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THE ORGANIZATION AND TRAINING OF RESERVE REGIMENTS

The Three Hundred and Second Field Artillery

BY LIEUTENANT-COLONEL H. R. BARKER, COMMANDING,
PROVIDENCE, RHODE ISLAND

NO PRECEDENT having been established for reserve organization it devolved upon those few officers who were in the regiment in 1921 to discover some way to organize, partially train, instill esprit and bring into existence a skeletonized regiment of field artillery.

ORGANIZATION

Due to the high standards and traditions of the Rhode Island Field Artillery it became necessary in selecting candidates for the regiment to approach only those officers, or potential officers, who through experience or reputation were of the desired field artillery type. Fortunately Rhode Island had a wealth of former 26th Division (Y D) field artillery veterans as well as officers of other combatant divisions of the World War, and around these veterans as a nucleus the regiment was built. The best officers available were assigned as battery commanding officers and given every encouragement possible to recruit not only their officers but noncommissioned officer personnel. As the regiment grew in numbers officers with staff experience were assigned to either regimental or battalion staff duties.

Then came the time when we tried to instill unit responsibility. Battery commanding officers were responsible to their battalion commanders for the officers and noncommissioned officers assigned or attached to their batteries. The battalion commanding officers reported to the regimental executive with reference to their batteries and battalion staff. The regimental executive consolidated the reports of the battalions and the regimental staff for the regimental commanding officer. Meetings, field manœuvres or any announcements were handled and checked back in this way so that as near as possible all matters pertaining to officers would be taken up through their unit commanders.

TRAINING

The training of the regiment has been divided into two parts, *i.e.,* indoor armory drill and field service. The keynote of the training both indoor and out has been the mutual coöperation and understanding which exists between the National Guard Field Artillery and the Reserves. Through the courtesy of Colonel E. S. Chaffee, 103d Field Artillery, this regiment has had the unqualified use of men, matériel and horses. Surely this regiment owes much to this coöperation. Indoor drill consists of monthly meetings at which such subjects as conduct of fire, calculation of firing data, service of the piece, and other technical phases of field artillery have been covered, the use of instruments and matériel from the National Guard being of great assistance. Certain meetings have been set aside, for which the officers of the regiment report at the riding hall of the National Guard Field Artillery, equitation and driving drill being the order of the evening. To promote esprit the officers of the regiment have met periodically at an informal dinner where the problems of the Reserve were freely discussed. Once each winter a field artillery banquet is held at which national guard, reserve and former World War field artillery officers are present. The best field artilleryman available gives an instructive and interesting address. All minds have but one thought, that is Field Artillery and Comradeship.

FIELD SERVICE

Outside of the two weeks' training period carried out under the direction of the division, which always results in excellent instruction and a comprehensive schedule, a program has been followed by the 302d Field Artillery, which has enabled the officers who were unable to attend the two weeks' training period to receive a certain amount of field service and instruction. In the spring and fall the monthly meetings are held on Sunday in the field, at which time the tactical side of field artillery is taken up. Terrain problems in which the regiment functioned as a regiment, with each officer performing the duty which would normally be his in the field, have been solved. The different phases of artillery in the offensive and in the defensive have been worked out and the general opinion of the officers present was that after all, artillery in the field is what counts. Each year a thousand rounds of service ammunition has been requisitioned and obtained. As the national guard field artillery has a range, and trains within the State, it has been possible for the reserve officers of this regiment to have at least two week-ends set aside for service firing. In this way practically every officer of the regiment has the opportunity to conduct service firing each year.

This year the 302d Field Artillery will take the field as a regiment for two weeks' training. A battery of the 103d Field Artillery will accompany us for service firing and instruction of battery officers. A tactical problem will cover the period of hiking and service firing, and the possibilities as the plan develops seem unlimited. This plan has been approved by the War Department and the Adjutant General of the State of Rhode Island.

Regular army officers assigned to this division have been most helpful in giving both their time and suggestions, especially with regards to the infantry phase of the tactical work. The response from the officers of the 302d Field Artillery to this service has exceeded anything thus far obtained and arrangements will be made whereby officers who are unable to take the entire two weeks' training, will be able to serve at least a part of the time with the regiment in the field and perform duties appropriate to their grade. The results should be of the greatest importance to both the Reserve and the National Guard. After all, we are one Army with the same interests and problems. Why shouldn't we work them out together?

The Three Hundred and Thirteenth Field Artillery

BY COLONEL LEROY W. HERRON, COMMANDING,
WASHINGTON, D. C.

IN THE training of a field artillery regiment in the Reserve Corps today the regimental commander undoubtedly faces many problems which are difficult for him to solve and, after he has tried, it is difficult to know whether correct solutions have been reached. This is brought about largely by the fact that the training of the officers, either assigned or attached to the regiment, may be located in one large city or possibly in the surrounding territory, whereas in other cases the officers live in widely scattered towns throughout a state. The regimental commander is not only confronted with the problem as to the best course of instruction, but is faced with the problem in the latter case as to how to give the instruction at all

It seems it is largely a case of what the particular regimental commander himself thinks and from what angle he views his own responsibility. If he looks upon the Reserve Corps as a real live component of the Army of the United States and as an organized and going concern, he necessarily feels his own responsibility for the instruction of the officers in his regiment. If, however, he is one of those who still erroneously believe that the Reserve Corps is a paper organization and that his own commission was given him as a reward for World War Service, he probably does not consider that he has any responsibility in the premises and, therefore, does little or nothing.

Some regimental commanders look at this question of instruction purely from the military standpoint, others seem to view it largely from a social angle, while still others are fortunate to combine the two.

When asked what was the best course of instruction for a regiment of field artillery in the Reserve Corps, trying to view it from every possible angle, I was not sure of the answer but had to rely upon my own judgment as to what should be considered the best course of instruction and method to be pursued in imparting this instruction to my officers. Of course, when a regiment is in the field and the officers are present where they can be observed from day to day, it is possible not only to have a progressive course, the results of which can be determined, but it is also possible to know the possibilities and limitations of each individual officer. All the matériel, horses, harness and fire control instruments are available so that the instruction can be constant, and those who do not catch on quite quickly can be "jacked up" a little. In the Reserve Corps where none of these things are available, the instruction assumes tremendous obstacles because of lack of equipment.

It has always seemed to me that there should be some coördinated plan of general instruction. As the matter stands it is so entirely in the hands of the regimental commanders, all of whom have probably different viewpoints, that two regiments belonging to the same division may find when they are put together that one is far advanced along certain lines wherein the other is lacking, and the other regiment advanced along certain lines wherein the first is far behind. In either case the team does not pull evenly and, unless they do, team work is largely lost.

Frankly, this article is considered because the writer hoped to receive some ideas or suggestions from other regimental commanders as to what they are doing, in order to improve his own regiment. When this thought was suggested to some other officers they immediately stated that the way to secure ideas from others was to give a few and, therefore, it would be well if I informed the readers of THE FIELD ARTILLERY JOURNAL of the methods pursued by me in the instruction and attempted up-building of the 313th Field Artillery.

I might just as well start at the beginning. Shortly after the World War when I was commissioned a lieutenant-colonel of field artillery I was very glad of it, but at the time I did not consider that it embraced any particular duties or responsibilities. Sometime thereafter I received an order from the Headquarters of the 80th Division stating that I had been assigned to the 313th Field Artillery and as I was the senior officer with this regiment, I was to assume command. Even this did not make any particular impression

THE WAR-TIME THREE-THIRTEENTH FIELD ARTILLERY
Moving up to New Positions Through Tailly, Ardennes, France, November 4, 1918

GETTING READY FOR THE NIGHT MOVE INTO POSITION
Three-Thirteenth Field Artillery, Nixeville, France, September 24, 1918

upon me. Later I received word that an officer of the Regular Army would soon report as executive officer of the reserve corps units for the District of Columbia. At that time I not only did not know who were the other officers assigned to the 313th Field Artillery but I did not know how to find out. Even if I had known I did not have the time to do the necessary work. Sometime there-after Major John Scott reported to me and said that he was the officer assigned to this duty and we had a general chat about the situation. He came in to see me several times and finally one day brought in a list of the names of the officers together with their rank and addresses, who had been assigned to my regiment. From that time on things commenced to pick up. I called meetings of the officers of the regiment but for the first year I did not meet with much success. Few officers came to the meetings and these were largely different ones each time; therefore, it was a difficult matter to have any progressive course of instruction and, as a matter of fact, no progressive course of instruction had been thought out.

At the end of the first year in trying to estimate the results obtained I was quite a bit discouraged and about came to the conclusion that I had failed. I heard some talk among the officers of the Reserve Corps, both in and out of my regiment, about lunches, dinners, dances and all sorts of social stunts, which seemed to me to have no place with a military organization except as a side issue. I almost reached the conclusion that it would be better to resign or at least ask other assignment and let someone command the regiment who was more sympathetic with the social end of it. I, however, decided to try it again for another year. Meantime, I was promoted to the rank of colonel and I was more conscious of my responsibilities than I had been before. I prepared a program of instruction which I considered progressive; issued it in the form of an order, at the beginning of the year so that both battalions, the one in Baltimore and the one in Washington, would be working on the same schedule. I assigned an officer to take charge of each meeting and to discuss the subject assigned at length, and I told the other officers I expected them to study it also, so that they would ge ready to correct any mistakes or ask intelligent questions. The program this second year included, the organization of the infantry division, types of artillery, explanation of infantry tactics, organization and administration of the field artillery battery, tactical and technical employment of the infantry battery and the accompanying gun, reconnaissance and occupation of position, artillery on the offensive, artillery on the defensive, artillery combat orders and map reading. A portion of each meeting is devoted to terrain board firing. I have not devoted any time to drill of the battery, arm signals, etc., but have devoted the time to

theoretical instruction. Elementary subjects can be more quickly and better taught in the field. I have had officers of the field artillery stationed at Fort Myer give talks in battery administration, draft, horses, harness and other subjects where their up-to-date practical knowledge has been of great value.

