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# RECENT DEVELOPMENTS IN WIRE COMMUNICATION EQUIPMENT

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AT THE outset it must be realized that the importance of wire communications, both telegraph and telephone, in any military operation, and particularly where armies of any appreciable size are pitted against one another, cannot be over-estimated. Despite the tremendous development in radio, both during and since the war, and the popularity that radio has attained with the average layman, radio has its limitations. It can still be said that the wire system is the backbone of communications for armies in the field in the vast majority of situations. It is true that certain occasions arise where wire communication cannot be employed, such as in the transmission of intelligence from airplane to ground, the transmission of intelligence over areas where the laying of cables or wire is either impossible or impracticable, between ships at sea, between ships and shore stations, etc. Nevertheless, the history of every conflict participated in by this country from the Civil War (telegraph only) down to the World War has demonstrated conclusively the importance of keeping the wire net, both telegraph and telephone, operating at all times, and this notwithstanding the fact that other means of signal communication, such as radio, visual lamps, flags, rockets, runners, or pigeons, might be available. All of the latter means have their special roles, but in no sense could they be considered sufficient in the absence of wire communications. Consequently among the more important problems of the Signal Corps today is that of providing the most efficient wire communication equipment possible, and in particular the development of satisfactory types of field wire.

In the entire field of non-radio communication equipment, perhaps the most important development problem in recent years has been that of the design of an improved type or types of field wire. With a view to replacing as standard both of the present types of wire now used in the field, namely, Field Wire type W-40 and Outpost Wire type W-44, the Signal Corps has recently developed a seven-strand experimental field wire, several lots of which are now being tested by organizations in the field. This experimental

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wire is the result of an effort to furnish the using services with a wire which will be lighter and less bulky than the present standard Field Wire type W-40, and yet meet the other requirements for a satisfactory field wire. In this connection it might be stated that the using services have indicated from time to time the desirability of obtaining a single type of improved field wire which might take the place of both of the present types of wire now standard, i.e., types W-40 and W-44. Briefly, the experimental wire consists of five strands of high carbon steel 13 mils in diameter, one copper strand 13 mils in diameter and one copper strand 14 mils in diameter, the stranded conductor being insulated with a 1/32-inch rubber wall and braided the same as the present standard type W-40 field wire. By reducing the number of strands from eleven to seven and employing a high carbon steel, it was possible to reduce both the weight per mile and the bulk characteristics of the present field wire so that in the experimental wire these characteristics approximate those of the present outpost wire, which in turn is considerably less bulky and lighter than the present field wire. However, to obtain a wire which would be lighter in weight and smaller in diameter, it was necessary to sacrifice both tensile strength and conductivity. Despite this fact, it is believed that the new wire possesses sufficient tensile strength to permit of its being used in connection with animal and motor-drawn vehicles, and similarly, as the result of theoretical computations, it is believed that the transmission characteristics will be such as to render the wire suitable for field lines 15 miles in length.

The military requirements which were borne in mind during the development of this new wire were as follows: Electrical characteristics such that satisfactory telephone transmission could be obtained over the longer distances required in the theater of operations under the severe conditions met in the field, the maximum being estimated at approximately 15 miles; relatively small weight and bulk in order that a maximum amount of wire might be carried into the field with a minimum of effort and transportation facilities; ability to lie flat on the ground so as to offer a minimum of interference to foot and vehicular traffic; tensile strength sufficiently great to permit of the wire being laid rapidly from motor and animal-drawn vehicles; and perhaps the most important of all, assuming that the transmission requirements have been met, a type of wire which could be turned out rapidly in quantity production by American manufacturers in time of war.

Although it is too early to predict the results of the field tests now being conducted, such preliminary reports as have been received would indicate that the new seven-strand copper and steel

field wire, possessing as it does sufficient tensile strength to permit of its being used with animal-drawn and motor-drawn wire laying vehicles and at the same time weighing considerably less per mile and being considerably smaller than the present eleven-strand field wire, should prove to be a satisfactory replacement for the present heavy type W-40 field wire. Furthermore, inasmuch as the experimental wire and the present type W-44 outpost wire are practically identical in size and weight, it would appear that the experimental wire, if found to be satisfactory as the result of field tests, might well be considered as a replacement for both of the present standard types of wire, i.e., types W-40 and W-44. Should it prove to be satisfactory, the next logical step in the development of wire for combat troops would be in the direction of designing a very light wire for use in those situations where only hand laying or the employment of the hand-drawn wire cart would normally be practicable.

The seven-strand copper and steel experimental wire described above has received first consideration in the efforts of the Signal Corps to provide the using services with improved types of field wires. However, development and experimentation have not been confined to this particular new type of wire. To replace the present outpost wire type W-44, a seven-strand red brass and copper wire weighing less per mile and smaller in diameter than the present type W-44 was designed. Possibly the chief objection which will be made to this type of wire is its low tensile strength (slightly greater than one-half of that of the present outpost wire). However, it should be borne in mind that the wire was designed to replace the present outpost wire, which in turn was originally intended for hand laying and laying from hand-drawn carts only. Reports of tests conducted in the field in connection with this wire have not yet been received.

Mention may also be made of tests now being conducted of four different types of field and outpost wires employing solid conductors in place of the wire strands. These tests have for their object the determination as to whether or not solid conductor wires might be regarded as satisfactory substitutes during the first six months of an emergency when a shortage of wire stranding machines might be expected.

It is hoped that all of these field tests will have been completed by the end of the present calendar year in order that action may be taken to furnish the troops in the field with such of these types as may be found satisfactory for adoption as standard, or, in the event that none of the types being tested are regarded as wholly satisfactory, that further development may be resumed.

Another problem, perhaps second only in importance to that of developing satisfactory types of field wire, is that of providing suitable wire-laying equipment. Obviously, unless wire can be laid with great rapidity in the field, the fact that the wire as such is satisfactory and available would prove to be of little advantage during combat. Therefore the Signal Corps has been exerting every effort to improve its wire-laying equipment and is at present engaged in the following activities coming within this category:

(*a*) The development of an improved type of breast reel.

(*b*) The development of an improved type of hand-drawn wire cart which might be considered satisfactory as a trailer for the infantry communication cart, and as a replacement for the present type RL-16 Hand-Drawn Wire Cart.

*(*c*) The development of an improved type of horse-drawn wire cart.

*(*d*) The development of a wire-laying cross country car.

(*e*) The development of wire pack equipment including the pack wire reel.

Before and during the World War, standard wire-laying equipment was restricted to two types, namely, horse-drawn wire-laying vehicles and breast reels for laying and recovering wire by hand. Since the war, not only has the need for improvement of these two types of wire-laying equipment been recognized, but requirements for hand and motor-drawn vehicles have been likewise definitely established.

The trend of development in so far as hand wire-laying equipment is concerned has been in the direction of:

(*a*) Developing a new type breast reel which would be less cumbersome, more rugged, weigh less and embody certain other improvements over the old type RL-9 breast reel. Aside from the fact that the new type breast reel, the first model of which was recently completed, is lighter than the RL-9, it possesses the novel feature of having a folding handle which, together with the fact that the gear shafts have been eliminated, should tend to result in an article of equipment which will withstand a great deal more abuse than the old type. Several models of the new type breast reel will be sent out for test by the using services in the near future.

(*b*) Developing a hand-drawn reel cart with a view to obtaining a suitable replacement for the type RL-16 Reel Cart. Although the present standard type RL-16 Reel Cart was developed and adopted shortly after the war, it was found that this

*The developments mentioned in (*c*) and (*d*) above were discussed in the last issue of the FIELD ARTILLERY JOURNAL.

model possessed several undesirable features. The chief objection to the RL-16 was its lack of ruggedness. Since the adoption of the RL-16, an experimental model differing quite radically in design was developed and submitted for test. However, this second model, equipped with wood wheels similar to those used on the machine gun cart, did not meet with entire satisfaction, chiefly because of its excessive weight and lack of maneuverability and stability. A third experimental model is now being constructed with a view to overcoming these objections. This third model, which will shortly be submitted to the using services for test, is equipped with wire wheels somewhat larger than motorcycle wheels and fitted with broad hard rubber tires. Duralumin will be used quite extensively in the construction of the frame. The capacity of the cart will be that of the RL-16, i.e., capable of carrying approximately one mile of outpost wire type W-44.

Considerable progress has also been made in the development of field switchboards. Among these developments may be enumerated that of the field multiple switchboard for use at higher headquarters where the number of lines involved requires the installation of a multiple type board; the improvements made in the 40-line camp switchboard type BD-14; and the improvements incorporated in the monocord switchboards. Briefly, the changes which have been made in the last-named type of switchboard are as follows:

(*a*) The incorporation of the operator's set and hand generator as an integral part of the switchboard, thus obviating the necessity for a special operator's set such as the type EE-64 operator's set or field telephone, apart from the switchboard.

(*b*) A decrease in the length of the line units, thus making for a more compact article of equipment.

(*c*) The installation of more suitable line binding posts.

(*d*) The elimination of the separate carrying case. Instead of providing each switchboard with a carrying case, the switchboard equipment has been mounted in a waterproof cloth-covered box or cabinet, which, when the front panel is open, provides a writing desk for the operator. The top half of the front panel, when in the extended position, affords protection for the face of the switchboard.

(*e*) The installation of a dashboard lamp for use at night.

(*f*) The incorporation of a permanent braided cable between the line unit binding posts and the terminal strip, thus obviating the necessity for improvising hand-made cables in the field.

(*g*) Restriction to two sizes—six and twelve line boards only.

Although the experimental models, a number of which are about to be sent out to the using services for test, are equipped with permanent braided cables as stated above, experiments are being conducted with a view to providing a more suitable type of rubber covered cable.

As regards field telephones, the type EE-8 experimental telephone has received a great deal of consideration. This telephone was designed with the idea in mind of replacing all of the present types of field telephones and of furnishing the using services with an instrument which would possess the characteristics of light weight, ruggedness, compactness, sufficient battery supply, flexibility as regards the use of either hand sets or breast transmitters and head receivers, and general serviceability. Over one hundred models of this type of telephone have been sent out for test. However, the reports which have been received to date are so conflicting that it is difficult to predict at this time either the acceptance or the rejection of the EE-8 telephone by the using services. It is quite possible that it will be necessary to construct further models embodying certain of the changes recommended, and subject these modified models to further test.

A more recent development in the field telephone class has been the design of an extensible hand set intended for use either with or without the diaphragm type gas mask. Although quite similar to the hand set with which the present type EE-5 telephone is now equipped, it differs in the following respects:

(*a*) The construction of the hand set is such that the separation between the transmitter and receiver centers, which is normally 6¾ inches in the collapsed position, can be increased to 9¾ inches in the extended position. This feature is accomplished by mounting the receiver on two lengths of brass tubing which slide in and out of the handle proper.

(*b*) A lever switch, rather than a push button, controls the transmitter battery. It is believed that this type of switch will prove to be far superior to the push button, particularly in those situations where it becomes necessary to use the transmitter continuously for any appreciable length of time.

(*c*) A metal strap is provided at the receiver end of the hand set for the purpose of hanging up the instrument should that be desired.

Telephone transmitters permanently installed in gas masks were first considered. However, it was decided that this method would complicate the supply of gas masks in that a special type of gas mask would be required for certain special personnel and therefore, in view of the recent development of the diaphragm type gas mask, the extensible type hand set was regarded as the best solution to the problem. Judging from the reports of tests which have been received to date, present indications point to the fact that the extensible hand set is in general satisfactory, that it is superior in many respects to the present standard types of hand sets, and particularly so in those situations where its use may be required in connection with gas masks. Several minor modifications will have to be made before it can be considered suitable for adoption as standard.

Still another development has been that of a new type breast transmitter and head receiver as a replacement for the present type EE-70 telephone. The outstanding features of this new type headset are as follows: A breast transmitter equipped with the usual horn-shaped mouthpiece and with a combination push button and switch for transmitter battery cut-out; transmitter straps which pass around the body for the purpose of maintaining a uniform distance between the mouthpiece and the lips of the operator at all times; rubber covered cords which should prove to be more durable than the present braided cords used in the field; web straps and a light spring band for the head receivers and soft rubber ear cushions all designed with a view to affording a maximum of comfort to the operator. The large soft rubber *e*ar cushions also have for their purpose the exclusion of extraneous noises which so often interfere with operations in the field. Several models of this experimental headset are now being procured with a view to sending them to the various using service boards for field test.

In addition to the developments mentioned in this article, the Signal Corps is engaged in several other development projects which fall within the category of wire communication equipment, such as field printer telegraph equipment, portable time interval apparatus for mobile units of the Coast Artillery, meteorological time interval apparatus, antiaircraft gun battery telephone units, wire pikes, battery charging sets, etc. Although the last-named projects are probably of no less importance than those discussed in detail, it has been the purpose of this article to outline in a brief manner only those recent wire communication equipment developments which are most closely related to the communication needs of the Field Artillery.

# THE ELEVENTH FIELD ARTILLERY BRIGADE MOTOR SCHOOL

BY FIRST LIEUTENANT CLIFFORD C. DUELL, F.A.

NOTWITHSTANDING the fact that most men coming into the army are fair automobile drivers, and have some general knowledge of the automobile, it is becoming more and more evident that if the army wants good mechanics it is necessary for us to train them to do the things we want done in the manner in which we want them done. Few artillery officers have either the time, the knowledge, or the inclination to instruct mechanics. To do so necessitates that the battery commander or his lieutenants be expert mechanics; and in this day, when an officer serves either with horse-drawn or tractor-drawn artillery, it is an impossibility for all officers to be expert mechanics. The job of training mechanics is usually turned over to the motor sergeant, who obtained his knowledge from his predecessor. This results in a surprising amount of misinformation regarding motor repair and maintenance, to the detriment of our arm and the efficiency of our transportation.

There are few, if any, training regulations covering the automobile as used in the army. We have training regulations on the care of the horse, the artillery driver, etc., but to date not enough attention has been given to the training of mechanics. To get good mechanics it is necessary to train them.

The 11th Field Artillery Brigade is completely motorized, consisting of the 8th and 13th Field Artillery, 75-mm. guns, and the 11th Field Artillery, 155-mm. howitzers. The three regiments require about a hundred good mechanics at all times, and the motor school has been training them very successfully for two and a half years. Due to the peculiar conditions under which this brigade operates, it is necessary that this training be continuous and given more attention than in probably any other place. Reenlistments for the Hawaiian Department are relatively few, and these are seldom the mechanics. Due to this continual replacement requirement, the school, from its inception, has operated continuously with a permanent equipment and staff.

The motor school was started in November, 1925, with Captain M. R. Cox and Lieutenant C. M. Hallam as instructors. The first course was attended by about seventy men. There have been, to date, four courses for enlisted men and two for officers. About 150 enlisted men have completed the course, many of whom are now, or have been, motor sergeants.

The first course for officers was of three months' duration, classes meeting two afternoons per week. About forty officers attended,

most of whom finished the course. This initial course for officers was in many ways unsatisfactory, due mainly to lack of suitable equipment in the school.

Many changes have been made in both courses since then and much equipment added to the school's facilities, resulting in an organization which turns out good mechanics, of course, relatively inexperienced, and officers who know the peculiarities of each type of vehicle with which we have to deal.

The school is part of the Schofield Barracks school system. In the latter part of each course considerable general overhaul work is done for the various batteries of the brigade, and during this time the school operates as a branch of the motor repair section of the post for purposes of supplies, spare parts, etc.

## MISSIONS OF THE SCHOOL

The missions of the school are several: first, to train selected enlisted men to fill the duties of mechanics in their organizations, and to seek out the best of them as material for motor sergeants; second, to train officers to fit them for the duties of motor officers, or officers in charge of Department B in the batteries, and for the duties of motor officers on the staffs of battalion, regimental, and brigade commanders; third, to give advice and assistance, when requested, to the batteries of the brigade; fourth, to facilitate the repair and maintenance of the transportation of the brigade; fifth, to render the same service to the remainder of the post, in so far as may be consistent with the needs of the artillery brigade. The school accomplishes these missions by means of courses of instruction for officers, mechanics, motor sergeants, and recruits; by informal discussion with the battery commanders; and by periodic inspections of the vehicles of the brigade.

## COURSES FOR ENLISTED MEN

The motor mechanics course is of five and a half months' duration, classes starting in May and November. Each battery in the brigade sends two selected men, who must have finished the fifth grade in school. Most of the battery commanders appreciate the need for these men and, consequently, send us the pick of their recruits who show an aptitude as drivers, in work around the vehicles, etc. There is a great deal of competition in some organizations to be chosen for the motor school, as the men know they will learn something which can be turned into real money when they return to civil life. In addition to the men from the artillery, each infantry regiment and other organization in the post may send a small number of students if they so desire.

Classes are held daily from 8:30 to 11:30, thus leaving the men available for the first drill period of the morning. The first hour is given over to a lecture, and the balance of the morning to practical work. During the first two months of the course, the practical work consists of the disassembly, inspection, reassembly and adjustment of every major unit on the common government vehicles. On completing the assembly, the student must answer fifteen questions on it, taken from a list of twenty-five or more. He is then given a grade by the instructor and moved to the next assembly. These assemblies have been accumulated over a long period of time from salvaged vehicles, so there is no danger of the student spoiling any work before he is able to proceed by himself and becomes competent to handle tools.

Saturday morning is devoted to a written quiz on the week's lectures. During the lectures, each student must keep a notebook; for some of the quizzes he is permitted to use his notebook, and for others he may not. The students do not know until the day of the quiz whether they may use notebooks on that day or not, which insures that all notebooks be kept up to date. The notebooks are handed in every Saturday and are graded. Monthly marks are posted for the student's information. These marks are the weighted average of practical work, quiz grades, and notebook grades, in which the practical work counts one-half. It has been found that the average student will attain a grade of 50 per cent in his practical work, and it is required that the weighted average be maintained above seventy.

After working on all the assemblies the students go into productive work in the repair shop, and, working in groups of two or four, overhaul vehicles for the batteries of the brigade. All types will be in the repair shop during the progress of a course, and every effort is made to insure each man working on all types.

In addition, each student works ten days each on ignition and carburetion, during which time he works on the different types of magnetos and carburetors used on government vehicles.

The school has installed on test stands various engines which are used for trouble shooting, timing, ignition and carburetion adjustments, and each student does considerable work on these engines.

Men who are inapt, or who do not show proper interest in their work, are dropped as the course progresses. At the conclusion of the course, each man is rated by the staff according to his ability, and recommendations are made to his battery commander if he is material for a motor sergeant.

EXTERIOR OF REPAIR SHOP BUILDING, 11TH FIELD ARTILLERY BRIGADE


Photo by 3rd Eng. Photo Studio

PART OF THE VEHICLE REPAIR LINE

INTERIOR OF CLASSROOM SHOWING WORK BENCHES

Photo by 3rd Eng. Photo Studio

CORNER OF REPAIR SHOP BUILDING, SHOWING PART OF STOCK, IGNITION AND TOOL ROOMS, MACHINE SHOP IN REAR

## THE ELEVENTH FIELD ARTILLERY BRIGADE MOTOR SCHOOL

### COURSES FOR OFFICERS

Classes for officers run for five and a half months, starting in January and July, and are held four afternoons per week from 1:30 to 3:30. From the artillery brigade, officers are detailed to attend by the regimental commanders; but others may also attend, not only from the artillery but from the post at large. The first hour is devoted to lectures; and some officers who are unable to attend the whole course come to the lectures only. The second hour of the afternoon is used for practical work.

The lectures for officers follow the same general outline as those for the enlisted men, with considerable added material in the way of theory and detailed explanation. In addition, the officers' course includes considerable work in convoys, inspections, and the organization of the unit maintenance system.

For the first three months the practical work consists of the disassembly, and reassembly of the salvaged units, as in the enlisted men's course, but without special emphasis on detailed mechanical operations. Then follows two months' work on trouble shooting, ignition, carburetion, and horsepower tests on the test engines. The final month includes practical work in convoys, technical and lubrication inspections, and shop maintenance.

A few selected enlisted men, mainly first sergeants and motor sergeants, are attending the present officers' course. This is an innovation, and, if it works out successfully, it will be continued as part of the program.

In all courses the lectures are skeletonized and given out in mimeographed form, so that the students may preserve them conveniently. The enlisted men are required to keep them, and the officers advised to do so. Further, sheets are passed out which contain specific detailed directions for the disassembly and adjustment of every major unit, including the engine, of all government vehicles except the Cadillac.

### ADVICE AND ASSISTANCE TO THE BATTERIES

The staff of the school is always ready to give advice or assistance to those desiring it. At different times, the school has done such things as figuring out complete repair and maintenance programs for regimental commanders. Since the new Dodges and Chevrolets have been received, the school has been made responsible for their bi-weekly inspection. It has endeavored to make a mechanical inspection, using students for inspectors, of all vehicles in the brigade, at least twice a year. A copy of the inspection report goes to the battery commander concerned, and one goes to the school

file, so that, if the vehicle comes in later for repair, it can be seen whether the recommendations were carried out.

### FACILITATING REPAIR AND MAINTENANCE

Every effort is made to facilitate the repair of vehicles in the brigade. As previously stated, the school operates as the artillery branch of the motor repair section. Various sizes of bolts, nuts, washers, and, in general, small expendable parts are kept on hand and issued to organizations on request. This saves a large amount of time and work to the organizations, as we are located in the brigade area, and they would otherwise need to go to the parts warehouse, and probably require at least a day to get the part. The school does not handle non-expendable parts. If a job comes in which needs a non-expendable replacement, the organization concerned is notified to draw the part, and bring it to the school, where it will be installed by the students.

In every organization there always accumulate some parts that are not needed, and we try to have these all turned in to the school rather than allow them to remain around the organization and become unserviceable. When such items are turned in, they are tagged for reissue to an organization needing that part.

All salvaged motor vehicles are inspected by the officers of the school before being sold, and many assemblies, particularly those for which there is a great demand, or which are hard to get, are removed from the vehicle, and placed in stock for reissue.

### EQUIPMENT AND STAFF

The school is housed in two large airplane hangars, one of which is the classroom and the other the repair shop. In the repair shop hangar are the machine shop, ignition and carburetion room, tool and stock room, the offices, and quarters for the enlisted staff. These rooms occupy about half of the building. The other half is used for the general repair work, the vehicles being arranged in a long row, with a bench provided for each vehicle, and an overhead trolley and hoist to move complete engines, or other assemblies.

The school equipment is fairly complete and in excellent condition, many tools not normally supplied by the Government being in use. The machine shop houses two lathes, two drill presses, milling machine, bench grinder, valve refacer, forge and welding outfit, and a 30-ton Manley press. The ignition room has a complete test bench for the testing and repair of magnetos, starters and generators, being provided with the necessary ammeters, voltmeters, test points, etc. A battery charger is in use. Several magnetos and carburetors,

of the types used on government vehicles, are provided for instruction purposes.

The tool room contains a complete set of mechanics' tools, including micrometers, gauges, and all sizes of taps and dies. Many special wrenches and fixtures have been developed for specific operations. These tools are all available to the batteries for short periods of time on request of the motor officer, and they save much time to the organizations. The stock carried on hand consists of bolts, gaskets, brake lining, etc., and the assemblies reclaimed from salvaged vehicles.

In the other building are arranged about fifty work benches, each of which has on it one of the salvaged assemblies for use in the early parts of each course. These include the front axle, rear axle, transmission, steering gear, and engine for each government vehicle. Over each work bench is a framed chart, containing on one side the directions for the disassembly of that unit, together with a parts list covering it and pictures of each part. On the other side of the chart are the questions which each student must answer before proceeding to the next assembly.

In the front end of the building are raised benches, and a blackboard for use in the lectures. In line across the back of the building are arranged several engines, among them F. W. D., G. M. C., Dodge, White, Overland, Buick, and the 5-ton tractor. These engines are all operative and are arranged so that horsepower tests may be made and carburetors, fuels, and oils compared.

The staff of the school at present consists of Lieutenant Colonel B. F. Miller, 8th F. A., Lieutenant C. M. Hallam, 11th F. A., and the author. The enlisted personnel includes the shop foreman, machinist, stock clerk, supply sergeant, and four mechanics.

The school started in with nothing and developed until now it has a good organization and good equipment. Much credit for the results obtained must be given to Captain Cox and to Brigadier General Moseley, who was commanding the brigade during the early days of the school. There are still some things that the school lacks in the way of tools, etc., and these must be left for the future. From time to time the school receives equipment and motor units from manufacturers and automobile sales companies who realize the advertising value of bringing the students in contact with their product; and these have been greatly appreciated and put to good use. Additions to the equipment are always gratefully received.

## THE FUTURE OF SCHOOLS OF THIS TYPE

The staff of the school feels that it fills a very definite need in the army, and that it should be part of the peace-time organization

of all posts if practicable, particularly at those posts where there are large numbers of vehicles in operation. We of the motorized artillery realize that the day of the motor vehicle is here to stay, and that artillery, infantry, and cavalry must depend more and more in the future on motor vehicles for rapid, efficient, and dependable transportation.

The personnel forms a nucleus for a brigade or regimental field unit which can most effectively look after the transportation of the brigade or regiment, and it will easily fit into a war-time organization. All of our enlisted instructors, who must be the best type of men available, are obtained by depriving some organization of an authorized rating. This does not lead to the best results for the organization, and so, for this reason alone, motor schools of this type should have recognition, at least in peace time, in the tables of organization of a motorized artillery brigade, and of a motorized artillery regiment not serving at a brigade station.

# "FIRST IMPRESSIONS"
## OF AN INSTRUCTOR WITH THE NATIONAL GUARD

BY FABIAN

FIRST impressions are—sometimes—the nearest approach to the truth. What I set down hereafter recounts, in a rambling way all my own, my first impressions formed when first reporting on a detail with the National Guard. They are, perforce, personal and at times biased, as are the opinions I inject from time to time. I offer them merely as experiences that may be of some little value to others undertaking this same line of work, not as a panacea to soothe our present-day complicated existence.

I arrived at my new station just prior to the annual fifteen-day encampment. At Corps Area Headquarters they had carefully inoculated me against any desire to take command of National Guard troops, or to ride roughshod over the tender susceptibilities of our brothers of the other components. So I said "sir" to every new face I met, kept my own thoughts well to myself, and everything was lovely. The other Instructors and the personnel of the State Adjutant-General's office were extremely cordial, and seemed to want me to feel at home. All of which put a pleasant taste in my mouth, and I started to camp quite cheerful over the prospect of four years in such surroundings.

At camp I was quite impressed by the smooth, business-like way the troops detrained and went under canvas. Naturally I saw many little things, here and there, that made my "Regular" soul fairly turn over, but, on the whole, the Guard troops put up a very creditable performance. Whenever I felt myself tempted to become caustically critical (to myself, of course), I reminded myself that these people were performing after a year of training that averaged but one and one-half hours a week, and that their annual "turn over" was nearly 50 per cent.

I found the Artillery officers of an exceptionally high type, and many, particularly in higher grades, with World War service. Naturally there were "duds" among them, but the average measured up very well. The officers of the unit to which I was accredited were very pleasant to serve with, and I soon found myself on cordial terms with all of them. The unit commander was one of the outstanding men of the State and had an excellent war record. He was forceful, yet reasonable and open to suggestion at all times. He encouraged me to bring things to his attention whenever I deemed it necessary, and seemed anxious to cooperate with me in every way. His staff comprised an assortment of lawyers and business men, most of whom had had some war service. On the whole, personal

contacts alone considered, I felt extremely pleased with the unit to which assigned.

From the professional angle I was not so well suited, but I kept quiet and did a lot of looking and thinking. I felt then, and think so now, that it is of great importance that a newcomer on a job of this nature should not start out with sweeping criticism of everything in sight. Much can be found to criticize, but do it *gradually*. Remember that these people have been devoting many hours—in small doses, to be sure—of conscientious work to these units, and do not relish the idea of some outsider landing in their midst and immediately informing them that they are "all wrong." Put *yourself* in their places.

So I accompanied the unit commander from time to time and made suggestions when called upon, or whenever I saw fit. One thing helped me greatly, and that was the fact that the National Guard commander, in view of his own service, was well aware of the fact that his command had plenty of room for improvement. He and his staff seemed anxious for advice, and invariably acted immediately upon its being given. That feature of the work alone went a long way to encourage me. They all were so enthusiastic, and literally "hogs for punishment" when it came to instruction.

I was practically an observer at this first camp, as the officer I relieved was also present and took charge of all the active instruction. That is a sound policy, as it permits the new arrival to become better acquainted and oriented before jumping right into the rôle of an instructor. A friend of mine remarked recently that a new instructor should not attempt to do anything for the first six months—just keep quiet, get acquainted, and "saw wood." From my own experience I would most heartily agree with the suggestion. Above all, go easy with any innovations. The genus homo is a creature of strong habits—and this also applies to the personnel of the National Guard.

To come back to the professional angle: the batteries averaged about fifty strong and were fairly well grounded in the general basic subjects. Along technical lines most of them were somewhat weak, particularly in driving and draft and training of gun squads. This was caused, I believe, by the fact that such subjects are hard to cover in the drill period at home. By the time all preparations are made, and details marched to the stables or gun sheds, much of the hour and a half available is used up. I found that the better trained batteries used week-ends and holidays for this work, and it was almost entirely up to the individual battery commander to arouse the necessary spirit. Once he did that, the men would do extra work; otherwise they kept one eye on the clock and the other on the payroll.

