructed of stout poles and camouflaged with grass and brush on the outside. A peephole about three inches in diameter is cut through the side facing the bait. The blind is simply a frame of poles covered with brush. At shoulder height it has a small opening made for the rifle. If a large tree or an ant hill is nearby, the buma is built against it; and the blind is placed in such a way that it hides a path cleared of all dead leaves and brush for a distance of two or three

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hundred yards. The hunter can approach along this without being seen or making a noise. Bait, other than elephants, should be securely chained to a tree, because tigers always attempt to drag the bait before starting to feed. They can drag an incredible weight.

The approach along the path to the bait must be either absolutely noiseless or by a party of three or four who walk at a normal gait and talk in a moderate tone of voice. In the first case, if a tiger is on the bait, he can be shot from the blind, while in the second case he will hear the party coming and *perhaps* sneak off for a short distance to see what it is all about. Then one man gets into the buma, the door is closed and covered with brush. The rest of the party walk off, making a fair amount of noise and talking until out of hearing. As a rule, if the tiger was there when the party came up, his curiosity will get the best of him, and after a wait of an hour or so he will return to see what was done to his food. All that remains then for the "mighty hunter" to do is to try to control his nerves and fire almost point blank at the cat. If when you approach the bait, it shows signs that the tiger had been there and departed before daylight, it may mean a long, lonesome wait in the buma before he shows up again in the evening. As they do not conform to any set rules, at dark the rest of the party may come after a thoroughly disgusted hunter and lead him out to where he can get a breath of fresh air. Meat does not stay particularly fresh under a tropical sun, especially after being exposed five or six days. The doughtiest of hunters is apt to have his ardor slightly quelled after breathing the tainted air and watching the smaller animals or lizards gorge for several hours.

Another successful method, and one that does not require the discomfort of many hours motionless wait in a buma, is to kill deer and distribute them, not chained down, around the jungles near trails. A visit is made to each early in the morning and, if one has been dragged away, the trail is followed until the bait is found. The coolies drag it back about fifty yards to a place where the hunter can hide in a clump of brush. Then they depart, leaving him there. After the noise has subsided and the party is well out of sight, the tiger will investigate the cause of all the commotion and return to again drag the bait to his hiding place. Sharp lookout must be kept, however, as one hunter found to his sorrow. He had waited about half an hour and finally decided to light a cigarette. After carefully stooping down to strike a match he raised up. All he saw was a movement in the grass in the distance. The tiger had returned, picked up the bait, and left without making a sound. Another man sitting behind a blind, watching a bait under similar circumstances, began to feel very uncomfortable. He finally glanced over his shoulder to see a tiger calmly looking at him from a clump of trees



LIEUTENANT LAMBERT AND HIS TIGER. NOTE THE PLEASED EXPRESSION



LIEUTENANT GRABLE AND THE BANTING BULL SHOT AT A RANGE OF TEN YARDS,
AFTER BEING WOUNDED



SAMBAR DEER WITH HIS HORNS CAUGHT IN THE BRUSH AS HE FELL



FIFTY-SEVEN INCH LIZARD, NON-POISONOUS, AND CONSIDERED QUITE A DELICACY
BY THE COOLIES

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about twenty yards to the rear of him. He whirled and tried to shoot, but the tiger sprang into the tall grass and disappeared. It had been down to a water hole and came back along another path.

With the exception of man-eaters and females with young, the tigers usually give humans a wide berth. Their first thought is to run, unless cornered or wounded. At least that is what the guide with twenty years' experience told me. Personally, I didn't take any chances.

Banting and sleidang give exciting hunting. The banting (gaur) is a wild ox. It has short brown hair, large curved horns and weighs eleven hundred to fifteen hundred pounds. A full-grown one stands about five feet six inches at the shoulders. The sleidang (buffalo) resembles the American buffalo, except that it has short hair. Both of these species of animals will charge at sight and only a well-directed shot through the brain or heart will stop them.

The guide and myself fired four shots into a banting bull. Any one of the shots would have proven fatal, so later investigation showed; but he did not stop his charge until a fifth shot through the brain from my .405 Winchester dropped him. We had scared him up and Mr. DeFosse, the guide, at about twenty-five yards, shot him in the spine. My shot, a couple of seconds later, struck him in the shoulder as he turned to charge DeFosse. We both fired again at about fifteen yards. One shot struck the shoulder and the other entered the neck just back of the ear, which turned him in my direction. Then my last shot fired at about ten yards finished him.

The banting and sleidang travel in herds and are hard to approach. The best system is to determine their feeding ground, then start early in the morning and stalk a solitary bull that has strayed away from the herd, in hopes of finding him before he gets into dense jungles where they spend the day. Or, about dusk in the evening, you can watch for a herd to come out of the jungles to a feeding ground. They make excellent bait for tiger but are usually too far away from a place frequented by tigers and they are too heavy to move.

Water buffalo or wild caraboa are plentiful in swampy country. They can be stalked through the grass as long as the aigrettes and other birds that serve as their sentries do not catch sight of you. The moment the birds fly up and begin making a fuss, the buffaloes become wary and move off, keeping on their guard for hours afterwards.

Leopards are numerous but very hard to get, as they seldom touch any bait except a fresh kill. About the only way to get a shot at them is to hunt at night with a light to shine their eyes.

Night hunting is profitable in securing deer and civet cats. Both will stand and stare at a light. A man can shoot them with ease

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at comparatively short ranges. The novice fires at night at a pair of eyes and after wondering if he has killed a deer or a tiger, usually finds that he has just ruined a poor unsuspecting rabbit or porcupine, with a high-powered bullet. After a little experience, however, he learns to distinguish them, and can pick out a deer's or large animal's eyes among the many gazing at him from every direction.

Crocodiles are numerous along the rivers and streams. Wild pigs and boars can be found in profusion. Peacocks, aigrettes, maraboa birds and jungle fowl are plentiful, and make good shooting during the heat of the day, when larger game is resting.

In the country that we traversed there were several herds of elephants. Very few have tusks. As they move long distances overnight they are hard to encounter. A person may stay on the trail and hunt them to the exclusion of all other game, or he may have luck enough to stumble into them. A herd passed close to our camp one morning about two o'clock. They made a noise that can only be described by comparing it to a cross between a cyclone and an earthquake. Needless to say, we didn't sleep much the rest of the night.

Deer are so numerous that we literally kicked them out of our way, except when we tried to find them for meat or to use as bait. The sambar is the largest; an ordinary one weighs about five hundred pounds. They average four or five feet at the shoulder. They have beautiful pronged horns and can be shot on open feeding grounds at night or in the jungle during the day. The barking deer and hog deer are much smaller. Their average height is about two and one-half to three feet. Both are named from characteristics; the barking deer from its yelp or bark and the hog deer from the flavor of its meat. Roast hog deer tenderloin and peacock breast steaks are the ultimate in wonderful food after a long tiresome walk.

Opinions differ greatly as to previous experience or qualifications for big game hunting. I would say that a person should be a good game shot, which does not mean an expert range shot by any means. In other words, an expert game shot can be a good shot on the range, but the reverse is not always true. A cool head is an asset at all times, but for actually finding the game, luck is the greatest factor regardless of how good or how poor one is as a tracker or stalker. You can judge this by some of the stories that the guide related.

For example, last year two American college boys hired him for a hunt. They arrived at his home in the jungles, equipped with brand new, high-powered rifles purchased in Saigon. Mr. DeFosse found that neither had ever fired a rifle in his life, so he taught them how to hold the rifles and had them fire a few practise shots the first day. Early the next morning after arriving in their first camp, he took them for a walk through the jungles. They met an old elephant and calf within five hundred yards of the camp. DeFosse,



A SAMBAR DEER USED AS BAIT



THE TIGER SHOT BY LIEUTENANT LAMBERT; NINE FEET TWO INCHES. TIP TO TIP



NATIVE CANOE OR BANCA



A MOI CHIEF AND SOME OF THE VILLAGE "BELLES"

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who is a marvelous shot, killed both elephants and had the coolies construct bumas and get everything in readiness for tigers. Those two boys killed five tigers off those baits and wounded a sixth, but expended hundreds of rounds of ammunition at other game without securing a thing.

On the other hand, an old hunter with years of experience hunting in every part of the world, spent a month in that country. He saw three tigers but shot none. The first lay down behind a large tree about ten or fifteen yards from the buma, and all the hunter got for his ten-hour vigil were occasional glimpses of a big paw as the tiger stretched or moved his position during his day's sleep. It never came near the bait and about dusk moved off to a water hole. A few days later this man was sneaking up to a blind near a bait. He looked through the peep hole and saw nothing, so he stepped out from behind the blind. He almost stepped on a tiger asleep beside the blind. It gave one spring into the grass and was off for parts unknown, probably more frightened than the man if that were possible. But the climax that sent this old hunter home in disgust and rage, came when an enormous tiger walked up to his bait. In raising his rifle to his shoulder (it was a set-trigger gun) the hunter happened to touch the trigger and fired into the air!

An Englishman shot three tigers in four days off of one bait and when DeFosse wanted him to go back the fifth day, said, "Really, tigers bore me. Let us go out after something else."

Mr. Kirby, the manager of the Standard Oil Company in Saigon, told me an amusing story. He and a friend went out on a tiger hunting trip. One day after his friend had relieved him at a buma, he went to camp for lunch. Shortly after, he heard a shot fired. He sent the coolies down to bring in the tiger. After waiting a couple of hours, Mr. Kirby decided to walk down and see what caused the delay. He found his friend about two hundred yards from the buma and the coolies close beside convenient trees. They were acting as though they preferred a tall tree to standing on the ground. He asked his friend if he killed the tiger. The friend said, "I don't know."

"Well, why are you waiting here?" said Mr. Kirby.

"To be real honest, I haven't the nerve to go look. I shot him and he disappeared and I came back here. I have gone up to within ten yards of the buma three times and each time lost my nerve before I could get far enough to see over into the grass."

That caused Mr. Kirby to sort of pause, but they finally decided to walk up side by side and investigate. After much manœuvring they got a glimpse of the tiger stretched out in the tall grass. He had been killed instantly by a shot through the brain. However,

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don't laugh at that story until you have gone through a similar experience.

A trip into the interior of Indo-China requires about one or two months, owing to the time spent hunting. Two to four weeks actually in the jungle is ample time, but the ruins of Ankor Vat and the towns of Saigon and Phnom Phen are well worth visiting.

Now as to the expense. I said at first that it was comparatively cheap, meaning compared with the elaborate safaris and expeditions such as are necessary in Africa and India. There are no regular passenger ships between Manila and Saigon but Lieutenant Lambert and I secured accommodations on a freight steamer that was engaged in hauling cattle from Indo-China to the Philippines. Otherwise it would have been necessary to go to Hongkong and then to Saigon at about double the fare. For those interested, the following is a detailed list of expense:

Passage to Saigon, including meals	\$35.00
Hotel in Saigon, American plan, per day	3.50
Railroad fare, Saigon to Gia Huyhn	2.90
Guide per day	7.50
Ten native coolies at \$.20 per day	2.00
Native cook per day .....	.50
Two bullock carts	2.00
Two native ponies	2.00
Provisions for entire party, approximately	4.00

This makes a daily expense while in the jungles of about nine-fifty per person. That will vary slightly with the rate of exchange when converting gold dollars into piastres.

We were fortunate in securing as a guide a Frenchman who has lived in that country twenty years. He is a professional hunter, and will take parties only in his slack season. Even then he does it more for companionship's sake. He can make more money shooting deer for the market and hunting banting and buffalo for their hides. He is the only English-speaking guide who makes a business of taking out parties. Annamite (native) guides, or rather trackers, can be hired. They speak some French.

The Moi coolies are the aborigines of that country. They care very little about money but enjoy the trip on account of getting plenty of food, especially fresh meat, rice and salt. They are fairly large, muscular men, but uneducated, and very superstitious. They are used to carry canteens and cameras, clear paths through brush, build blinds and bumias, do the skinning and securing trophies of animals killed, etc.

Both of us carried .405 calibre Winchester rifles, model 1896. We used both soft and hard-nosed bullets, depending on the kind of game we were hunting. However, the .30 calibre Army Springfield

BIG GAME HUNTING IN INDO-CHINA

with special ammunition such as open point or soft-nose cartridges, would serve just as well and save the expense of purchasing a larger calibre rifle. In my own case the lever action of the Winchester bothered me after being accustomed to bolt-action rifles. In addition a study of the ballistics of the Springfield as compared with sporting rifles, convinced me that it has sufficient velocity and hitting power for any game. As one noted big game hunter said, "It's not the size or hitting power of the rifle so much as where the shot strikes the animal." We also carried .45-calibre revolvers. They were extra weight but might have proven very convenient in an emergency.

Our clothing consisted of issue cotton breeches, shirts, shoes and leggings, or laced boots, and pith sun helmets. The later are absolutely necessary. The heat doesn't seem so oppressive, but it is extremely dangerous to venture out in the sun without a good helmet.

Other equipment comprised a bedding roll, canvas cot, blankets, mosquito bar and toilet articles. Tents are not necessary because the coolies can put up palm-thatched huts in a few hours. They are much cooler than canvas.

Many people ask if the trip is worth all you put into it. Everyone who has been there unhesitatingly answers that it is. Regardless of what game you may be fortunate enough to kill, just to see the huge beasts in their natural habitat and to observe the habits of the inhabitants of the jungle, more than repays you for any time or money you may expend.

EXPLOSIVES

BY CAPTAIN M. A. STUART. 76th F.A.