I also told my officers I expected them to attend the meetings in their uniforms, and I set the example by always wearing my own uniform. I informed the officers very emphatically, however, that I did not expect any officer to absent himself from the meetings because he could not wear his uniform. At each meeting I questioned those who did not wear uniform as to the reasons therefor. I told the officers who were in uniform wherein it was not correct and suggested the necessary changes.

At the end of this year I noticed considerable improvement. In the meantime I was fortunate to command the first field artillery regiment of the Reserve Corps to have its coat of arms accepted by the War Department and my regiment was the first to receive its national and regimental standards with the accepted coat of arms embroidered thereon.

At the end of the second year the regiment was ordered to attend camp at Camp Meade. Prior to going I held an inspection of the officers and went over their uniforms very carefully and impressed upon them the desirability, from the standpoint of discipline and morale of the regiment, of officers appearing in their proper uniform at all times. We were turned over to the Sixth Field Artillery during our period at camp, had two complete days of firing and, altogether, received wonderful instruction. The Sixth Field Artillery was on manœuvres during this period and, we therefore, had the privilege of working with it at this time. My officers were assigned to the same batteries to which they were assigned in my own regiment and the results were remarkable.

Now we are in the third year and again we are pursuing a course of instruction outlined at the beginning of the year, and we seem to be making progress and the officers are taking more and more interest and are attending in larger numbers. The officer conducting the regimental meeting has given it considerable thought and study and is prepared, in almost any case, to answer any reasonable question that may be asked. This year we are holding two meetings a month instead of one. At the first meeting in each month we have moving pictures secured from the Photographic Section of the Signal Corps, on subjects pertaining as closely as possible to the next scheduled talk. After the pictures we have blackboard or terrain board firing. Every Sunday some of my officers go to Fort Myer and have instruction in equitation. We,

of course, cannot give practical instruction on the 75-mm. gun, harness and fire control instruments, but must confine ourselves to theoretical instruction in the tactics and the technical side of field artillery. The writer hopes that the time will come when each regimental headquarters, where the officers are sufficiently concentrated to make it desirable, may be issued at least a 75-mm. gun, a set of harness and a set of single mount equipment, together with the fire control instruments so that practical instruction can be given. This would be a tremendous step forward.

This year the 313th Field Artillery expects to go to camp at Fort Hoyle, Maryland, the post of the Sixth Field Artillery, and maintain a unit camp. The program of instruction will be entirely in the hands of the regimental commander of the 313th Field Artillery, subject to the approval of the division commander. The personnel and matériel of the Sixth Field Artillery will be used to a limited extent for the practical instruction, and the amount of practical instruction absorbed by this method will undoubtedly be very beneficial. Certainly the only way practical instruction can be given is to actually exercise command in the field and this will be possible under this arrangement. All officers of my regiment are assigned by regimental order to batteries and they are assigned within batteries by the battery commander to departments, so that each officer is well grounded in his duties if called into active service.

I cannot finish this article without giving full credit to the assistance rendered the regimental commander and the other officers of the 313th Field Artillery by Lieutenant-Colonel John Scott and the other officers of the Regular Army who have been assigned to duty with the Reserve Corps units in the District of Columbia. They have carried on the administrative work and have been untiring in their efforts to help in every possible way. Certainly a great deal of whatever success we have attained has been due to them. They have been interested and enthusiastic and have made many suggestions to me without in any way encroaching on my prerogatives as the regimental commander.

This is where we stand at the present time. I am an enthusiastic believer in the efficacy of the Reserve Corps as a component of the Army of the United States and I want to do my full share in the instructing of the officers of my regiment so that if any emergency comes we will be prepared as well as can be reasonably expected under the plan outlined in the National Defense Act. I am looking for ideas, suggestions and new plans in order to make my own regiment more efficient, and I hope that some of the other regimental commanders will write THE FIELD ARTILLERY JOURNAL as to what they are doing.

The Three Hundred and Thirty-Second Field Artillery

BY COLONEL NOBLE BRANDON JUDAH, COMMANDING,
CHICAGO, ILLINOIS

THE writer entered the Officer's Reserve Corps in December, 1923, and embarked upon a plan of organizing a reserve field artillery regiment around veteran officers of a former national guard unit. This unit was the 149th Field Artillery of the Rainbow Division, a regiment which had a very highly developed esprit de corps. This esprit de corps led many of the old officers to join the reserve regiment and it was possible in most instances to assign them to their former commands. The reserve regiment now has the regimental adjutant, two battalion commanders, and eight captains holding their former assignments. The first lieutenants and many of the second lieutenants held the same rank in the old regiment and the remainder of the second lieutenants were sergeants. In addition, seventy-five noncommissioned officers have been enlisted, who were noncommissioned officers in the old regiment. This same esprit de corps gives the reserve regiment a cohesion which the writer is satisfied from his observation, could not be obtained in a new reserve regiment without several years of service, and helps to solve the problems of attendance and study.

Last year, during the organization period, monthly dinners were held and lectures were delivered on subjects of interest to the artillery. At first the system of having the regimental officers deliver the lectures was tried. This was on the theory that the other officers would be interested in hearing one of their own number speak and that the preparations of a lecture would force the lecturer to brush up on his subject. However, it was found that this theory did not work in either respect and that lectures by officers of the regular service brought about better attendance at the meetings.

By the middle of the summer, the reserve regiment was fully organized. Our experience had by that time shown us that a monthly meeting was a waste of time for busy men unless real instruction was received. It was also found that having a dinner for the entire regiment was a waste of time and that it was better to let the officers and men eat in small groups wherever they pleased, and report for the meeting at a later hour.

In order to provide real instruction for the months from October to June, a course of lectures was laid out to be delivered by officers of the regular service who volunteered to help us. This instruction is given in three different classes. The senior officers have a course of lectures on general subjects of importance to the Field Artillery, the junior officers have a course to freshen them up for firing practice at the summer encampment; and the noncommissioned

officers have a course to bring them up-to-date in their duties and fit them for promotion later on. Captain Orville M. Moore and Captain Arthur B. Wade, both of the 14th Field Artillery and stationed at Fort Sheridan, Illinois, have volunteered to act as instructors for the junior officer group and noncommissioned officer group respectively, and have been extremely helpful.

Colonel Thomas S. Hammond, the Commanding Officer of the 124th Field Artillery of the Illinois National Guard and an officer of the 149th Field Artillery during the World War, has very kindly given us the use of space in his Armory. This has been of the greatest assistance to the regiment because guns, horses and fire control instruments have thus been made available for instruction purposes. The writer wishes to express here his acknowledgment to Colonel Hammond and his hope that this kind of coöperation between the National Guard and the Reserve will become stronger throughout the country.

A series of lectures to be delivered to the senior officers by officers of the regular service available at Sixth Corps Headquarters was decided upon, after consultation with Colonel Manus McCloskey Chief of Staff of the Sixth Corps, as follows:

Organization of the Army of the United States.
Tactics of the Combined Arms.
Communications and Liaison.
Recent Developments in Field Artillery Matériel.
Recent Developments in the Air Service.
Recent Developments in the Chemical Warfare Service.
Field Fortifications, Hasty and Permanent.
Homely Hints on Handling Men and Managing Messes; on Army Correspondence, Sanitation, et cetera.
Mobilization Plans, to Include Supervision of Plans of Lower Units.

The course for the junior officers was laid out as follows:

Present Organization of a Field Artillery Regiment.
General Theory of Artillery Fire; Elements of Firing Data.
Computation of Firing Data (Two meetings).
Battery Firing Positions; Selection and Occupation of the Same.
Conduct of Fire.
Conduct of Battery Marches; Camp Sites; Camp Sanitation.
Care of Horses; Draft.
Equitation.

The course for the noncommissioned officers was laid out as follows:

Present Organization of a Battery of 75-mm. Guns; Formation of the Battery Dismounted and Mounted; Manœuvres of the Battery Dismounted and Mounted.

General Theory of Artillery Fire; Position of Cannoneers; Service of the Piece.

Nomenclature of Fire Control Instruments; their use; Elements of Firing Data.

Elements of Map Reading; the Telephone.

Drill of the Gun Squad in the Service of the Piece.

The Horse, His Characteristics, Care and Handling.

Bridling, Saddling, Equitation.

The Artillery Horse and the Artillery Team.

Equitation.

For the spring months, classes in equitation are being organized for Saturday and Sunday afternoons and it is hoped that these will be well attended. There has been talk among some of the most interested officers of holding the regimental meeting every two weeks, but it is considered by the writer that in the present state of organization of the regiment, this would be too often.

It has been found that with this kind of instruction, much greater interest is being taken in the monthly meetings. The lectures start at 7:30 P.M. and end at 9:00 P.M. The attendance has averaged approximately forty officers and twenty-five noncommissioned officers. When there is a large attendance of noncommissioned officers, one or two of the junior officers, who were also instructors at Saumur during the War, assist Captain Wade. So far no method has been found to increase attendance except through the interest aroused by the instruction and the desire of the officers and men to see their comrades.