The officers also were weak in the more technical Field Artillery subjects. Those with war experience kept looking backward instead of forward, and were often content to tell tales instead of studying new methods. On the whole, though, I found their state of training better than I had expected, for here again it is necessary to remember that National Guard officers have livings to earn and families to support, and of necessity can devote but scant time to study of a military nature. The staff officers impressed me as being better trained than the average battery officer, but then I was in a better position to observe the functioning of the former. Taken all together, they had a good start in the right direction, but I could see readily the need of additional work for all concerned.

One thing struck me, as well as the National Guard commander, more forcefully than all the rest—the zeal and ambition of the Guard. In fact, I felt that they were just a bit over-ambitious. They went out on battalion and regimental problems before they were well grounded in battery training, and then sprang a brigade problem the second week of camp. The higher unit commanders seemed to labor under the impression that to train a command you must get it out as a unit, regardless of basic preparation. All the units did very well, I thought, in view of the training they had had. They just bit off too much, and could not quite succeed in masticating it. But most of the higher commanders profited by the experience, as I heard many remark (including the brigade commander) that at *next* camp they would devote more time to battery training before attempting problems for the higher units.

Another thing I observed, and took mental exception to, was the attempt to have National Guard troops solve problems originally prepared for the Regular Army. Many of the problems seemed to be field exercises from the Field Artillery School with little or no modification, and, to the best of my knowledge and belief, were usually over the heads of all concerned except the Instructors. Many of these School problems call for tactical decisions and operations of a nature that the average National Guard commander has just not had the training to handle, and consequently much of their value is lost and the would-be student soldier usually discouraged. I formed the opinion at the time, and still adhere thereto, that problems for the National Guard personnel should be drawn up along lines suited to their needs and condition of their state of training if satisfactory results are to be expected.

Camp closed with a review. I was pleasantly surprised at the showing made by the Artillery units, and could see worlds of improvement since their first days of training. If fifteen more days could have been added to their training period, I could be willing to wager the results could be four times or more in proportion to additional

time expended. Camp was then struck and troops entrained in a business-like manner—getting into and out of camp seemed to be the things this particular portion of the National Guard does best. Also I learned a lot at my first camp, though the magnitude of the opportunity opening before me was just beginning to be understood.

Upon my return from camp, I found myself about to be initiated into the mysteries of the Army Correspondence Courses. Up to that time, my acquaintance had been limited to a mere bowing, but now I was to shake hands with them in grim earnest. Papers began to pour in, and soon I was up to the ears in the "soluting" of problems varying in range from the details of battery administration to the old reliable "orders as issued by General A, commanding 1st Blue Division." The field covered and the amount of work required by the Instructor nearly took my breath away, and out of it I learned one clear lesson—do not get behind in grading correspondence course papers.

A word about correspondence courses. Before coming on the detail—and since—I have heard many people remark that the courses were "the bunk" and usually a waste of time. I disagree with that statement most heartily. As a substitute for practical, personal instruction I think they are of little comparative value. Work in the classroom, or actually with men or matériel, is much to be preferred. As a substitute for *no* instruction, however, I think they are invaluable. That is very nearly the situation we are up against in most States in dealing with the National Guard field and staff officers. Either they attend the drill of a small unit—usually a battery—or they get no instruction at all between camps, barring correspondence courses. For training in the functions of command and staff, and the various tactical principles, watching a battery drill is not much help. The *theory* of these things can be taught by mail, and the practical part (by map problems) with certain limitations. Classroom instruction is better, I admit, but correspondence work covers a lot of ground that would otherwise be left untouched altogether. The best general scheme I've found so far is to use the correspondence texts and lessons as subject matter for classroom work. This is the policy recently enunciated by the powers-that-be, and, in so far as I've tried it, it works fine. We can cover the lesson, including going over the text and answering numerous individual questions, in just about the time allowed for the student to solve the assignment working alone.

But this scheme has one great drawback. It requires the physical presence of the instructor and students at the selected point at the same time. Take my own State, for example. We have four Artillery officers on duty as instructors, all at different stations.

There are eleven headquarters and staffs of battalions or higher units. That leaves seven out of eleven without the presence of an instructor to conduct classroom work. Even supposing that the instructors can travel to each station once every quarter (all that current appropriations will permit) and conduct a class during each visit, that would still leave eleven drill periods (for equivalent duty) without benefit of an instructor. To conduct classroom work for all authorized drill periods, the instructor would have to visit each station four times each month—practically a physical impossibility, regardless of appropriations available, as there is much routine office work to interfere with incessant travelling. The answer seems to be correspondence courses. It is not the best answer, but it is the best thing available.

In grading papers I found the same ambitious attitude prevalent among the Guard officers that I had observed at camp. In a few cases it was praiseworthy indeed. The officer concerned would start the basic subjects, and complete many more lessons in the allotted time, eager to push on into new fields of endeavor. But in most instances the ambition consisted of a lack of desire to master basic subjects, coupled with a preference for more advanced work. Diplomatic restraint was necessary at such times. No one likes to be told bluntly that a subject is "over his head." I found in many cases it paid in the long run to let the officer attempt the first few lessons of the course he desired to take. Soon he found he was out of his depth, and usually came around in person for advice and assistance. Before very long he would suggest a change to some more simple subject, or I would gently insinuate that a certain course (more elementary, of course) would pave the way for a complete mastery of the troublesome lesson. The average man of intelligence will not hesitate to admit he is mistaken—provided you let him make, or appear to make the discovery.

Some time after my return from camp, I started on my first "visit of inspection." Having been warned, I went with an open mind. I did not expect too much, and at many places I got just what I expected. Large and small towns both were on my itinerary. I found at the end of my trip that the smaller town, on the whole, surpassed the larger unit. It can be accounted for in the main, I believe, in the following way. In the small town there are very few activities to compete with the Guard. The best boys of the community are drawn into the ranks, the leading men—lawyers or business men—are its officers, and the Guard unit enters wholly into the life of the locality. In the cities, with all the various attractions, social and otherwise, it is more difficult to arouse the *community* interest in the Guard. There are too many activities claiming attention. Drives of various sorts, all the complicated maneuvers of

modern business, quite smother the poor little Guard unit. The business men are too busy, and the more desirable youth of the city has too many "social" demands upon his time. Thus it is that the cities deal less generously, in this part of the country at least, than the small towns.

Another thing I discovered on my initial round. The status of a unit depends almost entirely on two factors, the battery commander and the caretakers. If both are good, the unit is invariably in excellent shape. If one or the other is delinquent, then the unit only progresses against a decided handicap. A good battery commander will usually select good caretakers. The pay is sufficient that, added to the armory drill pay, it should command a pretty high type of individual *in a small town*—another item against the cities. Let us consider these two factors a moment.

My idea of a good caretaker is one who will do the work required on his own initiative, and find as his reward pride in a job well done. There is much work to be done around a battery—particularly a firing battery. Motors to be gone over, or animals to be fed, watered, groomed and exercised. Wheeled matériel to be lubricated and painted periodically. Fire control instruments to be cared for; harness to be worked on; personal and organization equipment to be looked after; records to be kept straight—oh yes, there is *lots* for the caretaker to do. The usual result, I found, was one of two extremes. The good caretaker plans his work, with or without assistance from his battery commander. He arranges his working hours (supposedly eight a day) so that some time, at stated intervals, will be devoted to each and every item of his long list. The time interval, of course, will depend upon the character of the task to be undertaken. Some items will require daily attention, some weekly, monthly, and so on. The guiding principle should be to get to each article of government property often enough to prevent rust, mold, breakage, or other deterioration. A proper distribution of time will give better results, I believe, than "successive concentration." The whole secret is not to get behind in your work. The poor caretaker will kill time between visits of the instructor, and then try in a few days to brush up everything that he should have been taking care of from day to day. Usually he fools nobody, not even himself. It can't be done.

The battery commander has the weight of great responsibility on his shoulders. As responsible officer for the battery matériel, he is vitally concerned with the character of work performed by his caretakers. If not vigilant, he may find himself making his Uncle Sam the present of new equipment. He is also responsible for the proper training of the commissioned and enlisted personnel of his

battery. He must keep an eye on the records if he would avoid interminable "paper fights." He is usually a busy man—far too busy to be for ever on the heels of his caretakers. Therefore he wants men who do the work without the necessity of his own presence. Good caretakers can take care of the matériel in spite of the battery commander, because the latter can spend very little time during the day with the organization. A good battery commander, on the other hand, cannot take proper care of the matériel with poor caretakers. He has not the time to be forever behind them, so, being a *good* battery commander, he cuts the Gordian knot—he fires the caretakers.

Aside from the caretaker problem, the battery commander is directly concerned with the training of his battery, particularly his officers and noncommissioned officers. With an annual turnover ranging from 30 to 50 per cent, the private in the ranks has not much chance for thorough training. With officers and noncommissioned officers the annual change is much less, and there is where the battery commander can get his best work. If he himself is well qualified professionally, it is but a matter of systematic and persistent work. Officers' and noncommissioned officers' schools must be held, and prompt attention required. This in itself is a problem, as it is additional work for which no pay—or credit, usually—is received. If the battery commander has to train himself and his officers and noncommissioned officers at the same time, he has his work cut out for him. If an instructor is located at his station, he should avail himself of his assistance. If one is not available, then the battery commander must resort to correspondence courses—"in addition to his other duties."

The problem—a vital one, in my opinion—was handled in different ways, I observed. One battery commander experienced great difficulty in getting his noncommissioned officers to school on time. He made and broke them freely, but it seemed to do no good. Most of them lived at some distance, and things seemed to interfere unavoidably and repeatedly. Finally he hit upon the scheme of holding school immediately after drill, by detaining the noncommissioned officers half an hour after the rest of the battery was dismissed. The noncommissioned officers seemed to prefer that arrangement to coming on another night, or reporting early for drill, so everybody was happy. Another devised the scheme of making officers' school a semi-social affair. Meetings were held once a week—outside of drill hours, of course—at the homes of the officers of the battery in rotation. The wives of all officers attended and entertained themselves while their husbands, in some quiet, secluded spot, absorbed the subject matter of one correspondence course lesson. Upon accomplishing

their mission they rejoined the ladies, and light refreshments and other social amenities were forthcoming. In this particular class an instructor was available, which probably contributed to the success of the undertaking. However, it may be remarked in passing that the present courses are so designed that group study will probably result in greater benefit than individual work. The old story, you know—two heads are better than one.

The foregoing are examples of how problems were met—and solved—by different organization commanders. Many of the National Guard commander's problems are local. What works with one will not do at all for the other. I found several places where the men were paid every drill night instead of once a quarter. This was done by the battery commander arranging for an advance of funds from the local bank, and pro-rating the interest among the members of the organization. This scheme seemed to "take" very well where the personnel of the unit consisted mostly of high school or college boys. The dollar or two looked big to them and was literally a "bird in the hand." As one officer explained to me, the boy would argue to himself, if broke and desirous of filling a "date": "I can go to drill, be out by about 9:00, have a dollar in hand, and take the girl to the movies"—and drill attendance staged a remarkable come-back. In places where the unit contained an older run of men, or highly paid mechanics or laborers, the extra dollar was little or no inducement to attend drill.

Another weak spot I observed was failure of the battery commander to assign his officers appropriate duties. The lieutenants were very often "decorations." I found that where the officers had been assigned missions, and were required to fulfill them, this made for a better organization, as it took much detail off the battery commander's shoulders and gave him more time to superintend the work of the battery as a whole. The usual departmental arrangement, in my opinion, works best. Modifications are necessary at times, but the principle should not be departed from.

Care of personal equipment, chiefly articles of the uniform, is a great problem at almost every station. The equipment is taken care of in the bin system, which seems to be a satisfactory solution. Clothing presents a different problem. If the man keeps his uniforms at home, he will wear certain items. Shirts, breeches, leggings and shoes are worn serially or collectively for work on the farm or in the car. The result is an increase in the maintenance cost of the Guard. If the uniform is kept in the store-room, too much time is consumed issuing and taking in at each drill period. The answer seems to be individual lockers. This in itself presupposes commodious armories with regular club-room facilities. Small towns, and

some States, no doubt, cannot provide the type of armory. In some batteries I found them experimenting with a box-locker arrangement. I am interested to see how it will turn out. I believe, where possible, the locker scheme should be used in one form or another. *Something* must be done to conserve the articles of uniforms. At present it's a problem for the battery commander, and for the instructor as well.

My experience at camp, visits of inspection, and many long-drawn-out ruminations have led me to evolve a set of principles which I will enunciate for what they may be worth. Most of them are the result of experience—bitter, at times—and many have just "grown on me." I am willing to admit that all of them can doubtlessly be improved upon, but are *first hand* and *early* impressions, please remember.

*Do not criticize*. I say that advisedly, because I know the result can be accomplished in other ways. Suggestions can be made, and the officer led into the right path quietly. At times reports must be made of unfavorable conditions, but you can always avoid "shooting off your face."

*Be pleasant*. Personality means a lot on this kind of a job. You need not be effusive or gummily sweet, but you can be *firm* and *smile* about it.

*Be available*. There is nothing more discouraging to a Guardsman than to need an instructor and not be able to find him. Have some regular schedule, and whenever you deflect from it, leave word where you can be found. Very often officers will come from the far corner of the State on urgent business and cannot spare the time to wait for you. If you are easily available, it will greatly aid you to win the good opinion of the Guard in the long run.

*Be willing to help*. There are many ways, outside of the routine, and not prescribed by regulations. Once you let your "clients" understand you are willing—even anxious—to help, they will come to you much more readily. But let it be legitimate *help*—do not do their work for them. Show them how, guide and assist them, but make them perform their own proper functions. The idea is to train the Guardsman, not to show off the instructor. Very often it will require night work to accomplish this portion of your mission. Meet the Guard halfway; remember it is night work for them too, and usually without pay.

Last, but not least, remember there is plenty to do on a National Guard detail. What with correspondence course work, making trips, planning for camp, and working up suggestions for improvement, time should not hang heavy on the hands of an Instructor. Add to that the recent Command and Staff training policy, and the cup is

full. If the worst comes to the worst, and the above items are all up to scratch, you can use your idle moments visiting the local Guard officers at their business addresses. Just little friendly visits, but they go a long way toward establishing cordial contact. It at least shows that you have not forgotten their existence.

Need I add in parting, that whatever you do should be done *well*?

"Plan your work—
Work your plan."

# WAR FROM A BOX SEAT

## KALEIDOSCOPICS

By BURTON HARRINGTON

[This is the third of a series of Kaleidoscopics. The purpose of the author, who served in the Field Artillery during the World War, is to make a contribution to Field Artillery literature in the form of short word pictures. These are written around the activities of a battery which was in action for 210 days officially, between the dates of February 3 and November 11, 1918. —EDITOR]

FAR back from the front, perched on the edge of the Plateau de Malzeville, a stout little stone house sheltered four artillerymen who were being initiated into the mysteries of field camouflage in a two-weeks course.

Northward, through a valley formed by a series of mound-shaped hills, lights flared and silently dropped behind the horizon. To the south the somewhat barren expanse of the cheerless, sliced-off top of the plateau outlined itself sharply against the blue haze of hills farther south. To the east curled an arm of the plateau, beneath which snuggled, as if for protection, the suburb of Malzeville and the city of Nancy.

For two days iron hats, gas masks, rifles and other heavy and annoying impedimenta of war were forgotten while Slim, Dinny and Bud gamboled about with wire cutters, rolls of chickenwire netting, burlap and other of the camoufleur's cumbersome tools of deception.

There were days of walking upright and carefree sunning. Well-spiced meals at the French anti-aircraft battery were topped off with an occasional experience of elegant loafing at the sidewalk tables of a Nancy cafe. And then there were those small boy experiments with thermite in the fireplace of the cottage and interesting tours through the anti-aircraft position.

Then the dry, comfortable bunks in the cottage each evening with a cheerful fire and the buzz of careless conversation. Talk about sitting on the top of the world. In more ways than one.

The third day brought nothing more exciting than a spotted trail of white bursts a mile high in the deep blue vault of the heavens while the Archies traced the course of a curious German. The sense of security was complete.

It was just a bit after twilight. One of the three gazed pensively up the valley, watching the silent flickering of artillery, when he sat upright in his bunk.

"Douse the fire," he yelped.

"Whassamatter," muttered Dinny.

Wordless, Bud pointed to the upward spouting of tracers from machine guns.

"A raid," gasped Slim, "on Nancy."

And before he could say more the clamoring of sirens, bells, and whistles shattered the quiet night air as startlingly as the batteries of searchlights close by the cottage waved their long arms in panic, slithering to and fro, up into the black reaches of the night.

It was a wild, half clothed, cursing flight that brought the three to the arm of the plateau which overlooked the city of Nancy. Close by dugouts, they could dangle feet over the edge of the plateau and survey the city below. If the bombers were reasonably accurate they were in comparative safety, with a box seat for the show.

And immediately the first wave swept over, somehow getting by the crackling barrage that girded the city.

Brurr—Brurr—Brurr—Brurr; with mechanically spaced growls the Gothas passed through the restlessly pacing beams from the projectors and through excited chattering of the 75's, bursting in hordes of gleaming red pin points.

A quick silence.

One could feel the rush of the huge bombers as they swooped downwards toward the roof tops. There was a rushing hiss of water under pressure, a crashing flash of white light, another, another and still another. A mocking chatter of machine guns, derisively metallic.

It was finished. But no–

Another wave, and still others, until five had swept through the storm-tossed air vibrating and shaken with the earthward swoop of hissing torpilles, the impotently raging crash of the barrage. Scores of white beams despairingly grasped at space.

Then it was over.

"Hell," grunted Dinny as we crawled back into our bunks, "let's go back to the lines."

Someone inhaled a fervent Amen.

# A SMOKE PUFF TERRAIN BOARD

BY FIRST LIEUTENANT LEON V. CHAPLIN. F.A.

In the year 1919-1920, Mr. Thomas McLean Jasper, formerly Captain in the British Artillery, suggested to Major Orlando Ward, F.A., then on duty with the Artillery Unit of the R. O. T. C., University of Wisconsin, that a smoke producer, a pantograph, and screening representing terrain could be used to produce the effect of graze bursts. A terrain board incorporating these ideas and, in addition, an atomizer bulb, was constructed and successfully used in instructing the students at the University of Wisconsin.

That terrain board, generally known as the Jasper-Ward terrain board, was recommended by the Field Artillery Board as being an ingenious and highly developed means for the instruction of students in the conduct of fire. The Chief of Field Artillery recommended its installation in each of the Field Artillery Units of the R. O. T. C., and elsewhere in the service where an indoor terrain board could be used. It was described in the January-February, 1921, number of the FIELD ARTILLERY JOURNAL.

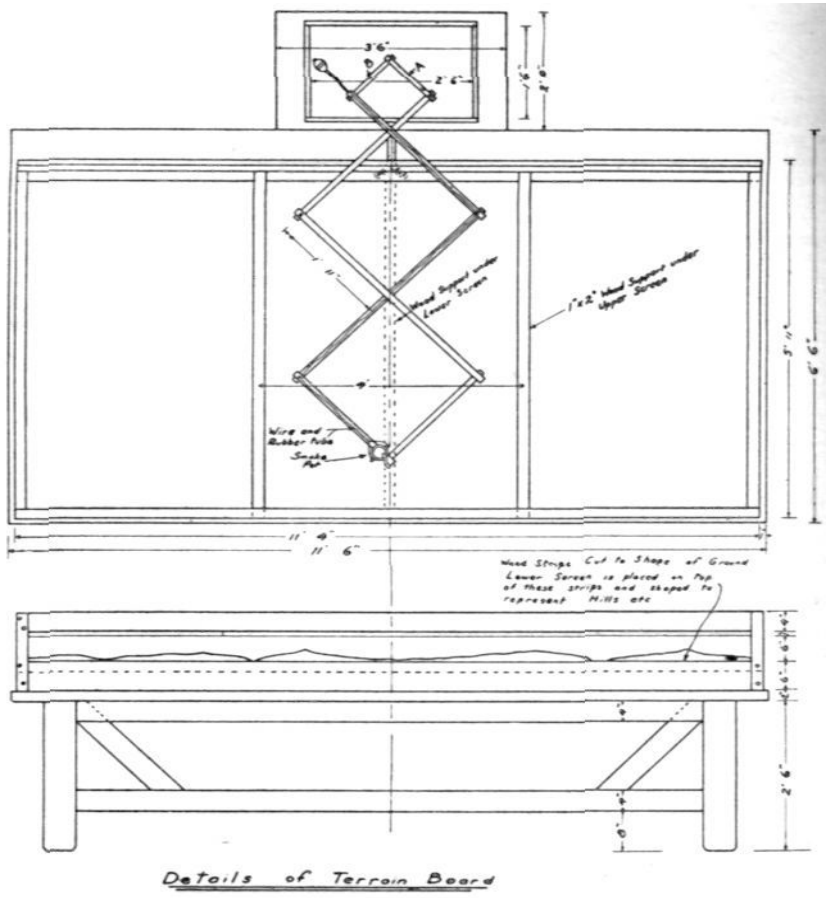
During a map maneuver at Fort D. A. Russell in the spring of 1928, Major Orlando Ward, Captain R. H. Dixon, Lieutenants N. W. Jones, L. V. Chaplin and A. E. Solem were considering possible improvements of the 76th F. A. terrain board. The need of air bursts to prevent too many sensings was under discussion and some one suggested an overhead screen. The possibilities of this idea were at once realized, and Lieutenant Chaplin constructed the board described in his article.

This addition is believed to materially increase the value of the terrain board. The Chief of Field Artillery has written Lieutenant Chaplin, thanking him for submitting this improvement.—EDITOR.

FOR several years the 76th Field Artillery has been using a terrain board of the Jasper-Ward type for indoor instruction of officers in firing. The results obtained have been very satisfactory. It was, however, impossible to represent air bursts, as all of the smoke came up through the screen, making it possible to sense all rounds for range even when the instructor called the bursts air.

Recently it was decided to remodel the board so that it would be possible to give a true representation of an air burst. This was done by mounting a frame with a wire screen bottom above the original terrain board. A second pantograph was mounted on this frame and connected to the lower pantograph so that they worked together. The smoke pot on the upper pantograph is always directly over the smoke pot on the lower pantograph. The smoke from the pot on the lower pantograph is blown up through the screen to rep-present graze bursts, and the smoke from the pot on the upper pantograph is blown down to represent air bursts.

The terrain board as originally constructed consists of a table 6 feet × 12 feet, with a small table attached at the back for the map and the range and deflection charts. A 2 inch × 6 inch frame was placed along the front and across both ends of the table. A 2 inch × 4 inch strip was used across the back to allow a space between the frame and the table for the lower pantograph. Strips of wood were cut to the shape of the ground and placed on top of this frame. By use of these strips of wood it is much easier to mold the wire screen to the desired shape. After the screen had been put on the lower frame it was first painted a dark green and then shaded with




Details of Terrain Board

brown, yellow, etc. Sponges dyed green were cut into small pieces and glued to the screen to represent trees. Buildings, windmills, water towers, etc., were made of wood and glued to the screen.

The completed board has a very realistic look when viewed through field glasses.

The modification, consisting of an upper frame, was made of 2 inch × 4 inch lumber and the lower side covered with wire screen, making a smooth surface for the upper pantograph to slide on and allowing the smoke to be blown down toward the targets on the lower screen.

In order to make the pantograph slide easily "Domes of Silence" (rounded supporting points) were used at all places where it came in contact with the screen. The long arms of the pantograph were made of ⅜ inch × ⅞ inch strips of wood, and the small arms at

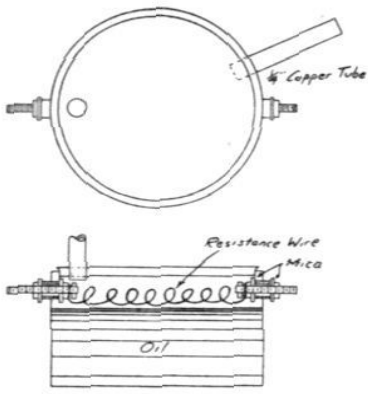
the rear were made of strap iron. Care must be taken to see that all holes on the pantograph are equally spaced and that the bolts fit the holes as close as possible. A little lost motion in the pantograph will cause large errors.

The smoke pots were made from ordinary friction top cans, about 3 inches × 1¾ inches. Two electric binding posts were mounted in the cans and insulated with mica. A piece of coiled resistance wire 8 inches long was connected inside the can between these binding posts. Asbestos wicking was wrapped on the resistance wire and allowed to dip into lubricating oil in the bottom of the can. The two smoke pots were connected in series with a resistance coil to the 110 volt lighting circuit. The oil on the hot resistance wire forms a dense white smoke in the can. A rubber tube with a bulb was attached to the can and when the bulb is pinched a puff of smoke is blown out the opening in the cover and through the screen.

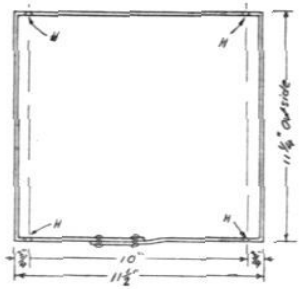
A map of the terrain board was then made, using the pantograph to reduce it to the proper scale. Then several transparent charts were made, the same size as the map, with range are and deflection fans. These range and deflection charts were made for different ranges from 3,000 to 6,000 yards, each chart representing 1,400 yards in range. The desired chart is placed over the map and covered with a piece of glass. Then several movable charts were made, similar to the others except that some had the range arcs in mils and others had the range arcs in yards. When it is desired to fire a problem with lateral observation the movable chart is placed over the large chart with the desired angle *i* at the target, and the movable chart is used as a director for the pantograph. The officer firing the problem always sits directly in front of the board. His distance from the board is changed to correspond to the chart being used over the map. The range from the observer to the target is shown on the chart which is being used over the map, while the range from the guns to the target is shown on the movable chart. By changing the position of the movable chart any desired gun range and angle *i* can be given without changing the position of the observer.

Bags of red and white beans mixed in the proper proportion may be used to determine the number of air and graze bursts, based on probability, to be given at any assumed height of burst.

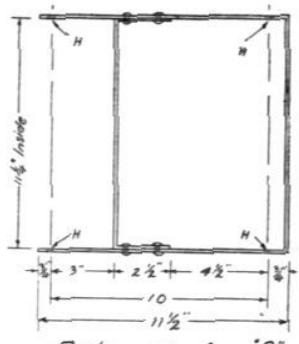
It was found that it is difficult to see the mil scale in the field glass at such short ranges, so the observer is shown two puffs of smoke a given number of mils apart, before he starts the problem.




Details of Smoke Pot made from Friction Top Can

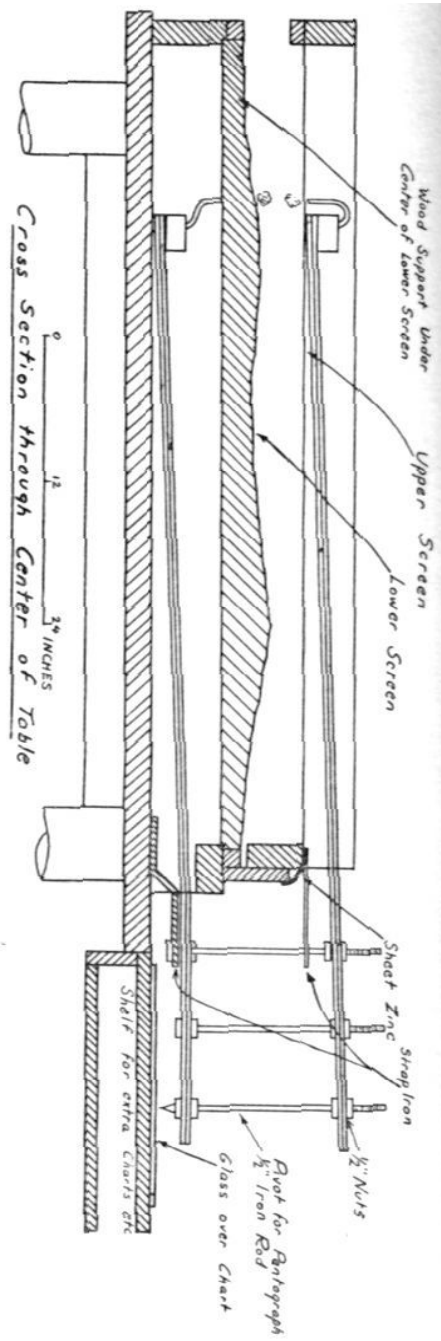



Pantograph Arm "A"




Pantograph Arm "B"

Details of Pantograph Arms A and B. To be made of 3/16 x ¼" Strap Iron. Holes marked "H" to be ¼" Diam.



# FIRING DATA COMPUTER

BY FIRST LIEUTENANT C. W. HENSEY. F.A.

THE FOLLOWING article is a description and explanation of an instrument, designed by the writer, for rapid and accurate computation of deflection angles, deflection shifts or magnetic azimuths corrected for the guns. This instrument can also be used by the battalion commander to simplify and facilitate the designation of targets.

The instrument is particularly valuable where the observation post is a considerable distance from the guns, and the offsets are too great (over 300 mils) to calculate by the parallel or other approximate methods.

By means of this instrument, through purely visual observation or sighting, the desired deflection angle, etc., may be ascertained in a very short time, without the necessity of any calculation whatsoever. This is done purely mechanically, thus reducing to a minimum the possibility of error and enabling the direct reading of the desired angle by a simple series of mechanical steps.

The particular model first described (Plates I, II, and III) was designed to be used in association with the plane table. It is small in size, and may be readily transported by the B. C. detail without greatly adding to its accouterment.