EXPLOSIVES consist of certain elements forced into unwilling combination; nitrogen, eager to release itself from the few grains of powder in which we imprison it, and assume its original state of a free gas; oxygen and carbon, kept apart through the medium of this very nitrogen, but eager to unite to form great quantities of carbon-oxide; and hydrogen, ready to combine with the oxygen as soon as the latter is released from its combination with the nitrogen by the disturbance of the complex explosive molecule. Thus occurs the seeming paradox that one of our most inert substances, nitrogen, is the essential ingredient of all explosives, for by coaxing it into distasteful association with other elements, so to speak, we may obtain a little brown powder, or perhaps a few drops of an oily liquid, which, docile enough until a shock severs the already strained relations existing between its elements, in a very small fraction of a second transforms itself into immense quantities of gas, producing by the enormous expansion an almost irresistible dynamic force.

An explosion is in fact, an extremely rapid combustion, which is obtained by bringing the oxygen, necessary for the combustion of the carbon and hydrogen, into the same molecule with them. This is unlike ordinary burning, where the oxygen must be supplied by the air, and the effect in an explosion, of the practically instantaneous liberation of the products of combustion, is roughly analogous to that which would be obtained were a boiler full of water completely converted into steam in a fraction of a second. On the statement of one authority, the modern explosive, T.N.T., produces ten thousand times its volume of gas.

From what has been said, it is obvious that an explosive consists of some material containing the two combustibles, carbon and hydrogen, to which nitrogen combined with oxygen has been added. This addition, known as "nitration," is effected by nitric acid, mixed with sulfuric acid to absorb the water formed by the nitration. Tri-nitro-toluol (T.N.T.), an explosive extensively used as a bursting charge for shells, is obtained by distilling toluol, a fragrant limpid liquid, from coal tar. This toluol is nitrated, so as to introduce three nitro groups into its molecule and convert it into one of the most deadly of modern explosives.

Coal tar is also the basis of another common bursting charge—ammonium picrate, a salt of picric acid. Phenol, the carbolic acid which relieves the suffering behind the lines, as a germicide, is a coal tar product, which is converted by nitration into picric

EXPLOSIVES

acid, a powerful explosive. Widespread devastation is not always the only effect of the explosion of a picric acid shell, for the acid is a powerful yellow dye, and if the detonation is not complete, everything in the vicinity is colored a brilliant canary-bird hue, not excepting the men's skin and clothing.

The explosion of T.N.T. shells, which have largely supplanted those filled with picric acid compounds, is accompanied with great volumes of smoke, which has earned for these shells the nickname "Black Marias." This smoke is due to the fact that the T.N.T. is deficient in oxygen, and to overcome this defect, explosives with four nitro groups have been made. Among these latter, about which little has been heard, are T.N.A. and tetryl, but although they are probably the most powerful explosives known at present, T.N.T. and ammonium picrate, together with such compounds as melinite and schneiderite of the French, lyddite of the British, and shimose of the Japanese, which are cast picrates, remain the chief explosives used as bursting charges in shells, bombs and grenades. All are dependent upon coal tar and are made by nitration of the various products of distillation of by-products of coking, which also furnishes us with anilin dyes. One of the reasons for the supremacy of this type of explosive is its safety; T.N.T. can be dropped from a tall building, hammered, set on fire, shot full of holes and dumped into a furnace without exploding, but the detonation of a cap containing fulminate of mercury produces an immediate explosion.

It is apparent that such high explosives, which detonate or explode instantaneously, would be entirely unsuitable for the propelling charge which forces a projectile from a gun, for their force is produced so rapidly that it would disrupt a gun chamber, even if the latter were entirely open. By nitrating common cotton, however, rather than toluol or phenol, we obtain a compound that is known as nitro-cellulose, or more commonly, gun cotton, which, when colloidized, burns rapidly, rather than explodes, and gradually liberates the gaseous products of combustion with calculated speed and energy. The operation of nitration provides it with oxygen, which is thus available for the combustion of the carbon of which the cotton is partially composed, without recourse to the air. The burning becomes a transfer of the oxygen from the nitrogen, which is released, to the carbon. But, as in the case of the T.N.T., the oxygen supply is insufficient, and the volume of smoke released would be the despair of the camoufleurs if we used gun cotton to shoot our guns. However, by colloidizing, that is, dissolving the gun cotton in alcohol and ether, we obtain a plastic mass which contains just sufficient oxygen for its combustion and in which the violence and sensitivity can be definitely controlled. This compound

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is the basis of smokeless powder employed by all nations as a propelling charge, from the infantry rifle cartridge to the 42-centimetre howitzer.

A multitude of shapes are employed such as sticks, shreds, multiperforated hexagonal grains, etc., which have as their object an increase or decrease in the surface exposed to burning as the charge is consumed, so that the pressure in the barrel of the gun remains effective, although the projectile is constantly moving towards the muzzle. Of course the time of combustion is exceedingly brief, but it is so much longer than that of T.N.T., for instance, that smokeless powder is spoken of as a slow-burning explosive. The pressure existing in the gun at the time, is a vital factor, for a stick of this powder only burns quietly when lighted in the open air. Where the space is limited, the velocity of burning is so greatly increased that an explosion results.

The manufacture of nitro-cellulose or gun cotton calls for extensive equipment and great care. Short cotton fibres are nitrated by the action of mixed nitric and sulfuric acids, the office of the sulfuric acid being simply to absorb the water liberated when the nitric acid acts on the cotton. The resultant nitro cotton must be repeatedly washed and, for the manufacture of smokeless powder, is dissolved in alcohol and ether to secure a plastic mass, which may be worked into suitable shapes, after which the solvents are evaporated.

It is seen that nitrogen is the backbone of all explosives. It is nitration that converts the fluffy cotton into gun cotton, that converts phenol, or carbolic acid, into an explosive, and the limpid, peaceful toluol and oily glycerine into instruments of war.

Many of the processes are involved and the technic of explosive chemistry fills many volumes. It has been our purpose merely to tell in non-technical language what explosives are and how they work.

TRAINING GUN SQUADS

BY CAPTAIN P. T. QUINN, 12th F.A.

THE end to be attained in the training of gun squads is fire discipline, and to reach this goal it is necessary that the crews have accuracy, coördination, team-work, and speed. How to bring about this condition is the problem of every executive. Accuracy is the *sine qua non* of every member of the squad. They must imbibe the theory of exactness from the first day on the piece. Never can a slight error be passed over; hair-line settings must be a fixed rule. The probable error is a sufficient deviation and any other is inexcusable. Coördination of effort is a matter of example and practice. The cannoneer must be shown the best way repeatedly until he understands thoroughly, then practiced until it becomes instinctive to him. This elimination of lost motion is the greatest aid in speeding up the work of the individual and the crew. Teamwork comes through working in the squad. Men learn to work together on the gun, as any other team learns, by repetition. When the cannoneers meet each other's movements and coöperate without conscious effort, the team is trained. Speed is the last element to be acquired. It is not a matter of hasty setting; it is rather elimination of lost motions, of coördination of every effort. It should be arrived at gradually and should never overshadow accuracy.

The duties of all members of the firing battery are laid down so clearly in training regulations and in articles on the subject, that it is only necessary to stress one point. "The chief of section commands the gun squad." Does he? Is he not usually an assistant to the executive only, a figurehead in the section? The section chief should be given a wide latitude in the choice of cannoneers and in their training. He should have full control, if he deserves it; if not, get a new chief of section. It was a great aid to efficiency when regulations prescribed that he should not keep a record of the data; it will be a greater aid when he is allowed full command of the squad. He should be often consulted on his duties and squad, and a young officer will find that an old and experienced sergeant can frequently offer valuable suggestions on handling the crews.

The American does his best when he understands the end in view. This is a truism, yet one that is not often put into practice in the training of gun squads. It is not usual to find that the cannoneers thoroughly understand the problems they fire; but to try the experiment of letting them know what they are doing, will greatly increase the interest and the efficiency of the gun crews. In a battery where the cannoneers whisper, "Now he's got a bracket," or "He's

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goin' into effect now," there is better spirit than in the battery where the men only know that they set figures off on a dial. Teach the men what they are doing. Some of them pick it up of their own accord, but it should be taught to them just as they are taught to set off ranges. Work must be made interesting, and, to the American soldier, there is little interest in setting off a range or in turning the fuse-setter handle, unless he knows what happens when he turns. He has the right, too, to know what is going on. In recruit training, with a blackboard and a few simple diagrams, the man can be shown enough to color the drill. Also, he can be shown by the same method what an inaccurate setting will do. Later when he joins the crew, blackboard instruction may be continued. It is not necessary to teach the cannoneer to fire a problem. If he understands how we shoot, what a bracket is, what is improvement fire, why we fire volleys, it is enough to increase his interest and his ability.

Service practice is the goal of the firing battery, yet too often nothing is done to make it of special interest to the cannoneers. Usually the guns are defiladed or far from the targets, and the crews must guess what is going on. The name of the officer firing and the type of problem should be sent down to the battery before the firing begins. It works well if target shots are reported to the guns making them. They are chance shots, true, but the crews do not take that view. Let them chalk on the shields the day's targets. Also, it is good, early in the practice, to put the guns where the squads may easily see the targets, and to fire a problem for the benefit of the cannoneers. The executive may explain the various steps, slowing up the firing so that all may see each round. Afterwards opening and closing, or increasing and decreasing the range will mean much more to the battery. It is an excellent principle to let the men know what they are doing.

What is the reason for our supremacy in sports and trade? The answer is keen competition. The fighting spirit in man engenders skill, when he is pitted against other men, that he could never attain alone. In every walk of life this is exemplified, particularly in the profession of arms. Our end is the competition in war, and we should strive to utilize the principle throughout our work. If four squads are put through a gun drill together, they will do well enough; but if they are told that they are to compete, each man will strain every nerve that his section may win. Put one man against another, or battery against battery, or regiment against regiment, and you will rouse the same spirit. Competitions are easily arranged. It is possible to draw up a set of rules that will cover any groups from squads to battalions. If necessary there are many simple awards

TRAINING GUN SQUADS

available within the jurisdiction of the commanding officer, such as excusing the winning group from reveille for one day. Most men will find in the competition its own reward. Of course accuracy must always be stressed, and time made a secondary consideration. Competitions at weekly intervals will change gun drill from a monotonous period, into an opportunity for training.

Standing gun drill is a better substitute for close-order drill in the Field Artillery. As such it should be made as interesting as it is possible to make it. This can be done when the cannoneers understand fully what they are doing, and the reason for it; also, when they are set in competition against each other and given the chance to win.

PRACTICAL SUGGESTIONS FROM THE HORSE ARTILLERY

BY CAPTAIN J. W. MACKELVIE, 82nd FIELD ARTILLERY BATTALION (HORSE)

THIS article was written at the suggestion of several senior field artillery officers who have inspected the 82nd Field Artillery Battalion (Horse) under the command of Major William H. Rucker.

In horse artillery attached to a cavalry division, mobility is of prime importance. With the large number of animals to keep in condition and a correspondingly large amount of equipment to care for and the small number of men with which to accomplish these things, every possible time and labor-saving device has been tried. Each of the schemes described below has been given a thorough trial by all batteries of this battalion and are in use habitually.

ADJUSTABLE POLE SUPPORT

After much experimentation with different devices to take the weight of the pole and pole yoke from the necks of the wheel pair, the arrangement shown in the pictures herewith was found to be entirely satisfactory. The idea of the support was conceived by Major William H. Rucker and was used by the batteries of the battalion during the march to Marfa, Texas, the First Cavalry Division Manœuvres in that vicinity, and the return march to Fort Bliss, in 1923.

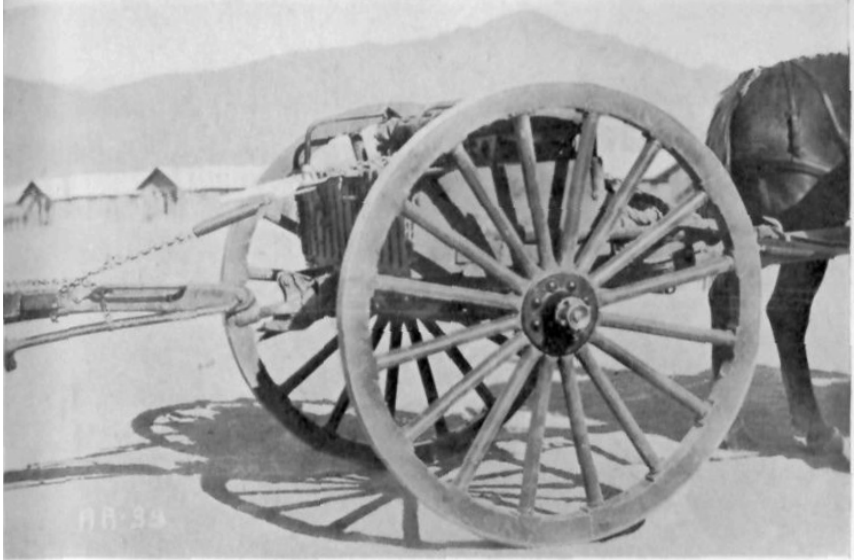
The different components will be taken up in the order of their attachment from front to rear on the limber, as shown in the accompanying illustrations.

A vertical hole five-eighths inches in diameter was drilled through the pole, twelve inches in front of the double-tree bolt hole. An eye bolt carrying a two-inch ring was assembled in this hole, with a lock washer and nut on the under side. This assembly is not shown in the illustrations.