By arrangement with the corps commander and the chief of staff of the reserve division, all assignments to the regiment have been upon the recommendation of the commanding officer, so that the esprit de corps of the old regiment can be used in building the new one, and so that there is an incentive among the younger officers to fit themselves for promotion. It has been stated to them that all vacancies in the regiment will be filled by promotion from the regiment and this is having an excellent effect upon the morale. A certain number of both officers and noncommissioned officers, of course, joined the regiment for old associations sake and do not take an active interest. However, most of the junior officers and a surprisingly large proportion of noncommissioned officers, are taking a very active interest. In the course of time, those officers who do not take a real part in the work of the regiment will be detached and junior officers promoted to fill their places. The detached

officers can then be attached to the regiment for instruction if they so desire, which will keep them associated with their friends but will not prevent the promotion of more active and interested junior officers.

It seems to the writer that the first requirement for the training of a reserve regiment is the creation of a strong esprit de corps. Without esprit de corps, regular attendance cannot be obtained even when the best instruction is given. When esprit de corps has been aroused, there is an incentive to work for promotion and an incentive for attendance at the monthly meetings.

The Three Hundred and Sixty-first Field Artillery

BY LIEUTENANT-COLONEL HENRY C. R. AKIN, COMMANDING,
PORTLAND, OREGON

THE diversity of man's beliefs is as wide as the poles and reflects the surroundings and conditions of the individual and the value of his interpretation of his experiences as well as his powers of observation. It is by a careful study of the beliefs and ideas of many individuals that certain fundamental truths may be discovered and evaluated. With this in mind and with a full realization of the limited importance and scope of the experiences or opinions of any one individual, the following notes on the activities and training in a single field artillery reserve regiment are informally submitted with the hope that they may be useful in other reserve organizations.

The 361st Field Artillery, 96th Division, is allocated to Oregon with its units and officers well scattered over that large state. About one-third of the officers reside in Portland and environs. Some 50 per cent. of all officers in the regiment are second lieutenants, without commissioned experience and with but little, if any, actual army service in any grade.

Whatever has been accomplished in the regiment that is worth while is due mainly to the interest and energetic coöperation of the captains and lieutenants of the regiment and the cordial understanding and assistance of Lieutenant-Colonel W. C. Webb, Field Artillery, Regular Army, on duty with the headquarters of the 96th Division and assigned to the regiment as executive officer.

The four principle methods of instruction for reserve officers now in vogue are not producing quite the broad general results to be desired, because only a very small per cent. of the reserve officers is being benefited.

Service magazines and instruction bulletins contain a great deal of valuable material, but give uncertain results since so few reservists receive them or read what they contain.

Correspondence courses, though excellent in themselves, accomplish

but limited results because only a comparatively few start the courses and still fewer complete them satisfactorily if at all.

Summer camps of instruction are also excellent both for instruction and for developing esprit, yet scarcely 10 per cent. of the reserve officers receive this instruction each year. It is to be remarked in this connection that about half of each year's attendance are those who have been at one or more previous camps.

Attendance at service schools affords perhaps the best training for reservists, but at the rate of perhaps one officer from each regiment every two or three years.

It is, therefore, evident that some additional means of reaching and instructing a greater proportion of reservists is necessary.

Any plan for training reserve officers must be governed by a due regard for the annual shortage of training funds on the one hand, and on the other, the lack of active interest on the part of some, especially the less experienced reserve officers, and the current reversion of public sentiment toward pacificism and a blind disregard for the patriotic duty of every American citizen. That a nation should perish because of unpreparedness due to failure of her citizens frankly to acknowledge and live up to their patriotic obligation to be prepared in time of peace, is as terrible as for a nation to perish because of cowardice on the part of her citizens in the face of the enemy in time of war.

In view of the numerous handicaps presented and mindful of the experience had with other means of instruction, it is evident that the first thing to be done is to gain the attention of the reserve officer and then stimulate his interest and coöperation by giving him what he wants and needs in the way of instruction with the least possible expenditure of time and effort on his part, for the reserve officer is a busy civilian with business obligations which he cannot neglect.

Defense Day in September, 1924, afforded a unique opportunity to assemble a number of the officers of the 361st. A luncheon meeting was held a week before Defense Day, at which arrangements were made for the officers to participate as a unit in the Defense Day parade. Considerable interest was manifest. Guidons were obtained locally and paid for by subscription by the officers. The turn out for the parade was good and indicated the birth of a regimental spirit. The following week another enthusiastic meeting was held, and then followed regular weekly noon meetings and the organization of an officers' mess under the name of the 361st Field Artillery Officers' Round Table.

Meetings have continued without interruption ever since, at noon on Wednesday of each week, and a careful check has shown a remarkably small number of unaccounted for absentees. In other

words, the veteran officers (bless 'em) in Portland and vicinity have consistently attended whenever possible.

An instruction program committee has provided speakers for the meetings. The subjects assigned have been handled by officers of the Regular Army, the Navy and able civilian speakers, and have varied from current artillery topics to talks on Japan, Explosives and Propellants, the War in Poland, Russia in 1918, Military Law, and so on.

Occasionally the set program has been omitted, and these enthusiastic open meetings have been most effective in establishing cordial and friendly relations among the officers of the regiment. Meetings have always been held about a round table in the same room. Notices have been mailed to reach each officer two days before the meetings.

Now as to results: Certainly there has been a bucking up of interest in the regiment and in reserve affairs in general, and it is beyond question that the acquaintanceship and understanding gained by the officers' meeting informally around a lunch table each week, having common interests and ideals and listening to instructive talks by able men, will better enable them to work as a team if the regiment is ever mobilized for war. The instruction gained at the meetings and the mere keeping alive of the field artillery interest, will make the individual officer better able to profit from his attendance at the summer camps. Above all comes the stimulation of that most important thing—Regimental Esprit.

A regimental rally was held on March 21, 1925, and it was a huge success so far as those who attended were concerned. The program included a Round Table luncheon at noon and a banquet at night, with a vaudeville entertainment followed by several interesting talks and discussions of an instructive nature, touching upon instruction methods and the problems of the citizen soldier in time of peace and during the trying period after mobilization starts for war.

The interest of some of the officers who came from a distance is worthy of note, one of them coming from the extreme eastern part of the state. No doubt the rally will be an annual affair hereafter.

But there was, as is so frequently the case, a fly in the ointment—namely, the second lieutenants.

One thing stands out significantly in all this and that is that the veteran officer in the regiment, almost without exception, is loyal and constant in his enthusiastic interest. The more service he has had, the greater his apparent enthusiasm. On the other hand, the youngsters, with no war or commissioned experience, as a rule seldom attend the meetings, in spite of every effort being made to secure their interest and presence.

A reserve commission means something real and worth while

to the man who has served as an officer, but the young men who have been commissioned since November 11, 1918—what of them?

What, indeed, of the second lieutenant? Unknown, unreachable by mail or phone or personal call, disdaining to answer letters from one and all, he presents a strange and serious enigma.

The lieutenants of today will become the battery commanders—perhaps the field officers of the next war. Unless these young men are brought into the game and tried out in practice, how can they ever qualify for advanced grades later on? Should they be required to serve with the colors for a term of months upon being commissioned? Will it be necessary to resort once more to the citizen training camps in the next emergency, and if so, who will stand between us and the enemy for fourteen months as France and England did in 1917-1918?

Our younger reserve officers are of the finest type of young American manhood. There can be no question as to their fundamental soundness of character or of their staunch patriotism once it is aroused. But, who will tell how to rouse their military and patriotic interest and keep it constructively alive during these piping times of peace in the days of their youth, when the evil days of war come not? Therein lies one of the greatest and most serious difficulties encountered by the reserve unit commander today.

The Three Hundred and Seventy-first Field Artillery

BY COLONEL H. R. FREEMAN, JR., COMMANDING,
PITTSBURGH, PENNSYLVANIA

IT SEEMS to me that a discussion of this sort falls naturally under three main headings: first, organization; second, training during an inactive period; and third, training on an active duty status during summer camp.

With reference to organization. My opinion is that a foundation on which proper unit training can be based, can only be effected after a skeleton organization has been formed and a certain shifting of officers made so that the right man is located in the position to which his previous experience and general capabilities fit him. This necessitates personal contact on the part of the regimental commander with officers in his regiment, and also a mutual acquaintance among the regimental officers. In the case of the 371st Field Artillery, our organization first began to function as such when we were called to camp last summer. Prior to this tour of duty, there had been one or two social gatherings of a number of officers of the regiment, which to some extent laid the foundation of the later organization. I believe, however, that any esprit which this regiment now has owes its inception to the associations formed at camp. We have endeavored to maintain this spirit by holding dinners

or smokers at different times, such affairs being handled on a strictly social basis. I firmly believe that such meetings are invaluable towards building up a proper regimental esprit, and until this has been firmly established, I doubt very much the possibility of securing fair attendance at meetings held for purposes of professional instruction.