The manipulation of this instrument is so simple that it can be operated by a soldier, not having the training, education or experience of a commissioned officer. Also it can be used during inclement weather, when the use of a map, or other plane table methods would be extremely difficult, if not impossible.

The following is a description of the instrument (Plate II). It consists of a base 1, adapted to be secured upon a plane table by the means of thumb tacks passing through apertures in its outer flange. This base is provided with a central hub 14, which in turn carries a traverse guide 8, having an index 10. Within this guide 8, a graduated base slide 2 operates in conjunction with the index 10. This scale on the base slide is graduated in units representing distances, and is intended to represent distances from the guns to the observation post along what we will call the OP-G line.

Carried by the base slide 2, is an arm 3. This is pivotally secured to the slide 2, at 9, and swings freely on this slide. Arm 3 is graduated in units corresponding to units on base slide 2, and is intended to represent distances to target (T) or aiming point (AP). A second arm 4 is pivotally mounted about the hub 14, the center line of this arm passing through the center 13. The ring 15, integral with the arm 4, is journaled about the hub 14. Arm 4 is therefore free to pivot about the center 13.

It will assist in obtaining a clear understanding of the principles underlying and controlling the operation of the instrument if it is kept in mind that the center of the instrument 13 represents the gun position (G); the pivot 9, the observation post (OP); and the arms 3 and 4, the lines of sight from the observation post and guns respectively. The pivot 9, representing the observation post, is offset from the center of angular measurement at 13, but measurements of distances are made from pivot 9, both along the slide 2 and arm 3.

The two arms, 3 and 4, are connected for cojoint movement, not rigidly, but by means of a member slidable along both arms and formed of two parts pivoted together. This is effected by the compound clip 5. The center of the pivot 12 represents the crossing of the lines of sight from the observation post and from the guns at a distance from the observation post corresponding to the setting indicated by the index on 5, along the arm 3.

The arm 3 is provided with a sighting device (71 and 72). The sights used on this model are similar to the open sight leaves used on the 1/20,000 F. A. Plotting Scale.

A deflection ring 6 is journaled concentric with ring 15 and hub 14, and is rotative about hub 14, being held down by an overhanging flange on ring 15. The deflection ring 6 is then free to rotate about the center 13 of the instrument. The arms 3 and 4 swing freely over the deflection ring. The deflection ring is provided with suitable scales that work in cooperation with the index and vernier scale on ring 15, and can be read either in terms of Plateau and Drum for the French Sight, or straight deflection angles for the Panoramic Sight. The model shown in accompanying plates can be read only to the nearest 10 mils, the hundreds or Plateau being read on the deflection ring, and the tens or Drum on the appropriate vernier scale.

### TO DETERMINE A DEFLECTION

1. Being at the observation post, secure the instrument to a plane table by means of thumb tacks passed through holes provided for same, in outer flange of base 1. Turn 3 and 4 until they coincide in direction with the base slide 2 (see Plate I). Turn the plane table until the line of sight (through 71—72) passes through the gun position. Clamp the plane table. The direction of the OP-G line has thus been established.

2. Set off the distance from OP to G, on base slide 2. (Example: 1,200 on Plate II.)

3. Set off the distance, OP-T, on arm 3 by moving clip 5 until its index is opposite the desired range. (Example: 3,500, Plate II.)

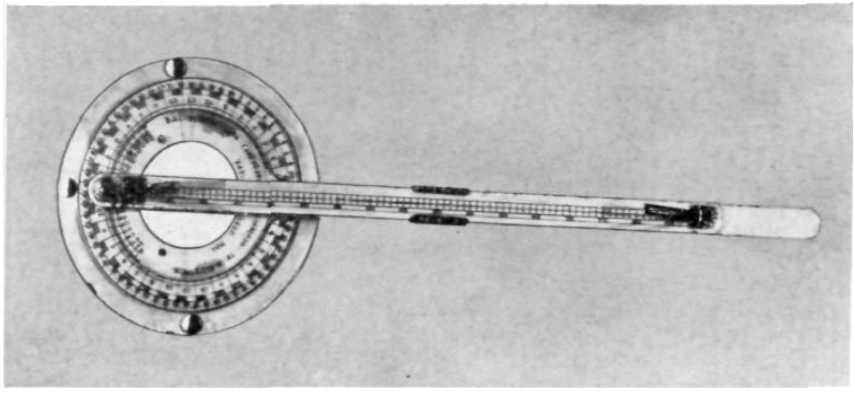


PLATE I

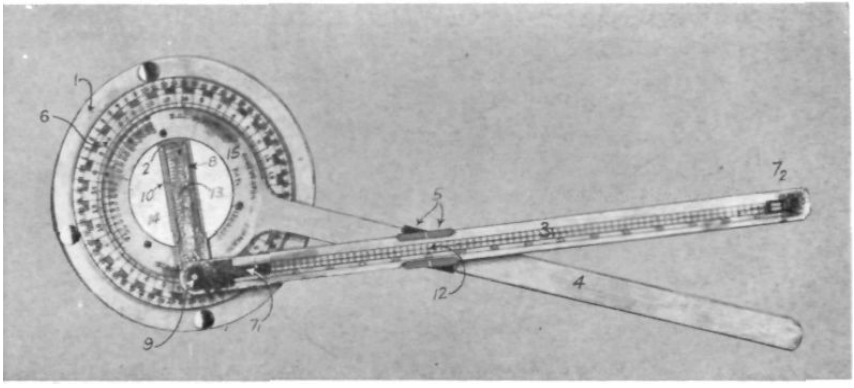



PLATE II

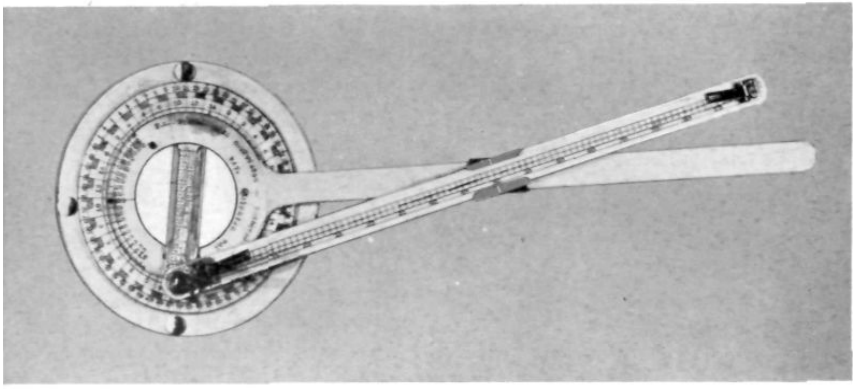


PLATE III

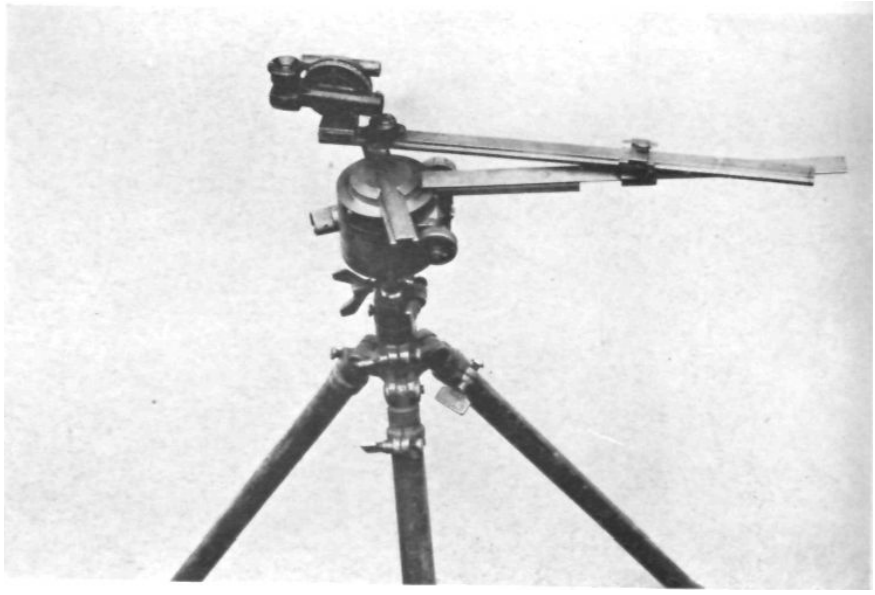


PLATE IV

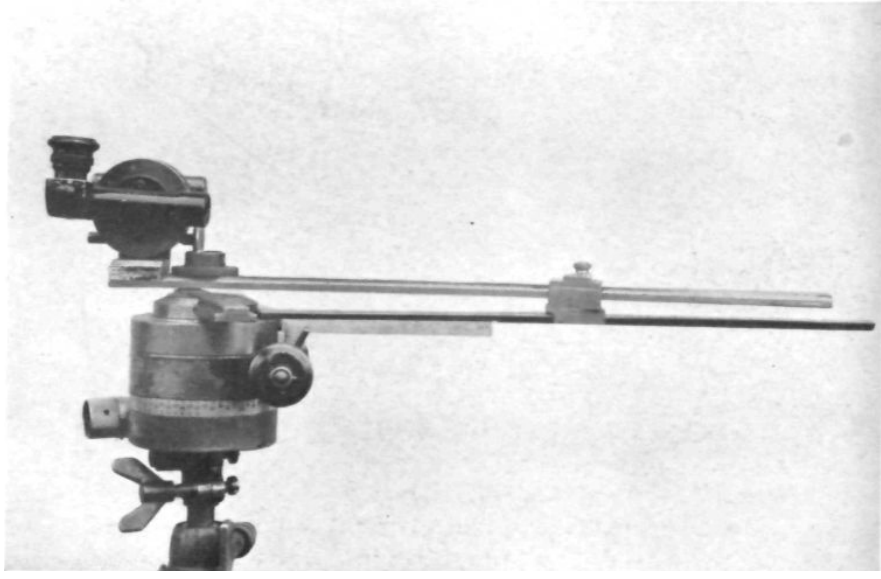


PLATE V

4. Swing arm 3 until the line of sight passes through the target (Plate II).

5. Turn deflection ring 6 until zero is opposite its index (Plate II).

6. Set off the distance OP-AP on arm 3. (Example: 5,000, Plate III.)

7. Swing arm 3 until the line of sight passes through aiming point (Plate III).

8. Read the deflection as indicated by the index and vernier* on ring 15. (Example: Plateau 10, Drum 160 or 5,860 mils, Plate III.)

It will be seen that if the arm 4 should be provided with graduations from the center 13 as a zero, the center 12, of the double clip 5, would indicate the gun-target range. As arm 3 covers the center of arm 4 at their intersection, a scale on the center line of arm 4 would be obscured. However, by making the lower arm wider and graduating it along the edges, the range could be read from an index opposite the center point of clip 5. Referring to the operations 1 to 8 above, the gun-target range could have been read on arm 4 after performing operation 4.

To measure a deflection shift, the operations are the same as described for measuring a deflection, the target *from* which the shift is to be made, being substituted for the aiming point.

To correct a compass reading for the gun position, the instrument being set up and the OP-G line established for direction:

(*a*) Set the base slide 2 at zero.
(*b*) Turn arm 3 until the line of sight passes through the target.
(*c*) Turn deflection ring 6 until the compass reading of the target is opposite the index on ring 15.
(*d*) Set off the distance OP-G on base slide 2.
(*e*) Set off the distance OP-T on arm 3.
(*f*) Turn arm 3 until line of sight passes through target.
(*g*) Read the corrected compass reading for the gun position, as indicated by deflection ring and vernier.

The instrument pictured and described in this article (although homemade, thereby having slight inaccuracies in the graduations) was found to give very satisfactory results, when reasonable care was taken in the manipulation of the instrument itself, and in obtaining the distances with a range finder.

With the observation post from 800 to 1,400 yards from the

* The scales of this instrument are read the same as the scales on the French Aiming Circle, the vernier being substituted for the micrometer scale.

gun positions, it was possible to obtain deflections within 10 and 15 mils of the true deflection as actually measured at the gun positions.

The instrument works equally well with the aiming point or observation post in any position with reference to the gun-target line, or the observation post itself may be used as an aiming point.

In addition to the modification of graduating the arm 4 as above mentioned, there are other obvious changes that might be made to broaden the scope of the instrument.

It may frequently happen that at the observation post it would not be possible or desirable to so locate a plane table as to allow sighting on the target, aiming point, and gun position, whereas it would be possible at the observation post to read, with the aiming circle or B. C. telescope, the angles between the gun position and target, and gun position and aiming point.

Plates IV and V show a later type of device for use on the tripod of an aiming circle, thus making a plane table unnecessary.

This instrument can be disassembled and packed in its case in a few seconds by detaching the lower gun arm and the base slide from the head of the instrument. The lower arm is held in the assembled position in the head by a plunger and spring in the bottom of a recess. By manufacturing the model shown by Plates IV and V, of non-magnetic metal, adding a box compass to the upper arm and providing the instrument with the proper type of telescope (similar to the one used on the French aiming circle), this instrument could be used for any operation that the present aiming circle can be used for, in addition to the computations described.

Referring again to the device as shown in Plates I, II and III, by making provision to so set and clamp the slide 2 with respect to the arm 3, that they intersect at any desired angle, the device could be so constructed as to allow the readings obtained with the aiming circle or B. C. telescope to be set on the device, and thus obtain the deflection and range without the use of a plane table.

If desired, further extension of the principles of this device would give approximate values of ø, ω and the angle *i*.

As the ranges given by new Field Artillery matériels and projectiles increase, it is to be expected that the observation posts will more frequently be located well in advance of the gun positions, and often with an angle *i* of considerable size. If neither an airplane, an accurate map, nor time for more extensive topographical operations be available, a device of the nature described would appear to have distinct advantages.

The instrument shown is rather crude, having been made from

materials and parts available. The idea is offered for what it may be worth. Should there be need for such an instrument, an expert instrument maker or designer could readily perfect the device.

# THE EXPERIMENTAL MECHANIZED FORCE

NOTES FROM 1ST BATTALION, 6TH FIELD ARTILLERY

THE 1st Battalion, 6th Field Artillery (less Battery C), Major J. W. Anderson commanding, forms the Field Artillery element of the Experimental Mechanized Force (Colonel O. S. Eskridge, Infantry, commanding), which assembled July 2, 1928, at Fort Leonard Wood for summer training. This mixed command consists of:

1st Battalion, 34th Infantry, from Fort Eustis, Va.
2nd Platoon, 4th Tank Company, from Fort Leonard Wood, Md.
1st Battalion, 6th F. A. (less Battery C). Fort Hoyle, Md.
Battery B, 61st C. A. (Antiaircraft), from Fort Monroe, Va.
Company C, 1st Engineers, from Fort Dupont, Del.
1st Signal Company from Fort Monmouth, N. J.
Medical Detachment from Carlisle Barracks, Pa.
1st Ammunition Train from Fort Hoyle, Md.
Armored Car Platoon from Fort Meyer, Va. (Troop E, 3rd Cavalry) and elements of
16th Tank Battalion (light) from Fort Leonard Wood, Md.
17th Tank Battalion (heavy) from Fort Leonard Wood, Md.

The War Department's conception of the Mechanized Force has been stated as follows:

"(*a*) The completely mechanized force is a self-contained unit of great mobility, great striking power and limited holding power.

"(*b*) It should not be considered as a divisional unit, but rather, because of its special characteristics, as a force of special mission.

"(*c*) The role of the mechanized force is essentially offensive.

"(*d*) Tanks are the principal attack elements of the mechanized force. The tactics of the force as a whole shall be predicated upon supporting and assisting the attack of the tank elements, and upon quick consolidation, securing and exploiting the success gained in the tank attack.

"(*e*) Other arms are added as auxiliaries, to furnish the element of holding which tanks lack, security, maintenance of command, fire support, facility of movement and supply.

"(*f*) Surprise, speed, and depth of penetration in the attack

should characterize the operation of a mechanized unit. Its tactics should be devised to assure these.

"(*g*) All members of the force should be imbued with a spirit of the utilization of the speed which the modern equipment will afford.

"The force should be regarded as a tactical as well as a technical laboratory. While it will have to operate this year with considerable obsolescent automotive equipment, it is nevertheless expected that much information as to tactics and technique will be derived which will be of benefit to further development."

Since in order to secure the strategic mobility required to operate with the experimental mechanized force it was necessary to change the battalion (less Battery C) into a portée organization, the horses of the battalion were turned over to Battery C, and on January 12 the personnel of the battalion went to Camp Holabird, Md., for a three-months course of instruction with the Quartermaster Motor Transport School. Here they received training in the care, maintenance, and operation of quartermaster motor transport vehicles.

On April 12, having completed the course at Camp Holabird, the organization went to Aberdeen Proving Ground for a course of instruction in ordnance motor vehicles, and for its annual service practice.

The concentration of the Experimental Mechanized Force was accomplished at Fort Leonard Wood, Md., on July 2 and 3, 1928. The 1st Battalion of the 6th F. A. (less Battery C) plus the battalion section of the Service Battery, left Aberdeen Proving Ground, Md., at 6:15 a. m., July 2, reaching Fort Leonard Wood at 4:30 p. m. the same day, having marched a distance of 57.6 miles.

The original organization of this battalion was influenced by the development of portée artillery in the Hawaiian Division. The 75-mm. gun and caisson were loaded in a Class B truck which had in tow a 3-inch gun trailer on which was loaded a 5-ton tractor, the gun and caisson being loaded into the truck by means of a set of 12-foot ramps, the tractor furnishing the power required to load. The tractor, moving under its own power, mounted the trailer using a short set of ramps. The gun and caisson were held in position by means of wooden blocks; the tractor was fastened by means of turnbuckles to the vertical and rear pintles of the trailer.

The Ordnance Department designed and built several types of both long and short ramps, which are now in use by the organization. The short ramps, made of steel and equipped with cleats for traction and side flanges for directing the tracks of the tractor, have proved, in general, very satisfactory.

The long ramps are of two types: the first being of U-shaped steel and the other being a wooden ramp without side flange. This second type has a primary advantage of less weight, but does not possess sufficient strength. Very little difficulty is experienced in using these ramps when loading the battery as outlined above.

The road from Aberdeen to Fort Leonard Wood is excellent, being practically all concrete. However, many sharp hills are encountered between Aberdeen and Baltimore. The Class B truck with its load of almost 17 tons has much difficulty in pulling these grades, and the trailer with its load presents a hazard on the down grade, tending to push the truck out of control. This hazard is lessened by having good brakes on the trailer and a man constantly on duty to operate them.

On arriving at Fort Leonard Wood the first objective was to devise some means of increasing the speed of the battalion on the road, using the equipment on hand. To this end the trailers were taken away from Battery A, and each tractor was loaded into another truck. It was found that the 5-ton tractor would overload the rear springs, and this condition was corrected by the addition of auxiliary or overload springs.

A return trip to Aberdeen was made on July 12. Battery A in the lead had no trailers, Battery B and the Combat Train followed it, with the usual trailed load. The trip to Aberdeen was made from 7:00 a. m. to 1:45 p. m., and the return to Fort Leonard Wood from 6:10 a. m. to 11:45 a. m. The speed made by Battery A was faster than the other unit, but to no marked degree, and all units maintained an average road speed of 10 to 11 miles per hour. It was later found that on dirt roads the speed made by Battery A was much faster than that of the other organizations.

It will be noted that the average speed made by the battalion on its second trip from Aberdeen was much faster than the first trip. This was primarily due to the drivers becoming more experienced in handling their trucks under load in traffic.

Civilian traffic presented a difficult problem in this highly populated area and necessitated operating the trucks at greater distance than that ordinarily used. The battalion marched with about 50 yards distance between vehicles and did not close up altogether at the halts. This was to allow civilian traffic to circulate within the column. In marching through Baltimore the column was closed to one truck length and was conducted by the civilian police as a unit with right of way. As thus spread out to allow for civilian traffic the battalion normally took fifteen minutes to pass a given point regardless of the rate of speed. Halted on the road it measured from .8 to 1 mile in length.

On July 17th the entire E. M. F. marched as a unit to Upper Marlboro, Md., a distance of 43 miles, leaving 6:00 a. m., and the last unit reaching camp about 3:00 p. m. Two bridges near the camp were considered unsafe for the Field Artillery, Tanks and Coast Artillery loads. This required unloading tractors and tanks (the Coast Artillery using long tow ropes on their trailed loads), all of which consumed time.

On this march the battalion marched in the same section with the Tanks and Coast Artillery and is capable of greater speed than either of these units as now equipped.

From the time Battery B halted to unload tractors and to load tractors on the trailers, five minutes were consumed in the unloading and loading operation until the battery resumed its march.

On its return from Upper Marlboro, July 18, the battalion marched independently. The head of the column cleared Upper Marlboro at 6:24 p. m., and entered Fort Leonard Wood at 10:10 p. m. This night march totaled 27 miles in length, the last seven being over a narrow, tortuous gravel road. A total of fifty-five vehicles was in the column (not counting trailers). The average gasoline consumption for the battalion was 16.2 gallons per mile.

Several modified F. W. D. trucks will soon be furnished the battalion and will be used to replace a like number of Class B trucks. It is believed they will perform much better in sand and mud than do the Class B trucks.

Since arriving, three commercial Caterpillar "Twenty" tractors have been issued to replace 5-ton tractors. These tractors are lighter and perform with a two-axle load most creditably.

Loading tractors from the ground into the truck requires modification of the original long ramps which are not satisfactory and would prove dangerous if loading were done at night. It is believed the solution will be found in a steel U-shaped ramp, sufficiently wide to accommodate the track, and having means to anchor it at the top of the truck and flanges at the bottom to hold it to the ground. The Ordnance Department at Aberdeen is now building several sets of ramps for this purpose.

Among other interesting types of automotive vehicles now within units of the E. M. F. which might be of great value to the Field Artillery is the self-propelled gun mount (Mark VII), which is armed with a model 1916 3-inch gun. This vehicle has been operated by the battalion with considerable success and is also capable of being transported by a Class B truck.

The Coleman, new F. W. D., and Walter trucks have demonstrated remarkable power and traction in carrying Field Artillery

and Tank loads and are, without doubt, material improvements over the truck equipment now on hand.

The Chevrolet Car equipped by the Signal Corps to lay and pick up wire is very interesting, as is also an oil burning kitchen developed by the Corps of Engineers. This kitchen is entirely within a 1½-ton truck, equipped with pneumatic tires.

The officer personnel of this organization follows:

Major J. W. Anderson, Commanding.
Captain Wm. M. Wiener, Adjutant.
Captain G. A. Graves, Commanding Battery A.
Captain W. A. Ray, Commanding Battery B.
1st Lieutenant L. T. McMahon, Commanding Headquarters Battery.
2nd Lieutenant J. J. Deery.
2nd Lieutenant R. M. Osborne.
2nd Lieutenant F. J. Brown.
2nd Lieutenant W. T. Watlington.
2nd Lieutenant D. P. Miller.
2nd Lieutenant H. B. Kirkpatrick.

Attached for summer:

Captain C. C. Brown, from Field Artillery School.
Captain Leon Dessez, from Aberdeen Proving Ground

# FRENCH POWDER SUPPLY DURING THE WAR

BY JOSEPH AGAN

A RECENT book by R. Pique, who was director of the powder supply service during the World War, furnishes valuable and hitherto uncollected information regarding the manner in which France fed the guns.

In July, 1914, there were thirteen establishments (ten powder factories and three refineries) employing 7,762 persons. The Lille and Esquerdes refineries, being in the war zone, were abandoned at the beginning of hostilities. Towards the end of 1914, five more were erected: at Chedde in Savoy, two at Saint-Fons, one at Port-Saint-Louis-du-Rhône, and one at Neuville. The latter was destroyed by an explosion in February, 1917. In 1915 two others were put up, at Blanc-Pignon and at Castres. The year 1916 saw the advent of hurriedly organized plants at Bergerac, Sorgues, Bassens and Oissel. At the time of the Armistice there were twenty-one munition factories in operation. Of these two were research establishments at Grenoble and Bouchet, and two were nitrate refineries at Marseille and Bordeaux.

Before the war the total daily output was 33 tons of nitrocellulose powder, called B. 24 cotton, 5 tons of nitric explosives, 5 tons of chlorate explosives, and 20 tons of plain black powder. It is interesting to note that during the whole period of the war, only 15½ tons of the latter kind were employed, and then only for fuses.

At the outbreak of the war, the heads of the munitions section felt that the conflict would be of short duration. Not only was production not speeded up—it was actually lessened and proved to be but about one-twenty-fifth of the needs of the army. Besides, an extraordinarily high percentage was allotted to the practically inactive navy. Up to the present time no one has come forward to assume responsibility for such a program. From September, 1914, the armies required 40 tons a day and the same amount of explosives. By July, 1915, the demand had risen to daily deliveries of 408 tons of nitric explosives, 109 of chlorate and percolate, as well as 186 of B. powder. By the middle of 1916 needs had doubled. In the fall of 1918 the demands for all categories made upon the factories were eight times those of 1914.

Naturally it was found necessary to increase the personnel in even greater proportions than the production, because of the fact that appeal had to be made to the services of unexperienced persons. The peak was reached in January, 1917, with 102,610 employees, without counting officers on special duty. Improved methods and American participation in the conflict permitted regular reductions,

and on the eve of the Armistice the number was only 90,000. Of course, a certain number of these were engaged not in the actual manufacture of explosives, but in experimentation with the more effective ones. A large contingent is still so engaged.

At the same time the Powder Service provided gas projectiles for trench mortars, thirteen million of 7.5 centimetres, four million of larger caliber, also grenades and containers filled with compressed gas in even greater number. It is difficult to ascertain just how many were turned out.

The principal difficulty was in the matter of raw materials. Most of the ingredients—nearly all, in fact—had to be imported from foreign countries and often from regions overseas. At the beginning of the war there was no regular organization for profiting by the sources of supply abroad, and when such channels had been created, the German submarine campaign had reached full swing. It will never be known to what extent the deficiencies of the French munitions services increased the casualty lists, but all other factors aside, it must be noted that blockaded Germany lost but one man on the western front to every two Frenchmen who fell.

# PISTOL TRAINING AT PURDUE UNIVERSITY

BY AN R. O. T. C. CADET OFFICER AT PURDUE UNIVERSITY

AT PURDUE, although pistol shooting is a minor sport, and is classed by the University along with wrestling, gymnastics, and other minor sports, it is a major activity in the Cadet Corps. Approximately eight minor letters are awarded by the University each year to members of the pistol team, these letters being similar to those awarded in other minor sports. The pistol team competes each year in about fifteen intercollegiate (R. O. T. C.) matches and in the National Field Artillery R. O. T. C. Match. All colleges having Field Artillery training in their corps are eligible to enter a pistol team in this national match, the winning team being awarded a cup by the National Rifle Association, which cup remains in the possession of the winning team for the ensuing year. Most of the intercollegiate matches are telegraphic, although one or two "shoulder to shoulder" matches are fired each year. It is toward the winning of the National Field Artillery Match, however, that the majority of effort is pointed.

Although all firing is done after regular school hours, about four hundred men turn out for the pistol training each year, and the interest is so great that even more could readily be induced to do so if larger facilities were available.

From this number a Varsity Team is selected, and at the same time a group known as the Camp Knox Squad is also trained so that a team may be entered in the match held at the R. O. T. C. Camp. This team is restricted to Juniors and to a few others who will attend the camp at the end of the year. The Camp Knox Squad often includes some men who are also on the Varsity Squad.

In developing these teams, both the Varsity and the Camp Knox squads are given a great deal of training. The experiences gained during 1926-27 seemed to show that a certain number of hours of instruction, given one hour each afternoon, five afternoons per week, is more effective than the same number of hours spread over a greater period. Therefore the fall is divided into four periods of thirteen working days each, the first period being from the first to the thirteenth day. Two groups are given their instruction and practice firing during this period. Each group consists of forty men, one group practicing from four until five o'clock each evening and the other from five until six o'clock during this period. The second period is from the fourteenth to the twenty-sixth day, the third period from the twenty-seventh to the thirty-ninth day, and the fourth period from the fortieth to the fifty-second day. During the second period, groups three and four practice, group three from

four until five and group four from five until six. Similarly, in the third period groups five and six practice and in the fourth period groups seven and eight practice. There is no firing on Saturdays and Sundays during this period of instruction. The reason for giving the elementary training and instruction early in the year is to give all novices instruction before Christmas. Experience gained last year definitely showed this to be very desirable, as the interruption occasioned by Christmas recess and mid-year examinations prevents any effective practice during this period.

The novice instruction given each man during his thirteen hours of instruction is as follows: On the first day the subject of pistol shooting is discussed as to scope and objectives. The individual is given training sheets in which stress is put on the importance of keeping in good condition, getting plenty of sleep, and keeping regular hours. The operation of the pistol is then very briefly given. Safety precautions and tests are given, including test of safety lock, test of grip safety, test of half-cock notch, and test of disconnector. The method of gripping the pistol is then shown and explained, neglecting position, aiming, breathing, etc. The student is told of the importance of squeezing the trigger, and an explanation is given of the method of executing the squeeze. This is practiced for a short time at raised pistol *without aiming*. Sighting of the pistol is then explained in detail.