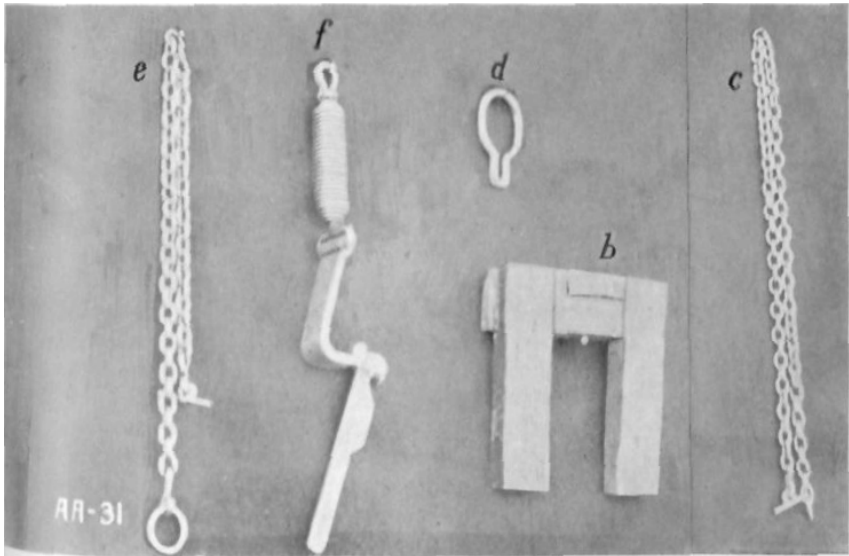
A frame of two-by-fours mortised together (b in the illustration) and with an iron reinforcement on top of the centre portion, was placed in the centre water bucket compartment. This frame is necessary to keep the chain from contact with the lantern top.

A quarter-inch chain (c) seventy inches long, with a toggle on the forward end, leads from the two-inch ring on the pole, the toggle being engaged in the ring. The chain is passed over the wooden frame, which emerges from the water bucket compartment through the right centre hole, and extends back over the limber chest. A grab link (d) of one-half inch iron is inserted in the chain at about the fourth link.

A quarter-inch chain, (e) forty-eight inches long over all, with a



THE POLE SUPPORT ATTACHED ON A CAISSON



THE COMPONENT PARTS OF THE POLE SUPPORT



SIXTY-NINE HORSES WERE EXERCISED ON THIS LINE



THE YOKE LYING ON THE SUPPORTED POLE

PRACTICAL SUGGESTIONS FROM THE HORSE ARTILLERY

toggle on one end and a two-inch case hardened ring on the other, is passed around the caisson trail and through the eye of the mogul spring, as shown in the picture of the caisson limber. When used on the piece it is passed around the trail in rear of the trail handles.

The locking device (f) consists of a mogul spring and its assembly. The assembly is made from good quality steel, one and one-half inches wide and one-half inch thick, reinforced in the notch where the grab link is engaged, to prevent undue wear on the link. This device may be released instantly, preparatory to unlimbering, and it is engaged in about five seconds after limbering.

An approximate adjustment of the support is made in the park. The adjustment is completed when the team is in draft. The tension on the mogul spring may be increased or decreased by changing the engagement of the grab link on the chain until the pole is inclined slightly upward, depending on the height of the wheel pair. The pole yoke should lie flat on the pole as shown in the illustration.

The off trace of the near swing horse, and the near trace of the off swing horse, are passed under the pole yoke as shown. It has been found that by this arrangement there is no contact between these traces and the pole yoke.

MOVING PICKET LINE

The proper exercise of animals when not engaged in daily mounted drill, has always been a problem for the officer commanding a mounted organization. The moving picket line offers a solution for this problem. With it six men can properly exercise seventy animals.

The line is one and one-half inch rope, three hundred and forty feet long, with a loop in each end. Starting at a point on the line eight feet from the forward end, two heavy halter shank snaps are braided into the line, and tight against it, with seven-eighths inch rope; thereafter along the line, the pairs of snaps are braided in at intervals of ten and one-half feet, the last pair being twenty-six feet from the rear end loop in the line.

The forward end of the line is attached to a limber by passing the pole through the loop in the end of the line and allowing the line to pass over the limber chest. Two pairs are used on this limber. At the rear end the line is passed under the pole and limber, and the trail of the caisson is passed through the loop. The line is lashed to the pole in rear of the pole yoke stop. One pair is used on the carriage at the rear end of the line.

Thirty pairs can be exercised on the line described. This has been found to be the maximum number that can be handled with ease. Having the snaps braided tight against the line eliminates many undesirable features; it is almost impossible for a horse to get

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on the wrong side of the line, or for the line to get down where a horse can get over it. When the line is taut, as it should be, it is impossible for a horse to step on the heels of the horse in front of him, or to frolic with the horse on the opposite side of the line.

In making turns with the line, the rear carriage must take the same gait as the limber in the lead and turn on the same ground. Individually mounted men by "riding off" the animals on the line as they come to the turn, can cause every animal on the line to turn on the same ground covered by the leading carriage. With practice right angle turns can be made at a trot with ease. Three drivers, three individually mounted men, and one man to ride on the rear carriage and operate the brake, are ample for the operation of this line.

BURNISHING AND BUFFING MACHINE

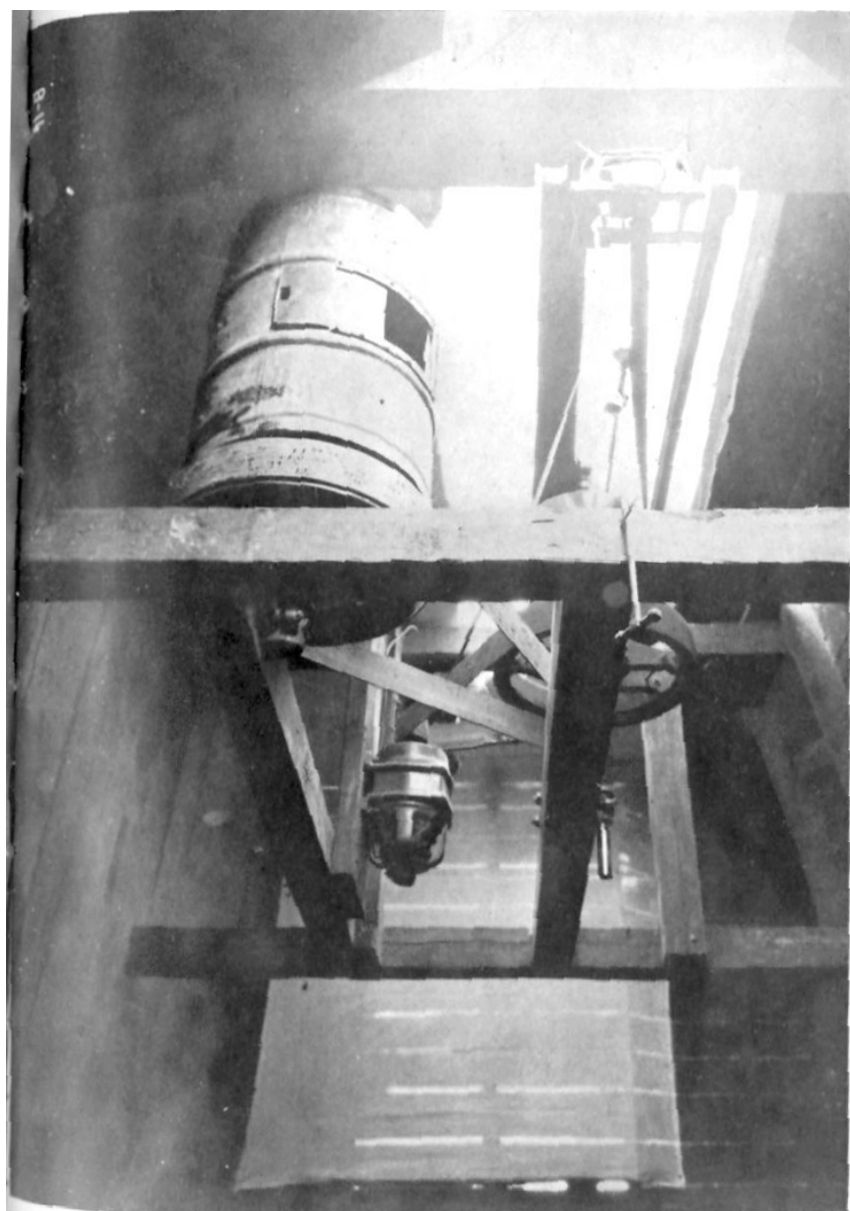
The machine shown in the illustration was installed at a nominal cost and operates: a burnishing barrel, a buffing wheel, and a clipping and grooming machine.

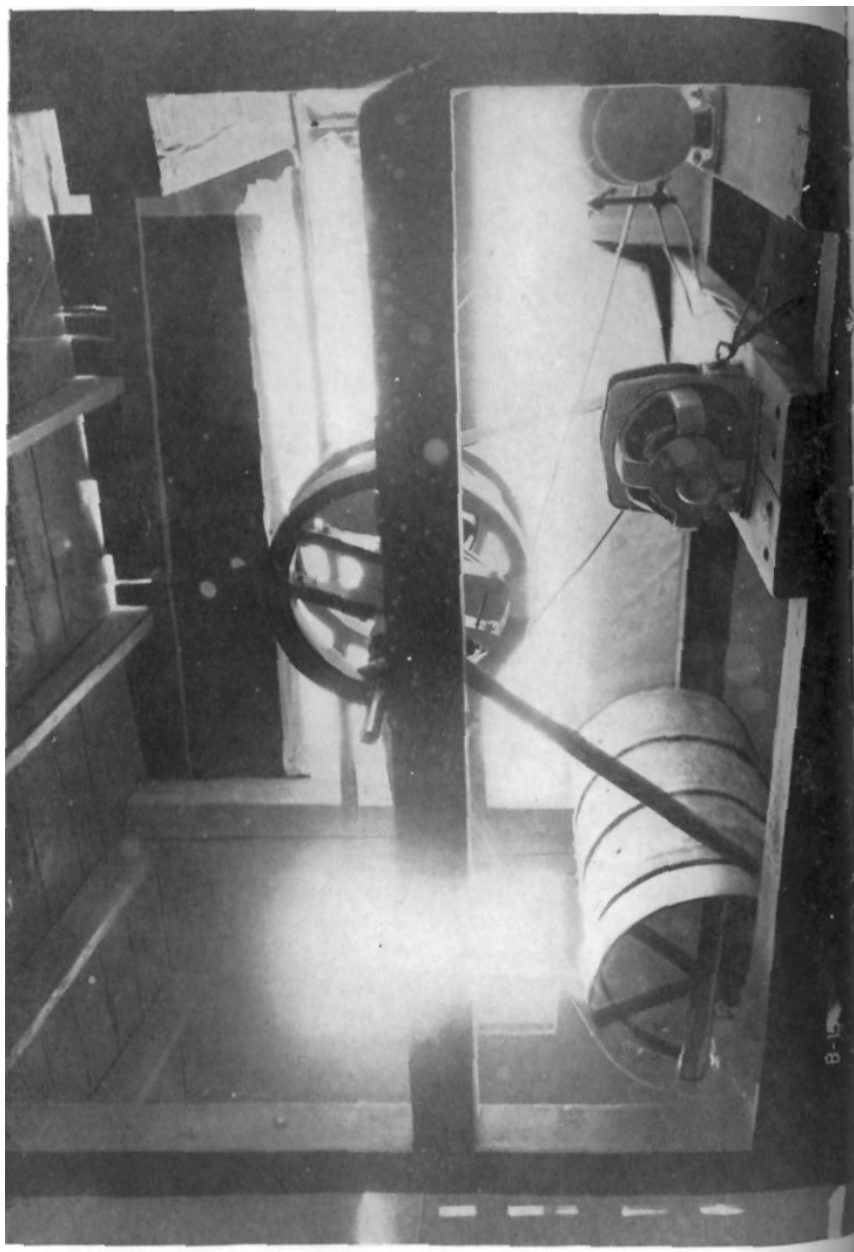
The motor is two horse-power, 1800 R.P.M., and drives everything simultaneously without overheating. For best results the following revolutions per minute should be obtained: barrel, 35 R.P.M.; buffing wheel, 3000 R.P.M.; clipping and grooming machine, 600 R.P.M.

For the barrel a forty-gallon gasoline drum is most satisfactory. Plates and axles attached to its ends make it a rigid construction. In using the barrel, if the articles to be burnished are rusty or dirty, they should be placed in the barrel with about five gallons of dry sand and let run until clean and smooth. Upon completion of this cleaning operation, the barrel should be emptied and care taken that all sand is removed. For the burnishing process the barrel should be about two-thirds full of scrap newspaper, torn fairly fine. The first burnishing the process usually requires about one hour; the subsequent burnishings about fifteen minutes. Steel parts only should be placed in the barrel. On completion of the burnishing all parts should have the appearance of being nickle-plated.

Bronze parts are buffed on the wheel. On the grinder frame the most suitable arrangement is one wire, or very fine emery cloth wheel, and one canvas wheel, each about twelve inches in diameter and two inches thick. The first is used to clean or to obtain a smooth surface, and the second is used to buff. Polishing compound may be obtained locally for use on the canvas wheel.

The clipping and grooming machine as issued by the Quartermaster Corps has been found satisfactory. The groomer, a rotary brush, is particularly suitable for use on officers' mounts and for turning out animals for competitions.





THE THREE HUNDRED AND TENTH FIELD ARTILLERY

BY COLONEL JOSEPH W. KELLER, COMMANDING, PHILADELPHIA, PA.

A LIST of names and addresses, one or two of the former and several of the latter incorrect, that's all the Three Hundred and Tenth Field Artillery was, until about two years ago. The regiment is part of the 154th Field Artillery Brigade of the 79th Division, the entire brigade being allocated to Philadelphia. There are no regular army posts within reasonable distance and no national guard regiments or units of divisional artillery. Likewise, of the officers now assigned to this outfit, only four have had service with the French 75-mm. gun and only about twice that number have had any experience with horses. The problem that confronted the regimental commander when he was assigned, for no regular executive officer was available, furnished ample food for thought and ingenuity.

The motto of the 310th Field Artillery consists of that stirring command, "Prepare for action." Manifestly, something had to be done to live up to it. Two major lines of endeavor confronted us, the first to build up regimental esprit and morale, the second to impart such military training as conditions could make possible. We shall treat the account of our development along these two lines rather than chronologically, for we understand this is desired as an interchange of helpful suggestions and not merely history.