It appears very difficult to accomplish much in the way of training during an inactive period. Conditions at Pittsburgh for such training, are probably as satisfactory as at any place in the country. We have here complete units of the National Guard with sufficient matériel for use by reserve officers, and we have met with the greatest degree of coöperation on the part of national guard officers in allowing us the use of their facilities. Also, division headquarters are located here, and members of the headquarters staff hold themselves available at practically all times for instruction of classes of reserve officers. In addition to this, practically all the officers assigned to this regiment are located in the Pittsburgh District, and are therefore, more available than is the case in the majority of reserve units.

Notwithstanding this, and although we have tried various systems of training, such as correspondence courses, weekly schools for all officers, and bi-weekly schools for officers of the field and staff, it has been extremely difficult to secure proper attendance at these classes, or to obtain any large degree of interest in correspondence courses.

The present scheme of summer training, providing as it does for two weeks for each officer every third year, is to my mind extremely valuable to such officers as can avail themselves of this opportunity. Of course, two weeks in three years is insufficient time to secure more than a veneer of training, but it at least enables an officer with previous experience, to get his hand in and it affords him an excellent opportunity for association with officers of his own regiment, and with others with whom he is thrown in contact. The fact that reserve officers are available for instruction for only this limited period, necessitates the highest degree of coöperation and coördination of the various agencies of instruction, so that the maximum benefit may be derived. In the case of our regiment last summer we met with every possible consideration on the part of those having to do with the general training, but I think that the general schedules followed are subject to some criticism. The officers of this regiment were attached to a regular field artillery regiment for intensive training, but it soon developed that in addition to the schedule for reserve officers, this training regiment had, at the same time, to follow more or less conflicting schedules covering training of the R.O.T.C. and the C.M.T.C. units, and also to follow

their own particular training schedule. This resulted frequently in loss of time and certainly the results accomplished were not as great as would have accrued had the regiment in question been available purely for training of the officers of the 371st Field Artillery.

This criticism is made with full knowledge on my part, of the very heavy demands made on the limited number of regular regiments which are available for training purposes during the summer months, but it does appear that every effort should be made to utilize to the full, the opportunities afforded the reserve officers by contact, during a very limited time, with a fully equipped and well trained regiment in the field.

In general, I might say that the difficulties which we experience in securing attendance at classes, are probably akin to those experienced by other units in various parts of the country. Of course, the officers of this regiment, as of others, have various business, social and fraternal affiliations, which of necessity compete with any meetings which we may wish to hold. I have found that the only way in which attendance can be secured is by personal solicitation, which requires a large amount of time on the part of two or three officers of the regiment, who are unusually active. A large majority of reserve officers, I feel, are interested in their work, but it requires an unusual effort to overcome the natural indifference they have towards accepting demands made on their time for the purpose of military instruction. Also, such instruction, when it can be given must of necessity be of a very flexible nature, due to the varying degrees of previous experience and training of officers in all grades.

I have written candidly as the situation appears to me, and it may appear from a perusal of the above that I am unusually pessimistic with reference to the possibility of securing any adequate training for the reserve officers, particularly on an inactive basis.

I do feel, however, that it can be accomplished, although it evidently is going to take time and a large amount of effort on the part of the regimental commanders with whom the burden chiefly rests. There are always, however, several officers in a regiment upon whom you can rely to devote considerable time and effort to this work, and by working intensively with them and through them, I believe the circle can be enlarged until eventually we will have a strong and active organization, founded on the mutual realization of the obligations which accompany a commission in the Reserve Corps, and on a willingness to work towards placing reserve units on a basis of efficiency which will make them of value in time of need, rather than purely paper organizations entirely out of touch with things military.

The Three Hundred and Ninety-first Field Artillery

BY MAJOR MEREDITH B. WOOD, 309TH F.A.*
NEW YORK CITY

WELL, it's the same old army—only it's a lot better.

It's the *same* because we had to get up bright and early every morning, and because we cursed ourselves and the army and the food and the weather.

And it's *better* because the army seems to have profited considerably from the scrap it went through not so long ago.

But to go back to the beginning. About a year or so ago, the War Department issued orders that a certain number of regiments should be sent to camp for two weeks' training as *units*. This was a radical departure from previous custom, when officers had been ordered out as *individuals* to go to camp for two weeks' schooling.

In the Second Corps Area there were only one or two regiments that had been active enough, or were sufficiently organized, to be ready for such duty. Foremost among these was the 391st, with Colonel W. E. Shepherd, Jr., in command. It was natural that the 391st should be actively organized at a time when other regiments were more or less waiting for somebody else to start something. For by being active, the 391st was merely reflecting the spirit of its commanding officer.

During the World War, Colonel Shepherd played an interesting and effective rôle, first as a junior officer in the Seventh Field Artillery of the famous First Division, then as operations officer for the First Field Artillery Brigade under General Summerall, and later as operations officer for the Fifth Corps when General Summerall was appointed to that command. It was during this last assignment that Colonel Shepherd worked out the now famous barrage that played such an important part in the success of the Meuse-Argonne offensive. For his tactical skill in handling this operation, he was justly awarded the Distinguished Service Medal.

For some time previous to the issuance of the order sending the 391st to Pine Camp, the officers of the regiment had been getting together at monthly luncheons and at a dinner or two in the evening. This had resulted in the development of an esprit de corps, which made it a comparatively simple matter to perfect the regimental organization. Of course there were a number of officers who found it impossible to go to camp for one reason or another. All vacancies were therefore filled by attaching officers from other regiments who had applied for two weeks' active service. In this a provisional regimental

* EDITOR'S NOTE: While Major Wood is a member of the 309th F. A., he was, due to local circumstances, attached for the last summer camp to the 391st F. A., in which regiment he acted as plans and training officer.

organization was worked out, with each officer assigned to a particular duty in accordance with the Tables of Organization. Captain "So and So" was regimental supply officer; Lieutenant "Blank" was executive officer of Battery A, and so forth.

Upon arrival of the regiment in Watertown, we were met by army trucks which conveyed us to camp—as ideal a spot as any I have ever seen. Turning off the main highway, we followed a dirt road for a short space, then passed through a grove of pines and maples to find a flat, sandy meadow nestling alongside the beautiful Black River under the shelter of a wooded bluff. Rows of tents at one end afforded shelter for ourselves and also for the officers and enlisted men of the Seventh Field Artillery, who were to be our hosts for the next two weeks. At the lower end of the field, and slightly below us, were the picket lines and gun park.

We found a warm welcome awaiting us in the form of Major J. N. Greeley and the officers of the Seventh Field Artillery—a welcome that was truly Southern in its hospitality, a welcome quite unlike that we received in the early days of the war. These regular officers were glad to see us. They wanted to know how they could help and what they could do for us. It was this spirit of hospitality and friendliness that made our two weeks at Pine Camp so pleasant, and which made us realize how great were the changes that had swept over the Regular Service since the war.

Another pleasant surprise in store for us was the fact that we were actually to function as a regiment. We weren't "just going to school again." Each officer had his special duty to perform, and if he didn't do it, the regiment suffered. For example, Colonel Shepherd was in full command of the regiment. If he didn't get busy nothing happened. If the adjutant didn't pass on the colonel's orders, nobody knew what was scheduled for the next day. If the supply officer didn't function, we didn't eat. It was the same all the way down the line. Each officer was given the opportunity, to exercise command and to function in his own particular rank.

Well, we plunged into work at once (and being blessed with an excellent supply officer, we didn't starve!). After the colonel had established his headquarters, he conferred with the camp commander to find out what the general nature of the program was to be. It turned out that the first three days—Monday, Tuesday and Wednesday—were to be devoted to brushing up in general, to lectures, riding and tactical exercises. On Thursday the regiment was to take over 300 C.M.T.C. students who were in training at Madison Barracks, some 18 miles away. For a week they were to be under our command, acting as our enlisted personnel, working with the horses and matériel of the Seventh Field Artillery. Upon their return to the Barracks the following Wednesday, there were to be

THE GUN PARK AND PICKET AT PINE CAMP

MESS TIME

CROSS COUNTRY RIDING—ALL IN THE DAY'S WORK

A C. M. T C. BATTERY

tactical rides and manœuvres of a more involved nature, ending up with a regimental problem on a large scale.

There are one or two points that I wish to bring out in connection with our work. In the first place, whoever would have thought in the old days that a crack outfit like the Seventh would be willing to turn over their horses, guns and other equipment to a bunch of reserve officers? Well, that's exactly what they did, and they did it cheerfully. Secondly, I want to stress again the fact that Colonel Shepherd was in command of the regiment. The regular officers present were to act as our instructors and to help the colonel as he saw fit. Truly the reserve officers were in the saddle!

But to get back to our story. The Schedule called for brushing up the first three days. And brush up we did with a vengeance. There were lectures and rides and conferences from early morn till late at night. The very first day we went on a tactical ride, covering some dozen or more miles at no gentle pace, and there was many a sore spot to tell the tale at the end of the ride. But we located a lot of good battery positions and of course we routed the enemy!

Then we had instructions in cross-country horsemanship from Major Sands, our senior instructor, famed throughout the army for his equestrian ability. There was many a rumor afloat of the wild rides he had conducted the summer before, and now we had a taste of them—through the woods, winding swiftly in and out among the trees, first in single file, then in column and finally in line; down a gully in single file again, up a steep slope, and then a slide!

It honestly looked impossible to most of us. But down went the major at the head of the column, so we just had to follow. And we managed it somehow without mishap, much to our amazement. (Before camp ended that slide looked easy!)