The second day's instruction consists of a review of the grip and trigger squeeze. Sighting is stressed more. The third day also has a review of the grip and trigger squeeze, breathing and position are explained, and various exercises for strengthening the arm are explained and practiced. The fourth day consists of more work on the trigger squeeze. The fifth day continues the practice of the trigger squeeze and more exercises for improving the position. All days after the fifth begin with practice on the trigger squeeze, followed by firing on the ten-target indoor range. On the sixth and seventh days each man fires five rounds, slow fire, at 15 yards with the instructor coaching. The reason for firing first at 15 yards is to establish confidence. On the eighth and ninth days five rounds are fired at 25 yards, slow fire, and the men failing to average 70 per cent or better on these two days are dropped. On the tenth and eleventh days ten rounds are fired at 25 yards, slow fire. On the twelfth day five rounds are fired at 15 yards, rapid fire, twenty seconds to a clip; and on the final day ten rounds are fired at 15 yards, rapid, eleven seconds to a clip.

Selections for varsity tryouts in the spring are made of all men who average 85 per cent at 25 yards slow fire. Juniors of somewhat less ability are acceptable, likewise men who are particularly good in rapid fire. Others are permanently dropped without firing for

record at the end of the thirteen-day period. In regular organizations it would, of course, be advisable to follow the thirteen-day period with instruction in quick and rapid shooting and then at once fire all men for record. At Purdue, however, there is not sufficient time to coach all men in quick and rapid fire, nor to have them fire for record. We select, therefore, only those men who give promise of qualifying as Expert Pistol Shot. In the spring these men are given further training of one hour per day for about one month. During this time they fire the regulation course for record, those qualifying as Experts, Sharpshooters and Marksmen are presented with medals and the best ten or fifteen of this group are retained for the Varsity and Camp Knox squads. The Varsity Squad then fires its intercollegiate matches during March and April. The Camp Knox Squad continues training about two hours a week until camp is reached in June.

The points stressed in coaching pistol teams at Purdue are taken from Training Regulations 150-20, on Pistol Instruction dismounted. This is a safe guide for any inexperienced coach. The division of time among various phases of the work is a problem which differs with each organization, but the preliminary work must not be neglected, no matter how much it may have to be shortened. No recruit should be allowed to fire until after at least five hours of preliminary work. Development of the trigger squeeze and the strengthening of the muscles of the hand and arm are the matters which are hardest to accomplish in a short time of preliminary training, but, as has been previously said, at Purdue work begins on this on the first day. Two five-minute periods per day are devoted to the development of the trigger squeeze.

As soon as sighting has been covered, position and aiming drill begins. To develop the muscles of the arm, weights of 2 to 3 pounds are suspended from the barrel of the pistol during aiming. The trigger is not squeezed during this exercise, which, after being once started, is also taken twice each day. Men are not permitted to get ahead of their instruction. No squeezing of trigger, much less the snapping of the trigger, is allowed until the proper method of doing so has been explained. Correct methods of holding the pistol, with thumb parallel to, or higher than, the forefinger, are insisted upon when taking the grip, although men sometimes say that this is unnatural. One of the main points watched closely at Purdue is not to allow men firing for the first time to line up ten or fifteen at a time and "pop them off" in volleys. The first shooting should, by all means, be done at 15 yards, slow fire, with only one man firing at a time, so that the coach can catch and correct at the beginning, any mistakes that may show up. Under this system

errors do not become habits, and many who might otherwise be spoiled are developed into good shots.

The Purdue University Pistol Teams have been very successful during the past five years, having managed to win a majority of their matches and having made a creditable showing in the National R. O. T. C. Field Artillery Pistol Matches, winning that of last year. The last season was the best, however, the Varsity winning all but two of its fifteen intercollegiate matches, and the Camp Knox Team winning its match by an easy margin. One member of both Varsity and Camp Knox teams, Cadet Captain C. R. Atkinson, who is also a member of the National Guard, went to the pistol and rifle matches last summer at Camp Perry, Ohio, and placed in both pistol and rifle competitions. The high point man of the National R. O. T. C. Match for the past two years has been a member of the Purdue team.

The outcome of the Field Artillery R. O. T. C. Pistol Match 1927 was as follows:

| *Team Standing* | *Score* |
|---|---|
| 1. Purdue University | 1529 |
| 2. Alabama Polytechnic Institute | 1528 |
| 3. University of Missouri | 1509 |
| 4. University of Utah | 1494 |
| 5. University of Oklahoma | 1488 |
| 6. Iowa State College of A. & M. Arts | 1487 |
| 7. Colorado Agricultural College | 1484 |
| 8. Princeton University | 1473 |
| 9. Oregon Agricultural College | 1467 |
| 10. Ohio State University | 1456 |
| 11. Cornell University | 1426 |

Individual scores for the Purdue team were as follows, Cadet Captain F. D. Stoops' score of 309 being the highest individual score fired by any competitor:

| | *Timed* | *Rapid* | | *Quick* | |
|---|---|---|---|---|---|
| *Names* | 25 yds. | 15 yds. | 25 yds. | 25 yds. | *Total* |
| F. D. Stoops | 49-48 | 50-50 | 49-48 | 5-5-5 | 309 |
| C. R. Atkinson | 50-48 | 50-50 | 48-47 | 5-5-5 | 308 |
| C. E. Lennox | 47-48 | 50-49 | 48-48 | 5-5-5 | 305 |
| J. E. Palmer | 48-48 | 49-50 | 46-48 | 5-5-5 | 304 |
| T. B. Holliday | 48-49 | 48-50 | 49-44 | 5-5-5 | 303 |
| Total | | | | | 1529 |

With a wealth of good material, Purdue should again be represented by a very successful team this year.

*Note:* Since this article was written Purdue has completed the 1928 pistol competition season. Of fifteen intercollegiate matches fired, all were won by Purdue. The F. A. R. O. T. C. Match was lost to Missouri by the margin of a single point, 1533-1532.

# FIELD ARTILLERY: PAST, PRESENT, AND FUTURE

BY GENERAL HERR OF THE FRENCH ARMY EIGHTH INSTALLMENT

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

## PART TWO

## THE FIELD ARTILLERY NECESSARY FOR WAR

### CHAPTER III

### THE USE OF ARTILLERY SURPRISE—MASS—DEPTH

WE HAVE described in Part I the progressive evolution of artillery tactics, and we have shown that that evolution had, as an end in view, a method of use of this arm which is summed up in the three following words:

Surprise.
Mass.
Depth.

### SURPRISE

The methods of attack during the first years of the War absolutely excluded any idea of surprise. The delays necessary to emplace heavy, cumbersome, slightly mobile matériels, and to assemble the formidable tonnage of ammunition for them; the desire to destroy everything in the path of the infantry, instead of being content with neutralizing the fire of the adversary, a conception which slowed up preparations for attack which was itself rendered interminable by the slow rate of fire and insufficient range of our old matériel; the delays of execution due to the necessity of adjusting each individual fire; all these practices were absolutely incompatible with the possibility of surprising the enemy.

However, the advantages of surprise were too evident to escape the High Command. After 1917, General Petain called this important factor to the attention of army commanders. At the end of that same year, the Germans at Riga and at Caporetto, and the English at Cambrai, made very fruitful use of it. All the battles of 1918 were characterized by attempts at its use.

The design of matériel and the combat plans for artillery should in the future favor, to the utmost, the realization of surprise. For this, all matériel should be endowed with perfect strategic mobility, excellent facility for maneuvering and great rapidity of fire. We have shown in the preceding chapter how these qualities will be assured for the scheme of artillery which we propose. As for combat procedure and methods of

fire, the path resolutely followed by the artillery at the end of the War was good. Perseverance alone is necessary, the instruction of the arm should be continuously pushed in this direction.

## MASS

We have cited the error into which the High Command and artillerymen fell before the War and at the beginning of the campaign, an error inspired by excessive confidence in the individual power and rapidity of fire of light cannon. We have shown that the essential lesson of all the battles has always been the same. Isolated cannon, no matter what their rapidity of fire, have no power in modern battle; artillery has no definite effect unless employed in mass.

This question is so important that we should be pardoned for emphasizing it again.

Looking at the matter more closely, it is seen that the idea is not new. It has been long under discussion, and a careful search shows that the germ was not only in our prewar regulations, but originated long before them. It began, more or less exactly, at a time when the matériel hardly lent itself to the realization of mass action, and the genius of Napoleon, far in advance of his time, in that as in many other things, had already foreseen its application. We have only to recall the great masses of artillery of Friedland, of Wagram, and, to a certain extent, of Waterloo. The Germans employed mass more or less conscientiously in 1870 at Woerth and at Saint-Privat. It survived with some of our great chiefs to the end of the life of the 90-mm. cannon, as evidenced by mass maneuvers at the camp at Chalons from 1890 to 1895.

The appearance of the 75-mm. rapid fire cannon, which should have given mass increased support, on the contrary caused it again to be forgotten, because the power of this weapon was overestimated, and a principle was established which led to the use of artillery in small units, battery by battery and even piece by piece, in what was called *dispersed order*, and which also tended to make great machine guns out of cannon. There is no more unfortunate error nor one which cost us more dearly during the War. It is to this error that can be attributed, without possible dispute, the feeble relative efficiency of the artillery, if one compares the results obtained with the energy expended. With the employment of an equal number of weapons, with an equivalent consumption of ammunition, what results could one not have obtained, if, instead of leaving so many units to act like lost children and waste their efforts in isolated and discordant actions, one could have understood sooner that this power of armament is less a function of numerical quantity than of method of use. What results could not have been obtained especially by their use in mass and with intelligent coordination of their employment!

It required the many experiences of the first year of campaign; it required the brutal confirmation from the hard lessons at Verdun, for us to finally understand that power cannot be realized by independent fire *in driblets* from isolated weapons, but that it necessarily required the coordinated employment of numerous weapons and the consumption of large quantities of ammunition.

The War then has taught us the falsity, or at least the relative inefficiency of the power of individual rapid fire cannon; it has led us to believe that we are much nearer the truth in accepting exactly

the opposite principle—that of the lack of power of isolated cannon, even of rapid-fire cannon except perhaps at point-blank range. Due to the dispersion of fire, particularly to the deceptive instability of the center of impact which is incessantly displaced by variations in atmospheric conditions, objectives are not destroyed by isolated shots no matter how often repeated. To obtain the desired result it is necessary to bracket the target with a dense fire, with the center of impact on the target. *Instantaneous density* is the only condition for effectiveness, because its rapidity prevents dispersion due to fluctuating atmospheric conditions.

The value of the "time" factor in the efficiency of artillery was thus strongly apparent to us, and we soon understood that an avalanche of projectiles, arriving simultaneously without warning on any objective, is infinitely more effective than the slow fire of the same number of rounds.

To accomplish a demolition in a given time with the necessary number of projectiles, it is not sufficient to have a few pieces even of rapid fire type. To obtain the desired density of fire at the target a large accumulation of matériels is essential. *Artillery is effective only when employed in mass.*

The use of mass necessarily implies its direction by a single chief, who plans and directs its maneuver, who regulates its missions as a unit, who coordinates actions and assures unanimity of effort.

In the future it is absolutely necessary that the commander should never be separated from his artillery, break it up into small units, divide it among his subordinates without imperious reasons, or delegate his command. On the contrary, he should keep it under his own personal direction. It is his duty to determine its use, at least for the major plans, and often in certain important details as well. He determines the organization in groupments, deployment and echelon, changes of position, supply, successive missions of his artillery. He also determines the objectives to attack, in what order, in what manner, with what density of fire, and with what minimum effect. He directs isolated action at a given interval and time, or on the contrary he decides upon liaison with some other tactical action executed by another arm, particularly the infantry. In a word the commander should himself order and direct *firing maneuvers* as he does his *maneuvers of movement*, because these two are but separate terms for an indivisible whole, two factors inseparable for the realization of his desires!

A difficulty is presented here. Everyone agrees today that the infantry cannot do without the constant aid of the artillery. In an action which has been thoroughly planned and prepared in advance, this aid can be given by artillery left at some distance to the rear and remaining grouped in control of its chiefs, and at the constant disposition of the High Command. But there is something else. Even with the best conceived plans and preparations, unexpected incidents often happen. The infantry suddenly confronts unsuspected obstacles which have not been covered by the regular supporting artillery or that temporarily acting as such, and which must be overcome before the advance can continue. In open warfare these incidents are the common occurrences of battle. No matter what precautions are taken to assure liaison between the infantry and its supporting artillery, experience has taught us that this liaison is precarious, that messages are slow and uncertain, and that there are often insurmountable difficulties tending to prevent appeals for aid from reaching

the superior commander who can bring that artillery into action in time.

Therefore, it is universally recognized that it is necessary that the infantry have accompanying it a few powerful weapons at the immediate disposition and under the direct orders of its local chiefs, which can intervene promptly and break up unexpected resistances without delay.

During the War this necessity led us to divide our divisional artillery into supporting artillery organized into as many distinct groups as there were regiments of infantry engaged in the front line, and accompanying artillery, comprising a few pieces or sections placed at the immediate disposition of the battalions.

The organization in groupments destined to support individual regiments of infantry need not, if sufficient precautions are taken, break up the tactical unity of the artillery or remove it from the control of the superior command. Therefore, these groupments should be controlled by the superior command, which retains the power and means to modify, suspend or recommence their action—in short, to maneuver them. Thus they are an integral part of the *firing maneuvers*. In fact, the groupments execute the work of the artillery as an entity.

The accompany weapons, on the contrary, are naturally placed under the orders of the local infantry commanders and therefore escape totally and definitely from the control of the High Command.

But, unless we are on our guard, the placing of attached artillery at the disposition of the infantry has a natural tendency to degenerate into using all artillery in this way. The entire artillery thus becomes divided *a priori* among regiments or even battalions; the artillery commander loses all control over it, can no longer modify its missions nor maneuver its fire; he is helpless, he can no longer direct his maneuvers; he has passed his hand to his subordinates. The combat degenerates into a series of isolated local actions, disconnected and sterile. If all of these isolated actions go well, the sum of their individual successes may constitute—entirely aside from any influence of the chief—a general success, which is usually mediocre, but with which certain individuals may be satisfied after a fashion. If one of these actions fails, often in spite of excessive expenditure of ammunition, its failure may affect the whole battle and even compromise the situation while the commander has no means to correct it; he is present, powerless and driven to despair.

Let us remark that the work which the artillery thus does is detail work not immediately profitable to the whole command, and is of service only to an isolated unit. This is in a way the work of the infantry, and if artillery has been used for it, this is because *without the use of artillery the infantry could not possibly have executed its mission with its own means alone*.

The logical conclusion is that if we wish to use in its normal manner the tactical properties of each arm, infantry as well as artillery, and to make each work to the extent of its own capacity, it is necessary that the infantry possess an accompanying weapon, properly belonging to it, like its machine guns and tanks, living with it, marching and fighting in its ranks, having sufficient power to permit it to itself regulate the incidental details of a combat. An accompanying weapon also should be so protected as to permit movement in a storm of bullets.

In the description of our scheme of artillery, we have foreseen the creation of a weapon to fill this need. Thanks to its existence, the commander

will have at hand two tools of incomparable power. First, artillery which can remain grouped at his immediate disposition, since it will not be reduced to dust during minor actions, which will operate under his orders to prepare and to clear the field of battle by irresistible united action (intimately connected with the action of the infantry by means of the High Command); will permit him to conduct his maneuvers, to always remain master of the situation, and to make his will felt on all sides at all times. Second, infantry which, in the area the artillery has prepared and kept open for his maneuvers, will be in a position to quickly and thoroughly handle by its own means all unforeseen incidents, and to thus fulfill with ease his mission of chasing the enemy from the territory which he occupies, and to occupy it himself.

Liberated thus from small details to which it is not well adapted and for which it was formerly often used without profit to the whole command, the artillery can be employed without other worries for the major mission of the entire command, where its existing methods of fire assure such wonderful results. For such use it must necessarily work in mass.

The example of the War has shown us what this mass can, and should, be. The figures which we gave in Part I on the subject of deployment of artillery in the large battles are worthy of thought. During the War we saw the density per kilometer go from five batteries in 1914, to forty batteries in the attacks on limited fixed positions in 1917, then reduced during our offensive open warfare in the summer of 1918 to an average of twenty batteries.

Unless a new arm comes to dethrone the artillery, everything leads us to believe that the evolution so clearly and so characteristically begun during the War will continue along the same lines, and that the importance of artillery will continue to grow for a long time. The density of fire realized in 1917 and 1918, will quite likely be surpassed in the next war.

## DEPTH

Whether it is necessary to capture strongly organized positions or to give battle in open country, victory requires the destruction of the defenses of the adversary and the creation of a breach which will dislodge him once and for all. With the multiplicity of successive lines of which defensive organizations are composed, with the considerable echelons which present day combat formations take, the enemy defenses cannot be considered as definitely broken unless the breach made is both wide and deep. Such a breach permits reaching and destroying the essential elements of the enemy defense, especially his deployment of artillery.

It is unnecessary to dwell upon the importance of this principle, which the military art has never ceased to proclaim, which all great leaders have successfully applied, and which the battles of the last war have shown to be indisputably just.

But since the offensives of 1915, we have been forced to recognize that the extent of an attack is necessarily limited in depth by the power of the artillery. As soon as the infantry is deprived of the support of the artillery, it is held up by the least material obstacle which hides a few automatic weapons. It is, therefore, necessary to assure continuous support by artillery, which can only be obtained by long range guns which have good tactical mobility. Long range guns make it possible to prepare the attack over the entire depth of the enemy defenses, to prevent

by interdiction fire the intervention of the enemy reserves, and also to follow the progress of the infantry with its fire for a long time without frequent changes of position. Tactical mobility facilitates changes of position when they become necessary, makes them easier and more flexible, diminishes the duration of the crises brought about by moves, and lessens all other difficulties.

Any scheme of artillery based on the lessons of the War should offer these two qualities to the highest degree.

However, an increase in range brings about increased weight of matériel, and, therefore, decreases its mobility, unless special measures are taken to conciliate these two antagonistic properties.

This is the result which we forced ourselves to obtain in the scheme of artillery which we proposed in the preceding chapter. It does not seem possible to accomplish more with the means which ballistics on one side and industry on the other actually place at our disposal.

## CHAPTER IV

## THE PROBLEM OF QUANTITY AND BALANCE OF ARMAMENT

The great lesson of the War was, without doubt, the striking manifestation of the power of fire. A lesson of almost equal importance was the unexpected revelation of the preponderant power of artillery fire.

Ten years ago* it was admitted without discussion that the fire of the infantry was infinitely more deadly than that of the artillery, and this opinion was supported by a study of statistics giving, for the most recent campaigns, the figures showing relative losses from rifle fire and from cannon. From a study of the table shown (Figure 2) it appears actually that up to 1914 the proportion averages about six to one in favor of the rifle.†

After the beginning of the campaign of 1914, we were forced to recognize, in spite of the advent of the machine gun, the general use of which was soon to multiply the effect of infantry fire by nearly three, that the killing power of cannon was increased by an even greater proportion.

We conclude from the figures compiled by the Sanitary Service of G.H.Q. for the entire War (Figure 2) that the average of the principal battles of the campaign give the following proportions:

| | |
|---|---|
| Losses from shell and grenades‡ | 67% |
| Losses from bullets (rifle and machine gun) | 23% |
| Losses from other causes | 10% |

So it is seen that the proportion of losses was completely reversed in favor of cannon: from one against six, it changed to three against one. In

*General Herr's book was published in 1923.—EDITOR.

†The table which we reproduce here is extracted from a work by General Toubert, the Surgeon General, appearing in the "Revue d'infanterie" number, dated September 15, 1921.

‡The proportion due to grenades is nearly negligible; it is zero for the early battles and nearly nothing for the latest ones.

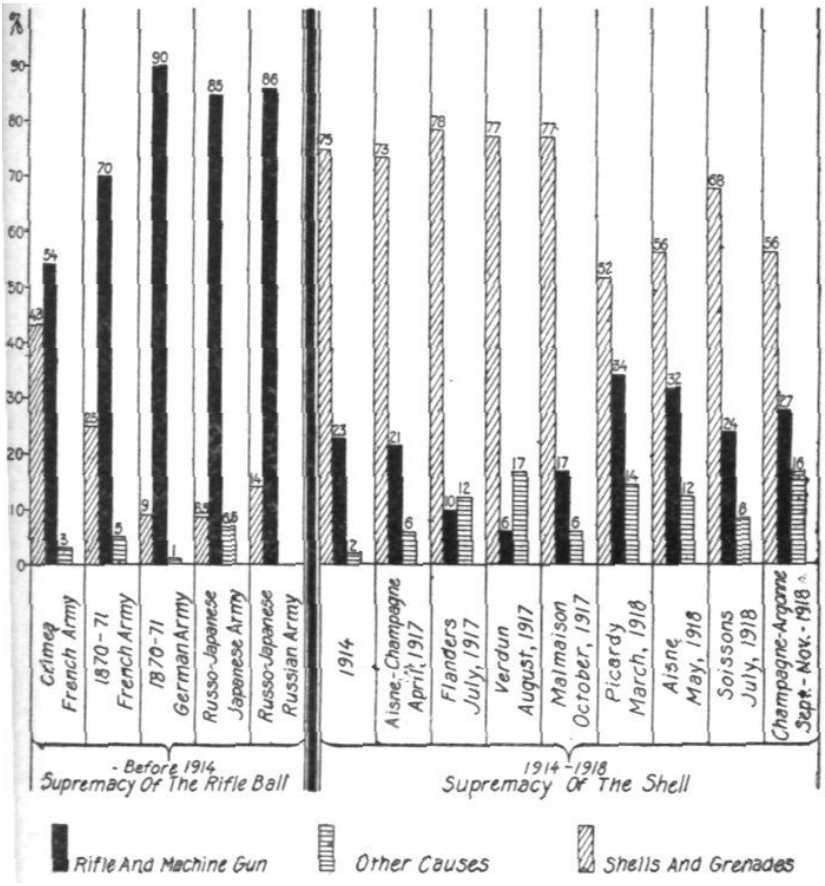



FIGURE 2
PROPORTION OF WOUNDS FROM VARIOUS CAUSES
(From article by General Toubert, Revue d'Infantrie, September 15, 1921)

other words, the relative killing power of artillery projectiles compared to bullets changed to the scale of one to eighteen.*

It is very evident that these figures are figures only and must be properly interpreted, and that the conclusion which we draw from them has no pretension of being mathematically exact. Such as they are, however, these figures show the sense of the variation, and, in a certain measure, its order of magnitude.

None, even among the most well informed, dared prophesy such an

*Compared with the generally admitted fact that the machine gun more than tripled the power of infantry fire, this remark leads us to believe that the *absolute* power of the artillery mounts to formidable proportions, perhaps, even 1 to 50 or 60.

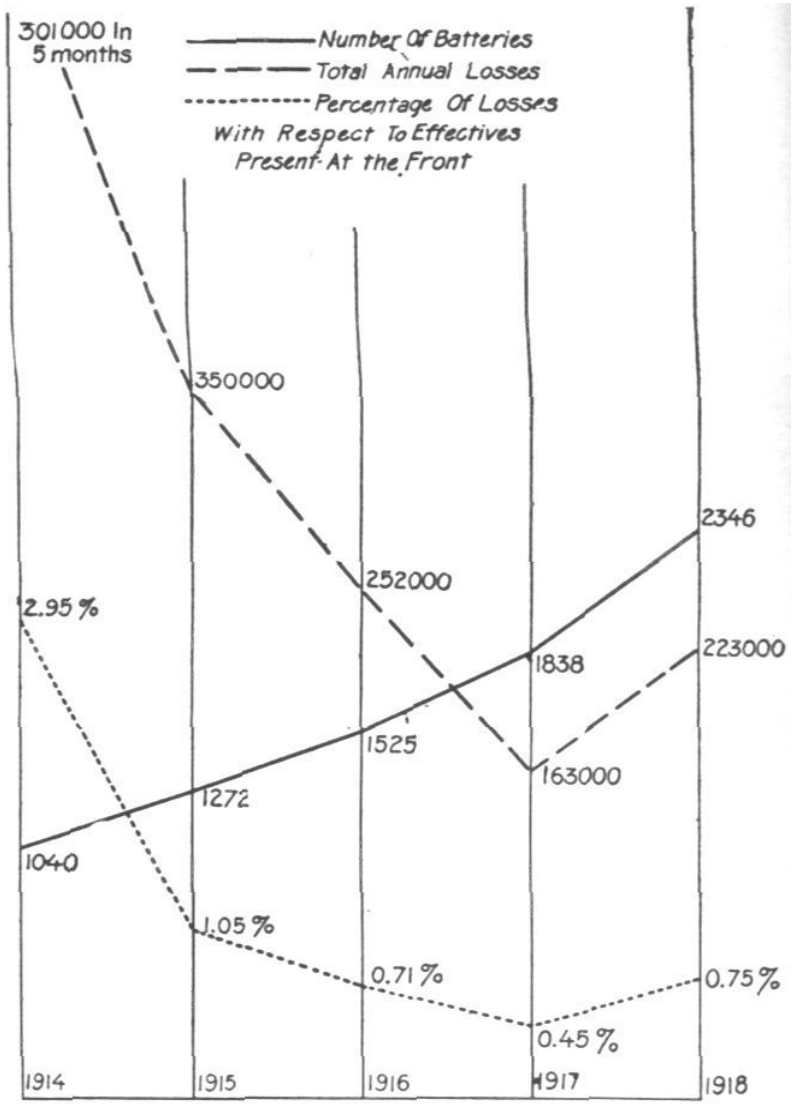



FIGURE 3

RELATION BETWEEN THE NUMBER OF BATTERIES AND PERSONNEL LOSSES IN THE FRENCH ARMY. 1914-1918

(Numbers of batteries shown are those of January 1st of each year. Percentages of losses shown are monthly percentages)

increase of power. However, its reality was forced upon everyone after the beginning of the campaign, and it led our High Command logically

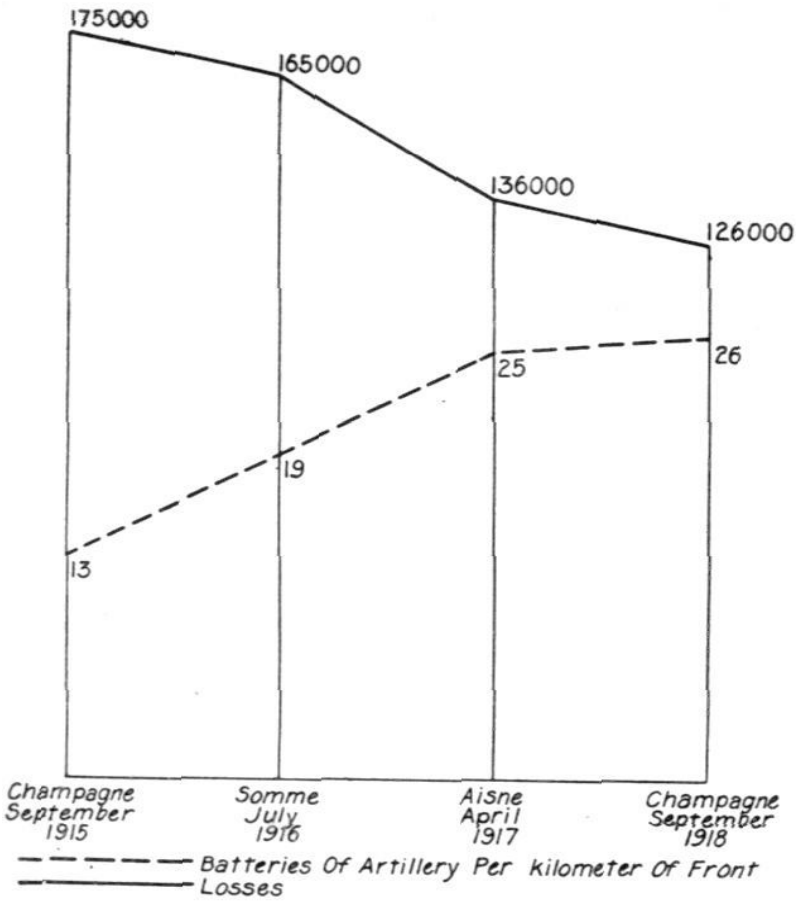



FIGURE 4
RELATION BETWEEN THE NUMBER OF BATTERIES PER KILOMETER OF FRONT AND PERSONNEL LOSSES FOR THE GREAT OFFENSIVE BATTLES

to enlarge the effectives of the arm which produced such results, without delay and without cease. At the beginning of the War there were 4,300 guns served by 11,000 officers and 420,000 men, while at the end there were 12,000 guns served by 26,000 officers and more than a million men. The combatant effectives of the artillery, which represented 20 per cent of the total mobilized combatants at the beginning, finally reached 38 per cent, almost equal that of the infantry which in the same time was reduced from 70 per cent to 48 per cent. In the first engagements of the campaign, our Army Corps fought normally with 120 guns on a front of from 5 to 6 kilometers, or about one gun for each 50 meters of front; eventually in offensive operations we increased the amount of artillery until it reached one gun for each 6 or 7 meters of front. Nearly all of our artillery at the beginning was light artillery; at the end more than half our cannon were heavy pieces.

The only thing to do from every point of view was to conform to this progressive transformation of the relative proportions of the two principal arms, for the increase in artillery not only increased our offensive power, but at the same time it affected our defensive power and our capacity for resistance by diminishing the losses to which we were subjected. In fact, we found, not without surprise, that our losses decreased proportionately to the increase in the number of cannon placed on the line for the battle. The two charts which give, first (Figure 3), a comparison of the per cent of monthly losses and the number of batteries existing in the French Army, and second (Figure 4), a comparison between the figures showing total losses in the great battles and the number of weapons put in action, speak for themselves with astonishing eloquence.