Before anything at all could be accomplished, accurate information concerning assigned officers had to be secured. This involved a careful checking of the roster, and it is interesting to here simply list the various agencies the regimental commander had to employ before every name on the list was "accounted for." They were, in addition to divisional records, mail, telephone, directories and 'phone books, the Adjutant General's records, Veteran's Bureau records, other officers, the police, American Legion, and, in one case, a county detective. When an officer whose name appeared on the list was located he was given a rather searching multigraphed questionnaire to fill out. Aside from his previous military record, it also embraced vital information concerning home and business addresses and 'phone numbers, educational qualifications, business, etc. So valuable did this prove, that now, the moment an officer is assigned to the regiment, he is immediately sent one of these blanks to execute, and is not assigned within the regiment until the record is available—one method of getting square pegs in square holes. At last this work

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was done and we found ourselves with about a 30 per cent. officer strength.

The building up of interest and esprit received first attention. It was recognized that attention to military education could only be insured after this sense of loyalty and obligation was aroused. First, an informal meeting and smoker was called in a convenient downtown club. Six men attended! Well, there was certainly room for improvement. Each loyal man was assigned a certain list of non-attendants to see and arouse. Other smokers, at first purely social "get-togethers," followed, each showing better and better attendance. Toward the end, a bit of snappy field artillery talk was insidiously introduced. Then the summer of 1923 intervened. Only a very limited number of field artillery officers could attend, and no specialized field artillery instruction was given at the camp.

With the autumn came the question of a regimental coat-of-arms. This unit was among the earliest of the reserve regiments to secure an approved design. Metal insignia were secured promptly and sold to the officers, for wearing of the uniform on every proper or military occasion, is strongly urged. The moral effect secured, as well as the indirect advertising, is good. From time to time, memoranda dealing with uniform changes have been issued, so that officers may at all times have the assurance that they are properly and "snappily" dressed. In order that the keeping up of good military appearance may not prove too heavy a burden on the younger officers, suggestions have been offered, and arrangements to secure economical alterations or changes have been made with military tailors.

The national standard and authorized guidons have been secured and the regimental colors are about ready for issue. No opportunity to secure visual evidence of existence and activity has been knowingly neglected. Constant endeavor to disabuse the mind of any idea that we are "only a paper organization" has been made.

In the late summer of 1924, Major Edward H. Hicks, F.A. (D.O.L.), was assigned as executive officer for the brigade and its components. This was indeed a welcome addition and immediately made possible more ambitious plans. Additional and foreign duties since saddled on our executive, have acted as a partial deterrent to more rapid development.

In the fall of 1924, Defense Day saw the entire brigade assembled, and 100 per cent. accounted for, at a splendid luncheon, after which, we paraded with three bands and ranks filled to strength with civilian volunteers. Shortly after this a series of weekly regimental luncheons were inaugurated. They are entirely informal and a man can order anything from a toothpick and a glass of water to a several course meal. The luncheons are held at a central club, where

THE THREE HUNDRED AND TENTH FIELD ARTILLERY

a table of generous size is reserved for us every Wednesday. Postcard reminders are mailed weekly, so as to reach each officer the day before the luncheon. Many reserve officers are busy men and we find these notices absolutely necessary to insure large attendance. Record is kept of attendance, which has averaged about 40 per cent., and at the last luncheon of the season at the end of May, a suitably inscribed loving cup is awarded to him who has shown the greatest interest and loyalty as evidenced by consistent attendance. Second and third awards of silver fobs, bearing the regimental coat-of-arms, are also given. The value of these luncheons is of extreme importance in building esprit.

In the spring of 1925 a formal brigade dinner was given, at which we had as our guests the division staff and regimental commanders, national guard artillery commanders and local ranking officers of the regular service. Its success was beyond question.

Following the preliminary gathering of data and assignment of officers within the regiment, work was begun on the regimental mobilization plan. This was satisfactorily completed in good time and was first published and explained to all officers at the Defense Day dinner and muster. Our plans, at present, are detailed, complete and workable. Mobilization of our present personnel could be started in a few moments, and it is believed we could complete it at any time inside of twelve hours, with every officer at his designated post.

The 310th Field Artillery was designated for summer training at Camp Meade in 1924, and for that purpose, the forty officers that reported were assigned to the 6th Field Artillery. Too much cannot be said of the courtesies, sympathetic aid and spirit of fraternity displayed by the officers of the Sixth. The training was practical and valuable. To fill in unforeseen deficiencies in the program, a regimental officers' school during available periods was instituted and carried on by the officers of the regiment itself. In addition, each day, we had our own officers call, and at that time opportunity was afforded for asking and answering all kinds of questions and settling of perplexities that inevitably arise. To the veteran officers the camp was valuable as a refresher course; to the newly commissioned ones it was a practical school of utmost importance.

This year, to prepare our officers for their work, an officers' school has been held every Tuesday evening throughout the entire spring. Usually the classes are held, through the courtesy of that regiment, in the 108th Field Artillery armory (Pennsylvania National Guard). Every officer receives a postal-card notice of each class the day before it is held and mimeographed copies of each talk or lecture are mailed to every officer on the following day. To develop initiative and self-confidence, competent officers from

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among our own numbers are required to prepare the lectures on assigned subjects and conduct demonstrations, under the supervision and previous approval of the regimental commander or executive. A list of the subjects taught includes hippology, explosives, projectiles, 75-mm. gun matériel, communications, topography, use of fire control instruments, computation of firing data, harnessing and draft, paper work and similar subjects. All lectures are made practical through the exhibit and actual use of the necessary equipment. As instances of how lack of matériel or facilities are met, the 108th Field Artillery being a heavy regiment, it was necessary to secure a French 75-mm. gun from Frankford Arsenal; for the class on draft and harnessing, we went to the 112th Field Artillery (New Jersey National Guard), in Camden, where horses, guns and latest type harness were available. In all our work, national guard and regular authorities have evinced the utmost interest and no effort has been spared by them to further the effectiveness of our endeavor. The foregoing school has had a most excellent record of attendance and it cannot fail to have a most marked beneficial effect. We forgot to mention that every class, when time affords, is followed by some blackboard or terrain board firing.

For officers unfamiliar with horses, a class in equitation, during which the basic elements are taught, has been run in a local cavalry armory, under the guidance of an officer of this brigade. The class is open to every and any reserve officer who may wish to join, and a nominal charge only is made to cover the expenses of the class.

For the summer training of 1925, a tentative plan has been presented, but not yet approved at this time of writing, which it is believed will allow all officers to attain a greater amount of training suitable to their previous experience and rank, than ever before.

At any event, the 310th Field Artillery and the whole brigade of which it is a part, is rapidly attaining a reputation for its spirit and progressiveness; we have a vastly increased personnel (about 75 per cent. of officer quota and a number of enlisted reservists); our officers have a basic, working knowledge of their duties; we are a unified family with a goal and an ambition, as well as a mere plan to reach it. In short, despite drawbacks and limitations of the dual civil and military lives that we lead, we feel that it has been definitely demonstrated by the 310th Field Artillery, that our National Defense Act is not "delusive theory," but a practical means to a laudable aim. It is possible for a reserve regiment to become an active, concrete unit of our military system. If our present plans carry through, before another year rolls around, the 310th Field Artillery hopes to demonstrate its fuller conception of the duty imposed upon it by its motto—"Prepare for action."

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Furnished By

The Military Intelligence Division, General Staff

FRANCE

Preparation of Student Officers for the Ecole Superieure de Guerre.—The French method of preparing student officers for the course at their Army War College (Ecole Superieure de Guerre) is believed to be worthy of study. Early in the spring of the year, examinations are held for the ensuing school course proper, which commences on November 3rd of this year. Officers who successfully pass these examinations are then detailed to short periods of duty with troops of each branch of the service. These short periods, or courses, commence on April 15th and continue for six months.

The schedule of the preparatory courses for the 1925 class is as follows:

SCHEDULE OF PREPARATORY COURSES—1925

Officers of	Detail with infantry.	Detail with tanks	Detail with artillery	Detail with air service	Signal school course at Versailles	Automobile course at Fontainebleau
Infantry.....	.....	15 days	2 months	2 months	15 days	15 days
Tanks	15 days	.....	2 months	2 months	15 days	15 days
Cavalry	1 month	15 days	1 month	2 months	15 days	15 days
Artillery.....	2 months	15 days	.....	2 months	15 days	15 days
Engineers.....	1 month	15 days	1 month	2 months	15 days	15 days
Air Service	2 months	15 days	2 months	.....	15 days	15 days

Between the two school years (summer 1926) officers of all branches, except the cavalry, will take a fifteen-day cavalry course. Cavalry officers will take a supplementary artillery course at the same time.

The air service course is for a period of two months in order to give all officers an opportunity to qualify as air observers and the course will be arranged with this object in view. The course in tanks will comprise principally a study of tank manœuvre in connection with the infantry.

The infantry and artillery courses will take place during the manœuvre period and while the organizations are in camp. For these courses officers will, as far as possible, be assigned by groups to a few chosen regiments which from the point of view of instruction have the best facilities. The officers taking artillery courses will be assigned to divisional artillery whenever possible.

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The student officers will be assigned to regiments and will take part in all of their marches and manœuvres. They will not in any case be assigned to regimental or brigade staffs or be used as umpires.

RUSSIA

Army Training Schools.—One hundred and twelve senior commanding personnel (field officers) passed the Senior Academy course on July 27, 1924, being classified as follows:

Administrative and Economic	10%
Political	28%
Training (Stroevie)	62%

Of these, 51 per cent. were of the intelligentsia, 23 per cent. were workmen, 12 per cent. were peasants and 14 per cent. were unclassified. It is interesting to note the large percentage of the graduates who are classed as coming from the intelligentsia (51 per cent.) and the small number of workmen and peasants (35 per cent.).

MEXICO

Reported Reduction of Army.—With the economies planned by the new administration in Mexico under President Calles, the War Department budget is said to have been reduced from 115,000,000 to 80,000,000 pesos, or approximately \$17,500,000. It is said that a plan is being worked out whereby the reduction of the army can be made from the present strength of 68,000 men to 50,000 by the end of August. In this connection, the press of Mexico City on January 31st announced that orders had been issued by the War Department for the discharge of 595 officers of all ranks, including 60 general officers.

GERMANY

Army Organization.—The German army organization is unique in that each division has an infantry leader with a staff composed of two general staff officers, a staff officer, and thirty noncommissioned officers and men as his assistants. In time of peace, the infantry leader is charged, under the division commander, with all matters concerning the infantry of the division. This is, perhaps, more necessary in the German organization, as the division commanders are also area or district commanders with the many additional duties the latter position demands. Another factor which may have influenced the establishment of an infantry leader and staff in the division, is that there are only three regiments of infantry in the division instead of four as in our service. This condition prevents the organization of two infantry brigades with their commanders.

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In examining a translation of recent tactical problems of the German Army, it is disclosed that the infantry leader also issues combat orders to the infantry and attached arms. In the problems in question, the division was arriving by rail at hourly intervals. The enemy was advancing toward the detraining area. The infantry leader was notified by the division commander, already in the detraining area, of the sector assigned, the troops already available, and was given the mission of covering the detraining of the rest of the division and opposing the enemy's crossing the frontier. In carrying out his mission, the infantry leader issued the necessary orders and manœuvred the troops between 5:20 P.M., October 2nd, when he received the division order, until 8:00 A.M., October 3rd, when a new division order was issued. During this time the front line was twice attacked and the infantry leader manœuvred his covering troops without reference to the division commander, whose headquarters were about fifteen miles to the rear, in the detraining area.

In general, the problems show the simplicity insisted upon in issuing orders and the wide latitude and initiative afforded subordinates.

The location of the tactical problems is of interest. The area selected is that just southwest of Hanover, covering the line between the Ruhr, now occupied by the Allies, and the large commercial coast cities of Bremen and Hamburg. This may have some significance as it was rumored that the Allies, in their plans for taking additional sanctions under the Versailles Treaty (before the Dawes Plan), contemplated an advance toward these two cities.

Another new feature in the organization of a German division (theoretical), is the presence of a reconnaissance detachment consisting of a headquarters, two squadrons of cavalry, a bicycle company and an armored auto train. A fixed organization of this kind offers the advantage of special unified training in reconnaissance and the best conditions for ensuring efficient information work. It should possess a decided advantage over units temporarily banded together to perform this function.

JAPAN

The Japanese Special Grand Manœuvres.—It should be made plain that the Japanese Special Grand Manœuvres are never a true reflection of the Japanese Army in action. While they give considerable experience in marching, the issuance of orders, communications, etc., the campaign is, no doubt, closely worked out in detail before it is started, and some of the engagements at least are anticipated

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and carefully planned in advance. There is therefore very little to be learned of Japanese strategy or tactics. These manœuvres serve a special patriotic purpose. They are held in a different section of the country each year, and usually three to six divisions participate. All the populace within reach, turn out to observe the more important battles and frequently crowd the fields and restrict the action and movement of the troops. Several imperial princes and either the Emperor or Prince Regent, graciously attend, and to these, great respect is paid by the troops and the populace.

The Special Grand Manœuvres are usually held each autumn. Those of 1924 were the first since 1922, owing to the earthquake of September 1, 1923. They were held on a minor scale both as to number of troops engaged and cost (about \$1,500,000.00). A war organization was outlined, but full war personnel and equipment was not supplied.

The Japanese War Department has notified the authorities of the Miyagi Prefectural Office at Seudai (north of Yokohama) that it has been decided to hold the army grand special manœuvres for 1925 in the Miyagi Prefecture, between the middle and end of October. It is reported that the Imperial Grand Division from Tokyo, the 7th Division from Asahigawa, the 8th Division from Hirosaki, several army air units and a part of the navy will participate. It is announced that the purpose of this year's manœuvres will be to train troops in the defense against an enemy moving south from northern Japan.