Such were the first three days. On Thursday the First Battalion was given the honor of marching half-way to Madison Barracks to meet the C.M.T.C. unit, which was hiking the 18 miles to Pine Camp in a day. It rained cats and dogs of course, but the march was accomplished without mishap, and the rain made it seem like old days in France. After the horses were groomed and put to bed, and the matériel properly cleaned and parked, the Second Battalion officers took command.

Bright and early next day, the regiment marched out, with guidons flying, to the range, where the batteries were dug in and firing commenced without delay. The officers of the regiment fired in turn under the direction and criticism of their battalion commanders, while the C.M.T.C. boys acted as our gun crews under the supervision of the 2nd battalion officers. By noontime we were all good and hungry, and the arrival of the Seventh Field Artillery rolling kitchens, emitting pleasant odors, was a welcome sight. All

thought of the "battle" was put aside for the time being while we dined on roast beef and corn and bread and potatoes, topped off with coffee and chocolate pudding! After mess came more firing until 3 or 3:30, when it came time to hike back to camp for a shower before retreat.

Such was the program for a week, with different firing points each day and different officers conducting the fire. In this way every officer fired at least one problem. And we didn't have to worry about ammunition either. Remember in the old days the constant watchfulness to conserve ammunition. "Save the shells," they used to tell us. "Don't go in for fire for effect. It's too expensive." Well, here it was different. Not that ammunition was wasted—it wasn't. But we were able to go into fire for effect, to fire a number of volleys if necessary to see whether adjustment in the various elements of fire had really been completed or not.

During all this week those who were not required with the batteries on their march out to the firing points were greatly entertained by Major Sands and his famous cross-country rides. Mounted horsemen can of course travel faster than a battery on the march, consequently the rides conducted by the eminent equestrian major not only covered greater distances, but also afforded him the opportunity to teach us something about real slides. Each day we went down a more difficult slide until finally we went down a bank 120 feet high that honestly looked almost perpendicular. It actually was 65º in slope and it descended directly down to the rocky bed of the Black River itself.

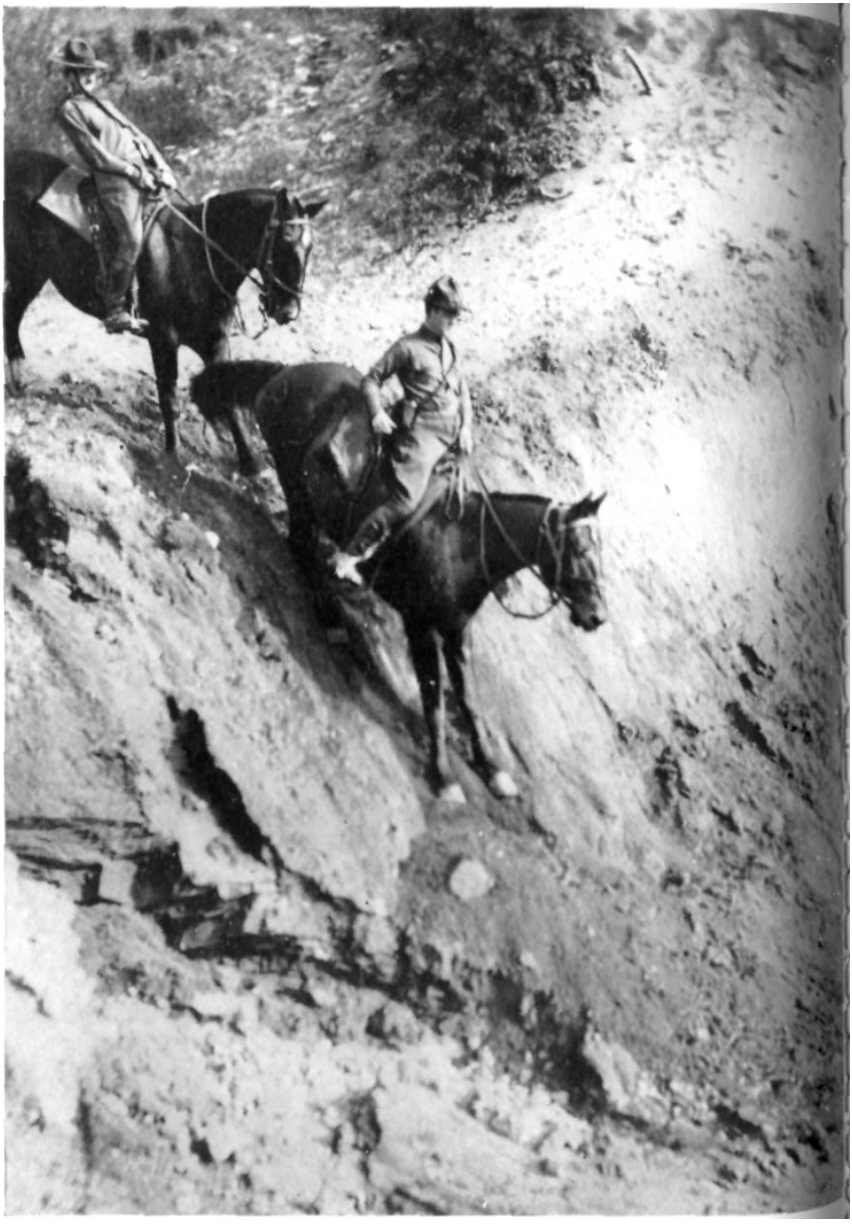
It took a good deal of nerve to go down that slope, particularly for the first ones down. Fortunately the footing was soft and the descent was accomplished without mishap, much to the amazement of the natives who gathered from all sides to watch the excitement. *That* was a slide worth talking about.

After the C.M.T.C. students had been with us a week they were marched back to Madison Barracks by the officers of the Third Battalion. Those boys were a good lot and they did their end of the work very satisfactorily. When they had gone we resumed our tactical rides—taking up battery positions, battalion positions, regimental positions. We imagined all kinds of situations for the famous Red and Blue Armies and had those mythical forces go through many intricate battles and manœuvres. The climax in a tactical sense came on the day before camp ended. We, as the 391st, were part of the corps artillery supporting the 77th Division. This division had been sent ahead to establish a bridge head and to cover the crossing of the Black River by our army, and because of the nature of the mission, a great deal of artillery was required.

After the situation had been explained to Colonel Shepherd, he

THE 391ST, F. A. POLO TEAMS AT MADISON BARRACKS

THE BIG SLIDE



JUST TO PROVE OUR STORY

rode out with his staff ahead of the regiment to reconnoitre. Presently he sent word back to his battalion commanders to report at the "Hog's Back," a prominent bluff with a commanding view of the terrain. After everyone had reported, the situation was gone over carefully, the regimental orders were explained and the various elements of the regiment were assigned their general locations and duties.

Meanwhile the reconnaissance officer had discovered an ideal spot for regimental headquarters—an abandoned house on the range. The colonel and his staff descended upon this at once and welcomed it with open arms. The staff soon had headquarters working like clockwork. Tables and chairs were rustled from nowhere; telephone communication was established with the battalions and with the brigade commander, Major Sands; further regimental orders were prepared; and beautifully colored maps were worked out and hung on the walls for the eyes of any inquisitive superior officers that might happen along.

The beauty of the whole problem was the thoroughness with which it was worked out. This was true right down to the last officer. Not only was every battery position actually located, but data were calculated and dead space charts prepared for each position. Not only were communications actually established with every unit in the regiment, but accurate maps were prepared showing the regimental network. All this was the result, of course, of the training received during the camp. Every officer knew what he had to do, and he did it.

After the problem had been carried on for some time, a messenger was sent to brigade headquarters to find out if there was any further information regarding enemy movements. Presently he came back with the information that the B.G. was asleep and did not wish to be disturbed. Truly it was just like France again!

Well, that was the story of the camp. No, not quite all, because I haven't mentioned the polo team and the recreational side of camp. Almost any afternoon, after work was done, a number of enthusiasts might have been seen with polo mallets, whacking the ground in their attempts to hit the elusive polo ball. After several days of practice under the able coaching of Major Sands, two teams of moderate ability were selected to play at Madison Barracks, where the officers of the post were kind enough to furnish us with good ponies and an excellent field. Then there was a week end which was used differently by the different officers. Through our excellent supply officer, arrangements were made for some of us to motor over to Alexandria Bay for a dance and a good rest. Others went sailing on the bosom of Lake Ontario, passing the week end in utter laziness and acquiring an excellent sunburn. A few of us played golf, for

the privileges of the Black River Country Club were kindly extended to us. And finally there was a farewell party, given the night before camp broke up. Around a roaring fire we gathered, with refreshments and cheese and crackers a-plenty, listening to army songs and stories, old and new. That was a real good party.

Camp broke up the next day and I think everyone had had a good time. Of course there were some who grumbled and others who complained at one thing or another. But what would the Army be without its grumblers? To Major Sands, our senior instructor, must go full credit for the great interest the camp held for us. It was his hard work and ever-cheerful personality that helped us over the rough spots and made us forget our troubles.

From every standpoint the camp was a great success. First, it gave us a healthy two weeks' outing. It brushed us up on the fundamentals of field artillery and gave us a high regard for those gentlemen, the officers of the Regular Establishment, who so graciously put up with our ignorance. Second, it gave us an inkling of the great possibilities inherent in the reserve idea. It showed that the officers of the reserve want to stand on their own feet—they don't want to be coddled, they want hard work and real responsibility.