This result is even more remarkable because the enemy artillery underwent an augmentation comparable to our own, and it seems that these two increases should have exactly compensated each other. If this is not so in the battles we have chosen as examples, it is because these battles were offensives, and the attacking artillery rapidly gained superiority over the defending artillery and thus shielded our infantry from fire by destroying the weapons of the enemy.

The following conclusion is drawn: powerful artillery fire constitutes the most effective protection for the infantry. From this, one must logically deduce that there is an optimum proportion to be realized between the effectives of the different arms. With an insufficient proportion of artillery, before a powerfully organized enemy artillery, the losses of our infantry mount painfully, while those of the enemy diminish accordingly; success is compromised or is purchased only with a price of blood, the battle is won by men—if it is won. The importance gained by the artillery in modern battle was by no means a single step; it is part of a general evolution which tends progressively, following the progress of mechanization and parallel with the increase of fire power, to give mechanical weapons superiority over men, and preponderance to field weapons over small arms. Thus, while the artillery and the engineers saw their effectives more than doubled during the last war, while the Air Corps, represented in 1914 by 6,500 men and 200 planes, reached in 1918 the sum of 95,000 men and 3,300 machines; while the newly born tanks immediately made important strides, the effectives of the infantry and the cavalry were reduced ⅓ and these two arms, nevertheless, had seen their fire power approximately tripled in value by the multiplication of matériel, machine guns, automatic rifles, grenades, and accompanying cannon and mortars.

While the War lasted, none thought of denying the logic of this transformation, nor to overlook its imperious necessity. Now that the danger is past the lesson is readily forgotten.

It is maintained by some that the tendency to continually increase matériel to the detriment of personnel shows a reprehensible misunderstanding of the value of morale, that all the cannon in the world will not suffice to bring success to troops which refuse to march, and that in the last analysis it is always man with his moral qualities which brings back the victory—and not the machine, without intelligence, inert, senseless, without heart and without will.

None, among the partisans of matériel, would think of denying the influence of morale. We say on the contrary: as the war becomes more deadly, as the horrors of the battlefield increase, individual courage, the

spirit of sacrifice, devotion to the chief, strict discipline, in a word, all the qualities which make good soldiers, should reach supreme heights. But we add also: the most beautiful miracles of self-sacrifice, the sacred flame of heroism, the most burning ardor of patriotism would not know how to prevail alone against the blind destruction, brutal and complete, of the perfected weapons of modern warfare. The famous cry: "Debout, les morts!" is certainly sublime; but we would not know how to base a doctrine of combat upon it. It is not with corpses that battles are won. The holocaust of thousands of heroes marching with bare chests and equipped with unsuitable weapons against an enemy powerfully armed and organized can well serve to illustrate a chapter of Plutarch; it should not again appear in the history of France. Our country is not rich enough in "human matériel" to have the right to make war with men alone.

Above all, the augmentation of matériel is one of the most powerful means at our disposal to raise morale. An army which knows itself to be better equipped than its adversary immediately dominates him morally. Its moral worth increases in pace with its superiority of matériel. To the question, "What is a battle won?" we reply willingly by only changing one word in the famous saying of Joseph de Maistre: "It is a battle which one knows one can win."

Let us cultivate the virtues of morale, but let us contribute to its development and assure ourselves of victory by providing our army with all of the most perfected matériel it desires.

It is also maintained by some that the formidable augmentation of matériel during the last war was principally due to the type of warfare and to the particular conditions under which it was fought; that the almost immediate stabilization of the fronts, transforming the operations into a veritable war of siege, gave as a natural consequence a preponderant influence to matériel, notably artillery and engineer, which are, as everyone knows, the masters of siege warfare; but that war of movement, which we intend next to impose upon our enemies, could not accommodate itself to all this impedimenta; that man, with his flexibility, his mobility, his individual initiative, regains all of his incomparable value, the moral factors find all of their superiority again, at the same time that matériel, heavy and cumbersome, loses all possibility of utilization in mass.

It is easy to reply that this reasoning is wrong from the start. It is not war of stabilization which brought about augmentation of matériel; it is, on the contrary, the lack of material which obliged the combatants to dig in and remain during 4 mortal years in the trenches. Without going back to the wars already ancient, like the many Balkan wars, the South African war, and the Russo-Japanese war, which showed clearly enough however to all those who really wished to see it, that it is no longer the effectives which give a decision, but the matériel. The War of 1914-1918 was a shining example of this. There the law of numbers was always wrong. On the west front the Russians always had very superior numbers of combatants, double, triple, and sometimes quadruple those of their adversaries; but their armament was so manifestly insufficient that they could not hope for victory. On the east front, the superiority in effective Allied troops was considerable in 1915, 1916 and 1917. In that last year the Entente had 1,500,000 more men on that front than did the Germans. In spite of the offensive efforts so heroically wasted by our soldiers, victory did not respond to our call, and it was necessary to wait until 1918 when the withdrawal of Russia, happening before the helpful entry of the

Americans caused the reestablishment of the balance of effectives to the advantage of the Germans, before the Allies, having at last acquired incontestable superiority of matériel, finally succeeded in conquering the enemy and in chasing him from the territory he had held so long.*

After all, it is not a question of diminishing the effectives of the mobilized army; it is a question of *otherwise* using them. As the machines of war are perfected, complicated and multiplied, their maneuver and maintenance also becomes more complicated, periods for replacement come at shorter intervals, and the number of men required to serve, supply, repair and manufacture them increases accordingly. It requires about 80 men per gun in service to accomplish all the services of the artillery from the battle field back to the main army supply zone; an airplane in condition to fly requires the services of from 25 to 30 men at the field for its upkeep. The increase of matériel therefore in no way reduces the effectives, very much the contrary, but it requires other uses for them. That which diminishes, is the number of effectives on the front line, which is a decided advantage. If it is true that the commander, with a given military force, can expose fewer numbers to the enemy fire; if in addition as we have just shown, it is possible for him to reduce their losses by supporting them with more powerful artillery, the advantage of this operation is strikingly apparent to the most uninformed minds.

The question resolves itself as follows: All depends on determining definitely the best possible proportion between the effectives of the attacking infantry and the supporting artillery in order that the attack may succeed with the least loss of blood.

Unfortunately, the question is not one which can be equated and solved by simple algebraic computation; it is more of an empirical order. Experience alone can give the solution, and we find that in going back to the lessons of the War.

We have seen that the number of our guns went from 4,300 to 12,000 in 4 years. It was nearly tripled. The proportion of guns per 1,000 foot troops, which was about 4 in 1914,† reached 13 in 1918. It had more than tripled.‡ The evolution which marked the continued increase of artillery had not then reached completion; the heavy artillery program of May 30, 1916, had not been entirely completed: notably the divisions had not yet received their second heavy groups and many regiments of the General Reserve Artillery had neither the type nor the amount of armament intended. If circumstances had permitted the achievement of the program of May 30, 1916, the proportion of guns would finally have reached 14 to 15 pieces per 1,000 foot troops, or about 120 guns per division.§

Without discarding the experiences of the war, we can nevertheless attempt to solve the problem by inductive methods. But in this case it is

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* See in Part 1, (page 41, January-February 1928 Journal), what we have already said on this subject with reference to our 1918 offensive.

†This small figure is rather surprising when we recall that Napoleon fought his great battles in 1805 and 1806 with 3 guns per 1,000 foot troops, and that in 1813 he raised this proportion of artillery to 5 pieces per 1,000 foot troops. Napoleon, however, was an artilleryman.

‡This proportion is figured on the entire army. For an attack, the troops actually engaged had an average of 3 or 4 times more artillery.

§Notice that in this total there are not only divisional weapons but all the corps and General Reserve Artillery as well. We shall see in the next chapter how the weapons should be apportioned between the large units.

necessary, instead of attacking the problem in all its general phases, to study on the contrary a particular well-defined situation with the necessary initial assumptions.

The case which interests us most is, without possibility of contradiction, that of a future war *with our former enemy*. In this case the conditions of the problem would be as follows:

First, where will we meet our adversary? The organization of its regular army having been limited by the Versailles Treaty, Germany should at first face serious difficulties of mobilization, the solution of which requires time. There will undoubtedly be the delay necessary to prepare a strong defense, using, with the strength of the great national barriers parallel to the Rhine, all the resources of organization of the terrain and of modern armament. Protected by this defense, the purpose of which is to gain time, he will complete his mobilization and the assembly of his forces in a position studied in time of peace, probably prepared largely in advance and which will leave nothing to be done thereafter except the perfection of his organization. After a series of minor engagements destined to roll back the defense, we should then expect to find ourselves, after the first serious engagement, facing a "Chinese Wall" analagous to that behind which our adversaries intrenched themselves during 4 years, but provided with the latest improvements in defenses.

This hypothesis is perhaps false; it is at least plausible, and we are justified in considering it and in preparing ourselves to face it. It would certainly be childish, after the War of 1914-1918, to pretend that battle on an organized front is a remote probability. Besides, we repeat, the initial conditions of entry into war will impose upon our adversaries, for many long years to come, the necessity of adopting an attitude of strategic defense at the beginning, and we cannot suppose that they will neglect to assure themselves of the strongest organization of fortifications possible. We will admit then—and this is the point we wish to bring out—that the quantity of artillery to be employed is that which will permit us to accomplish, among other things, the penetration of a fortified front.

We will have at our disposal, it is true, improved and more powerful matériel, if not for all, at least for a good part of our mobilized forces. But it is wise to admit that our adversaries will have counted on this in organizing their lines of defense, and they will themselves have the same type of weapons. Certainly it will be difficult for them to obtain new armament while the Commission of Control functions; but even now, all the plans can be laid, tools prepared, raw materials stocked, and manufacture can commence the day after the departure of the Commission of Control. The augmentation of power of our matériel will thus be largely counterbalanced, and it is prudent not to overlook this fact.* Everything considered, the penetration of the enemy front will still require the same deployment of artillery as in the major operations of the last war.

Additional information is also necessary to define the problem; this relates to the magnitude of the operations which are to take place. The wars of today, which employ all the existing forces of the belligerent nations, are desperate struggles where the stakes are their very existence. In such crises there is no respite other than that which is necessary to

*There is every reason to believe, as well, that in countries where we have no control and where the influence of our adversaries is strong, powerful matériel has been prepared or even stocked to largely satisfy the early requirements of our adversaries.

prepare for a stronger assault. Therefore, the effort of the army is continuous. If part of the troops cease fighting, it is only for the time necessary for them to rest, to effect replacements, and to reorganize the armament. For that matter, if we do not wish the war to be prolonged, we should attempt to reach a decision in the first battle. As to the proportion of troops that can thus either participate effectively in a combat without truce or respite, or be ready to relieve the elements engaged (the war furnishes us with experimental data), about half of the large units available can be engaged at one time.

There remains a last hypothesis on the subject of the kind of organization into which our mobilized forces will be placed. This hypothesis, however, will not compromise the form of the organization in any way; it will simply put at our disposition a familiar terminology, which will permit us to be more precise in our language. For this purpose we will choose the organization toward which we were tending at the end of the War—the division of the army into large units of all branches, apportioned organically with the minimum amount of artillery which they can use under all circumstances. (Divisions of 9 infantry battalions, 4 battalions of light artillery and 2 battalions of heavy artillery; army corps of 3 or 4 divisions disposing of 4 additional heavy battalions and finally the General Reserve of artillery.)*

We will make our calculation of the proportion of artillery for an army of 100 divisions of this type divided among 30 army corps: This was precisely the army which we had in the line at the end of the War. The results can be applied, by simple proportion, to the number of large units which our resources in effectives will permit us to mobilize in the future.

We will allow one division for each 1,500 meters of front for a penetrating operation.

Then we will seek to obtain a deployment of artillery of a density comparable with those attained in the drives for penetration in 1917 and 1918, on the German side as well as on the French. In fact, we have no proper reason to justify a diminution of that density, considering the incessant development of matériel for the battle field which is bound to continue to increase. Such a deployment requires approximately 5 battalions of light batteries and 5 heavy battalions per kilometer of active front.

To sum up, to determine the necessary amount of artillery, we start with the following assumption:

*The army should be able to break a fortified front.*

*It should be possible for half the effectives to be continuously engaged in battle.*

*The two armies engaged have the same relative strength of armament.*

On this basis we can figure the artillery necessary for an army comprising 100 divisions of the type indicated in the table on the following page.

The divisional and corps artillery organizations lack, thus, 175 light battalions and 215 heavy battalions, which we should be able to find elsewhere. The rational solution is to have them in reserve, under direct

*These allowances for an army corps and a division are sufficient for the needs of these large units except for major operations such as we are considering, that is to say, for the first phase of contact, a pursuit, or the guard of a defensive front aside from critical periods, etc.

| Large Units | Artillery Groups | | | | | |
|---|---|---|---|---|---|---|
| | Number Necessary | | Number Existing | | Number to be Used as Reinforcements | |
| | Light | Heavy | Light | Heavy | Light | Heavy |
| On secondary or quiet fronts: | | | | | | |
| 50 divisional artilleries | 200 | 100 | 200 | 100 | ..... | ..... |
| 15 Army Corps artilleries | ..... | 60 | ..... | 60 | ..... | ..... |
| On active fronts, counting 5 light battalion and 5 heavy battalion per kilometer, on a total front of 75 kilometers (50 divisions each holding a front of one and a half kilometers): | | | | | | |
| 50 divisional artilleries<br>15 Army Corps | 375 | 375 | 200 | 100<br>60 | 175 | 215 |
| Totals | 575 | 535 | 400 | 320 | 175 | 215 |

orders of the Commander-in-Chief, who details them to the large units when needed as battle reinforcements. They constitute the general artillery reserve.

It is interesting to compare the allowance of artillery thus considered necessary to that which we possessed at the end of the War. At that moment the divisional artilleries, exactly 100 in number,* each contained three battalions of 75-mm, and one battalion of 155 howitzers, or 300 light battalions and 100 heavy battalions. The thirty corps artilleries contained at the same time 100 heavy battalions. Lastly, the General Artillery Reserve contained 110 light battalions and 250 heavy battalions. A total of 410 light battalions and 450 heavy battalions.

Comparing these figures with those furnished by our calculations we see that in round figures our allowance at the end of the war should be increased by 165 light battalions and 85 heavy battalions, a total of 250 battalions or 3,000 cannon. The total number of pieces which was about 12,000 in 1918 would thus reach about 15,000, or 150 pieces for each division.

Conclusions of this nature worry certain minds. Nevertheless, this anticipation is not in the least fantastic; it is the direct conclusion, at once experimental and deductive, obtained from the lessons of the War. The organization allowances which we have approved are those which everyone called for at the end of the War. The density of 10 battalions (or 30 batteries) per kilometer is an average resulting from the study of the great attacks of 1917 and 1918.† Certainly the necessity of attacking simultaneously over a large front is universally recognized, and the front

*On the northeast front.

†Number of batteries per kilometer:

| In 1917: | | In 1918: | |
|---|---|---|---|
| French: Flanders | 38 | German: Picardy | 21 |
| French: Verdun | 34 | German: Aisne | 32 |
| French: Malmaison | 40 | German: Champagne | 25 |
| German Riga | 35 | French offensives | 26 |

Which gives an average of 31 batteries per kilometer.

of 75 kilometers which we have taken as a basis is not in the least exaggerated: The German offensive in 1918 had 80 kilometers of front in Picardy, 60 kilometers on the Aisne, 90 kilometers in Champagne, and those of the Entente 44 kilometers between the Aisne and Marne, 60 kilometers in Champagne, 80 kilometers at Cambria, and more than 200 kilometers for the decisive battle of October. We are not unconcerned with a recognition of the ideas which actually reign on the other side of the Rhine on this question of the quantity of artillery necessary for an attack. In a map exercise, directed last year by a high military official, a division executed, in liaison with other divisions, a penetrating attack analogous to that which we have just portrayed.

The division organization included:

1 light regiment with three battalions,
1 light regiment with two battalions,
1 heavy regiment with three battalions,
1 battalion of motor-cannon for antiaircraft defense, A total of nine battalions.

Held as reinforcements:

First, all the artillery of a second line division, or nine battalions. Second, a part of the artillery of a corps, comprising:

1 light regiment with three battalions,
1 heavy regiment with three battalions,
3 heavy battalions of large caliber; or a total of nine battalions.

Third, artillery belonging to the General Reserve, comprising:

1 light regiment with two battalions,
2 heavy regiments with two groups,
1 battalion of heavy mortars; or a total of seven battalions.

The total artillery of the division comprised, therefore, 34 battalions. In addition, a part of the combat artillery detached from the army corps, mounting to two or three groups, could be used on his front. Total 36 or 37 battalions, about 110 batteries, not counting four batteries of infantry accompanying guns and one battery of 10 inch trench mortars. This division attacked on a front of about 2,500 meters, the deployed artillery thus reached a density of 47 batteries per kilometer, 50 per cent greater than that which we have, included in our calculation. It should be noted that our evaluation applies to an organization of fifty divisions and consequently only furnishes an average. Actually, the distribution of the artillery would not be uniform on such a front; certain divisions should be supported more strongly than others, and for these the density of artillery could reach 40 or even 50 batteries per kilometer, while others less important or having less to accomplish would be less richly endowed.

# CHAPTER V
# ORGANIZATION AND COMMAND

## I. ORGANIZATION

As we have stated in the preceding chapter, an army which engages in a battle of major importance should be able to emplace artillery with an average density of 10 battalions per kilometer (5 light battalions and 5 heavy battalions).

The most satisfactory solution, from the purely tactical point of view, would certainly be for all large units to have in their organization at all times, all the artillery necessary for use in a major action; thus each army, as far as the artillery is concerned, would be constantly ready to undertake a major offensive, and, an even better reason, to successfully withstand a heavy attack by the enemy. Also the strategical combinations of the High Command would acquire incomparable flexibility.

Where would such an organization lead us?

Let us take up again the mobilized army, organized into 30 army corps and 100 divisions, which we have just used to study the problem of quantity. However, instead of admitting, as we did, that the density of artillery necessary on the main front will be obtained by reinforcement at the moment of need, let us suppose now that it is a permanent part of the organization. Our 30 army corps will all have the composition which we have attributed, in our preceding calculation, to each of the 15 corps actively engaged. The total requirements for our artillery will then be raised to 1,500 battalions (750 light and 750 heavy), or 18,000 guns. We know that for one gun in action, we need an average of 80 artillerymen present in the army zone (batteries, parks, ammunition and artillery service). Our army would then be composed of a total of about 1,500,000 artillerymen, requiring nearly 40,000 officers for their command.

The importance of these figures is worthy of thought. The organization *a priori* of all large units with the mass of artillery which they would need for a great attack would have as a consequence the constitution of a formidable artillery and a considerable immobilization of effectives. France today has neither the financial resources nor the number of combatants necessary to face such exigencies.

The difficulty can only be overcome by the application of the principle of reserves: Not being able to have strength everywhere at once, we must resign ourselves to being strong only at essential points, and to this end to dispose of the mobile resources which the High Command applies at the moment of need at points where strength is momentarily indispensable.

We always had reserves of artillery until 1871, and they were discontinued then only because it was claimed they were never present when they were needed. However, that defect was incontestably due, not to intrinsic faults of the system, but to the deficiencies of the command of that time which was unable to use its reserves. The War has shown that an able and skilful commander, who has foresight and knows how to command, who knows how to make expert use of his reserves, possesses in them a precious tool with which he can get the most varied and powerful effects.

It is, therefore, necessary to have artillery reserves, and this is another of the great lessons of the War. Each large unit receives in its organization only the minimum artillery necessary in ordinary circumstances, permitting him to face all of the more ordinary situations and assuring him, in periods of crises, the time to await the arrival of reinforcements. The higher echelon has reserves, thanks to which the commander is in a position to increase the allowance of subordinate units to the density recognized as necessary for important engagements, offensive and defensive.

One question is immediately raised: To what size of command should we assign reserves of artillery?

The division is the unit of command. It receives a definite limited mission, for which it requires a definite amount of artillery, which seldom varies in the course of that mission. It is engaged on a narrow front, and the size of its zone of action is sufficiently limited so that its artillery is always in a position to intervene at any point within this zone. The division, therefore, has no need for a reserve of artillery. It would have no use for it.

The army corps is a battle unit. It has several divisions under its orders, with which it maneuvers, which it uses simultaneously or successively, which it should be able sometimes to support solidly, and sometimes on the contrary, abandon to their own resources in order to support a neighboring division. To be in a position to fulfill these tasks; to conduct the battle and to make its power felt, it needs an artillery reserve. Our army corps of 1914 had an artillery reserve. It was a regiment of 75's, under the designation of corps artillery, armed with the same matériel as divisional artillery, capable of the same missions, and always ready to reinforce one division or another, following the exigencies of the moment. The necessity to equip newly created divisions caused the gradual disappearance of the corps regiments during the war, until the last ones were absorbed by the general artillery reserve. They were replaced by heavy regiments, armed with entirely different matériel than were the divisions, and whose normal mission was counter-battery and interdiction, but which were entirely unsuited to reinforce divisional artillery. From then on, the corps commanders, deprived of their artillery reserve, lost all ability to intervene in battle and to maneuver with their divisions by temporarily supplying to one or another the additional artillery for demolition or support. The inevitable consequence was that they passed responsibility more often to their divisions, thus renouncing the conduct of a battle in which they could only be disarmed and powerless spectators. The High Command felt the grave defects of this situation; it condemned it time and again; it pointed out that the Command should never "abdicate its essential function, which is to plan, organize and conduct operations."* But we must recognize that without artillery reserves, the corps commanders can have little function in battle.

As a remedy for the absence of artillery reserves at the end of the war, the army corps received reinforcements coming from the General Artillery Reserve, which filled the rôle in critical periods. When these reinforcements were insufficient, or were not furnished, the custom of using divisional artillery from divisions in reserve or in rest areas was established in all army corps. It is useless to dwell upon the grave inconveniences of that procedure. It resulted in the artillery being continuously engaged, no longer knowing the meaning of rest, having no time to instruct replacements, to repair matériel, or to replace horses; and as a result all equipment was worn out prematurely.

In order not to fall into the same mistake again, it is indispensable that in the future the army corps have included in its organization, not only heavy artillery, suitable for missions of long range counter-battery and interdiction, but also a reserve of light artillery. This should be similar to divisional artillery, with which the corps will be in a position to reinforce any division at will, or which it can, if preferred, use for counter-battery

*Note from G. Q. G., November 6, 1918.

and interdiction within the limits of its range, in order to complete the often insufficient fire from the heavy artillery.*

The army and the group of armies are rather units of command, than units of combat. Their rôle is not themselves to utilize the means placed at their disposal. It is confined to the allotment of these means among subordinate organizations depending upon the mission, the situation, the nature of the terrain, etc. Therefore, they have no need of an artillery organization of their own.

The real reserve of artillery is the General Reserve of the Commander-in-Chief. The latter should, for every necessity, have at his disposal the reservoir of forces which, as we have shown above, is necessary to reconcile the quantity of matériel with economy of resources. This reservoir, designed to supply the needs of critical periods by reinforcing, at the desired rate, all units engaged in a penetrating action, should necessarily contain all types of matériel found in an artillery organization. In addition, all special matériel, in limited amounts, which is suitable for particular missions demanded of artillery, exceptional destruction, extreme long range, etc., logically belongs to the General Reserve.

The principle of artillery reserve being thus laid down and admitted, it remains for us to see how the organization of artillery in the various echelons of command should be constituted, with what matériel they should be composed and in what quantities.

We know that in the German army during the first years of the war there existed, properly speaking, only divisional artillery. Divisions, having the only organized command, absorbed a great variety of matériel when reinforced, and also assumed many types of missions. In the French army, on the contrary, from the very beginning there was, in addition to divisional artillery, the corps artillery, and army artillery was created after the winter of 1914-1915. The experience of the war led us progressively to adopt the following principles:

> Divisional artillery is charged only with missions, directly and exclusively affecting the division; that is to say, all destructive fire in the zone assigned to the division and the support of its infantry.
>
> The corps artillery, due to the type of its organization, takes as its burden the more general missions affecting the entire army corps, and more especially counter-battery and interdiction.
>
> The army artillery assumes general missions profitable to all and also firings at extremely long range.

The division of matérial among these three echelons of artillery correspond very exactly with this division of missions.

We discussed this question in Part I, and we showed that the French conception was the most rational, assured better use of the arm, and guaranteed coordination of effort. We have said that after Riga (August 1917) the Germans seem to have recognized the superiority of our method and copied it, if not by reorganization, at least temporarily for their great attacks. We will not go back here to a discussion of these principles, we will consider them as accomplished facts.

Starting with these principles, we arrive naturally at the following

*In fact, we know that light artillery, thanks to its rapidity of fire, is extremely efficient for interdiction within the limits of its range, and for neutralization of unprotected artillery.

conception of the organization of artillery for a mobilized army. The matériels involved are those described in Part II, Chapter I.

DIVISIONAL ARTILLERY

1. *Accompanying Artillery*. This extra-mobile artillery which can maneuver and fight even in the zone of artillery fire should have an organization based on that of the infantry it is to accompany. It will then comprise a group composed of as many batteries as there are regiments of infantry in the division, consequently 3 batteries for a division of 3 regiments.

In order to be always ready to place a sufficient number of pieces in line, it appears necessary that the batteries be organized with 6 pieces.

The question now comes up as to whether this artillery will be served by infantrymen or artillerymen. The two solutions have their partisans. It is claimed in favor of the first that intimate cooperation will be indispensable between the infantry and its accompanying weapons, and that this perfect cooperation can be certain only with the material and moral liaison which is automatically created between different parts of the same unit, carrying the same number, always sharing the same existence, living in perpetual contact, and, lastly, obeying the same chief. Without denying the value of this argument, the partisans of the other solution believe that the personnel, officers and troops with accompanying weapons, belong more to the artillery than the infantry, as far as its tactical employment is concerned. Also, that it will have more complete training, better technical instruction, and consequently superior efficiency, if it belongs to the divisional artillery. They add that the experience of the war has shown that moral liaison is quickly established between the infantry and the artillery which regularly supports it. Lastly, it is good from the point of view of morale for the infantry to see artillerymen come in actual contact with the enemy and take part in the hard struggles which generally fall to the lot of the infantry.

We believe for our part that it would be most advantageous to recruit, form and instruct the personnel for accompanying weapons in the divisional artillery and to require them to live completely with the infantry as soon as the division becomes engaged. During rest periods it will rejoin the divisional artillery to which it belongs for administration and instruction. Thus it is assured of replacements, replenishment of matériel and ammunition, and continuation of instruction. That is why in this study we consider the accompanying artillery as an integral part of the divisional artillery.

2. *Supporting Artillery*.—It is comprised of light artillery, guns and howitzers.

It was the unanimous opinion at the end of the campaign that supporting artillery should include 4 battalions. To us this number appears indispensable.

When we were studying matériel, we said that the real weapon for direct support was the light howitzer and we gave the reasons. Nevertheless, a long cannon with its flat trajectory and long range is also necessary in many circumstances. In any case, the mixture of the two matériels becomes necessary, and it is only a question of determining the proportion in which each should enter in the composition of the divisional artillery.

We conducted the entire campaign without light howitzers, and we

suffered cruelly from their absence. The artillery of the German divisions, on the contrary, had three battalions of cannon and one battalion of light howitzers at the beginning of the war. The latter matériel was so well liked that the proportion was raised from ¼ to ⅓ in 1918, and in studies actually being made on the other side of the Rhine, this proportion will reach ½.

This tendency toward an increase in howitzers for the light artillery is wholly logical. With equal weight, and with but slightly less range, the howitzer has clearly more power than the gun, and the form of its trajectory gives it greater flexibility in rough and hilly country. This gain in power, nevertheless, leads to other difficulties, aside from the loss of range, in the increased difficulty of supply. Therefore, there is a limit which should not be exceeded, and this limit is reached with a proportion of one-half howitzers, which is easy to obtain with an organization of 4 battalions.

If in such an organization we wished to have only one-third howitzers, this could be done only by organizing mixed battalions formed of 2 gun batteries and 1 howitzer battery.

Mixed battalions were frequently used by the Germans during the war. It was the rule in the heavy artillery and was also attempted in the light artillery, where it appears to have given good results. It is adopted today for all the artillery of the skeleton army of 100,000 men, where its presence is justified by the necessity of instructing the entire personnel in the service of each different matériel in turn. The Germans claim the advantage of being thus able to obtain in the organization of tactical groupments for active service, all combinations of long and short weapons necessitated by different missions without ever changing the tactical organization. Also, in the plans concerning organization and use of the mobilized army, we see only mixed battalions. These are composed sometimes of 2 batteries of guns and 1 of howitzers, and sometimes with the inverse proportion, but giving to the entire unit an equal proportion of guns and howitzers as we have indicated above.

In France we do not share this infatuation for the mixed battalion. We feel, on the contrary, that while it may offer some advantages for the occasional formation of small detachments, a particular case which will always be the exception, it presents only inconveniences in normal times. The efficiency is lowered; the difficulties of command are greater, and supply and maintenance more complicated. In the war of mass such as we conceive, the battalion is the smallest unit of artillery, while the battery is only an organ of execution. The use of isolated battalions will be wholly exceptional and the cooperation of the 2 types of matériel, howitzers and guns, will be obtained by the distribution of long and short battalions within the groupment. The groupment is more solidly framed and better suited for command, observation and liaison, at the same time being less directly occupied by the conduct of fire and the details of combat than is the battalion. It can, therefore, have a mixed organization without difficulty and often even with advantage. The battalion should remain homogeneous.