Air Service to be an Independent Combat Arm.—It is reliably reported that the Japanese Army air troops are to be organized into a distinct combat arm on the same footing as infantry, cavalry and artillery. The Japanese air units were originally organized under the engineers, and to date the officers are detailed from all branches of the army. In most cases, the officers, after completing a detail, have returned to their original arm, leaving only a few old, thoroughly trained officers with the air service.

Japanese Mission to Italy.—A Japanese military mission composed of high army and navy officers arrived at Pisa, Italy, recently. The object of the mission was an inspection of the Dornier Aircraft Factory. It is reported that Japan has purchased the rights to manufacture the Dornier airplane.

ENGLAND

The following figures showing the gross expenditures for the fiscal years 1913–1914, 1922–1923, 1923–1924, 1924–1925, and 1925–1926 have been made public:

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	Navy	Army	Air Force
	£	£	£
1913–1914.....	50,213,450	31,320,397	@ 1,375,700
1922–1923.....	65,403,954	66,001,075	14,585,271
1923–1924.....	59,201,586	55,532,359	16,635,706
1924–1925 (Estimated).....	60,729,250	54,480,000	19,074,000
1925–1926 (Estimated).....	64,363,460	54,333,300	21,319,300

@ £605,700 charged to Navy Items and £770,000 charged to Army Items.

MOROCCO

French and Spanish Military Organizations.—French and Spanish efforts towards the pacification of Morocco have been so featured in the newspapers for the past six months that it may be of interest to see just how each country has organized its forces to combat the warlike Rif tribes led by their capable leader, Abd-el-Krim.

At present, Spain maintains four strongly garrisoned posts in her zone, which stretches from the mouth of the Moulouya River, on the Mediterranean, east to Melilla, to south of Larache on the Atlantic. These four posts are Melilla, Tetuan, and Ceuta on the Mediterranean and Larache. When the organization of her permanent army in Morocco is completed, Spain will have about 65,000 Spanish troops and some 15,000 native troops in all. It is interesting to note that Spain relies almost entirely on her own nationals for this trying military service, the proportion of native troops being about one to four Spaniards in the zone.

France, on the other hand, reverses this proportion in the Protectorate. At the beginning of 1924, the strength of the French Corps of Occupation in Morocco was about 65,000 men. This comprised 55,000 men of the regular forces as follows:

- 43 Battalions of Infantry,
- 16 Squadrons (really troops) of Cavalry,
- 2 Squadrons of Cavalry Armored Cars,
- 22 Batteries of Artillery,
- 10 Air Squadrons,
- Services.

Of the above, only 7 of the 43 battalions of infantry were French battalions, and, of the 7 French, 4 were Zouave, which really serve only as depots for the instruction of the French noncommissioned personnel of the native troops. They do no fighting. The other three French battalions are the African battalions, penal battalions, which may serve only in Africa. Of the remaining 36 battalions, 9 are Foreign Legion and 27 are natives—Moroccan, Algerian, Tunisian and Senegalese—but all Regular Army.

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The other 10,000 men are included in one of three distinct categories:

Mixed Goums of Morocco,
Maghzen, Mehallas of the region of Marrekech,
Partisans.

There are also being organized two Saharan companies. These native troops are peculiar to Morocco. The Goums were formed to circumvent the Treaty of Algeciras, by the terms of which Germany would have claimed that France was usurping the authority of the Sultan if she had raised regular troops, as she had done in Algeria. They were local police forces, which, in reality, rendered the same service as did regular troops and did it so well that even with the German mortgage lifted, and in spite of the consequent enlistment of Moroccan spahis and riflemen, the mixed Goums have been retained. There are now 27 of them—each consisting of three-quarters of infantry and one-quarter cavalry, officered by French officers of the information service and with French or experienced natives of the regular army as noncommissioned officers. Unlike the other irregular troops, they wear in part French army uniform, notably breeches.

The Maghzen are permanent troops of infantry and cavalry under the orders of the officers of the information service. Their strength, never very great, varies according to the posts and regions where they are employed. Unlike the Goums, they have no French officers or N.C.O.'s, and obey directly a native leader. Their job is to assure the police and security of the post to which they are assigned, to make patrols and to protect convoys and escorts.

The Mehallas are semi-permanent forces of infantry and cavalry, with no French officers or N.C.O.'s, which are recruited when needed by the great Caids of the South (Marrakech) under the control of the officers of the information service. They are all that remains of the Moroccan armies of former times.

The Partisans, on the other hand, are in no way permanent, but are the horsemen and footsoldiers of the friendly tribes who volunteer to take part in any determined military action during a comparatively short period. For this they receive a daily pay, a rifle and some cartridges. In combat they are directed by the particular officer of the information service who is assigned to their tribe.

The difficulties of the operations in Morocco can be visualized by quoting from an account given by an officer on the staff of the French Resident General, Marshal Lyautey:

"Our first contacts with the natives were decisive, great hordes coming out, at the call of a marabout, from the most distant tribes, confident in his power to annihilate us and counteract any effort of our arms, hurling themselves in dense masses against our cannon and

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machine guns. At Djorf, in 1903, at Sidi-Bou-Athmane in 1912, while General Mangin was marching on Marrekech, the victory was immediate and complete.

"Those happy days have passed!

"The Berbers opposing us now know the force of our arms; they have, in a marvellous manner, applied their manner of fighting to their own warlike habits and to the terrain which they are defending.

"As to their warlike qualities, an absolute disregard for danger, alertness, physical vigor, as well as a surprising ability to manoeuvre on all kinds of terrain, an instinctive knowledge of surprise attack, cleverness in discovering the weaknesses of the adversary and in taking immediate advantage of them, are some of the most manifest. Their contempt for danger, warlike zeal—all who have served in Morocco can testify to these qualities.

"Their physical vigor is most extraordinary under all circumstances; whether their faces are torn by the 'siroco' and burning sand, as was true at Skoura in 1918, or whether it be a raging snow-blizzard lashing their half-naked bodies, as through the bitter night of the 'Aouinettes' in 1913, or yet being beaten down by the hailstones of such an icy deluge as was experienced at Bou-Arfa last May. The endurance of the 'Djicheurs' in descending the slopes of the Atlas in the heat of summer to scour the Sahara seems a feat almost supernatural to us of the civilized but more anæmic races.

"Their ability to operate on any terrain is almost unbelievable. In 1913, at Ras Amras, a guard detachment which had just completed an hour's hard climb to the peak it had been ordered to occupy, observed the Chleuhs down in the valley and continued to fortify themselves rather at their ease, thinking they had an hour to spare; a quarter of an hour afterward they were attacked in hand-to-hand conflict by those same Chleuhs!

"From his early childhood the chief ambition of the young Berber is to become strong and artful. This is most natural, for he learns early in youth, from observation of his surroundings, that life for him will be one perpetual struggle for the 'survival of the fittest'—night and day the Berber stands guard against his hostile neighbor of the adjacent tribe. Thus, he follows his father and brothers to the hunt—even to war; very young he rides horseback; at the first opportunity he buys a rifle—or more probably, steals one—the very folksongs chanted by the women of the tribe at night under the tents, impress deeply into his mind that he can not be worthy of being called a man until his exploits and acts of bravery and valor shall have been recognized and chanted by the women folk, as they are now singing the deeds of his ancestors. In the eyes of

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the Chleuhs, the action of theft under arms is an accomplishment worthy of great honor, admiration and esteem; so the young Berber longs and seeks the first chance to try his skill. He soon takes part in one of the customary undertakings of his tribe, known as the 'rezzou,' organized to annoy the neighboring tribe, or still another operation known as the 'djich,' the motive of which is to take by surprise the French trains, labor parties or other small detachments. This innate thirst for plunder is one primary reason why the French recognize the advisability, in order to get along peaceably with the Chleuhs, of respecting the lands of these unruly tribes. Unless such a policy were adopted, a continuous attack by night and day by hordes of them, would result; the French posts, convoys and communications would be in constant danger.

"In spite of all this, these incorrigible thieves seem to have a character which contains certain noble traits. For instance, they observe scrupulously certain time-honored traditions—and, strange to say, keep their word. They have a clear understanding of the rules of hospitality, which they respect warm-heartedly. If we go back to the early part of the Middle Ages, we will discover curious resemblances, even in looks, between these mountaineers of the Moroccan Atlas and the men who have become the world's models of chivalry.

"But let us follow the fortunes of a force which, with the object of taking over new territory, proposes to build an advanced camp. The enemy spies give the alarm. In a flash, fires are kindled calling out the warriors, who rush from their 'douars'; the foot-soldiers jump into the saddles with the cavalymen or hang onto the tails of the horses; far back in the mountains, the sound of our cannon will bring out the others; it is the 'Call to Arms'. In a short time a curtain of sharpshooters is formed; up on the crests, at the mouths of the ravines, they hide themselves awaiting the coming of the advance-guard. The sun, the dust and the winter tempest have given to the clothing and skin of these fighters the very color of the ground they are defending—and they seem to melt into it. Woe to the band of invaders that is too weak or too dispersed, or which arrives out of breath or in disorder and dares to venture beyond the protection of its neighbors or out of sight of its artillery—in a flash the alarm announces their approach and, from all sides, the war-cry of the Berber rings out: 'Aoura, Aoura!' (Come on! Come on!)—and, out of tiny ravines, out from behind every imaginable shelter, the assailants filter down upon their victims with almost unbelievable rapidity. A few seconds and the firing begins, becoming more and more intense and close up, until it comes to a hand-to-hand conflict.

"But the signal has likewise been given to the French forces,

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and artillery shells and machine-gun bullets rain down on the enemy, who disappear at once as rapidly as they had appeared, carrying off their wounded and their dead—but also a quantity of French arms and munitions. Sometimes the line, drawing back, gives up a little ground in so doing, but not without continuing the firing, until the terrain is sufficiently favorable to warrant a counter-attack which they undertake in fury.

"It is against the flanks of a moving detachment, and to the rear, that they find their best opportunity to make trouble, so consequently most of them go in that direction. They come in swarms to harass the flank-guards; a summit is scarcely evacuated by the last echelon before it is covered by the sharp-shooters who have been, up to this moment, dispersed around about, all in spite of a veritable shower of shells. Having been so scattered about in the bushes and behind rocks, no definite objective was offered to the artillery, whereas the sharp-shooters, once having thus gained the summit and profiting by the facilities of adjusting their range, snipe off the cavalymen and the infantry platoons still in movement. Everywhere, the instant a vacant position is spotted, they swarm in to encircle it, taking advantage of every natural vantage point, and gradually coming nearer to their coveted prey, the main guard slowly moving along down in the valley below.

"And if, by chance, the French column reverses its direction of march—if, in any way, the new direction which they may have taken can be construed by their desperate assailants as a retreat, their warlike fury reaches a degree hard to comprehend. Their attack becomes really maddening; urged on by the shrieking of their womenfolk, all of them, even any who before may have been somewhat hesitant, appear all round the horizon; onward, through the rain of machine-gun fire and shells they rush, wedging in and out through the underbrush and rocks until they are right up onto the French units already hampered by having to carry their dead, whom they must preserve from mutilation, and their wounded whom they must save. In 1914, at El Herri, an entire French column was thus almost totally annihilated.

"Once the French, despite all of this, have reached their objective, and have proceeded to set up camp, the assailants lose no time in harassing them by constant fire while they are digging their trenches or erecting their shelters. This accomplished, they post a number of guards to spy over the French while the rest retire to the 'douar' to eat, care for their wounded, admire the trophies they have won, and boast to the women of the tribe of the valor of their exploits. For this they do not lack an audience, their women being indeed numerous—real vixens, active, shrewd and warlike, having themselves followed up the men in battle to cheer them on, offer

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them drink, rob the enemy dead and wounded, as well as to lend a hand in carrying off their own dead, honor forbidding that they be left to lie on the field. They are constantly on the watch during the conflict to detect any sign of cowardice on the part of one of their men, which, if discovered—an event most rare—makes them use every effort to cover him with ignominy and shame.

"At dusk the most stubborn fighters return. They attempt no longer to attack the camps themselves, too well defended by a network of barbed-wire, illuminated by torches and well flanked by automatic weapons, but they send in heavy volleys and often kill or wound quite a number of men and animals. Others are bold enough, even, to creep under the wire and strangle a sentinel or to cut the strap attaching the rifle to the wrist of a soldier asleep in his tent, making away with the weapon despite the violent fusillade loosed after them.

"The following days, native posts and lookouts are established; these spy unceasingly every movement of the French from all sides, holding themselves ready to take advantage of the slightest inattention on the part of the French, to spring down on their convoys, their labor parties, animals at water, etc. In France one too often hears officers expressing astonishment over the size of the losses: 'How can this be possible, when you consider that we are fighting with cannon and machine guns against an enemy equipped only with rifles?', they say. They forget that, when a moving column has operated during an entire day on an almost impossible terrain, playing the rôle of a 'bull tormented by wasps,' it is not surprising if, at nightfall, a goodly number of stings have been received . . ."

FOREIGN MILITARY JOURNALS A CURRENT RESUME

ITALY

"Rivista di Artiglieria e Genio," December, 1924

COLONEL PRIMO DALLARI, Artillery, in an interesting article, discusses the new Italian Artillery Firing Regulations, which are being prepared for the press. It appears that they provide for a final period of artillery instruction called "finishing exercises," which come after the period of regimental firing. In the "finishing exercises," artillery units of various calibres would work together, paying particular attention to command, communications, coöperation and massing of fire. It is a period more of tactical than technical instruction. Colonel Dallari points out the importance of the principles in the employment of artillery which were greatly developed during the World War: The principle of massing artillery fire, the principle of artillery fire surprise and the principle of artillery fire in depth.

Captain Settimio Donati, Engineers, contributes to this number a noteworthy article on road and bridge demolition on the Austro-Italian front. He not only goes deeply into the technic of the work, but he also shows what great effect this work had on slowing down and stopping offensives.