That the War Department feels the same way about the success of the camp is evidenced by the fact that orders have recently been issued designating other regiments for training as units this summer. There is to be a difference this year, however. Last year we took over the C.M.T.C. unit after two weeks' training under regular officers. This year, the reserve regiments will take over the students upon their arrival in camp. The reserve officers will organize the students into batteries, furnish them with clothing and equipment, feed them, and drill them in the elements of artillery—foot drill, gun drill and so forth. It will be a taste of what we would have to go through in the event of an emergency, with the draft furnishing us with our enlisted personnel.

It is this idea of *service by regiments* that will make the reserve worth while. Such service presupposes organization within the regiment, and naturally the officers of any regiment will take more interest in the reserve when they know what their particular tasks are to be within their own outfits. They have something definite to drive at and are not attached to some mythical regiment that never seems to function. It will take time of course to work up the desired amount of interest throughout the entire Reserve, but the War Department is on the right track. *Service by units* is the answer.

THE SCHOOL IDEA FOR NATIONAL GUARD OFFICERS

BY CAPTAIN GENNAD A. GREAVES, F.A.

REGIMENTAL schools are apt to be sporadic. It sometimes happens that they have a distinct tendency toward desultoriness and a bad habit of petering out. A thin finish is the rule, and it is only the exception that terminates with a full attendance and a flourishing morale. It seems inevitable that schools are vanquished by the sterner demands of other and unforeseen duties, and while the schools very often start with the proclamation that nothing shall interfere with attendance, there is a falling off and a slowing down. Captains Smith and Jones are called suddenly to general court duty at the critical moment, and Lieutenants Black, White, Greene and Brown are putting out fires on the target range or superintending the loading or the packing or the building or the training of certain things or detachments at certain places at the important hour when they should have a volume of 430–85 in one hand and an Eversharp pencil (complete with long-distance eraser) in the other, and an acrobatic frame of mind conducive to computing atmospheric elasticities and V minus V subzeros.

In spite of the fundamental instinct of the human race to escape from schools and the tendency, which many improvised schools have, to gradually thin out until they are "called off," there is one such school for national guard officers which has been running successfully for two years and hasn't yet thinned out or been called off.

This is the 111th Field Artillery Club of Norfolk, Virginia (really a school in disguise), which meets regularly twice each month for ten months in the year for an hour and a half session at each meeting.

The story of this school-club is told here in the hope that it may prove of passing interest to officers of the National Guard and with the idea that it may be of actual service as a suggestion to officers of the Regular Army who are, or in future may be, detailed as instructors of the National Guard.

This school was born on the Old Bay Line steamer that traversed the glittering, black waters of the Chesapeake Bay on the night of December 1, 1922. A small detachment of officers of the 111th Field Artillery, Virginia National Guard, journeyed, that cold, moonlight night, from Norfolk to attend the Army Day celebration held that year for the 3rd Corps Area in Baltimore, December 2nd.

Lounging in the smoking room in the hazy penumbra of an almost total eclipse of the electric lights, and encompassed by brass-bound cuspidors, an officer of the detachment was "struck" by one of those rare flashes of thought-lightning which light up the dim paths of the future and illumine the course of action to a great distance.

Major William H. Sands, who now commands the 111th Field Artillery with rank of colonel, conceived the idea of having a school for officers camouflaged and disguised as a social club, at which the officers would assemble for dinner and social contact. After dinner, according to the plan, a blackboard would suddenly be produced from behind the scenes, and an instructor, who would have been appointed two weeks in advance, would lecture for half an hour on a technical field artillery topic. The lecture or talk would be followed by a general discussion, questions and informal debate and arguments on the merits or demerits and the pros and cons of the subject of the evening. Training regulations and Fort Sill documents would be placed at the disposal of the instructing officer well in advance of the date set for the talk in order that he might fully prepare himself. Following the general discussion there would ensue a session of blackboard firing or computation of firing data, problems in clearing the mask, lateral observation, diagrams or actual demonstrations with instruments. The meetings would take place in a private dining room of a centrally located hotel and the gatherings would be dismissed promptly so that other engagements might not be interfered with. The blackboard firing would always be conducted with swiftness and energy by some one well qualified for this type of work, so that it might never become irksome or lack the necessary tension.

Such was the basic plan of the school. This original plan has worked. Several of the details were developed as the school progressed. Only one important detail of the original plan failed to work. The original plan provided that each officer in turn would be designated to lecture or talk before the club. This proved to be an error. After hearing a few fatally ineffectual talks by the weaker members of the club, there developed an alarming tendency on the part of the older and more experienced officers to be very, very busy on school nights. This system, therefore, was speedily abandoned, and thereafter only those best qualified to talk were requested to lecture. This change in policy caused surprisingly good results in attendance.

The first regular meeting was held on February 2, 1923, at the Fairfax Hotel, at Norfolk. A private dining room was secured which has been used at all subsequent meetings except one. Major Sands (later lieutenant-colonel and colonel) was elected president

of the club. A secretary and treasurer was appointed and given authority to buy a sufficient number of training regulations and Fort Sill pamphlets to supply the needs of all of the members. Dues were collected for the first year at the rate of one day's armory drill pay for the first year, the amount being determined by the rank of the officer. From this amount each officer was provided with an individual subscription to THE FIELD ARTILLERY JOURNAL. Each member, according to the plan, contributed one dollar (plus ten cents for tip) for his own dinner, which was ordered in advance by the secretary. This custom of having each officer pay his own way at dinner has continued to the present time without argument and with excellent success. The club dues have since been reduced to one dollar a year to cover postage and minor expenses. Only once was the custom of dining together interrupted; one meeting was held after dinner at the armory in order that the officers might actually "reciprocate" in reciprocal laying and that they might actually "aim" the aiming circles, and actually dismantle or disassemble certain parts of the gun.

The social feature of having dinner together before the school part of the club meeting has had a most salubrious effect on the fortunes of the school. Arriving promptly at 6:30 at the hotel for dinner, the members (now 20 in number) sit down to chow without a moment's delay. In dining together the officers quickly establish friendly relations, and during the progress of the simple dinner they unconsciously drift into the field artillery frame of mind by means of arguments on matters of field artillery doctrine or administrative technique. Errors and successes and ideas are aired and swapped, filtrated and revised, rehashed and crystallized amid the abundance of good, healthy appetites, barbed banter for the backslider, and one fork adjustments on roast beef and French fried potatoes.

A prominent feature contributing to the success of the school-club is punctuality. Punctuality has become a fetish with this group of officers. They arrive promptly at 6:30, or a few minutes before. Coming from their respective offices down town, without uniform, they know that they will not lose a minute in obtaining something to eat. They have a standing engagement for dinner on the first and third Thursdays of each month, August and September excepted. A notice sent out by the secretary two days in advance of each meeting serves as a reminder that the engagement is not to be broken. Promptly at 7:15 the chairs are pushed back from the table. Those who are slow eaters must capitulate. Out come the blackboard and chalk from a closet. The lecture or talk commences with little or no introduction. The lecture ceases after 20 minutes or half an

hour. The discussion follows. The moment the discussion wanes it is closed with a snap. Blackboard firing commences. No one knows where the baleful glance of the instructor will fall. Battery commanders rise and fall, while the beleaguered infantry calls in vain for effective artillery support. Infantry battalions are mowed down by the prosperous enemy while the infantry commander curses and wonders: "Where is that damned Artillery?"

Promptly at 8:45 the school session is closed, regardless of the importance of the impending victory on the blackboard. The officers are dismissed. Those who have engagements vanish quickly; some take in the nine o'clock movies and others remain in the lobby or at the blackboard to rehash the firing data as it should have been, but wasn't. From the time that Chaplain Callender, who is nearly always present, asks the blessing, to the final flurry of lost overs on a moving target there is seldom a dull moment. This, I think, may be attributed to a certain grip or firmness of control with which the club is managed. Everything moves swiftly. No one goes to sleep. In some manner, by means of autocratic governing there is sufficient magnetic attraction or tension to keep everyone interested and some of them enthusiastic. And the prohibition laws are still practically intact in this club (not, however, because the chief of police is lieutenant-colonel of the regiment, but because the officers are there for business).

There is but one objective. The design and purpose of the club is to improve the technical training of the officers of the 111th Field Artillery. The social feature is purely a means to an end to get the officers on friendly terms with one another, to derive a certain buoyancy of spirit from dining together and ease the train of thought into artillery channels. Nothing is spared to make the talks interesting and varied. After several sessions of plain technical hardships, something easy is thrown in. Major P. W. Booker (2nd F. A., Fort Bragg, N. C.), while on leave at Hampton, Va., accepted two invitations to give lectures on the higher tactical phases of field artillery. Colonel (retired Major) Offnere Hope, of Norfolk, gave an interesting lecture on the duties of G2. Two debates have been held which created a strong current of interest among the members: the first was on the popular argument, The Horse *versus* the Tractor for Draft Purposes in Field Artillery, and the second was on the much-discussed accompanying gun proposition. An article was read from the October, 1924, *Coast Artillery Journal,* entitled "Leadership," by General Harry A. Smith. This caused many comments of praise for the author of this masterpiece of military literature. Another article, from the same issue of the *Coast Artillery Journal,* which led to a prolonged discussion, was "Handling of the Soldier,"

by Major R. N. Perley. It was universally agreed that no young officer could afford to miss hearing this article. Following the reading of this article, several officers desired to know whether Major Perley is a West Pointer. The question has not been answered. Two members of the club subscribe to the *Journal of the Royal Artillery* (British) and much valuable data are derived from this excellent publication.