To sum up, the divisional artillery should include 4 light battalions for direct support, 2 of guns and 2 of howitzers.

3. *Heavy divisional artillery*.—Divisional artillery should also include some heavy artillery. The experience of the war of movement in 1918 gave evidence that the 155-mm. howitzer, which weighs over 3 tons,

was too heavy and therefore insufficiently mobile to follow movements of the infantry with desired ease. The weight of ammunition also rendered supply at the division echelon difficult, precarious and uncertain. These characteristics would be still further accentuated with the 155-mm. howitzer which we propose. Such matériel has no place in divisional artillery. Besides, although the light howitzer is, properly speaking, supporting matériel rather than a weapon of destruction, its projectile weighing from 15 to 18 kilograms with 2 or 3 kilograms of explosive would have sufficient power to suffice for the current needs of the division in many cases. For other weapons, the division will call upon the more powerful equipped corps artillery.

It appears necessary, however, that the combat division should possess a long weapon, more powerful than the light cannon, permitting long range and concentration fire. At the end of the War, during the offensive campaign of 1918, the custom was quite generally established of placing 105-mm. guns from the corps artillery at the disposition of the divisions. It is logical to sanction, in our organization, this change of assignment suggested by experience.

The 105-mm. gun, which we described in Chapter I, will conserve mobility and maneuverability, permitting it to follow the movements of the infantry to a large extent. In conformance with the lessons of experience, then, nothing seems to oppose the apportionment of this weapon to the divisional artillery. One group of this matériel appears necessary and sufficient.

*Résumé*.—The organization allowance for divisional artillery should be the following:

| | | |
|---|---|---|
| Accompanying Artillery | 1 battalion of 3 batteries of 6 pieces each mounted on caterpillars | |
| Supporting Artillery | 2 battalions of light guns | Horse-drawn |
| | 2 battalions of light howitzers | |
| Heavy Artillery | 1 battalion of 105-mm. long guns. | |

CORPS ARTILLERY

Corps artillery should include all medium caliber artillery (155-mm.), namely:

| | |
|---|---|
| 4 battalions of 155-mm. howitzers | Motor-drawn |
| 4 battalions of 155-mm. guns | |

In addition, as we have explained before, in order that the army corps can act as a reservoir of forces for the benefit of the divisions, it is necessary that the corps artillery include all types of divisional matériel, in quantity at least equal to that found at the division echelon, namely:

| | |
|---|---|
| 2 battalions of light howitzers | All horse-drawn |
| 2 battalions of light guns | |
| 1 battalion of 105-mm. guns | |

To sum up, corps artillery should include:

1 heavy regiment of 6 battalions, motor-drawn
1 mixed regiment of 5 battalions, horse-drawn

## ARTILLERY FOR THE ARMY AND GROUP OF ARMIES

As we have already explained, neither the army nor the group of armies requires an organization of artillery.

When needed, the Commander-in-Chief will place the necessary matériels at the disposal of the group of armies, which will apportion it to the armies under its orders. Of the matériel which will thus be allotted to it, each army will reserve for its own direct use all weapons of unusual model, either on account of their power or long range. It is not possible to fix definite rules in this respect. The ordinary matériel will be divided among the army corps according to their respective missions.

## ARTILLERY FOR THE CAVALRY

Each division of cavalry will have 2 battalions armed with light matériel, 1 battalion of guns and 1 battalion of howitzers. The cavalry, for which fighting on foot will be the rule, will need the 2 types of weapons as will the infantry. These matériels, of the same model as those of the infantry, will either be horse-drawn or drawn by one of the light caterpillar tractors which travel anywhere and can maintain 25 miles per hour over the road and 8 miles per hour across country.

As for the cavalry corps, if any are ever constituted, no artillery organization is foreseen for them. The artillery which can be momentarily useful to them will be taken from the horse-drawn or light tractor-drawn battalions of the general artillery reserve.

## THE GENERAL ARTILLERY RESERVE

We have already shown the absolute necessity of a considerable general reserve of artillery at the immediate disposition of the Commander-in-Chief. This is necessary from motives of economy and flexibility of maneuver.

We have stated that this reserve should include; first, all matériels of unusual model, very powerful mortars, extra long range guns and railway artillery which find no place in the organizational artillery already mentioned. Second, specimens of all types of organizational artillery to take care of all particular needs, and for necessary reinforcements. The common characteristic of all these matériels, from the very definition of the rôle of the General Artillery Reserve, should be perfect strategical mobility. This condition may even lead to the organization as motor-drawn units, of matériels which in the division echelon are horse-drawn.

The general artillery reserve could advantageously have the following composition:

(For consideration: A reserve of accompanying artillery.)

1*st Division.—A reserve of light artillery* of divisional model which can either be horse-drawn, or motor-drawn for the purpose mentioned above.

2*nd Division.—A reserve of medium caliber artillery* of divisional type (105-mm.) and of corps type (155-mm. guns and howitzers) all either tractor-drawn or portée.

3*rd Division.—A reserve of very powerful tractor-drawn artillery*, including all other road matériel.

4*th Division.—Railway Artillery*, the name of which explains its function and indicates the matériel of which it will be composed.

*5th Division.—Fortress Artillery* (contingently) serving the trench artillery (if any exists), existing matériel of ancient model and certain weapons of special model not entering in any of the preceding categories.

The composition of the General Artillery Reserve will depend partly on the general organization of the army (number of army corps and divisions) and partly on the composition of the various artillery organizations. By subtracting from the total number of weapons considered necessary, the number included in the organizational artilleries, we obtain the number of weapons which should compose the General Artillery Reserve. In the preceding chapter we gave an example of this calculation for a definite hypothesis.

*Antiaircraft Artillery*.—Antiaircraft guns belonged to the artillery during the War. After the armistice they were for some time controlled by the Air Corps for reasons which had nothing to do with tactics. They have now been returned to the control of the artillery, which it was acknowledged they never should have left. They have in fact, evident connection with the artillery, created by the needs of recruiting and organization personnel, by the necessities of supply of matériel, maintenance, supply of ammunition and similarity of methods of fire and mode of employment.

In the German army of 100,000 men there actually exists one group of motor-guns per regiment of divisional artillery. The Versailles Treaty prohibiting antiaircraft matériel in Germany, these weapons are camouflaged as light automotive artillery for use against fleeting targets. They are, nevertheless, veritable antiaircraft guns. It is evidently a nucleus around which more numerous organizations will be mobilized. It appears that the German tendency is to conserve, for mobilization, one group of twelve antiaircraft guns per division.

This excessive decentralization appears to us to be illogical. The organization of antiaircraft defense, as much because of its technical necessities as for its methods of combat, requires centralization of command and coordination of effort on a vast front. Antiaircraft artillery can only be well handled by the army echelon.

It is difficult to fix the future number of antiaircraft batteries, mobile as well as semi-fixed, which will be necessary during a campaign. The Air Corps will be small and rather poorly trained at the beginning of war, its effectives and professional attainments will gradually increase as the campaign develops. It seems that antiaircraft artillery should follow the same process, seeking always to keep in advance of the enemy aviation. Actually, the immediate state of enemy aviation and its assumed progress will always guide the High Command in its evaluation of the antiaircraft artillery necessary, considering the difficulties and delays in the production of matériel and training of personnel.

## II. COMMAND

A very general conception before 1914, which even the experience of the War uprooted with difficulty, attributed only a vague rôle of repair and supply to the echelons of artillery command, requiring neither special knowledge nor the collaboration of an extensive staff. In time of peace there only existed the Corps Artillery Command, which had no well-defined tactical responsibility. The commands of

the divisional and army artilleries never saw the light of day before the War.

In fact, we did not perceive that intervention in the tactical command of the artillery for the various echelons was a necessity of the first order until the day when the artillery, casting aside the mistakes of peacetime, decided to revise its status on the battle field by giving technical procedure the importance which experience demanded.

The establishment and examination of war plans, the formation of observation units, the continuous maintenance of intelligence service, the judicial use of different methods of adjustment, the distribution of ammunition in lots carefully weighed, the constant use of range tables, the preparation of fire, and many other questions attracted the attention of the Command because they were necessary to the Commander-in-Chief for the success of battle. It was, therefore, decided to intrust the study to those who were professionally qualified, the artillerymen. From that day the utility of commands for the artillery of all echelons has never been disputed.

However, these commands were not intrusted to officers who could decide artillery matters, and who had equal rank with officers commanding troops of all arms. Thus it happened that in the divisions, the command of the divisional artillery was for a long time held by lieutenant colonels, then by colonels, many of whom were holding temporary rank, while the commander of the divisional infantry was a general or at least a permanent colonel. Also, in the army corps the artillery commander was generally a colonel, which by no means facilitated his dealings with the generals commanding divisions. Lastly, in all the armies except one, the artillery commander was a brigadier general.

The ever increasing number of effectives of the artillery and the importance which that arm took in battle should have been sufficient to justify the granting of higher grades to commanders of artillery in the different echelons. In any event the lesson has since been learned, and legal steps taken to prevent a similar error in the future.

Today, we consider the following commands for artillery as necessary:

A major general having the rank of corps commander, commanding the General Artillery Reserve.

A major general having the rank of corps commander, commanding the army artillery.

A major general commanding the corps artillery.

A brigadier general commanding the divisional artillery.

A brigadier general (or colonel) commanding the separate brigade of artillery belonging to the corps.

In addition to these commands, which correspond both to command of troops and to tactical commands, will be found two echelons of artillery chiefs who exercise no direct command but only general direction both technical and tactical. These are the general officers representing the artillery among the generals commanding a group of armies. One of these holds the rank of corps commander and above him a major general, having the rank of army commander, who is assistant to the Commander-in-Chief. The latter, who is none other than the Inspector General of Artillery, must play a rôle of primary importance which

we have already had occasion to justify in Part I. We will refer to this again, from another point of view, a little further on. His duties in time of war should be those which devolved upon him in 1918, with a better determined and more accentuated influence on tactics.

Each of these general officers should have a staff proportionate to the importance of the work he must perform. Until we have better information we can keep the same personnel and composition for the different staffs that we finally attained bit by bit following the experience acquired during the War.

*Note*.—The command of the corps artillery was exercised at the end of the War by the colonel or lieutenant colonel commanding the heavy artillery regiment of the corps, who thus performed the functions of chief of corps artillery and commander of a tactical group at the same time. While it had been considered necessary in the divisional artillery to clearly separate these two functions and to intrust them to two distinct authorities, each with a staff and facilities of command and liaison, nothing like it had been done for the heavy artillery of the army corps. In critical periods, however, this heavy artillery received important reinforcements which often amounted to 15 or 18 batteries. The heavy artillery commander had to exercise this burdensome command, at the same time extending his front to double that of each divisional artillery and to a greater depth. His staff was constituted exactly like the staff of a regiment with insufficient resources in organs of command, liaison, and transmission. Logically, the staff of the corps artillery should be organized like that of the divisional artillery. It should include, aside from the colonels and lieutenant colonels commanding the regiments of the corps, an officer of higher rank exercising command over the whole and taking under his orders all reinforcements which the corps may receive.

## III. SUPPLY ORGANIZATIONS

Aside from the artillery commands and the combatant units of artillery, there should exist organizations necessary for:

1. Maintenance and repair of matériel.
2. Supply of ammunition.
3. The complex and important services of topography, supervision of the field of battle, and meteorology, of which we will speak but briefly.

*Organizations for Repair and Supply*.—The experience of the war brought to us an organization which is entirely satisfactory for the present, and we have only to keep it as is. This organization includes:

1. The maintenance of divisional artillery parks and corps artillery parks with the repair equipment which is permanently assigned to them.
2. The creation at the army echelon of two distinct services, each commanded by a colonel as assistant supply officer. One of these is charged with ammunition and supply service. The other has charge of the repair service for artillery matériel, equipment and small arms.

*Organization for Observation, Triangulation, Topography, and Meteorology*.—These new organizations were instituted little by little during the War under the pressure of necessity. Their utility has been sufficiently demonstrated.

In the organization of their army of 100,000 men, which they consider only as a skeleton army in which all units should be increased and enlarged to form similar units in case of war, the Germans have provided a special battery in each of their seven artillery regiments. This battery, which is called the Observation Battery, is charged with the performance of flash ranging, sound ranging, topographical and meteorological services for the entire regiment.

In time of war this battery will furnish for each divisional artillery, an observation group which will include all necessary equipment for observation of enemy objectives, the selection of firing positions, recording of meteorological data, observation and adjustment of fire, making of maps and the triangulation for artillery fire.

In France, we have a similar organization, much less developed and provided with insufficient means, which forms a special autonomous corps not connected with the artillery regiments. This is an Observation Group, a single unit comprised of:

1. One sound ranging company.
2. One flash ranging company.
3. One company with sections for adjusting fire.
4. One topographical company.

In case of mobilization, the group is charged with furnishing all the units necessary for the entire army. However, they remain under army control or possibly under corps control, and they are not sufficient in number.

We believe that the German conception is best. The organizations for observation, laying of guns, topography and meteorology, as indispensable for the artillery today as its cannon, should be multiplied so that each artillery regiment will have its own.

## IV. AIRPLANE OBSERVATION FOR ARTILLERY

Airplane observation for artillery began during the war. It immediately rendered such good service that it was rapidly increased in amount. It reached its maximum efficiency at the battle of the Somme in July, 1916, and at Verdun in October, 1916. After 1917 it began to decline, and thereafter went from bad to worse until it failed almost entirely in 1918.

Many causes explain this rapid decline. The duties of the squadrons were changed incessantly so that understanding between observers and battery commanders became impossible. The quality of artillery observers, aside from a few brilliant exceptions, grew continually worse because combat aviation, charged with a more brilliant and flattering rôle, with better remuneration in the way of publicity and generous compensation, unfortunately attracted the best material. Lastly, the equipment was not all that could be desired.

We hold especially to the first two causes. It was the unanimous opinion of artillerymen who took part in the War, that to overcome these difficulties it is necessary to place the observation aviation under the direct orders of the artillery chiefs. That subordination was the constant rule in the German army during the war and the artillery was always well pleased with it. In France this necessity was also recognized. Early in 1916, the General Artillery Reserve succeeded in having several squadrons assigned exclusively to it, and we know the brilliant

results of that organization at the battle of the Somme. In 1917, to provide for the use of modern weapons which were beginning to be received from the factories, the General Artillery Reserve was forced to take all of the Second Division of Special Squadrons and to train observers capable of observing the fire of these weapons on the enemy lines. In 1918 a school of observation was established at Sezanne.

Unfortunately, the worth of that organization was not understood by everyone, and it was also contrary to certain particular interests. The squadrons soon ceased to follow the moves of the artillery regiments to which they were assigned, and the observers trained by the General Reserve were gradually taken away.

We must return to that organization not only for the General Reserve, but for the entire artillery. This alone will permit the artillery to recruit its observers, to train them for its own needs, and to retain them by properly rewarding them for their services. This alone will assure the complete and intimate moral liaison which creates a spirit of cooperation within each arm.

Naturally the Air Service will continue the technical surveillance of the squadrons, the supply of machines, the maintenance of matériel and the recruiting of pilots. But for aerial observation for artillery, the rôle of the Air Corps will be limited to placing airplanes at the disposition of observers as a means of rapid transportation and aerial observation, just as the Motor Transport Service places a reconnaissance vehicle at the disposition of any staff officer who makes a request for it.

# POLO

## ARMY CENTRAL POLO COMMITTEE

WASHINGTON, D. C.

### PLAYERS NAMED FOR ARMY JUNIOR TEAM

THE line-up of the Army team for the Junior Championship Tournament, play for which begins in Philadelphia July 7, will be as follows:

No. 1—Lieutenant Morton McD. Jones, Fort Bliss, Texas.
No. 2.—Major C. C. Smith, Fort Leavenworth, Kansas.
No. 3—Major George S. Patton, Jr., team captain, Washington, D. C.
No. 4—Captain George E. Huthsteiner, Fort Sam Houston, Texas.
Substitute—Captain C. E. Davis, Fort Bliss, Texas.

Although the Army team was unable to start practicing for a couple of weeks after assembling at Mitchel Field, due to inclement weather, it has recently played several games, both practice and tournament.

### PRACTICE GAME

On June 14th, the Army played a good team composed of Schwartz, J. Cooley, Captain Rodes, and David Dows. Army line-up: Captain Davis and Lieutenant Jones at No. 1, each for four periods; Major Smith, No. 2; Major Patton, No. 3, and Captain Huthsteiner, back. The Army won, 11 to 10. The horses went very well and the team play was fair.

### ARMY 8—SANDS POINT 7 (WESTBURY CHALLENGE CUPS)

On Saturday, June 16th, the Army team made its initial bow in tournament play by defeating the Sands Point team, 8 to 7, in the opening round of the 20-goal open tournament for the Westbury Challenge Cups. This tournament is open to teams not over 20 goals but is played on the flat. While the game was close in the final score, the Army led all the way except for a moment in the seventh period when the teams were tied.

In commenting on the game, Major Patton, team captain, stated: "The satisfactory part is that although Sands Point is probably the best and most expensively mounted team in the tournament, our horses were not much out-classed at any time and frequently showed superior to the opposition. The outstanding player of the match was Captain Huthsteiner, who played beautiful polo at all times."

## Line-up:

| *Army*—8 | *Sands Point*—7 |
|---|---|
| No. 1—Captain Davis | Gerry |
| No. 2—Major C. C. Smith | Averill Harriman |
| No. 3—Lieutenant M. McD. Jones | C. Cowdin |
| Back—Captain Huthsteiner | J. Whitney |

As many ponies as possible were played in order to save them. The following is a list of the ponies used:

| | | |
|---|---|---|
| Captain C. E. Davis—No. 1 | *Blue Heaven* | Private mount—Lieutenant Collins, Fort Sam Houston, Texas. |
| | *Billy* | Public mount—Front Royal, Virginia. |
| | *Chin Chin* | Private mount—Captain Davis, Fort Bliss, Texas. |
| | *Peggy* | Public mount—Front Royal, Virginia. |
| | *Papana* | Private mount—Lieutenant Jones, Fort Bliss, Texas. |
| Major C. C. Smith—No. 2 | *Princess* | Private mount—Major Smith, Fort Leavenworth, Kansas. |
| | *Big Boy* | Private mount—Major Smith, Fort Leavenworth, Kansas. |
| | *Rosebud* | Public mount — Fort Leavenworth, Kansas. |
| | *Ranger* | Public mount—Fort Reno, Oklahoma. |
| | *Barbara Breeze* | Private mount—Major Patton, Washington, D. C. |
| | *Javeline* | Private mount—Major Patton, Washington, D. C. |
| | *Wiki Wiki* | Private mount—Major Patton, Washington, D. C. |
| Lieutenant M. McD. Jones—No. 3 | *Miss Polo* | Private mount — Lieutenant Jones, Fort Bliss, Texas. |
| | *Bull Run* | Private mount—Major Patton, Washington, D. C. |
| | *Star Shell* | Private mount—Major Patton, Washington, D. C. |
| | *Virginia* | Public mount — Front Royal, Virginia. |
| | *Green Bug* | Public mount — Front Royal, Virginia. |
| | *Miss Maliet* | Private mount — Lieutenant Jones, Fort Bliss, Texas. |
| Captain G. E. Huthsteiner—Back | *Red Ball* | Private mount—Captain Huthsteiner, Fort Sam Houston, Texas. |
| | *Bill Meadows* | Public mount—Fort Sam Houston, Texas. |
| | *Cy Hawkins* | Public mount—Fort Sam Houston, Texas. |
| | *Lew Truscott* | Public mount—Fort Sam Houston, Texas. |
| | *Jeannette Andrews* | Public mount—Fort Sam Houston, Texas. |

No horses were hurt. It is interesting to note that half of the horses used were private mounts.

### MEADOW LARKS 10—ARMY 8 (HEMPSTEAD CUP)

On the International Field at Meadowbrook, the Army lost to Thomas Hitchcock's Meadow Larks, June 27th, by a score of 10 to 8, in the former's second game of the Westbury Challenge Cup. This game was marked by the brilliant playing of the incomparable Captain of America's international force.

The following excerpts with reference to the game are of interest:

*New York World:* "The Army team, fighting for every inch, forged ahead soon after halftime and seemed on the way to an inevitable victory.

"Then Hitchcock got busy. In the sixth and seventh periods he put on a series of shots impossible for other polo players. Four goals were scored in rapid succession, though there must have been chances enough for ten, and the Army's hard-earned lead was wiped out. That ended the Army's hope of beating a Hitchcock team, for there wasn't enough pony strength left on the Army picket-line to make much of a fight in the final chukker.

"The Army brought forth a number of players in whom there will be considerable interest this summer, notably young Lieutenant M. McD. Jones, who has been burning up polo courses in the west and southwest. He appeared at No. 1 in the Army line-up and proved to be an energetic, hard-riding and hard-hitting young player, whose eye has not quite yet caught the range of eastern goal posts."

*J. P. Abramson, New York Herald-Tribune:* "In the fifth period the Army four had come from behind at 4 to 3 to take the lead, 6 to 4, on a superb stroking and riding spree by young Lieutenant Jones, who is a four-goal player and hails from Fort Bliss in Texas.

"Riding a black mare which made him easily distinguishable, Lieutenant Jones broke loose inside the Lark's defense to even the score at 4-all starting the fifth period. Then he scored again, beating Hitchcock in a spirited duel half the length of the field, and once more Lieutenant Jones was out in the open with an unchallenged run for goal.

"The Army had a well balanced four, which hit hard and accurately and maintained a fast pace. In the fourth chukker Captain Huthsteiner, also riding a black mare, staved off Hitchcock's attack four times with saves in the mouth of the goal.

"This was Huthsteiner's period, for he then carried the ball the length of the field on a beautiful five-stroke run that brought the score to 4 to 3 at half-time."

In speaking of the game, Major Patton, team captain, commented as follows:

"At the end of the first period the Army was only one goal to Meadowbrook's four, but at the end of the sixth period the Army had a lead of seven to four. After this the brilliant work of Mr. Hitchcock, ably seconded by some phenomenal hitting on the part of Mr. Tevis, insured our final downfall. While in no way desiring to detract from the superior polo play by the winning team, it is worthy of note that the Army players all used seven or eight horses, thus necessitating the appearance on the field of a certain proportion of less well-trained mounts, with the inevitable results of poor hitting on the part of the riders. The reason for this arose from the fact that the Army considers its primary mission the placing of as well mounted a team as possible in the Junior Championship. To facilitate this result, it was not thought advisable to play the good ponies more than one period, if it could possibly be avoided.

"While the game was a defeat, the practice gained by the proposed Army Junior team against such a strong combination cannot but prove beneficial. Following is a list of ponies played by each member of the team:

| | | |
|---|---|---|
| Lieutenant Jones, No. 1 | *Virginia* | U. S. Government mount from Front Royal, Virginia. An old pony with experience at fast polo. |
| | *Peggy* | U. S. Government mount—Front Royal, Virginia. Peggy is a veteran of at least eight years of high goal polo, and still holds her own as one of the very best ponies in the Army. |
| | *Billy* | U. S. Government mount—Fort Bliss, Texas. This is a fairly new pony, making his debut in high goal polo. |
| | *Green Bug* | U. S. Government mount—Fort Reno, Oklahoma. This pony is as green as his name indicates, but gives promise of improvement. |
| | *Miss Polo* | Private mount of Lieutenant Jones, Fort Bliss, Texas. Miss Polo is making her debut at Meadow-brook but has played over a year of fast polo before coming here. |
| | *Miss Goal* | Private mount of Lieutenant Jones, Fort Bliss, Texas. Remarks appropriate to Miss Polo apply to Miss Goal. |
| | *Papana* | Private mount of Lieutenant Jones, Fort Bliss, Texas. Inexperienced in high goal polo. |

| | | |
|---|---|---|
| Major Smith, No. 2 | *Sam Landers* | Private mount of Major Smith, Fort Leavenworth, Kansas. Good experienced pony. |
| | *Big Boy* | Private mount of Major Smith, Fort Leavenworth, Kansas. Excellent green pony. |
| | *Princess* | Private mount of Major Smith, Fort Leavenworth, Kansas. Good pony, lacking in experience. |
| | *Rosebud* | U. S. Government mount—Fort Leavenworth, Kansas. |
| | *Ranger* | U. S. Government mount—Fort Reno, Oklahoma. Good green pony, playing his first year of fast polo. |
| | *Tiddly-winks* | U. S. Government mount—Front Royal, Virginia. Old pony. |
| | *Clara Bow* | Private mount of Captain Rodes, Fort Bragg, North Carolina. Good pony, lacking experience. |
| Major Patton, No. 3 | *Red Eagle* | Private mount of Major Patton, Washington, D. C. New pony, playing well. |
| | *Barbara Breeze* | Private mount of Major Patton, Washington, D. C. Old pony, three years experience with Juniors. |
| | *Star Shell* | Private mount of Major Patton, Washington, D. C. Old pony. |
| | *Bull Run* | Private mount of Major Patton, Washington, D. C. Three years experience with Juniors. |
| | *Wiki Wiki* | Private mount of Major Patton, Washington, D. C. Hawaiian pony, with three years experience. |
| | *Aina Hau* | Private mount of Major Patton, Washington, D. C. Green, Hawaiian pony. |
| | *Margaret* | U. S. Government mount—Front Royal, Virginia. Old pony. |
| Captain Huthsteiner, back | *Red Ball* | Private mount of Captain Huthsteiner, Fort Sam Houston, Texas. Young, very good pony. |
| | *Blue Heaven* | Private mount of Captain Huthsteiner, Fort Sam Houston, Texas. Green pony. |
| | *Lew Truscott* | U. S. Government — Fort Sam Houston, Texas. Fairly experienced pony. |
| | *Jeannette Andrews* | U. S. Government — Fort Sam Houston, Texas. Experienced pony. |
| | *Blue Meadows* | U. S. Government — Fort Sam Houston, Texas. Experienced pony. |
| | *Cy Hawkins* | U. S. Government — Fort Sam Houston, Texas. Experienced pony. |
| | *Guy Fisher* | U. S. Government—Fort Reno, Oklahoma. Green pony, but doing very well. |

"It is interesting to note that fifteen out of the twenty-eight ponies playing in this game were private animals, and with the exception of one or two Government horses, the private animals were very much superior."

The line-up:

| *Meadow Larks*—10 | *U. S. Army*—8 |
|---|---|
| No. 1—G. G. Moore | Lieutenant M. McD. Jones |
| No. 2—T. Hitchcock, Jr. | Major C. C. Smith |
| No. 3—W. S. Tevis | Major G. S. Patton |
| Back—B. K. Gatins | Captain G. E. Huthsteiner |

*Score by Periods*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Meadow Larks | 2 | 1 | 1 | 0 | 0 | 4 | 2 | —10 |
| U. S. Army | 1 | 0 | 0 | 2 | 3 | 0 | 2 | — 8 |

Goals—Meadow Larks: Moore 2, Tevis 4, Hitchcock 3, Gatins 1. U. S. Army: Jones 3, Smith 2, Huthsteiner 2.

Referee—Captain P. P. Rodes. Time of periods—7½ minutes.

## CAVALRY SCHOOL TEAM WINS ROCKY MOUNTAIN ELIMINATION TOURNAMENT

Once again the Cavalry School Team from Fort Riley, Kansas, will represent the Rocky Mountain Circuit in the Inter-Circuit Championship Tournament to be played in Cleveland, Ohio, in August, as a result of having won the recent elimination tournament held in Fort Leavenworth, Kansas. After having defeated the Wakonda Country Club Team of Des Moines by a score of 11 to 8, the Cavalry School team went into the finals against the Fort Leavenworth team. In this latter game, Fort Riley won by a score of 17 to 9. The line-up of the Cavalry School team is:

No. 1—Captain E. M. Daniels.
No. 2—Captain P. H. Morris.
No. 3—Captain L. K. Truscott.
Back—Captain V. M. Cannon.

In 1927, the Cavalry School team also won the right to represent the Rocky Mountain Circuit in the Inter-Circuit Tournament, but was defeated in the latter by the Old Oaks team from Rumson, New Jersey, in an overtime game by a score of 10 to 9.

## POLO IN FOURTH CORPS AREA

Polo in the Fourth Corps Area has made great strides this past year. Although it has been impossible to hold a Corps Area Tournament, a number of good garrison and regimental teams have been developed, both in the Regular Army and National Guard. A new field is being built at Fort McPherson, Georgia. Within a year or two it is hoped that Corps Area tournament play will be possible.

A very good team was turned out by the Infantry School at

Fort Benning, Georgia. This team was successful in defeating Sixth Cavalry and two Atlanta teams. In addition to this, there are other teams at Benning made up of the instructor and student personnel, and officers with troops, that play post tournaments.

### THE POLO PLANT AND HORSES

At a visit of the Chairman of the Army Central Polo Committee to Mitchel Field on June 30th, the improvement in the plant and in the condition of animals over previous years was very marked. Mr. Thomas Hitchcock, Sr., stated to the chairman that, in his belief, the Army had brought to Mitchel Field this year a string of horses very much superior in type to anything he had ever seen before under Army players and whose general condition reflected better care than previously, and an increasing knowledge of conditioning and stable management on the part of the officers who come to Long Island to play.

The ponies of the Army's string on the whole are promising and, although there is a dearth of really experienced ponies, there are several among the new ponies which will make good. The team is endeavoring concurrently with its play, to bring forward green ponies for next year.

Members of the team under Major Patton's direction have contributed greatly to the making of the new polo field at the Army Polo Center, and this field is advancing rapidly. By next year it is hoped that the Army will have its home field available for its own use and will not be forced, as in past years, to be entirely a guest on Long Island fields.