A description of the new Austro-Italian frontier, which runs along the tops of the Tridentine and Carnic Alps and which, of course, is of tremendous military value for Italian National Defense, is presented by Captain Luigi Norcen of the Artillery. It is interesting to note that through the Brenner Pass, which is one of the few places where vehicles can cross the frontier, the ancient Romans launched their conquests of the Danubian tribes, and that Italy has been invaded by no less than sixty-six armies marching through it.

In the historical section there is an excellent narrative of the mountain battle of Monte Piana, 22-24 October, 1917, by Major Ernesto Galeazzi, now deputy in the Italian Parliament.

Under "News Items" there appears a statement that the French Army recently held manœuvres in Lorraine, in which a force strong in ground units manœuvred against a force strong in air units. The ground side consisted of two infantry divisions, plentifully supplied with tanks, armored cars and motorized equipment, while the air

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side had one infantry division and one air division, consisting of four regiments of bombardment, pursuit, and attack aviation and one observation squadron. The results have not yet been published.

"Rivista di Artiglieria e Genio," January, 1925

General Salvatore Gatto contributes an interesting article on the present status of motorized artillery in the Italian and other armies, particular attention being paid to the results of America's experiments along these lines. At present it appears that the Italian solution of motorized artillery, is to drag the guns behind trucks for long fast trips over hard roads, the guns riding on special sleds with pneumatic tires. The Pavese four-wheel-drive, jointed chassis truck is used considerably, and more or less takes the place of our five-ton tractor.

Considerable attention is given to the book on motorized artillery recently published by Colonel Rimaillo of the French Army, especially that part which deals with present and future developments.

In the historical section of this number there is an interesting translation of an article by Major-General V. Pengov of the Austrian Army on his operations against the Italians at Col di Lano, in 1915 and 1916.

"Rivista di Artiglieria e Genio," February, 1925

The following are of particular interest in this number; a work on camouflage by Captain Gustavo Secco; a narrative of ten operations of the 9th Italian Corps in the battles on the Carso in 1916; a résumé of General Perrin's article in "France Militaire" on wastage of artillery ammunition and matériel. This latter résumé ends with the statement that "the best way to improve the assistance given by the artillery to the infantry, is not by increasing to an exaggerated degree the amount of artillery, but rather by teaching the artillery to fire better, and when and where the infantry needs it."

FRANCE

"Revue Militaire Francaise," March, 1925

General Camon contributes an article "The Motorization of the Army." He advances several arguments why the horse should be replaced by the motor:

Strategic reasons: In the World War, the cavalry at times made 80 kilometres, or even more, in a day's march, but it usually arrived in poor condition. At a speed of 16 kilometres maintained for 20 hours, a truck may make 320 kilometres in 24 hours; and the troops carried by trucks arrive in the battle line scarcely fatigued.

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Tactical reasons: On the field of battle the cavalry mounts and the artillery teams present large and vulnerable targets. The horse cannot be protected against the ever-increasing use of gas. The motor of an automobile offers but a very small target and it can be protected by light armor.

Economic reasons: The horse is gradually disappearing from general use. In the cities, fewer and fewer of them can be requisitioned. As soon as the farm tractors and their fuel become cheaper, the horse will almost disappear from the farm. If the army insists upon keeping the horse, it will soon be produced only for army use and consequently at exorbitant prices. If the cavalry is no longer anything but infantry using the horse as a means of transportation, the automobile offers a means much less costly. Working or idle, the horse needs food and daily care. Much time is wasted in this care and in riding instruction. The cavalry places more emphasis upon equitation than upon combat training.

Conservation of man power: Whether for cavalry, artillery, or trains, the replacement of the horse by the motor reduces the number of noncombatant troops. Undoubtedly repair of matériel requires men, but men unfit for combat can be used.

Of the two classes of motors used by the army, the truck and the tractor, no difficulty will be found in requisitioning enough trucks in case of war. The problem of tractors is still unsolved, and will be, until their price can be reduced from about 30,000 francs to 15,000 francs or less, which price would place them within reach of the French cultivators.

The author discusses at length the various types of tractors. He concludes that the caterpillar type is not suitable as it tears up the roads. The "Latil" tractor can be modified to make speed on the roads by means of rubber-tired wheels, which can be removed and replaced by tracks in 15 or 30 minutes for use in rougher terrain.

Colonel Allehaut, in his article "Concerning a German Opinion of French Military Doctrines," reviews General von Taysen's "Matériel or Morale." Von Taysen contends that the memory of the stabilized condition of the last war has led the French army to multiply disproportionately its heavy artillery, and adopt a policy tending toward excessive centralization of fire direction under the artillery commander. In the event of a war of movement, the present doctrine will be found to be faulty. Centralization of fire direction in the corps and the division is to be desired during a concentration preceding an attack, but at the moment the barrage is lifted such a policy will not encourage a rapid progression of the advance. The Germans prefer subordination of the artillery, to give the front-line infantry commanders every opportunity to exploit their initial

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surprise, and with close artillery support, to push the local attacks to the limit.

During the late war the French, as a rule, held up their attacks with pauses in the execution of fire, and with even interruptions of several days while awaiting artillery reinforcements. There is little doubt in the mind of the German author that the next war will be one of movement, and that such a war will necessitate numerous local engagements by small units, which continually push forward and take advantage of favorable situations. This they cannot do if they must wait for support from the artillery commander.

Lieutenant-Colonel Paquet continues his article "The Attrition of German Strength in 1918." The German high command had always hoped to break through in Flanders and march to the sea, separating the French and English forces. Temporarily abandoning this idea of a battle of rupture, the German command planned the Aisne offensive of May 27th as a battle of attrition. They hoped to exhaust the allies in drawing toward this new front the French reserves, which the allied high commander was holding in readiness to support the British at the time of the offensive of Picardy and Lys. Germany still had numerical superiority on the western front and hoped to wear out the allies before the arrival of the American troops, and then at the favorable moment to resume the original plan of a break through in Flanders.

On May 26th, 206 German divisions were on the western front. Of this number 125 were in the line and 81 in rear. A month before, 134 were in line and 72 in rest areas. A comparison of these figures explains the economy of the new plan, a progressive reduction of the density of the front line and a corresponding increase of reserves, resulting in longer and more frequent rests. However, in order to maintain the 206 divisions, during the month of May, an average reduction of 100 men in battalion strength was necessary.

In accordance with the German plan of a battle of endurance and economy of reserve strength, only a fixed number of divisions were to be used in this drive. A deep penetration using more than the allotted number of divisions was not to be desired.

This policy explains the apparent hesitation of some of the German units on May 28th. Having reached their objectives, they awaited orders. Apparently a council of war was held on the 28th. In view of such unexpected success in the Aisne sector, it was decided to use more of the reserve strength and to push through to the Marne. Each unit was instructed to pursue the enemy as rapidly as possible and not to wait for the advance of the units on the right and left.

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In his article "Doctrine Based on Precedent *vs.* a Doctrine of Circumstances," Captain de Gaulle points out the mistake made in past wars, particularly in the war of 1870, in adhering blindly to any fixed tactical principle. He points out how all great military chiefs owe their success to having appreciated and having taken advantage of circumstances suddenly arising in each particular case.

In this issue General Boelle continues a very detailed account of the meeting engagement around "Vitron" in August, 1914. In this number also appears "Powders and Explosives (1914–1918)" by Commandant Duchemin.

"Revue Militaire Francaise," April, 1925

In this issue General Camon continues his article "The Motorization of the Army." In discussing the "auto-cannon," the gun and motor combined in one mount, he states that this type of matériel is unsatisfactory for several reasons. The resulting cost would be enormous, should an attempt be made to equip all artillery units with this mount. The life of the motor is much shorter than that of the gun. The motor is exposed with the gun in battery position, making it much more vulnerable than a tractor, which would be removed while the gun is in battery position. The tractor is available if needed for hauling ammunition. At the outbreak of hostilities the artillery can hope to be quickly equipped, only by utilizing available commercial motor power.

The author suggests that any sort of automobile chassis, the taxi type, for example, could be modified and used to haul light artillery. Provision could be made for changing from wheels to tracks, when leaving the road; this change to require not more than fifteen minutes' time.

The author also proposes that cavalry divisions be replaced by motorized divisions employing the proper proportion of armored cars; cars for anti-aircraft work; motorcycles; and light cars, carrying a squad each, to be used for advanced guard work or missions of a similar nature. These divisions should attach strong engineer forces for bridge and road repair. He emphasizes the necessity of creating, immediately, at least one such division for experimental purposes. Infantry divisions will be moved from sector to sector, as they were during the late war, by means of general army reserve of trucks.

At present the one serious objection, in France, to the general replacement of the horse by the motor is the lack of fuel. In 1923, of the 670,000 tons consumed, only 25,000 tons were produced at home. In time of war, unless fuel-producing countries were allied

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with France, or at least sympathetically neutral, France could not obtain the necessary supply.

Commandant Texier begins an article "The British Empire in 1924," a study of the effect of the power of the labor party on the British Army. The author concludes that Britain's military power has not suffered under the direction of the labor cabinet.

Colonel Allehaut continues his résumé, "Concerning a German Judgment of French Military Doctrines." In this issue he discusses the cavalry and the tanks. The German author, General von Taysen, observes that a certain element in the French Army wishes to replace all cavalry by motorized infantry and by tanks. Another group wishes to reinforce the cavalry by the addition of tanks. Divisions of cavalry thus reinforced, would be invaluable at critical moments, either to save a dangerous situation (as in March, 1918) or to contribute to victory by a rapid entry into a part of the line, or by striking the enemy on the flanks. Von Taysen criticizes the German high command for not having used it at the end of March, 1918, in the breach opened between the British right and the French left.

General von Taysen believes that the tank will be of little value in any future war. He attributes the success of the French tanks at the close of the last war to the lack of opposition offered by the demoralized German troops.

Colonel Allehaut believes that von Taysen and other German military chiefs are trying to belittle the true power of the tank since Germany is forbidden by the Versailles treaty to construct them. Von Taysen recognizes the tank, however, as an aid to the morale of the infantry, pointing out at the same time a danger, that, accustomed to its support, the infantry will lose in offensive spirit when not continually accompanied by the tank.

In this issue Commandant Graeset continues his article "A Meeting Engagement." Colonel Pagezy continues a detailed discussion of the technic of "Anti-aircraft Fire."

In this number also appears a review by Commandant Martin, "A German Controversy." The "Reichsarchiv," successor to the historical section of the German general staff, has just published the first two volumes of the "History of the World War," under the title "Der Weltkrieg (1914-1918)." Two more volumes are yet to appear. The introduction attempts to prove that Germany did not want the war, and defends the violation of Belgium neutrality. The history is of a highly critical nature and is very interestingly written.

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"Revue d'Artillerie," November, 1924

"Anti-aircraft Defense in the Light Motorized Division," by Major G. Meckler. In the *Revue Militaire Francaise* for April, May, and June, 1924, there appeared a study by General Boullaire on the organization and use of a motorized division. The troops were to be carried in trucks or in light flexible tracked vehicles, such as crossed the Sahara some time ago; the artillery was to be drawn by tractors, and all supplies were to be carried in trucks. The present article deals with the anti-aircraft protection which would be necessary for such a large body of vehicles, which in strategic moves, is necessarily confined largely to roads, and is particularly vulnerable to attacks from the air.

The author agrees with General Boullaire, that a battalion of 75-mm. A-A guns on automobile mounts is necessary, but advocates in addition, machine guns or small-calibre automatic cannon scattered along the column, transported in the firing position, and ready for immediate action. The tactics of the A-A battalion are worked out in some detail. Three battery zones are established, to protect the column at sensitive points along the line of march, and as soon as a battery is passed by the column, it displaces rapidly forward to the head, where it takes up a new position.

"A Reduced Firing Range," by Lieutenant-Colonel P. Joly, describes a simply constructed device which simulates all types of fire very accurately. Bursts are represented by marbles attached to a fine wire, the height of burst being regulated by the length of the wire.

"The Artillery of Louis XIV" completes the series of articles by Major E. Pichat. This instalment deals largely with supply functions. Interesting points brought out were: the reluctance at this time, of many cavalry commanders to give up the cuirasse, due to the low power of small arms; a light model of ponton was devised, which could be stowed upside down on the carrying wagon, an advantage of this method of carrying being that soldiers could not hide in them with their family and equipment, nor the drivers conceal loot there. Many bitter complaints are quoted as to the quality of cloth furnished for uniforms.

The manufacture, procurement, and storage of powder are described, as well as the system of distribution and inspection. The organization of the artillery with the armies at different times is gone into, the constant effort being to increase the mobility of the matériel.

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In a "Note on Two Topographic Instruments," Major "F." describes a collimator alidade, which eliminates the parallax of the ordinary alidade; and a multiple armed ruler for resection, similar to the commercial double-armed protractor.

"Two Problems in Intersection," by Major L. Camps, gives formulæ which, using the azimuths of a point from two known points, give the coördinates of the unknown point, and also the topographical data necessary for laying the guns on that point. The formulæ are adapted to the use of logarithms.

"Horses, Tractors, and Motor Mounts" is a translation of the report of the Field Artillery Board appearing in the U. S. FIELD ARTILLERY JOURNAL of November-December, 1923.

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"Fire Direction in Groupements" is the first part of an article by General Challeat describing two field exercises held at Camp de Mailly in September, 1924. The first exercise, described in this issue, is an attack on a position organized for defense. The problem deals with the attack of a three-division corps, with two divisions in the line. The artillery studied is the organic corps artillery, reinforced by a three-battalion regiment of 155-mm G.P.F.'s, and the artillery of one division reinforced by a three-battalion regiment of 75-mm. portée. Some of the units were simulated, others represented by a reduced number of pieces.