Another variation from the technical talk or lecture has more recently been devised. A small pamphlet has been published by Colonel Sands which contains 300 questions, the answers to which every field artillery officer should know. The questions are technical field artillery questions that can be dug out of T.R. 430–85 and other training regulations. But a quicker way to have them answered is to come to school and ask two questions (and only two, on account of lack of time). Each officer fills in a blank, naming two questions, and drops it in a self-addressed stamped envelope which he receives in the mail two days before the meeting. At the meeting these questions are answered. An officer who does not ask his allowance of two questions or does not show up to hear the answers, is presumed to know the answers to all the questions, and accordingly will be put to the test in the summer encampment to prove it.

As I look back over the attendance record for the past two years (two years completed February 2, 1925), I look in vain for some evidence of the customary "petering out." With what manner of magnetism Colonel Sands has been able to lead, coax, entice and beguile the members of this club into almost regular attendance for two complete years is still a mystery. The regiment, though widely scattered, has four units in the Norfolk-Portsmouth vicinity and several field and staff officers. This means that the membership is usually about 20, barring vacancies. There have been 40 meetings of the club and 39 dinners together as a group. There have been 40 lectures, talks, debates or readings from artillery publications. There have been 32 sessions of blackboard firing or some form of computation of data or other artillery computations. The average attendance for the two years, as shown by the record of attendance, is 14.35 officers. This is 71.75 per cent. of the officers residing in the Norfolk-Portsmouth vicinity, assuming no vacancies, which is not always the case.

This means 60 hours devoted to field artillery instruction, outside and above the armory drills of the batteries, by 14 officers of the regiment. Reduced to absurdly simple terms, this is the equivalent of five minutes every day in the year for two years taken from the time of busy lawyers, engineers, salesmen and clerks, who have

their respective livings to make, and spent in the pursuit of technical training in field artillery methods, procedures and practices. This may seem pitifully small, at first, but when it is remembered that this instruction comes in hour-and-a-half doses, and is done by earnest men in their spare time, which they often spare only by forgoing some other activity, it does not seem small. It is done in the interest of improving that technical knowledge which they are supposed, often erroneously, to possess, and indirectly they make a better regiment and a more efficient National Guard. It is a struggle for development, and the development is along patriotic lines. It is a struggle to be fit and able to serve one's country in a greater struggle, should a greater struggle ever come.

THE YOUNG OFFICER'S SPARE TIME

BY FABIAN

IN PREFACING any remarks on this rather touchy subject, we should first consider the day and age in which we live. Before considering the young officer specifically, we must first contemplate the young folks in general of the present generation.

The slogan of the young people of today appears to be "Get by!" It isn't what you *do* that counts, it's what you're *caught* doing. Duty for duty's sake seems to be comparatively non-existent. Obedience to the law is all right—when there's a policeman looking. But why obey the law when you can easily get away with disobedience? Why study when you can "get by" without the additional effort necessary?

Please do not think that I hold a deeply-rooted grudge against our younger generation. Not at all. I am simply stating the facts, as observed over a period of several years, while on duty with an educational institution and while visiting around an important educational centre. The youngster of today does very little real studying, and much less serious thinking. He skims over textbooks, reading with only the attention necessary to retain the subject until his next class. When classes are over—Ho for the movies, the Follies, or "Snappy Stories"!

The young officer of today partakes, to a certain extent, of the aforementioned characteristics. To be sure, if he has just come from the Military Academy, he has *had* to do considerable studying. He thinks that when he joins his organization he has done with study until he goes to one of the service schools. He resembles somewhat the youngster referred to above in this particular. As soon as drill or routine work is over he's off to town, to the show, to the dance—anywhere to have a good time!

Let me impose upon the reader's good nature long enough to quote my own case as a horrible example. When I first joined my organization, my captain very thoughtfully obtained for me several essential books. They formed a neat little row in my tent—say about three feet long. My orderly dusted them religiously. I knocked them over occasionally and cussed—and used them as paperweights to hold down theatre programmes, novels, etc. Read them? Of *course* not—I was too *busy!* As soon as my captain released me, I was headed for town, or the club, or some other place of amusement. The interesting part of all this is that I really like to read and study. The idea of doing it during my "time off," however, never seemed to appeal to me. From observations

made at the time, I am convinced that my case was the average rather than the exception.

Back to our original subject. The young officer is required to do certain things around his organization. Usually he has to do very much. He must acquire a certain amount of knowledge to be able to perform these routine duties in a satisfactory manner. He must study his Training Regulations, and various other service manuals. He absorbs a lot of information from constant association with troops and older officers. Some of it is very misleading, but the greater part of it is useful. Then, too, there are the troop schools—these he is required to attend.

In spite of the formidable array of what we have just considered, the young officer still has sufficient spare time on his hands. Routine duties do not run into the evening, as a rule, and troop schools do not require an excessive amount of burning the midnight oil. He will have at least two or three hours daily to dispose of as he sees fit. Some of it will fall in daylight, some after dark—but all of it is entitled to be classified as "spare time."

The question now before the house is, "What is the *best* disposition that can be made of the young officer's spare time?" There are several excellent causes to which it may be worthily devoted, chief among them being exercise, recreation, and education. Let us consider them in the order named.

Exercise is a mighty important activity, particularly in the Service. In the case of the young officer, however, we feel that it is not necessary to stress it unduly. He is at the age that delights in outdoor sports, and does not have to be urged to indulge in tennis, baseball, golf, or polo. He'll do lots of it without any urging at all. Let us just remind him, then, in passing, that he should consistently take at least one hour daily of vigorous exercise, preferably in the open air, and *keep this up throughout his military career*.

Now we come to a delicate subject—recreation. Call it amusement, relaxation, or anything you like. What I mean by it is something that yields no visible or immediate return for the money or effort expended save a feeling of mental or physical exhilaration. It is a pleasurable sensation that lifts us out of ourselves, making us forget our cares and troubles. It is play as compared to work.

Recreation, in my humble opinion, is quite as important as exercise. Usually the two are combined, especially in the case of the younger officers. A certain amount of recreation is as essential to the young man as is a certain amount of food. *That,* I believe, will not be denied by anybody with powers of observation. The troublesome part of the question is—where to stop; when have we had enough? Perhaps we should work from the other end—first

consider how much time we should devote to education, and utilize the balance remaining for recreational purposes.

Many of us—most of us, I fear—believe that our education is complete when we finish school. Right there we make our fundamental error, and innumerable authorities will support that statement. Education involves a process of mental growth. It's more than an acquiring of book knowledge; it is an exercise and a development of the brain. Without it we *may* stand still—but we *usually* march backward.

In speaking of education, I do not mean mere military studies. We have already assumed that the young officer concerned has a good working knowledge of his routine duties and textbooks. Just as "straight troop duty" is liable to get one into a rut, so, in a broader sense, does purely military study tend to narrow our point of view. While it is highly advisable to study professionally above and beyond the call of routine, it is also equally meritorious to develop ourselves along more general lines.

Read *good* books of the day. Study the older classics, and read and study plenty of history. Post yourself on subjects of general interest, particularly those of concern to the community in which you find yourself stationed. Do not count light reading as education—it is relaxation, and therefore recreation. Above all, do not "skim over" what you have chosen to exploit. Go at it conscientiously, and make it your own before you leave off. Post yourself on questions of importance to the public welfare. Keep abreast of the times. Know what is going on in the world, and in your own immediate surrounding country. Set this for your goal; the ability to discuss with any well-educated civilian, subjects of his own choosing.

Pray do not get the impression that I favor nothing but non-military study during spare hours. Not at all. I am a firm advocate of extensive military reading and research. One cannot know too much about one's own profession. But one must also, in order to attain the highest degree of mental development, know something else—something of what the other fellow, the rest of the world, is doing. As a practical suggestion, I would advise that roughly equal parts be devoted to military and non-military study during our spare time, with the emphasis slightly on the military side.

In a recent number of a service journal, I read of an interesting experiment conducted by a certain colonel. This same colonel was a firm believer in the necessity of honest, educational reading. Upon taking command of the regiment, he prepared a list of seventy-five excellent books—military history, history, classics, and good

novels. He required all the officers in the regiment to check the books that they had read. The result was startling.

Fifty-seven officers reported on the list. One officer—the regimental surgeon—had read forty-nine out of the seventy-five listed. Another—a field officer—came second with thirty-eight to his credit. The rest dwindled on down to less than six, and the average for the whole regiment was *thirteen!*

The colonel then proceeded to find out what his officers had been reading. He called for a report showing all the books—magazines and newspapers excluded—that had been read by each officer within the past twelve months. This time the lists were equally enlightening.

Most of the older officers had been reading the better class of fiction, with a little history and professional reading interlarded. Forty-six of the fifty-seven had devoted practically all of their literary efforts to such books as "The Sheik," "The Beautiful and Damned," "Tales of the Jazz Age," etc. Reflect on *that*. Forty-six fifty-sevenths of the regiment were reading such trash, to the virtual exclusion of the better class of literature.

The next step was to call a meeting of all officers of the regiment. There the colonel explained briefly what he had done, and why. He outlined to his assembled officers what men in civil life—doctors, lawyers, bankers, teachers, writers—were doing with their spare time. Most of them had less leisure than the average army officer, but they used it to a decided advantage. To quote the colonel:

"I found one great difference between these men and you—as a class. These men read; they study. They read books pertinent to their various activities, and other books to enlarge their knowledge of their fellow men and of the world they live in. You do not. As a class, generally speaking, you read practically nothing but the stuff which is written solely to sell."