### THE NEW YORK MILK FUND GAME

In the match on July 1st for the benefit of the New York Milk Fund between Sands Point and Meadowbrook in which Meadowbrook's line-up included Captain Wilkinson at No. 1 and Captain Rodes at No. 2, the play of these officers compared favorably with the other strong players in the game, with the exception of Thomas Hitchcock, Jr., whose play on that day was sensational and whose performance was very much above that of the other seven men on the field. Rodes at No. 2 was out of position and showed that he is much more at home in a fast game at No. 3 than at No. 2. Wilkinson, particularly in the last half of the game, showed up well. It is rumored that he is an outstanding candidate for the No. 1 position for this year's International Matches against the team from the Argentine.

# FOREIGN MILITARY JOURNALS: A CURRENT RÉSUMÉ

ENGLAND

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

"A Division in Future War and Its Problems," by Major General Sir Edmund Ironside, K. C. B., C. M. G., D. S. O.

This is a lecture delivered at the Royal Artillery Institution. In common with much of the military thought in England today, it deals with mechanization. General Ironside is speaking of the future of a Division, as quite distinct from a completely armoured force, when he says:

> "In training a division at Aldershot two things have struck me forcibly. First, the lack of mobility possessed by the main striking force of a division—12 battalions of infantry—and secondly the lack of offensive power possessed by this main striking force. If we follow the French ideas we shall have to increase our artillery strength in a division far beyond anything that we have at present. They make all their calculations upon the basis of artillery strength. They reason as follows. We have so many guns, and at 15 metres a gun that will allow us to attack such a frontage. For that frontage we will require so many infantrymen. They make an invariable rule of having a gun to every 15 metres in all attacks against an enemy's main position. We have not sufficient guns to do the like and therefore we must look to the tank to enable us to bring our infantrymen forward to their objective. I think, therefore, that tanks must be an integral part of a division. They have to work in such intimate close co-operation with the infantry that they cannot be lent for special occasions by a higher formation which keeps them as a reserve. The infantryman no longer has the power of brushing away resistance and preparing the battle for the final assault and he requires the tanks to be in the same formation as he is himself. I should like to see a division consisting of three fighting groups of all arms—infantry, tanks and artillery—trained to fight as a group. The power still remains in the hands of the divisional commander to use the tanks and artillery or infantry of any one of his groups to reinforce the others according to the terrain or the task in front of him."

This is all good common sense. Perhaps the most interesting thing in it is the acknowledgment that the French method of the overpowering use of artillery has unquestioned advantages, and that the British are forced to the use of the tank to compensate for shortage in artillery.

In the present furor about mechanizing armies, British or American, there may be too much of a tendency to overlook artillery fire power, and try and replace it with some such assault weapon as the tank.

**"The Experimental Mechanized Force,"** by Colonel Commandant R. J. Collins, C. M. G., D. S. O.

This is another lecture dealing with mechanization. The lecturer is apparently in command of the British Experimental Mechanized Force and therefore speaks with authority.

Among the deductions which he draws from last year's experience are:

(*a*) Complete demonstration of the ability of the force to approach and strike quickly.

(*b*) A difficulty which has largely escaped the notice of many writers on mechanization—the vulnerability of the force at present to small arms fire.

As noted before, the British army is undoubtedly very much interested in problems of this nature, and this lecture excited a great deal of comment, which indicates the manifold difficulties in handling a force of this nature.

**"N/5 R. A. in the Zulu War of 1879,"** by Major General J. C. Dalton, Colonel Commandant, R. A.

This is an account of the history of a particular Battery in campaign in South Africa. It is largely taken up with a digest of the history of the Battery, and a roster of its commanding officers. However, there is included a letter describing a British defeat in the Zulu War, which is one of those rare documents which show a war as it really is, and which indicate how swiftly an organized force can degenerate into a helpless mass of fugitives. It is worthwhile to quote from this letter at some length.

"HELPMAKAAR, NATAL,
*"February 2nd, 1879.*

"Now things have quieted down again a little, I can tell you more about what has happened. * * * We none of us had the least idea that the Zulus contemplated attacking the camp, and having in the last war (Kafir war, 1878) often seen equally large bodies of the enemy, never dreamt they would come on. Besides, we had about six hundred troops (regulars) two guns, about one hundred other white men, and at least one thousand armed natives. About twelve, as the men were getting their dinner, the alarm was again given, and we turned out at once. Major (Stuart) Smith came back from the General's force at

this time, and took command; this, of course relieved me from all responsibility as to the movement of the guns. We, being mounted, moved off before the infantry, and took up a position to the left front of the camp, whence we were able to throw shells into a large mass of the enemy that remained almost stationary. The 24th Regiment came up and formed in skirmishing order on both our flanks. The Zulus soon split up into a large mass of skirmishers that extended as far round the camp as we could see. One could form no idea of numbers, but the hills were black with them. They advanced steadily in the face of the infantry and our guns, and I believe the whole of the natives who defended the rear of the camp soon bolted and left only one side of the camp defended. Very soon bullets began to whistle about our heads, and the men to fall. The Zulus still continued to advance and we began to fire case, but an order was given to retire after firing a round or two. At this time out of my small detachment one man had been killed, shot through the head, another wounded, shot through the side, and another through the wrist. Major Smith was also shot through the arm but was able to do his duty. Of course, no wounded man was attended to, there was no time or men to spare. When we got the order to retire we limbered up at once, and one man was hardly in time as the Zulus were on us at once, and one man was killed (stabbed) as he was mounting on a seat on the gun carriage. Most of the gunners were on foot, as there was not time to mount them on guns. We trotted off to the camp, thinking to take up another position there, but found it in possession of the enemy, who were killing the men as they came out of their tents. We went right through them, and out the other side, losing nearly all our gunners in doing so, and one of the two sergeants. The road to Rorkes' Drift that we hoped to retreat by was full of the enemy, so no way being open we followed a crowd of natives and camp followers, who were running down a ravine. The Zulus were all among them stabbing men as they ran. The ravine got steeper and steeper, and finally the guns stuck, and could get no further. In a moment the Zulus closed in and the drivers who now alone remained were pulled off their horses and killed.

I did not see Major Smith at this moment but was with him a minute before. The guns could not be spiked, there was no time to think of anything, and we hoped to save the guns up to the last moment. As soon as the guns were taken, I galloped off and made off with the crowd. How any of us escaped I don't know; the Zulus were all among us, and I saw men falling all round. We rode for about 5 miles hotly pursued by the Zulus, when we came to a cliff overhanging a river. We had to climb down

the face of this cliff and not more than half of those who started from the top got to the bottom. Many fell right down, among others Major Smith, and the Zulus caught us up here, and shot us as we climbed down. I got down safely, and came to the river, which was very deep and swift. Numbers were being swept away as they tried to cross, and others were shot from above. My horse fortunately swam straight across although I had three or four men hanging on to his tail, stirrup-leathers, etc. After crossing the river we were in comparative safety, though many were killed afterwards, who were on foot and unable to keep up. It seems to me like a dream. I cannot realize it at all."

It is particularly appropriate at a time when young officers are being trained who have not had the advantages of actual experience in war, to bring to their attention such episodes as this. Everybody who has had much experience in war, knows that disasters like this are bound to occur, but the tendency of schools is always to teach how things should be done in place of to demonstrate how they should not be done. The result is, unless a young officer takes every advantage to orient himself by such authentic documents as this, he is likely to be horrified and astounded at the appalling disorder which he will often find in actual campaign.

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

(*a*) Growth of Artillery Training.
(*b*) Communications and Close Support.
(*c*) Army and Royal Air Force Co-operation.
(*d*) Reorganization of Divisional Artillery.
(*e*) The Influence of the Six-wheeler upon Divisional Administrative Questions.
(*f*) Synthetic Petrol.
(*g*) The Artillery Armament of an Infantry Division.
(*h*) Steeplechasing.

Many of the above articles are more instructive, but none are more interesting than a description of bird shooting in Iraq, by Lieut. Gen. Sir George MacMunn. In common with so many Englishmen, this officer took his sport where he could find it and found time from his other duties during the Iraq campaign to do a lot of bird shooting along the rivers of the Mesopotamia.

### FRANCE

### Revue D'Artillerie, January, 1928

The constant progress of aviation and the incessant improvement in the science of chemistry lead to increasing possibilities for

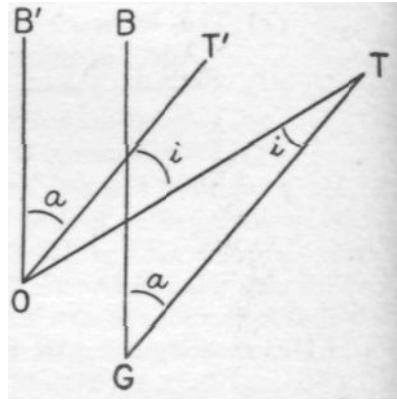
aero-chemical attacks against cities of the interior in future warfare. A thorough study of the problem of protecting the civil population against gas appears necessary. In a recent German work, **"Chemical Warfare,"** Dr. R. Haslian devotes a chapter to this subject. In it he summarizes the present ideas of the principal European powers on the question. A translation of this chapter, made by Major Grenouillet, appears in the Revue d'Artillerie for January.

The author believes that serious damage may be done to cities by gas bombardment, particularly if defense measures are neglected. To produce effect from a chemical such as mustard gas, one must count on at least 10 grams per square meter of surface. To gas Berlin, which includes an area of about 300 square kilometers, 3,000 tons of gas would be required, hence 3,000 large bombing planes. It is doubtful if such wholesale bombardments could be achieved, but a bold enemy will be able to obtain partial and serious effects on cities in spite of the various active means of defense.

In general, the civilian population will not be compelled to remain at a fixed post. Hence it appears that only temporary protection will be required for the majority, and the problem then lies in regulating circulation and providing special shelters.

The creation of special commissions to formulate defense plans; the creation of shelters; the instruction of the population in gas defense; the issue of gas masks, signals and supplies—all have been made the subject of study in various European countries.

In his article **"Unilateral Observation Without the Map,"** Captain Guillemain stresses the importance of obtaining an approximate value of the angle *i*. A chart should be attempted without fail, showing as accurately as possible the observation post, the guns, and the target. He suggests a means of determining the angle *i* approximately by firing.




The piece being laid on a base point B, an aiming circle is set up at the O. P. with its zero on the line OB' parallel to GB. The firing angle *a* is obtained from the guns and laid off on the aiming circle. A series of shots is then fired at T and the angle T'OT read at the O. P. The mean of the readings gives angle *i* approximately.

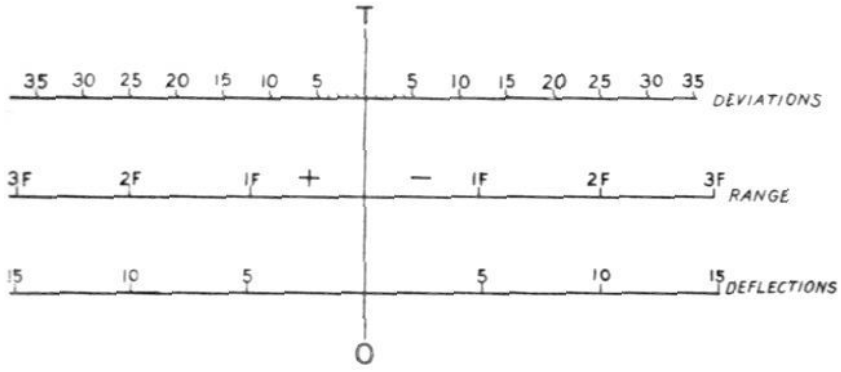
Captain Emond presents a study, **"Registration Using Unilateral Observation,"** in which he advocates the employment of a graphical

chart similar to the one used in our graphical chart method for bilateral observation. Trial fire is delivered in series of four rounds. The mean deviation of each series is plotted on the chart and changes made accordingly, deflection or range changes being used according to the usual rules.

If the observing angle (angle *i*) is known and if a map is available, the chart is accurately constructed from the known data. If the gun, target, and observer are not located, the required data may be obtained by firing, as follows:

1. Fire a series of 4 rounds, note the mean deviation; for example, 15 right.
2. Make a range bound of two or four forks and fire another series. Take the mean deviation of the 4 rounds. Suppose this is to left for a two fork change.
3. Fire a third series at the same range but with a deflection change corresponding to the deviation shown in *b*, and again note the mean deviation. For example, suppose the change of right 10 produced a mean deviation of 15 right.

With these data a chart similar to the one shown below is constructed, as shown below, using cross-section paper or any paper at hand.




a. On the upper line lay off arbitrary graduations according to the instrument used for observing the deviations.

b. On the range line lay off the total deflection change for the range bound used and mark it according to the number of forks it represents. In this example, a two-fork bound changed the deviation from 15 right to 10 left, or a total of 25 mils. Hence, the two-fork division on the range line appears under the 25 division on the deviation line. The observer is on the left, therefore range division on the left side of the O-T line are positive.

c. Now consider the total deviation change obtained from the deflection change made: in this case, a change of 25 for a 10 mil

change in deflection. Therefore, the 10 division on the deflection line appears under the 25 division on the deviation line. If a change in deflection causes no appreciable change in the deviations observed, range changes are indicated and the deflection line is not used.

The adjustment is then conducted in the usual manner by trial and improvement fire, using the chart to obtain the changes required.

**Revue D'Artillerie, February, 1928**

General Pagezy's "Notes on Firing With Unilateral Observation," which began in October, 1927, are completed in this number. The author gives a detailed discussion of the merits of the various methods prescribed by the French regulations. Of particular interest is his elaboration of a method for tracing out the planes of fire on terrain of sufficient slope. In this method the four corner points of a quadrilateral enclosing the target are materialized on the terrain by fire. The proportional shift and range change to reach the target can then be calculated with sufficient exactness to allow zone fire for effect or improvement fire according to the circumstances.

The method is effective only under certain conditions of terrain, but these conditions are frequently encountered. The precision of the observing instrument should be sufficient to allow measurements of shots to within ½ mil. For a precision adjustment to within one probable error the minimum slope of the terrain at the target is $10\ \frac{r}{R}$ %, r being the distance from observer to target and R being the range. In other words, for $\frac{r}{R}=1$, the minimum slope is 10 per cent. As the observer's station is moved nearer the target, the minimum slope required becomes less.

In general, the method is based on the accurate observation of rounds with respect to the target and the cross hair of the instrument. In the cases where the general slope of the terrain at the target is roughly toward the guns, the mean line of a number of rounds fired at the adjusted range of the target and at varying deflections may be materialized by placing the horizontal cross hair of the observing instrument along the base of the target. The formula for the angle ß which this mean line makes with the horizontal is: $\tan ß = s \tan i$, in which $s$ is the site of the target from the O.P. (in mils), and $i$ the angle of observation. If either the site or the angle of observation is small, ß is generally negligible. If both are appreciably large, ß is obtained from the formula and the cross hair turned through this angle away from the horizontal. With the cross hair set at the proper angle, shots observed above the line may be called over and those below short.

To adjust under these conditions, the author proposes to fire

four rounds, or groups of rounds, in trial fire. The first group, or round, is fired at an estimated range and deflection. Assume that its position is as shown at (1) in the figure. It is plotted on cross-section paper with the plotted position of the target as an origin, the position of the shot being noted in the observing instrument as so many mils above or below the cross hair and right or left of the target. If above the cross hair, the shot is probably over and a second round is fired at a range two or four forks less and at the same deflection. Its position is plotted at (2) in the figure. The line joining (1) and (2) represents the trace of the plane of fire on the terrain. We now measure from the target to this line along the cross hair and make a deflection change accordingly, so as to surely bracket the target in deflection. Two rounds are then fired at this deflection, one at the range used for (2) and the other at the range used for (1).

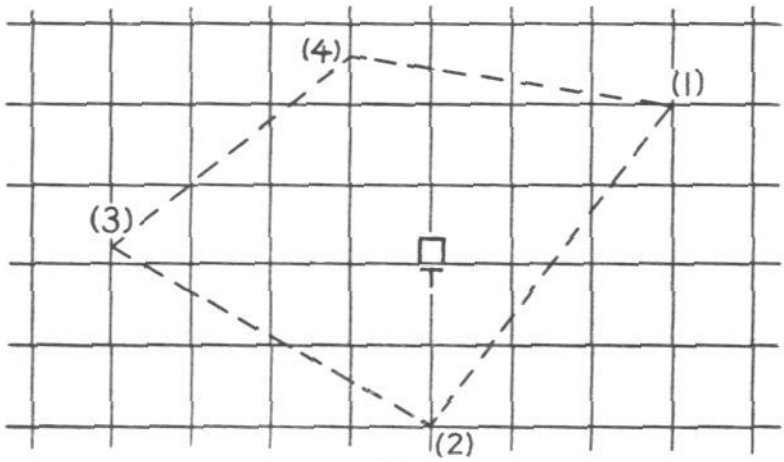



*Fig. a.*

Plotting the four shots, or centers of impact, we have four points which outline a quadrilateral enclosing the target whose position in range and deflection is then obtained by interpolation. Improvement fire or zone fire for effect may now be commenced. By using smoke shell the quadrilateral can be outlined on the terrain itself and the measurements made accordingly.

Other articles in this issue are "Notes on the Restitution of Aerial Photographs," "New Equipment for High Burst Ranging," and "A Study of Artillery Concentrations."

**March, 1928**

In his article, **"Infantry-Artillery Liaison,"** General Challeat discusses the problems of the accompanying gun and the supporting

artillery. He considers the 75-mm. a mediocre accompanying weapon, particularly when horse drawn, on account of its weight, its vulnerability, and its trajectory.

The first emplacements for supporting artillery should be located 2,000-3,000 metres from the front line elements of the enemy and the line of fire should be generally in the direction of march of the infantry. A definite system of target designation by the infantry must be put into effect and clearly understood by both infantry and artillery. The form of message for calls for fire should be definite and simple for rapid transmission by telephone.

The zone of action must be divided into concentration areas in advance and the areas designated by letters or numbers to facilitate prompt delivery of fire. Concentrations on these can be called for by simply signalling the proper letter or figure. To prevent one's own infantry from advancing before the fire is completed, the duration of each concentration is fixed in advance and completion of fire can be signalled to the infantry by firing a certain prescribed number of high bursting rounds.

Two continued articles, "Infantry-Artillery Cooperation" and "A History of the École de Guerre" will be reviewed later. Other articles are "A Study of Probable Net Costs in Foundries" and "The Rapid Formulation of Rough Drafts for the Design of Materials."

### "Revue Militaire Francaise," March—April, 1928

In the April number Captains Loustaunau-Lacau and Montjean conclude **"In French Morocco in 1925."** In discussing the part played by artillery in this colonial war, they explain that there were few trenches, dugouts, automatic weapons or other targets of a type that called for artillery fire. Moreover, the enemy infantry was thinly scattered in this mountainous region. However, these scattered bands feared artillery fire as they were unable to combat it, and the artillery materially aided the infantry in preventing enemy troop concentrations.

The terrain greatly handicapped the artillery's mobility. The portée artillery could not leave the roads, and even the tractor-drawn artillery could not consistently maneuver off the roads. The unusually rough terrain limited even the mobility of the horse-drawn 75s and 155 howitzers. Only the mountain artillery was able consistently to follow the infantry. The 65, the 75, and the 105 carried on packs responded to practically all requirements of maneuver and fire which confronted them in the most mountainous regions. However, the problem of ammunition supply limited the activity of even the mountain artillery.

In some respects, preparation of data and conduct of fire were more difficult in this type of warfare than in the World War. The nature of the targets, which were usually scattered and poorly defined, obliged the battery commander partly to abandon precision fire and methods of time fire used in position warfare. In Morocco the battery commander had to estimate quickly and decide instantly. In other respects the battery commander's problem was simplified. The absence of enemy artillery eliminated all necessity of defilade. The guns could be placed safely on crests and close to the observation post except in cases where lateral posts were necessary to give observation of the enemy area. In this mountainous terrain, liaison with the infantry was facilitated since the artillery in most cases was able easily to observe the advance of friendly troops. This advantage was somewhat offset by the difficulty encountered in laying telephone lines. In Morocco the question of security of artillery assumed an importance that it had not had in Europe, where the front was continuous. It was found necessary to attach infantry to batteries as protection against the Riffs.

In spite of the freedom enjoyed, due to the absence of enemy artillery, the French artillery encountered many obstacles which complicated its task. The rough terrain and the rapid movement of the friendly infantry prevented centralization of artillery fire. Decentralization led to dispersion of effort and waste of ammunition laboriously transported. These various conditions, favorable and unfavorable, called for the exercise of more than ordinary initiative and judgment on the part of the artillery commanders.

**"Lessons of the War in Morocco in Aviation Matters,"** by Colonel Armengaud, is continued in the March and April numbers. One of the many missions of the aviation in Morocco was to supplement the work of the artillery. The difficulties encountered in this special type of warfare necessitated the intervention of the aviation in the zone of action ordinarily assigned to the artillery.

There were several difficulties encountered by the artillery: the absence or the numerical insufficiency of artillery; the difficulties of ammunition supply; the frequent inability of artillery fire to reach important dead spaces; the impossibility to see certain targets and to observe the fire; the difficulty or impossibility to obtain accurate fire, even with control by airplane, with enough rapidity to reach mobile targets concealed from direct view; the difficulty of following infantry columns in a country without roads.

Even though the high command was very reluctant to permit unnecessary use of the aviation in places where the artillery was sufficient, the use of the aviation as aërial artillery became frequent and even normal. Colonel Armengaud cites numerous instances

where the aviation was used to deliver all the types of fire prescribed by artillery regulations: fire preparatory to an attack; interdiction and harassing fire; accompanying fire during an attack; protective barrage; counter-battery fire; counter-preparation fire. In accomplishing these missions the aviation showed that it was an artillery that knew no dead space, always saw its objective, and was able instantly to correct its fire by direct observation. Being able to see both the friendly troops and the enemy troops, the aviation was able to intervene, not systematically and blindly as the artillery is at times forced to do, but always with knowledge of the situation. The aviation was therefore able to supplement the artillery and to reinforce the artillery at critical points and critical moments, especially in the retreat and the pursuit.

One fundamentally important thing that the aviation lacked, however, was "continuity of action." In considering the possibilities of the aviation, in a European war, to supplement the artillery, Colonel Armengaud concludes: "To use the aviation for such a purpose one must count on its continuity of action. The aviation in Morocco at times furnished this continuity of action because of special conditions. In European warfare the aviation would not be able to maintain the continuity of action, especially as its strength would be diminished by the antiaircraft defense of the enemy."

"Serb Victories in 1914," is concluded in the April number. In this article, Lieutenant Colonel Desmazes compares the Serb retreat to the Koloubara, and the succeeding victory, to the French retreat to the Marne. He attributes the victory of the Serbs over the Austrians to the superior fighting qualities of the Serb soldier who reflected the qualities and characteristics of the Serb nation itself.

The Austro-Hungarian army, whose technical ability was on a par with that of the best European armies, whose matériel was excellent, whose leaders were in general well schooled in their profession, was defeated because it represented a decadent state. It was not the image of a unified patriotic nation as was the Serb army, but rather the representation of a group of diverging nationalities.

Later, of course, the Serbs were cut off from their allies; and confronted by the combined forces of the Germans, Austrians, and Bulgarians, the Serb army retreated to the Adriatic. Here the Serb army embarked for Salonique, where it joined the allied forces. Not until November, 1918, did the Serb armies return to their native land.

In the article "Field Fortifications in the German Army," the author remarks upon the manner in which the Germans emphasize

the importance of instruction in field fortification and camouflage.

Profiting by lessons learned in the last war, the German regulations of 1924 prescribe certain principles: (1) field fortification is the rule in all forms of combat; (2) all arms take part in it; the pioneer troops assist only as instructors or directors; (3) camouflage should be one of the very first concerns of the command.

The purpose of the regulations is to inculcate this concern for camouflage in the minds of the troops. In the German army the instruction in camouflage is carried on throughout the year. Even before receiving his rifle and learning the manual of arms, the recruit is taught to obey the rules of camouflage.

**"The Permanent Fortifications of Germany"** is an article which describes the present condition of German frontier fortifications.

In 1925 and 1926, the Germans attempted to organize a new line of defense along the eastern frontier. This was, of course, a violation of the Treaty of Versailles. As a result of the diplomatic conflict which followed this attempt to violate the treaty, a more precise agreement was drawn up which defined Germany's authorized fortifications.

The Treaty of Versailles provided for the destruction of the western frontier fortresses on and west of the Rhine, thus eliminating the possibilities of maneuver that these fortresses gave Germany in an attack on France. Eastern Prussia is still strongly fortified. The southern frontier, which has become important as a result of the creation of Czecho-Slovakia, is poorly defended.

**"Organization of Terrain of Operations,"** by Commandant Roques, is a history of the Service of Supply of the 4th French Army during the World War. The principal lesson to be learned from a study of the operations of the 4th Army is the difficulty encountered in supplying an army as it advances in an enemy country. In spite of a very ample supply of auxiliary transportation, it is probable that had the advance in September, 1918, been pushed beyond the Meuse River, the French high command would have had to withdraw several divisions in order to supply the remaining divisions.

Commandant Roques concludes that a modern army can scarcely move a distance of more than 70 kilometers from its base. If an enemy army in retreat leaves a void behind it in destroying roads and railroads, the high command of the army in pursuit must expect to see its operations slow down and then stop. The advance can be resumed only in bounds corresponding to the reëstablishment of railroads.

# CURRENT FIELD ARTILLERY NOTES

## Tactical Work of Experimental Mechanized Force Outlined

IN OUTLINING the work for the Experimental Mechanized Force which is being organized at Fort Leonard Wood (Camp Meade), Maryland, the War Department has informed the Commanding General, Third Corps Area, that it is thought the development of technical methods for application by such a force to tactical problems, is of greater importance than the solution of the tactical problems themselves.

To this end, study and experiment will be directed by the commander of this force along the following lines:

*"Route marches*: Proper methods; grouping and subdivision of column; relative speeds; economical rates; capabilities on roads of varying character; capabilities off roads; supply on the march; camping and bivouacking methods; special methods and training necessary for night marches; duties of engineers in facilitating the march; equipment needed.

*"Marches in the presence of the enemy*: Means of reconnaissance; means of security; liaison with air units; antiaircraft security and defense; liaison and maintenance of command in the marching column; tactical subdivision of the force on the march; security within the force itself; the use of the mechanized force as a security detachment for troops of other (present day) characteristics; value of the motorcycle, cross-country car, armored car as security elements.

*"Reconnaissance*: The employment of means within the force to obtain information prior to engagement; the motorcycle, cross-country car, armored car; means for rapid communication with Air Corps.

"*Command*: The means of insuring command in a force of this character; character of command posts, moving or fixed; the means of communication to be employed; liaisons to be maintained between components of the force; organization of the command and staff of the force and its components to assure rapid handling of intelligence; rapid decision and formulation of plan, rapid transmission of orders; effectiveness of supply.

*"The tactical methods of the force in the approach* alone or when carried by other forces. Approach formations; front and depth required for development and deployment; methods of concealment from ground and air; methods of diminishing noise; conduct of approach march; security and information during the approach; functions of auxiliary troops, engineers, signal, etc., during the approach; order of components in the approach;

initial positions of artillery; disposition of rear echelons; the best means and weapons for supplying smoke screens in the attack of mechanized units.

*"In the attack*: Formations, width, depth of the tank attack; co-operation between neighboring tank units; missions for light tanks; missions for medium or heavier tanks; liaisons to be maintained by and with tank units; special tactics to take advantage of the speed of modern tanks, based upon experiment with four MI tanks to be furnished; command of tank units in the attack; security elements; means for protecting flanks; combat patrols, composition and equipment; battle reconnaissance.

*"Fire support*: Character of artillery supporting forces; methods of maintaining contact with advancing tank elements; methods of maintaining adequate observation; methods of displacing forward to continue to cover an attack of rapidly moving elements pushed to great depth; transference of artillery liaisons to the infantry when that force has relieved tank elements in the attack or is consolidating ground won; ammunition supply within a mechanized unit; method of maintaining liaison with the force command when the latter is moving; tests of fire of artillery in defense against tanks using salvaged tanks.

*"Infantry support*: The organization, tactics, and equipment which infantry will need to enable it to support the tank elements rapidly and without causing the latter to lose advantage of modern tank speed; methods of quickly mopping up; methods of rapidly advancing machine guns and other infantry weapons, wire, intrenching material; organization of the infantry command; liaisons with other components of the force; defense against tank attack, including tests of fire of infantry weapons, particularly the latest 37-mm. gun as an anti-tank weapon, against salvaged tanks at your disposal.

*"Engineers*: What should be the special equipment of the engineer component of a mechanized unit? Can they assist the advance of such a unit with improvised material? What should be the span of bridge materiel with this force? What tools are needed by these engineers? What character of transportation is needed?

*"Supply, administration, etc.*: Division of units into combat and supply echelons; methods of handling the latter; should they be grouped and administered by one officer at one place; location of the rear echelons on the march; in combat; field repair of automotive materiel; where accomplished; vehicles needed; character of repairs to be sent to motor repair shops; supply of oil and gas to tanks during course of operations;

vehicles needed; economy of personnel at rear echelons; ammunition supply of mechanized unit, control; method."