The missions of the division artillery, which were emphasized, were wire cutting for the 75's and counter-battery for the 155 howitzers, without meteorological data or air observation. The missions stressed for the corps artillery were counter-battery by three battalion concentrations (marteaux), shifting concentrations to newly discovered targets, and neutralization of an "orchard" formation of artillery.

The "orchard" formation for a battery is as follows: two guns are on a line with a wide interval—about one hundred metres; the other two guns are on a parallel line about three hundred metres to the rear, with the same interval, but with the flank gun in rear of the centre of the interval between the front two. This formation is designed to prevent damage to more than one gun of the battery if fire is accurately adjusted on any one piece. In actual practice, it will amount to having two or more lines of batteries, separated by a distance of three hundred metres, with intervals between pieces of at least one hundred metres. By the application of simple corrections, to the data for the base piece, the data for the other pieces may be obtained.

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Special situations were given to bring out particular points in fire direction. The results were in general satisfactory, particularly in regard to the high-burst ranging.

"Recollections of an Artilleryman, 1874–1914" is the second part of Lieutenant-Colonel E. Mayer's article on the evolution of command and instruction in the artillery. In telling of his early training, he shows the influence of his first battery commander, Captain Durand, who commanded a group of territorial divisions at the beginning of the World War. The battery commander supervised the work of the youngster very carefully, giving him varied duties to keep him interested and alert. As soon as he was proficient in the duty assigned, more and more responsibility was turned over to him, until he soon had a very good knowledge of the administration and working of a battery.

It was customary in the regiment for the new lieutenants to be assigned to recruit instruction immediately, but Captain Durand did not approve of this, as it reduced the prestige of the young officer when his instruction was compared with that of the old experienced noncommissioned officers. Young Mayer, therefore, did not train recruits until his third year. His object then was to turn out men who were well trained, and ready to take their place in the battery, cutting out much of the theoretical work that he considered deadwood. His recruits were highly praised by the battery commanders who received them, but when they were inspected by an inspector, they were found deficient in the theoretical knowledge, and turned out for further training in the winter season.

In 1879 Mayer was promoted to the grade of second captain, which grade had duty away from troops. He emphasized the fact that the period of eight or ten years, spent out of touch with troops, and just previous to commanding a battery, was very injurious to the service at large.

Another peculiarity noted was the lack of discussion of experiences in the War of 1870, and the probable methods which would be used in any future wars. The only "shop" topics were pay, promotion, and details of the current work. He tells of one instance, where a captain in discussing reconnaissance for positions, told of going on reconnaissance and returning to find that his battery had been captured. This officer, in any argument or discussion thereafter was always silenced by "Well, I haven't the experience that you have, I have never lost a battery!"

"An Introduction to the Study of Anti-aircraft Fire" by Major P. Vauthier, states generally the problem which confronts the anti-aircraft

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gunner, and is intended as a preparatory study, before going into the more detailed regulations on the subject. Formulæ are stated, but not derived, and the instruments are not described, their use being indicated only.

"A Method of Sound Ranging," by Lieutenant F. Dévé, describes a special case of sound ranging, where the stations are on the same straight line. The method, known as the "Equilateral Cone Method," gives mathematically exact solutions, the graphical constructions are simplified, and they are more easily handled. The method is designed to fill a special case, and not to replace the regulation method.

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Conduct of Target Practice

Below is quoted a training memorandum, governing service practice in one of the regular army field artillery commands. It has been the subject of considerable favorable comment.

I. *Organization of Firing Points.*

(a) A plane table, range-finder, B.C. telescope and aiming circle will be set up at each firing point, and officers, in turn, will be required to determine the range by range-finder to the target designated for the problem in progress, such ranges to be stated and recorded during each critique and compared with the estimated range of the officer conducting the problem and the range determined by the guns.

(b) If practicable, each officer will be required to determine firing data in at least one firing problem, employing in succession.

(1) The B.C. telescope.

(2) The aiming circle; observation of fire with the field glass.

(3) The field glass with reticule graduations.

(4) The hand or B.C. ruler, observation of fire with the field glass.

(c) All officers at the firing point will be equipped with:

(1) *Map*, covering the area upon which firing is to be delivered, except when instructors order otherwise.

(2) *Field glasses*, with reticule graduations.

(3) *Jacob's staff or stick*, to support and steady the field glass.

(4) *Range table*, pocket size.

(5) *Camp chair*, or other comfortable seat.

(6) *Note book or pad*, similar to that used at the Field Artillery School, and *pencil*.

II. *The Problem.*

(a) During the period of technical firing, the majority of problems will require the calculation of original firing data with aiming points so selected by the instructor in various quadrants, as to insure familiarity with the correct procedure in all possible situations; these problems will be worked out by the instructor in advance, each problem being drawn to illustrate a well-defined principle, which principle will be carefully taught at the daily instruction period preceding the actual firing by the battery.

(b) The problem will be stated by the instructor in tones loud enough to be heard by all persons at the firing point.

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(c) The officer conducting the problem will be required to announce in a tone loud enough to be heard by all persons at the firing point.

(1) Estimated distance to target, aiming point, guns, the measured angle, etc.

(2) His commands for firing.

(3) His sensings.

(4) Other pertinent observations necessary to the understanding of his procedure.

(d) All officers not conducting the problem, will be grouped comfortably at such distance from the officer conducting the problem as to insure his unembarrassed freedom of action.

(e) Every officer at the firing point will be required completely to solve each problem by himself, noting his differences with the officer conducting the problem, and being ready at any moment to conduct the problem, if so directed, or to conduct the prescribed critique.

III. *Critiques in Firing.*

It will be constantly borne in mind that critiques are primarily for the purposes of instruction. In order that the critique may be systematized, time saved, principles emphasized, and the maximum instruction imparted, the critique at the firing point will take essentially the following form and sequence:

(a) *Character of Target; Appropriate Method of Attack.*—The principle involved in the problem should be stated in a few words, as, "The target assigned was machine guns in the open. Properly *to attack* this target the officer conducting the fire must secure a 200-yard bracket and fire through it with shrapnel." "The officer conducting the problem did (or 'did not') obtain the prescribed bracket and did (or 'did not') fire through it properly. The mission was (or 'was not') accomplished."

(b) *Calculation of Firing Data.*—"Correct" or "incorrect in the following details." (Fundamental errors will be emphasized, unessentials avoided.)

(c) *Commands.*—"Correct except. . . ."

(d) *Procedure.*—Principle involved in problem; method employed; errors; time consumed. (The rules governing fire at the Field Artillery School will be rigidly enforced; departure from the rules will be tolerated only when the rules are so well known as to become habit and the reasons for departure are thoroughly understood.)

(e) *Tentative Rating.*—"Problem satisfactory" or "unsatisfactory" with appropriate remarks. (Exact rating of each problem will be submitted later as outlined in paragraph IV).

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(f) This form of critique should be modified by calling upon officers who are not conducting the problem, to answer specific questions, such as, "What errors did the officer commit in giving commands?" "What error did the officer commit in procedure?", etc., etc., and requiring prompt, specific replies.

IV. *Ratings.*

Beginning Monday, March 9th, a very complete record will be kept of each problem, including the observations, if practicable, of the range party. These problems will be rated according to the standards of the Field Artillery School, as solutions or nonsolutions; percentages will be assigned and reports listing problems and ratings will be sent by battalion commanders through regimental commanders to these Headquarters for file with the personal records of the officers concerned.

Branch Assignment Group Camp

The training camp for the Field Artillery Branch Assignment Group, Reserve, is being planned for September 5th to 19th at Fort Sill, Oklahoma. It will be recalled that the 1924 camp was held last September at Camp Meade, Maryland. The camp this fall is to accommodate the reserve officers of this group, who live in the mid-west. It is evident from the rate of acceptances coming in from the reserve officers concerned, that the present funds will not provide for all who wish to attend. About thirty-five officers can be provided for. As this JOURNAL goes to press, the quota is already practically full.

Communications Literature

The Field Artillery has a liaison officer at the Signal School. Officers desiring information or literature on communications, may secure their data by writing to the Field Artillery Representative, Signal School, Camp Alfred Vail, New Jersey. The Signal Corps Training Manuals are distributed by the Adjutant General, but our liaison officer is prepared to cite references or supply original Signal School material for interested officers.

Meetings of the Field Artillery of the 96th Division

The 361st Field Artillery.—The first rally of the 361st Field Artillery can only be described as a howling success. Perhaps the word "howling" might be modified a trifle, on the side of euphony, but only slightly. Taking it by and large, the rally was a most notable party, in every respect a real, whole-hearted, soul-satisfying assembly. It was held at the Multnomah Hotel in Portland, on March 21st. Thirty officers attended, more than half from Portland,

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but out-of-town members came from points all over the State, as far away as Huntington—320 miles.

Under the toastmastership of Captain Ren L. Holsclaw, a thoroughly enjoyable program was developed, culminating in a hilarious "sing" at the end of the evening. Two talks, both too brief, were really worthy of a most appreciative comment. They were given by Lieutenant-Colonel William C. Webb, F.A., U.S.A., and Major Thomas E. Griffith, the surgeon of the regiment, and they received the most sincere tribute possible—namely, rapt attention on the part of all the officers. These talks, with the fact that it was a farewell meeting for Lieutenant R. W. Price, struck the only serious notes in an evening of fun.

It might be well to say at this point that the rally was a meeting in the form of a banquet—with all the trimmin's appertaining thereto. It was well managed, well conceived, and admirably well executed. Those who attended the execution have only one regret, and that is: that some thirty brother officers missed one whale of a good time.

The 362nd Field Artillery.—The regimental consciousness born at the camp last summer found expression recently in a reunion banquet of its officers, ably engineered by our Colonel, Malcolm Douglas, and capably staged by the Olympic Hotel. The drawing power of the regimental pride was evidenced by the presence of several of the officers who live out of the city: Major Frank N. Brooks from Anacortes, Major James C. Exline from Olympia, Captain Fred M. Weil from Priest Rapids, Captain James S. Purdy from Everett, Captain Harry Wells from Spokane, Lieutenant Alfred B. Donohue from Ellensburg, and Lieutenant Fleete D. Shannon from Tacoma. The desire to meet "the gang" again was irresistible. Twenty officers were present and letters were received from nearly as many more, expressing their regrets that they were unable to attend.

The occasion proved to be an inspiring one to all who were there. The friendships started last summer were renewed and strengthened, while the "inner man" gloated over the excellent chicken dinner. Incidents of the past were lived over again, and the evening was punctuated with outbursts of laughter provoked by the recollection of some amusing, but long unthought of incidents of the service. Of course, some of the gaiety resulted from the "latest" stories as retold by the humorists of the regiment.

The outstanding feature of the evening was the eagerness with which the officers looked forward to next summer's camp, not primarily because of the chance for the improvement of themselves as officers that it offered, but because of the desire to be identified with the organization which they refer to with pride as "their regiment."

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Lieutenant-Colonel Malcolm Douglas, the commanding officer of the regiment, presided with as much ability and dignity as he does on the Supreme Court Bench of King County.

When the dinner was over and the reverberations of "Hi Hi He" had died away, the officers went to the Times Building, where an instructive and valuable tactical problem was conducted by Lieutenant-Colonel John B. W. Corey, F.A., U.S.A., assigned as instructor with the Washington National Guard.

Field Artillery Summer Training Camps

The list below shows the tentative assignments to camps for the field artillery of the National Guard, the Reserves, the R.O.T.C. and the C.M.T.C., together with the estimated attendance. Some units, on which data are not yet received, are not included.

CAMP	DATE	ORGANIZATION	OFFICERS-MEN	
Camp Devans, Mass.	7/18 to 8/1	Hq. 51st F.A. Bgd., Mass., and 101st Amm. Tr., Mass.	16	143
	7/25 to 8/8	101st F.A., Mass.	55	814
	7/11 to 7/25	102nd F.A., Mass.		
Camp Keyes, Me. Charleston, R. I.	8/1 to 8/15	152nd F.A., Me.	24	264
	6/11 to 6/26	1st Bn. H. & C.T., 103rd F.A. and Batty. "A", 103rd F.A., R. I.	8	123
	7/11 to 7/25	Batty. "B", 103rd F.A., R. I.	7	98
	8/1 to 8/15	Batty. "C", 103rd F.A., R. I.	6	90
Madison Barracks, N. Y.	8/23 to 9/6	112th F.A. (less Batty. F)	45	530
	6/14 to 6/28	112th F.A. (Batty. F), N. J.	4	67
	6/28 to 7/12	106th F.A., N. Y.	47	721
	7/19 to 8/2 and 8/2 to 8/9	} 104th F.A., N. Y.	45	795
	7/12 to 7/19 and 7/19 to 7/26			
		} 105th F.A., N. Y.	53	735
	8/9 to 8/23			
	7/19 to 8/2	102nd Amm. Tr., N. Y.	2	46
		52nd F.A. Bgd. Hq., Hq. Batty., N. Y.	10	30
		7/26 to 8/9	156th F.A., N. Y.	36	696
Fort Eustis, Va. Tobyhanna, Pa.	8/2 to 8/16	258th from N. Y.	41	695
	7/5 to 7/19	111th F.A., Va.	48	661
	7/5 to 7/19	192nd F.A., Conn.	55	858
	7/18 to 8/1	109th F.A., Pa.	47	581
	7/18 to 8/1	176th F.A., Pa.	53	666
	7/25 to 8/8	Hq. & Hq. Batty. 53rd Bgd., Pa.	11	40
	7/25 to 8/8	103rd Amm. Tr., Pa.	3	58
	8/1 to 8/15	107th F.A., Pa.	45	636
8/1 to 8/15	108th F.A., Pa.	55	722	
8/16 to 8/30	110th F.A., Md.	12	410	
(?)	172nd F.A., N. H.		(?)	