**Commercial Automotive Equipment To Be Tested**

In compliance with instructions from the War Department, the Chief of Ordnance has invited commercial manufacturers of automotive equipment to submit their most modern equipment of possible use by mechanized and motorized units of the Army for tests by the Mechanized Force now assembled at Fort Leonard Wood, Maryland. The following equipment will be furnished in accordance with the invitation for such tests:

1 caterpillar "20" tractor.
1 caterpillar "30" tractor.
1 caterpillar "60" tractor.
1 Cletrac "30" tractor.
1 Lynn tractor of the half track type.
1 Athey 3-ton truss wheel trailer with caterpillar "20" tractor to tow it.

This equipment will be given thorough test under all possible weather and terrain conditions in order to determine its suitability for military use. Trained Ordnance personnel will be made available for the maintenance and operation of these vehicles.

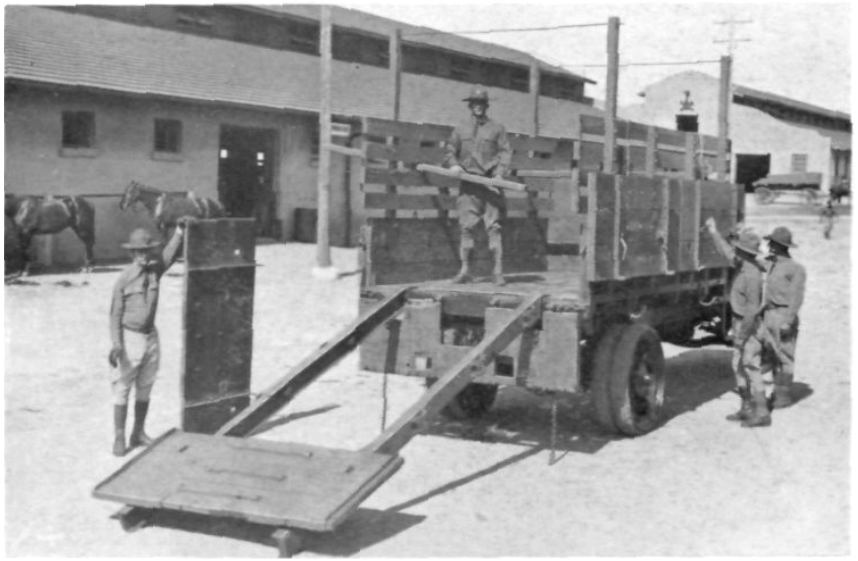
In addition to the above, the Ordnance Department has prepared and will provide the following special vehicles for use in connection with the tests:

1 Ford tank.
1 Christie tank.
1 medium tank M 1921.
1 medium tank 23-ton T-1.
2 motor carriages Mk IX for 155-mm. gun or 8″ howitzer.
1 caterpillar "20" tractor.
1 caterpillar "30" tractor.
1 caterpillar "60" tractor.

**New Automobiles Purchased**

On April 2 the War Department opened bids for forty-nine open and seventy-five closed automobiles for the use of the army transportation units. The award of this contract was to the Chrysler Corporation for its Model 62. This type car had previously been given exhaustive tests by the Army's automotive engineers at Camp Holabird, Maryland, and the award was satisfactory to the motor technicians.

Due to their weight and lack of clearance, these cars are not intended for tactical use by the Field Artillery or other combat



RAMP PARTLY ASSEMBLED. I-BEAMS AND LOWEST SECTION OF FLOOR IN POSITION. ONE SECTION OF PLATFORM BEING HELD TO SHOW UNDER CONSTRUCTION. (NOTE HOOKS AT END OF ANGLE IRONS THAT FIT INTO STRAPS ON I-BEAMS.) TWO SECTIONS OF FLOOR IN CARRYING POSITION ON RIGHT SIDE OF TRUCK

SIX HORSES IN TRUCK; RAMP BEING REMOVED

TRUCK LOADED WITH SIX HORSES. NOTE THAT THIS TRUCK HAS A HIGHER TAIL-GATE, AND HIGH SUPERSTRUCTURE BEHIND DRIVER'S SEAT, MAKING IT IMPOSSIBLE TO LOAD IN THIS TRUCK BOTH A GUN AND CAISSON (3-INCH OR 75-MM.)

THREE HORSES LOADED IN TRUCK FACING FORWARD. RAMP ASSEMBLED

branches, but are issued for administrative use to headquarters above and including the regiment.

One Chrysler Model 62 is being issued to each of the following Field Artillery Headquarters: 1st F. A., Ft. Sill; 5th F. A.; 17th F. A.; and 13th F. A. Brigade, Fort Bragg. Cars of this type are also being issued to posts at which Field Artillery units are stationed as follows: Fort Sam Houston, three; Fort D. A. Russell and Fort Bliss, two each; Fort Sill, Fort Hoyle and Fort Riley, one each.

**Portée Experiments**

Considerable experimental work has been done by the Field Artillery School on portée methods and equipment both for horse-drawn and tractor-drawn units.

The ramps for loading horses each consist of two steel beams, a floor in four sections and the two side rails. One-half of a complete ramp is carried by each truck.

In addition to the tractor-drawn portée equipment similar to that used by the 11th Field Artillery Brigade, Schofield Barracks, described in the May-June, 1927, Journal, the floor type of ramp has also been used for tractor-drawn units. Should this latter prove satisfactory, it would mean a single type of ramp for both horse and tractor-drawn portée movements, a feature of considerable advantage should the Motor Transport be called upon to portée Field Artillery organizations. As shown by the accompanying photographs, the ramp equipment for the tractor outfits differs from that used for loading horses only by the omission of the side rails. This omission makes it possible for each truck to carry a complete ramp, two floor sections and a steel beam on each side of the truck.

**Test of Pack Equipment**

In order to provide a conclusive test of the merits of the Phillips pack as compared to the standard aparejo equipment, for use with the new 75-mm. pack howitzer, the Chief of Field Artillery decided upon a long march during hot weather, using both types of packs.

Between July 31 and September 10, Battery B, 4th Field Artillery Battalion, operating under a directive from the Commanding General, 7th Corps Area, will make a 500-mile march, two gun sections being equipped with the Phillips pack, and two gun sections with the standard aparejo.

The march will be under the supervision of the Pack Artillery Board. Colonel A. E. Phillips, Cavalry, designer of the Phillips pack, and Captain L. L. Leech, Marine Corps, will accompany the battery as observers.

**U. S. Equestrian Team for Olympic Games**

The Army equestrian team sailed on July 10 on the chartered Olympic boat *President Roosevelt*. The team is composed of the following officers:

Major Sloan Doak, Cavalry.
Major Charles P. George, Field Artillery.
Major Harry D. Chamberlin, Cavalry.
Captain Adolphus W. Roffe, Cavalry.
Captain William B. Bradford, Cavalry.
Captain Frank L. Carr, Cavalry.
Captain Peter T. Carpenter, Veterinary Corps.
1st Lieutenant Edwin Y. Argo, Field Artillery.

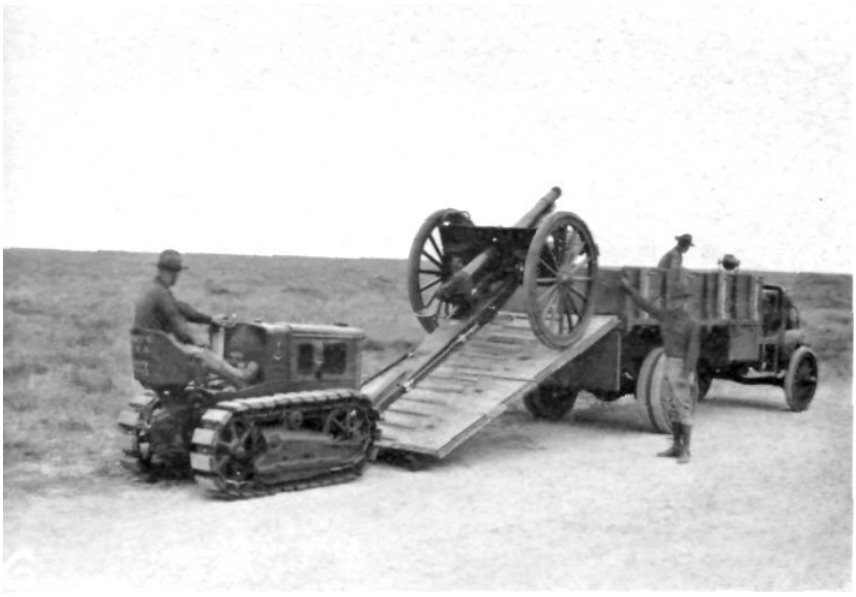
The above-named officers were in training at the Cavalry School, Ft. Riley, Kansas, under the direction of Brigadier General Walter C. Short. They then went to Rye, New York, where they had a final month of training at the Westchester-Biltmore Country Club. In addition to the United States, the following nations contemplate competing in the Olympic equestrian events at Amsterdam, Holland: France, Germany, Japan, Italy, Poland, Spain, Sweden, Holland, Austria and Switzerland.

Sixteen horses went to Rye, New York, only four of which are thoroughbreds, the others being grades or unknown. As regards ages, Jack Snipe, the oldest and one of the very best, is nineteen. Proctor is fourteen. The youngest horse is six, a thoroughbred owned by Lieutenant Callicutt of the Field Artillery. The average age is over eleven. The breeding is interesting: Jack Snipe is said to be a French coach horse; Sandy comes from France, but that is all that is known about him; it is thought that Nigra comes from Ireland; Rocket is half hackney and half thoroughbred; Joe Aleshire is by an American saddle horse out of an American saddle mare.

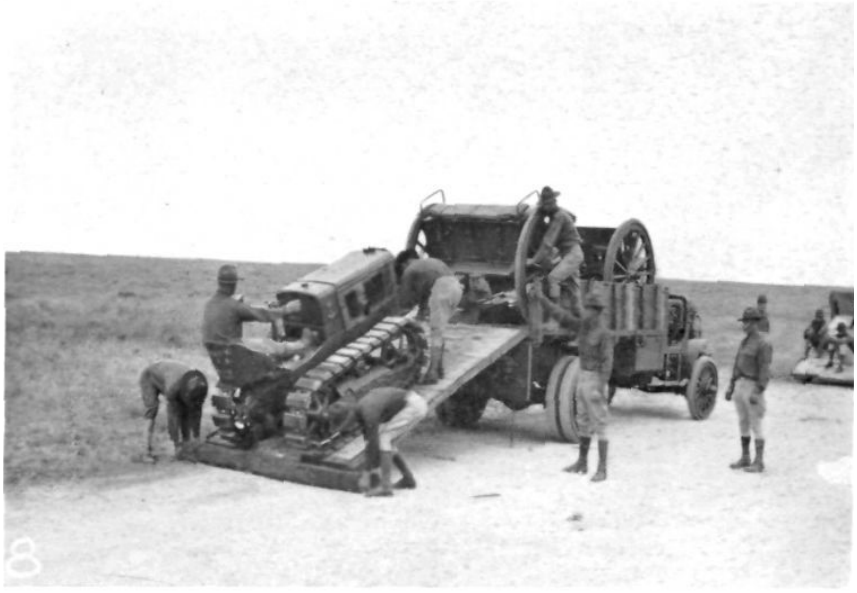
Our Olympic team is entered for two events: the "equestrian championship competition" and the "obstacle jumping for the Prix des Nations."

The "equestrian championship" consists of tests for training, endurance and obstacle jumping. In that part of the test for training, especially as concerns high school movements, European officers have more experience than Americans.

The endurance test is 22 1/2 miles—4 1/5 miles on roads and paths at 9 miles per hour; 2 1/2 miles steeplechase over obstacles at 20 miles per hour; 9 2/5 miles on roads at 9 miles per hour; 5 miles across country over obstacles at 17 miles per hour; 1 1/4 miles on road to finish at 11 1/2 miles per hour. The obstacle jumping, which is the third part of the main event, is to be held in the

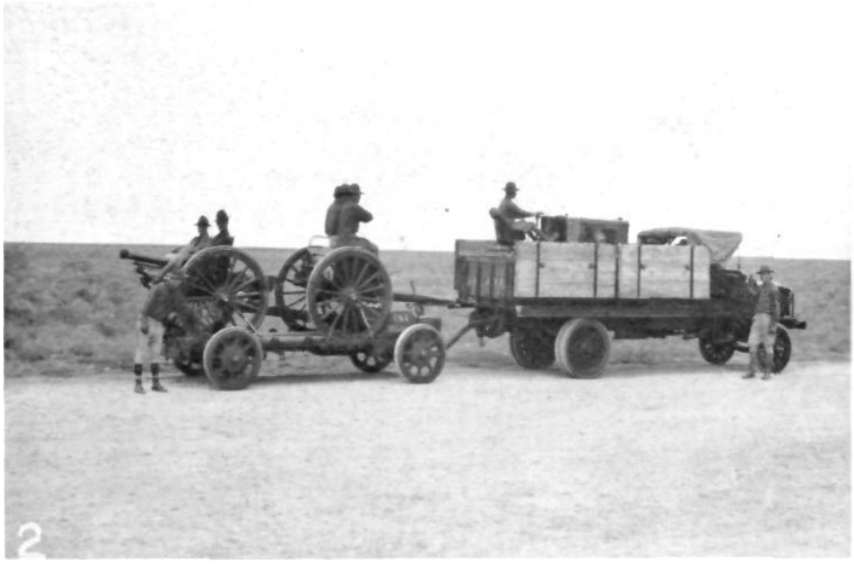


LOADING 3-INCH GUN ON TRUCK, WITH USE OF 2-TON TRACTOR



LOADING 3-INCH CAISSON ON TRUCK, WITH USE OF 2-TON TRACTOR

SECTION READY TO MOVE, 3-INCH GUN AND CAISSON WITH 2-TON TRACTOR LOADED ON TWO TRUCKS



SECTION READY TO MOVE. 3-INCH GUN AND CAISSON WITH 2-TON TRACTOR LOADED ON TRUCK WITH TRAILER. (THE MAN STANDING IS MAKING FINAL ADJUSTMENT OF RIGHT REAR "HUB HOLD-DOWN CABLE")

stadium over 12 and 14 obstacles of every variety at a rate of 12 miles per hour.

"The obstacle jumping for the Prix des Nations" event consists of about 16 obstacles varying from 4 feet 2 inches to 4 feet 9 inches, with broad jumps up ot 14 feet wide and a minimum average speed of 14 miles per hour.

**Other Invitations for Riding Team**

The Secretary of War received a note from the Minister of Poland inviting the Government of the United States to send a team of Army officers to take part in the International Jumping Competition at the Horse Show in Warsaw, Poland, September 12 to 28, 1928. The Secretary of War informed the Minister of Poland that, although the invitation is highly appreciated, it is regretted that circumstances are such that it cannot be accepted. A team to attend the Warsaw Horse Show would have to be selected from the United States Equestrian Team which is to attend the Olympic Games at Amsterdam, Holland, in August, 1928. It is necessary that this team return to the United States on the chartered Olympic boat, the *President Roosevelt,* which is scheduled to sail from Amsterdam about August 15, 1928. This is the fourth invitation, besides the Olympic, received by the War Department to send riding teams to continental horse shows during the coming summer. The others have been the Olympia Horse Show in London, England; the Military International Horse Show at Nice, France; and the International Horse Show to be held at Lucerne, Switzerland, July 7 to 15.

**New Field Artillery Quarters**

The Secretary of War has approved the recommendation of the Quartermaster General and the Chief of Field Artillery relative to the location of the new officers' quarters to be constructed at Fort Sill, Oklahoma. A sum of $72,000 was appropriated in the first Deficiency Bill, Fiscal Year 1928, for the construction of seven bungalows. These bungalows are to be located in the New Post, two west of the Officers' Club and five east of that building. This location appears to satisfy the requirements of an economical and suitable arrangement and provides a compact grouping of officers' quarters in the New Post.

The Quartermaster General has recently awarded the contract for the following construction at Fort Bragg: Two field artillery battalion barracks, $365,850; six battery officers' quarters and seven non-commissioned officers' quarters.

**White Uniforms for Officers**

The Secretary of War has directed that Army Regulations be

amended so as to authorize the wearing by officers of the white dress uniform and a white mess jacket, when prescribed by the commanding officer, in the United States as well as in the tropics. The amendment also provides that black trousers, black shoes and black socks will be worn with the white mess jacket in lieu of white trousers, shoes and socks, whenever prescribed by the commanding officer, this uniform being now authorized for officers in the Philippine, Hawaiian and Panama Canal Departments, and by the United States Forces in China and in Porto Rico.

Heretofore the wearing of the white dress uniform and the white mess jacket by officers in the tropics has been authorized, but the wearing of these uniforms in the United States has been optional.

**Camouflage of Army Tents To Be Considered**

A War Department study is to be made as to the advisability of camouflaging Army tents. If a military need for such camouflaging is indicated, consideration will be given the most promising means to meet such a requirement. During the World War, ships, trains, vehicles, guns and emplacements, roads, billets, and other installations and articles of equipment were camouflaged, but as troops lived either in billets or dugouts the camouflaging of tents was not practical on a large scale, nor, so far as known, has any previous consideration been given to the subject.

**Transportation of Horses by Motor**

Field tests of trailers for transport of cavalry horses, each equipped to carry six animals, will be held by the Third Cavalry, Fort Myer, Virginia, under authorization by the War Department. Two trailers, of the type used to transport 3-inch field guns, are being converted into animal carriers at Aberdeen Proving Ground, and upon completion will be shipped to Fort Myer. Exhaustive tests, including transport of animals over a considerable distance, will be held. The tests are expected to be completed in time for utilization of the trailers with the Experimental Mechanized Force this summer at Fort Leonard Wood, Maryland.

The continuation by the War Department of experiments in transportation by truck has resulted in the issuance of instructions to The Quartermaster General to conduct tests on the carrying of six horses in a vehicle truck. These experiments are to be different from the ones conducted so far in that the horses are to stand facing fore and aft and three abreast to facilitate loading and to maintain better balance against the sway incident to movement. Heretofore as many as six horses have been loaded in a truck, but they have been faced alternately to the sides of the truck. The

ordinary Army trucks now in use are believed to be of too short a wheel base to permit transportation of more than three horses facing to the front or rear. If Army trucks of sufficient wheel base and body lengths are not available, the Quartermaster General will consider the use of a commercial vehicle specially designed for this purpose.

**34th Infantry To Be Motorized**

The 34th Infantry, Colonel Thomas W. Darrah, commanding, stationed at Fort Eustis, Virginia, has been designated as the first infantry regiment of the United States Army to be motorized. The War Department has approved plans for the motorization of the regiment which became effective after July first. An appropriation of $140,000 was provided in the budget for the fiscal year beginning July 1, 1928, for this purpose. Equipment required for the motorization includes the following:

23 cross-country cars.
9 cross-country cars with light cargo body.
15 ¾-ton cross-country trucks, 4 wheel with 2-wheel drive.
14 ¾-ton cross-country trucks, 6 wheel with 4-wheel drive.
19 1½-ton cross-country trucks, 4-wheel drive.
8 motorcycles with side cars.
19 truck bodies, Class A.
5 tractors, caterpiller "20" 3½ ton.
5 kitchens, rolling (trailer).
1 truck, 750-gallon gasoline carrier.

This equipment will completely motorize the Regimental Headquarters; Regimental Headquarters Company, including two Battalion Sections; Regimental Service Company, including two Battalion Sections; two machine gun companies, and one rifle company and attached medical personnel. The remaining rifle companies of the two battalion regiments are to be transported in Quartermaster Corps 3 to 5 ton trucks.

Programs have been formulated for extensive tests and exercises by the 34th Infantry. These will include rapid road and cross-country movements; marches under tactical situations in which the regiment is acting alone as an advance, rear or flank guard of a larger force; and various phases of attack, defense, pursuit and retreat to test the possibilities of a motorized regiment.

In the latter part of June a motor column consisting of thirty-five trucks and four passenger vehicles from Fort Leonard Wood, Maryland, reported at Camp Eustis, Virginia, and transported the 34th Infantry to Fort Leonard Wood, where that regiment will become part of the Experimental Mechanized Force after receiving their motor equipment.

# THE UNITED STATES FIELD ARTILLERY ASSOCIATION

PROPOSED AMENDMENT TO THE CONSTITUTION

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

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

Sir:

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

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

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

It is proposed to amend Section 3, of Article V, by striking out the period at the end of said Section, substituting therefor a comma, and adding to said Section the words "except such publications, other than the Journal, as may be designated by the Executive Council.", so that said Section shall read, when amended, as follows:

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

Respectfully submitted,

ANDREW MOSES, Col., F. A.
E. P. KING, JR., Major, F. A.
E. H. DEARMOND, Lt. Col., F. A.
G. R. ALLIN, Lt. Col., G. S. (F. A.)
A. C. MCBRIDE, Major, G. S. (F. A.)

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

# THE UNITED STATES FIELD ARTILLERY ASSOCIATION

## CONSTITUTION*

### ARTICLE I

#### TITLE

THIS Association shall be known as the "United States Field Artillery Association."

### ARTICLE II

#### OBJECTS

The objects of the Association shall be the promotion of the efficiency of the Field Artillery by maintaining its best traditions; the publishing of a Journal for disseminating professional knowledge and furnishing information as to the Field Artillery's progress, development and best use in campaign; to cultivate, with the other arms, a common understanding of the powers and limitations of each; to foster a feeling of interdependence among the different arms and of hearty co-operation by all; and to promote understanding between the regular and militia forces by a closer bond; all of which objects are worthy and contribute to the good of our country.

### ARTICLE III

#### MEMBERSHIP AND ELIGIBILITY

Section 1.—The Association shall consist of (1) active members and (2) associate members.

Sec. 2.—The following shall be eligible to active membership:

Commissioned officers on the active lists of the Field Artillery

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*The Constitution, last amended in December, 1920, is here given in full. When the Constitution was last printed, the following remarks were made, which seem to be equally applicable at the present time.—EDITOR.

"The United States Field Artillery Association was formed in June, 1910. The thought which resulted in this action was first conceived among a group of regular and national guard officers. Little can be added to the expression of their intentions, found in Article II of the Constitution herewith. The completion of their projected action was achieved at a summer training camp at Fort Riley, Kansas, where the signatures to the original constitution were written.

"The Association has pursued a continuous and successful career since 1910, along the lines mapped out by its founders.

"In the passing years the FIELD ARTILLERY JOURNAL has come, perhaps, to be the best known and most useful activity of the Association. In a less conspicuous but not for that reason a less valuable role, the Association has in other ways maintained the purposes for which it was formed; when a working organization has been needed it has been the instrument of service; when a worthy field artillery project has suffered the need of temporary funds, a source of aid has been found here; in continuing service the Association is forwarding the esprit, the honor, and the efficiency of our Great Arm."

of the Regular Army and of the Organized Militia of the several states, territories and District of Columbia and commissioned officers on the active list of the Field Artillery Section of the Officers' Reserve Corps; provided, that officers of the Regular Army when separated from the Field Artillery, by promotion or detail in staff departments, shall not thereby lose their status as active members.

Sec. 3.—The following shall be eligible to associate membership:

(a) Commissioned officers on the retired lists of the Regular Army and of the Organized Militia of the several states, territories and District of Columbia.

(b) Those who, as commissioned officers, either regular, militia or volunteer, have served with batteries or larger units of Field Artillery in time of war.

(c) Commissioned officers of the Regular Army and of the Organized Militia of the several states, territories and District of Columbia, not now belonging to the Field Artillery, who have served at least one year as commissioned officers in Field Artillery.

(d) General officers of the Regular Army, except as provided in Section 2 of this Article, and of the Organized Militia of the several states, territories and District of Columbia.

(e) All commissioned officers and former officers of the United States Army, Navy and Marine Corps, and of the Organized Militia in good standing, not included in the classification hereinabove set forth.

(f) Those in civil life, whose applications are approved by the Executive Council hereinafter provided for.

(g) All persons who, in any war, served in any capacity in the Field Artillery of any of the forces of the United States Federal government.

## ARTICLE IV

### APPLICATIONS FOR MEMBERSHIP; WITHDRAWALS

Section 1.—Any person, eligible, under the foregoing article, to membership, may become a member by making written application to the Secretary and paying the first year's dues. The decision of the Executive Council as to eligibility of an applicant shall be final.

Sec. 2.—Any member may withdraw from the Association at any time by tendering his resignation in writing, but such resignation shall not take effect until such member has paid all indebtedness due the Association at the time of such resignation.

Sec. 3.—Any member may be dropped for cause by a majority vote of the Executive Council; but no member shall be so dropped

without first previously notifying him, in writing, at his last known postoffice address, of the proposal to so drop him, and waiting a reasonable time for his reply.

Sec. 4.—A member dropped under the foregoing section may be reinstated by a majority vote of the Executive Council, and by paying all sums, if any, due the Association.

## ARTICLE V

### RIGHTS AND OBLIGATIONS OF MEMBERS

Section 1.—Active members only shall be entitled to vote.

Sec. 2.—The annual dues of the Association shall be fixed by the Executive Council, but shall not exceed $4.00 per annum.*

Sec. 3.—Active members shall be entitled to receive all publications issued by the Association without payment other than the annual dues.

Sec. 4.—Associate members shall be entitled to receive the Journal without payment other than the annual dues.

## ARTICLE VI

### EXECUTIVE COUNCIL; OFFICERS

Section 1.—The Executive Council shall be composed of nine active members, five of whom shall be officers of the Regular Army, two officers of the Organized Militia and two officers of the Field Artillery Section of the Officers' Reserve Corps, to be elected biannually for a term of two years by majority vote, in person or by written proxy of the active members. The Council shall hold its meetings at the headquarters of the Association, which shall be in the city of Washington.

Sec. 2.—The Executive Council shall appoint the following officers of the Association:

1. A President, to be selected from its own members, and who shall be an officer of the Regular Army.

2. A Vice-President, to be selected from among the active members of the Association.

3. A Secretary-Editor, to be selected from its own members, or other active, or associate members of the Association, and who shall be an officer of the Regular Army.

4. A Treasurer, to be selected from among the active or associate members, and who shall be an officer stationed or residing in Washington, D. C.

These officers shall hold office at the pleasure of the Executive Council and shall perform the duties usually and customarily performed by like officers in civil associations.

* The present dues are $3.00 per annum.

Sec. 3.—The Executive Council shall meet from time to time, at the call of the senior member present in Washington. Five members shall constitute a quorum for the transaction of business.

Sec. 4.—The Executive Council shall have power to fill any vacancy in its own membership by temporary appointment from among the active members and subject to the requirements of Sections 1 and 2 of this Article; provided, that such temporary appointment shall not extend beyond the next annual meeting of the Association.

Sec. 5.—It shall require a majority vote of the members of the Council present at any meeting to carry any proposition.

Sec. 6.—The Executive Council shall be responsible for the administration of the affairs of the Association. To this end, they are empowered to carry out any measures whatsoever, which, in their judgment, seem expedient to further the interests of the Association and to attain its ends and aims; provided, such measures are not in conflict with the rules, decisions or practice of the War Department.

Sec. 7.—No contract involving expenditure of funds of the Association shall be made except pursuant to a general or special resolution of the Executive Council, duly recorded. The Executive Council shall have no power to place any personal liability on any member of the Association, and shall incur no obligations which cannot be met by the funds on hand in the treasury of the Association.

## ARTICLE VII

### MEETINGS AND ELECTIONS

Section 1.—The regular meetings of the Association shall be held annually at Washington, D. C., or at such other place as may be designated by the Executive Council, who shall also prescribe the time of meeting and at least thirty days' notice, by mail, must be given to each active member.

Sec. 2.—At regular meetings, any existing vacancies in the Executive Council shall be filled; the Treasurer's financial statements shall be submitted, and his accounts audited; the Secretary-Editor shall submit a report on general affairs and progress of the Association and the conduct of the Journal since the last regular meeting; and such other business shall be transacted as may come before the meeting.

Sec. 3.—Special meetings may be called by the Executive Council upon written request therefor signed by twenty members. At least thirty days' notice thereof shall be given, by mail, to active members. The object of the meeting shall be stated in the request and in the notice.

Sec. 4.—Fifty per cent of the members in the United States, either present in person or represented by written proxy, shall constitute a quorum, except as provided in Article IX.

## ARTICLE VIII

### ADOPTION

Section 1.—This Constitution shall be considered as adopted and shall be of full effect when it shall have been accepted by eighty officers having the qualifications herein prescribed for active members, and when it shall have been subscribed to by the same officers, who shall then, and thereafter, be known as charter members of this Association.

Sec. 2.—Immediately after the adoption of this Constitution, the charter members shall proceed to the election of the Executive Council. For this first election, those eligible to join the Association as active members, under Article III, Section 2, shall be eligible for election as members of the Executive Council, the same as if they had already signed the Constitution as charter members; provided, officers so elected shall have the other qualifications provided for in Article VI, Section 1; but any officer so elected shall qualify as a member of this Association upon notice to him of his election, and before undertaking the duties of the office to which he is elected.

## ARTICLE IX

### AMENDMENT

This Constitution may be amended or altered by a three-fifths vote of the active members, either in person or by proxies in writing. To secure consideration of a proposed change, application must be made to the Secretary, in writing, signed by not less than twenty-five active members, setting forth clearly the alterations desired and the principal reasons therefor. This application must be submitted at least six months prior to the time of the meeting. The Executive Council will direct the Secretary to give notice, by mail, to the members entitled to vote, so they may receive it at least ninety days prior to the meeting. The notice will contain the proposed amendment with the names of the proposers. The notice will also be published in all copies of the Journal issued between the receipt of the application and the date of the meeting.

Proposed amendments to the Constitution will be voted on at annual meetings only.