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Field Artillery National Guard

CAMP	DATE	ORGANIZATION	OFFICERS-MEN		
Fort Bragg, N. C.	8/2 to 8/16	106th Amm. Tr., Ala.	3	55	
	8/2 to 8/16	141st (less 1st Bn.), La.	33	477	
	8/2 to 8/16	Bgd. Staff, 56th F.A., Bgd., Fla.	1	0	
	8/2 to 8/16	116th F.A., Fla.	48	780	
	8/2 to 8/16	Hq. 56th F.A., Bgd., La.	1	0	
	8/2 to 8/16	1st Bn., 141st F.A., Ala.	15	301	
	8/17 to 8/31	Batty. A, 178th F.A., Miss.	3	59	
	8/17 to 8/31	Hq. 55th F.A. Bgd., Ga.	3	0	
	8/17 to 8/31	105th Amm. Tr., Ga.	3	54	
	8/17 to 8/31	118th F.A., Ga.	50	624	
	8/17 to 8/31	117th F.A., N. C.	67	813	
	8/17 to 8/31	Battys. D & E, 115th F.A., S. C.	5	136	
	8/17 to 8/31	115th (less 2nd Bn.), Tenn.	28	400	
	8/17 to 8/31	Hq. D & C.T., 2nd Bn., and Battys. C, 178th F.A., Tenn.	7	111	
	Camp Knox, Ky.	8/2 to 8/16	63rd F.A. Bgd., Ind. and Ky.	107	1268
8/2 to 8/16		150th F.A., Ind.	56	692	
8/16 to 8/30		62nd F.A. Bgd., Ohio	105	1359	
Camp Sparta, Wis.	8/16 to 8/30	185th F.A., Iowa	35	461	
	7/2 to 7/16	Hq. 59th F.A. Bgd. & Hq. Batty.	}	Minn. 82	
	7/2 to 7/16	151st F.A.			908
	7/17 to 7/31	125th F.A.			
	6/12 to 6/26	147th F.A., S. D.	47	661	
	8/1 to 8/15	122nd F.A., Ill.	52	630	
	8/16 to 8/30	124th F.A., Ill.	52	770	
	8/16 to 8/30	1st Bn., 123rd F.A., Ill.	17	225	
	8/1 to 8/15	120th F.A., Wis.	45	625	
	8/1 to 8/15	1st Bn., 121st F.A., Wis.	17	200	
8/1 to 8/15	107th Amm. Tr., Wis.	3	65		
Grayling, Mich.	8/4 to 8/18	182nd F.A., Mich.	47	608	
	8/4 to 8/18	119th F.A., Mich.	48	610	
Fort Riley, Kans.	7/12 to 7/26	128th F.A., Mo.	44	572	
	8/2 to 8/16	Hq. & Hq. Batty., 60th F.A. Bgd., Kans.	10	46	
	8/2 to 8/16	130th F.A., Kans.	55	590	
Camp Stanley, Tex.	8/2 to 8/16	161st F.A., Kans.	51	567	
	(?)	61st F.A. Bgd., Texas	10	1253	
			7		
Fort Bliss, Texas	7/7 to 7/21	Batty. C, 158th F.A. N. Mex.	4	65	
	(?)	Batty. E, 158th F.A., Ariz.	4	65	
Fort Sill, Okla.	8/3 to 8/17	2nd Bn., 158th F.A., Okla.		(?)	
	8/3 to 8/17	189th F.A., Okla.	58	697	
Camp Lewis, Wash.	7/4 to 7/18	143rd F.A., Cal.			
	6/13 to 6/27	Battys. A, C & D, 148th F.A., Idaho and Ore.			
	7/18 to 8/1	145th F.A., Utah.			
	8/1 to 8/15	222nd F.A., Utah.			
Camp Murray, Wash. Fort D. A. Russell	(?)	146th F.A., Wash.			
	6/12 to 6/26	1st Bn. 158th F.A. (less Batty. C), Colo.	17	191	

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Field Artillery Organized Reserves

CAMP	DATE	ORGANIZATION	OFFICERS-MEN	
Camp Devans, Mass.	8/23 to 9/6	389th (155-H)	49	4
	8/23 to 9/6	390th (155-H)	45	5
Fort Ethan Allen, Vt.	8/2 to 8/16	303rd (75)	25	4
	8/2 to 8/16	365th (75)	25	3
	8/16 to 8/30	301st (75)	40	4
	7/12 to 7/26	355th (75)	30	
Fort Terry, N. Y.	8/16 to 8/30	489th and 431st (155-G)	56	5
Charleston, R. I.	7/11 to 7/25	302nd (75)	31	2
Madison Barracks, N. Y. (Pine Plains)	5/31 to 6/14	367th (75)	31	2
	6/14 to 6/28	490th (155-G)	26	0
	7/5 to 7/10	307th (75)	75	2
	8/30 to 9/13	368th (75)	75	
	7/26 to 8/9	309th (155-H)	84	
	7/5 to 7/9	391st (155-H)	75	2
Raritan Arsenal, N. J.	4/12 to 4/26	(scattering)	84	
Camp Blauvelt, N. Y.	7/5 to 7/19	441st (155-G)	60	
Fort Eustis, Va.	7/15 to 7/29	395th (155-H)	40	
Camp Meade, Md.	6/23 to 7/7	314th (75)	40	
	7/12 to 7/26	311th (75)	40	
	7/26 to 8/9	370th (75)	30	
	8/16 to 8/30	396th (240-H)	20	
Tobyhanna, Pa.	5/17 to 5/31	316th (75)	12	
Fort Bragg, N. C.	5/17 to 5/31	317th (75)	20	
	6/25 to 7/9	319th (75)	20	
	6/25 to 7/9	320th (75)	15	
	6/25 to 7/9	399th (155-H)	30	10
	8/16 to 8/31	452nd	30	
	(?)	334th (75)	30	
	(?)	444th	30	
	(?)	Prov. Bn. (75)	24	
Camp Knox, Ky.	5/17 to 5/31	323rd (75)	41	
	5/31 to 6/14	464th (75)	26	1
	6/14 to 6/28	326th (75)	42	
	8/16 to 8/30	407th (155-H)	23	2
	8/16 to 8/30	479th (75)	24	
Camp Sparta, Wis.	7/5 to 7/19	338th (75)	33	
	7/5 to 7/19	341st (75)	29	
	7/5 to 7/19	377th (75)	40	
	8/2 to 8/16	332nd (75)	40	
	8/2 to 8/16	329th (75)	40	
	8/2 to 8/16	486th (75-Portée)	40	
	8/2 to 8/16	403rd (155-H)	40	
	8/2 to 8/16	379th (75)	30	3
Fort Riley, Kans.	7/5 to 7/19	Batty. C, 466th (75)	2	
	7/5 to 7/19	410th (155-H)	10	
Fort Sam Houston	7/5 to 7/19	411th (155-H)	10	
	7/5 to 7/19	438th (155-G)	10	
	7/19 to 8/2	383rd (75)	9	
Fort Bliss, Texas	2/14 to 2/28	382nd (75)	6	
	5/31 to 6/14	382nd (75)	20	
	7/19 to 8/2	383rd (75)	20	
	8/2 to 8/16	358th (75)	14	
Fort Sill, Okla.	11/8 to 11/22	410th (155-H)	19	
	2/1 to 2/15	409th (155-H)	15	
	10/4 to 10/18	346th (75)	25	
Monterey, Cal.	7/12 to 7/26	347th (75)	25	
	8/2 to 8/16	361st (75)	15	
Camp Lewis, Wash.	8/2 to 8/16	362nd (75)	15	
	8/16 to 8/30	385th (75) and 29th		
Fort D. A. Russell	7/5 to 7/19	Amm. Tr.	25	
		386th (75) and Hq. 179th		
	7/19 to 8/2	F.A. Bgd.	25	

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Field Artillery R.O.T.C.

Camp	Date	Numbers
Fort Ethan Allen	6/19 to 7/30	90
Madison Barracks	6/12 to 7/23	133
Camp Meade	6/12 to 7/23	35
Fort Bragg	6/12 to 7/23	100
Camp Knox	6/16 to 7/24	314*
Camp Sparta	6/19 to 7/30	111
Fort Bliss	6/6 to 7/17	38
Fort Sam Houston	6/3 to 7/14	52
Fort Sill	6/12 to 7/23	59
Camp Lewis	6/12 to 7/23	128
Total R.O.T.C.		1060

* Includes Seventh Corps Area students.

Field Artillery C.M.T.C.

Camp	Date	Numbers
Fort Ethan Allen	8/1 to 8/30	150
Madison Barracks	8/3 to 9/1	300
Camp Meade	7/1 to 7/30	158
Fort Bragg	7/2 to 7/31	1000*
Camp Knox	7/1 to 7/30	339
Camp Custer	7/23 to 8/21	296
Fort Snelling	8/1 to 8/30	100
Fort Des Moines	8/1 to 8/30	100
Fort Leavenworth	8/1 to 8/30	100
Fort Sam Houston	7/28 to 8/26	25
Fort Bliss	7/28 to 8/26	25
Fort Sill	7/28 to 8/26	55
Camp Del Monte	7/21 to 8/19	86
Camp Lewis	6/19 to 7/18	57
Fort D. A. Russell	6/12 to 7/11	70
Total C.M.T.C.		2861

* The basic course at Fort Bragg will be field artillery basic. The number 1000, therefore, includes both basic and advanced.

Polo.

The American Army Team.—As this JOURNAL goes to press, none of the international army games have been played; before it reaches our readers, the series will be over. At present the British line-up seems to be: Captain R. L. McCreery, number 1; Lieutenant W. S. McCreery, number 2; Captain J. P. Denning, number 3; Captain D. C. Boles, number 4. Captain Boles, a player of sterling qualities, replaces the famous international player, Lockett, who was originally chosen to play number 4. Lockett has been ill and probably will not play in this series of games. Unlike America, England has, in the past, drawn most of her talent for her great international teams from her army. Her present army team is worthy metal for any opponents in the world.

Our team will probably line up with Major A. H. Wilson, number 1; Captain P. P. Rodes, number 3; Major L. A. Beard, number 4. Captain C. H. Gerhardt and Lieutenant E. McGinley are in a close race for the number 2 position, with indications that Captain

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Gerhardt will fill the place. Lieutenant J. A. Smith, Jr., is our substitute for number 4.

Major L. A. Beard, the team captain, was appointed to the Military Academy from Texas, in 1906. He was commissioned in the Field Artillery in 1910, serving through the various grades up to colonel, which rank he reached in the World War. He transferred to the Remount Service of the Quartermaster Corps in 1920. He played on the Army team when we won the Junior Military Championship in 1923 and was also a member of the Army team which defeated England's army team that year, in our first international army tournament. He was captain of last year's Army team in the Junior Championship series.

Major A. H. Wilson was appointed to the Military Academy from Illinois, in 1899. He has served continuously in the cavalry since the autumn of 1904. For valor in battle against the Moros in the Philippines, he was granted a Congressional Medal of Honor. He has been a member of each of the Army Junior Championship Teams, and won high praise for his play on our Army team two years ago, when we defeated the British.

Gerhardt, Rodes, McGinley and Smith are players of comparatively short experience for this class of polo. Captain Gerhardt was appointed to the Military Academy from Tennessee, in 1913. His commissioned experience has all been in the cavalry. He was graduated from the Cavalry School at Fort Riley in 1922. His play is conspicuous for its speed and aggressiveness; the outstanding characteristic of the play of his present rival, McGinley, is accurate hitting. The choice between the two players is close.

Captain Rodes was born in Kentucky. He was commissioned as captain in the Field Artillery Reserve Corps in November, 1917. He has served continuously in the Field Artillery since, having been in the 343rd F.A., 78th F.A., 3rd F.A. and 14th F.A. He served in the Office of the Chief of Field Artillery in 1922 and was graduated from the Field Artillery School in 1924. He has not had long experience in high class polo, but since joining the Army team, he has won the unqualified praise of all critics. His work is excellent and consistent.

Lieutenant McGinley was appointed to the Military Academy from Ohio in 1917. His commissioned service has been wholly in the Field Artillery. He has served in the 1st F.A.; was graduated from the Field Artillery School, Basic Course, in 1920. He has served as aide-de-camp to Major-General Ernest Hinds since 1922. He was a member of the team which represented our army at Mexico City last winter.

Lieutenant Smith was first commissioned as a second lieutenant in the Field Artillery Section of the Reserve Corps in November,

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1917. Since then he has served continuously in the Field Artillery, He has been in the 82nd F.A., 73rd F.A., 15th F.A., the staff of the 2nd F.A. Brigade, and was aide-de-camp to Brigadier-General Nolan in 1923. He was also a member of our team in Mexico City last winter.

English newspaper comment is interesting to us. *The Daily Telegraph*, under date of May 9th, says: "If the Americans are defeated, it will not be for lack of hard work and hard training. When they cannot play polo, they 'drill.' Three or four times a week their string of ponies is given a schooling, while the members of the team keep themselves fit by constant practice with stick and ball. They drink no alcohol; they do not smoke. Their stale regime is a model to all, the credit for which must largely fall to Major Beard, the captain, who is at present employed in the U.S.A. Remount Department."

The Morning Post, on May 16th, comments as follows: "It has already been announced that Major Vivian Lockett will captain the British team in the international Army polo contest at Hurlingham this summer, while Major L. A. Beard will lead the Americans. This coming contest will add zest to what in any circumstances should be a most interesting season, provided the weather is kind. Major Beard and his men exactly typify the nervous, eager, adventurous, all-or-nothing American temperament, and in this, as on other similar occasions, their thoroughness in preparation is there for all eyes to see. The American temperament, with its generous measure of 'pep,' is undoubtedly ideal for the big clash in polo.

"Next to the clever strategy of their skipper, the U. S. Army polo team's main force will doubtless be found at number 3, where Captain Peter Rodes, a terrific hitter, somewhat after the Hitchcock type, and a most determined hustler, usually puts up a far better game than his all too modest American handicap of 5 would suggest."