These remarks applied to all his officers, but more particularly to the younger ones. They were the greater offenders by far. In addition to these lists, the colonel had also carefully investigated the book situation in the various officers' quarters. In visiting the regimental officers, he noted mentally the number and type of volumes in each set of quarters. He struck a rough average, and found it to be nineteen. Most of these were of the type of best sellers already referred to, with a few subscription sets of popular authors thrown in for good measure. Of the nineteen volumes listed, only *two* were of professional character—*that* should be sufficient to make one pause and think, should it not? Does it not show that the condition I have previously mentioned is not a product of my own fevered imagination, but actually exists in the

Service today? Furthermore, does it not prove conclusively that it applies more emphatically to the younger officers? But let us to our text again.

Here we are at an important cross-roads—recreation and education. We must now decide what proportion of our leisure we should devote to both. If we omit one or the other, we have not a well-balanced program. Compare briefly the advantages and disadvantages of each.

Recreation frees the mind from worry and care—it is a mental house-cleaning. Too little of it is much worse than too much. If we devote all of our spare time to recreation of the right sort, we will probably live to a ripe old age, and enjoy good health to the end. There is very little danger from too much recreation.

Education packs the mind with useful information. It is a rearrangement of the furniture of the mental household, with the frequent acquisition of additional pieces. It properly falls under the classification of *work*. Too little of it is to be deplored—but too much of it is *dangerous*. The proverbial book-worm is a shining example. He overloads his brain with theoretical knowledge that he cannot possibly live to apply or enjoy. Lack of recreation means loss of health, and too much education and lack of recreation are invariably corollaries.

Therefore, it would appear that the useful limit on education should be fixed, and the question of recreation will then automatically take care of itself. Let us consider, then. Of the several hours daily available to the young officer, I suggest a minimum of half an hour and a maximum of two hours to be consecrated to mental development. If the young man be bookishly inclined, he should stop short at the two-hour limit and *make* himself get out and exercise. If he be of athletic propensity, he should make himself sit still for thirty minutes daily and do a little forced feeding to his brain. Results will surely justify the effort put forth in both cases.

So it would appear that the happy medium is the best course to pursue. Either extreme—too much, or two little—is bound to be injurious in the long run. But if the young officer's spare time be carefully divided between recreation and a preparation for further mental progress—balancing one against the other as evenly as his natural inclinations will permit—he will be sure of reaping a future reward. Soundness and strength of body and mind shall be his.

In conclusion, let me sound a note of warning. It is based on my own bitter experience, as well as on observation of those about me. Get yourself into regular habits of recreation and study. It is so easy to put off these little things—to say "Tomorrow!"—and

never do them. How many times do we promise ourselves to do certain things, to start next week, or the first of the month, or the first of the year—oh, you know the old story! "The road to Hell is paved with 'good intentions'!"

Instead of talking about what you'll do, *do* it. Make yourself a little schedule for your spare time, if necessary, and stick to it *religiously*. Soon you will find that habits are forming themselves, and each day it becomes a little bit easier. Promise yourself to sow a reasonable amount of good wheat daily, and eliminate the tares and wild oats. Do not forget that there are certain principles—and sayings—that are immutable, unchanging through the ages, and one of the best is:

"As ye sow, so shall ye reap!"

CITIZENS' MILITARY TRAINING CAMPS

BY MAJOR J. E. LEWIS, F.A.

ONE of the most important phases of citizenship is that of fitting one's self by peace-time training to play his part in the military defense of his country. Our government has decided that this training shall be *voluntary only,* and has in the National Defense Act, as amended, provided therefor. We must at least train the officer personnel of our future war-time military forces in peace-time.

The War Department's regulations governing that part of the military instructional organization prescribed in the National Defense Act, and known as the Citizens' Military Training Camps, are found in Army Regulations, 350–2200 as amended by War Department Circular 33 of 1922. The C.M.T.C. program for this particular year (1925) is laid down in the War Department's general training plan sent to all corps areas last November 28th, and more at length in the letter (AG 354.1) from the War Department to all corps area commanders under date of January 9th this year. Something of the origin of the C.M.T.C. movement, and the purposes sought by its maintenance is revealed in a pamphlet, "Special Report of the Secretary of War on the Conference on Training for Citizenship and National Defense." The Training Manuals numbered 1, 2, 3, 4 and 5 were prepared primarily to assist in the citizenship phase of the instruction given in these camps. Warrant officers, enlisted men, and civilians who aspire to become reserve officers or noncommissioned officers are eligible to attend.

MISSION OF THESE CAMPS

The mission of these camps is manyfold. Some of the missions are as follows:

To improve our citizenship by implanting in the young

elastic mind a wholesome respect for law and order and for constituted authority.

To further the future citizen's knowledge and belief in the ideals and accomplishments of his country.

To improve him physically.

To point out defects in physique and the remedies therefor.

To impress on the youth that with the privilege of the opportunities of this republic, hand in hand, go obligations to serve her faithfully as a citizen day by day; in peace to prepare himself to effectively serve her in war, and if war should come to further serve her with his mind, his strength, his blood, and if need, his life.

To teach personal hygiene and community sanitation.

To teach such military discipline, technique and tactics as is possible in the time available.

To teach the youth that by submitting the individual will to the common will the maximum may be accomplished—team work.

To impress the fact that the status of a "man at arms" is not acquired simply by donning a uniform or receiving a commission.

To bring the young civilian, his family and friends, to meet the personnel of the Regular Army in common endeavor and thus build up *mutual understanding* and *friendship* to the end that the National Defense shall be really built up.

ORGANIZATION

At each camp will be organized provisional military units of each arm. For the smaller auxiliary branches such as Air Service and Engineers the basic training is infantry. There are now four courses.

The Basic Course for young candidates with little or no previous military training. The scope of this course will be mainly physical training and acclimating the youth to military discipline. All military training given is elementary infantry, except in camps where only field artillery or cavalry demonstration troops are present.

The Red Course. Those in this course will be the privates of the military organizations. They are graduates of the Basic Course or its equivalent.

The White Course. These men generally have had the Red Course or its equivalent. They will be the noncommissioned officers of the units formed.

The Blue Course. Those in this course have in general had the Red and White Course or their equivalents. These men

are candidates for reserve commissions, and should be the officers of your company organization. They should be addressed as "Mister So and So."

The young men in the last two courses have a status analogous to that of cadet noncommissioned officers and cadet officers of the Corps of Cadets at West Point. They should be given the greatest degree of *responsibility* possible. This done under careful supervision is a great builder of morale, very rapidly develops them from boys into men, and is valuable training for civil life or for the day when they may be your lieutenants and captains and their conduct in campaign reflect the quality of training you gave them.

The companies, troops, or batteries should be subdivided into permanent units under their own leaders. When sufficient regular army units are present, the War Department is stressing the desirability of associate organizations; that is, a C.M.T.C. unit becomes an additional platoon of the regular battery, or even a sort of double battery is formed. The advantages of this system is obvious from the viewpoint of messing and administration; the regular army unit's machinery takes care of the many routine tasks. Whatever system is adopted, the organization of the C.M.T.C. units should be as methodical and far reaching as you can devise. Then the question of administrative details such as police, supply and discipline, and much of the training, can be rapidly and efficiently handled to a large measure by the candidates themselves. If the size of the camp justifies it, the company or battery units should be formed by arm into battalions, regiments and even into a reënforced brigade. Each company or battery unit should have a captain of the regular establishment in command. He should be assisted by a regular lieutenant as administrative officer (administration and supply) and such other regular and reserve officers as are available. At least two such should be provided per company.

Each company should have detailed enlisted men as supply sergeant and clerk. They will be quite busy too. The personnel of the clerical force for higher units are either warrant officers, enlisted men or civilians, or both. Paragraph 23 of Army Regulations 320–2200 authorizes the use of students as kitchen police, but this may be avoided if an excellent mess officer is available. They may still be used as waiters, but this does not interfere with training. White students should be assigned as sergeant majors, etc., and blue students as staff officers, but neither should be kept at paper work during instruction periods. In organizing camp it is suggested that a distinct line of demarcation be drawn between administrative and instructional personnel.

The camp commander should have a personal staff consisting of a lieutenant or two, a chaplain, the hostess, an old motherly soul

that the lieutenants will not entertain with small talk, and the welfare society representatives if available. The administrative group should consist of a camp executive, camp adjutant, supply officer, surgeon, police officer, finance officer, and mess officer, with their necessary commissioned and enlisted assistants.

The instruction group should consist of the director of instruction or in small camps the commanding officer himself, the senior officer in each arm in which instruction is given, and the necessary number of battalion and battery commanders and their assistants, a range officer, an athletic officer, and at least at times, specialists in the auxillary arms such as the Air Service, Chemical Warfare Service and Engineers. In organizing the battalions, provide a battalion executive, who should preferably be a recent graduate of the special service schools, and have him conduct that part of the instruction of the Whites and Blues which is separate from the Reds, when the battery unit does not work as a whole. These battalion executives, should be able to instruct in orientation, reconnaissance, communications, field artillery firing, terrain board, blackboard firing, smoke bomb, service practice, combat orders and minor tactics. This means fully fifty per cent. of their total time.

PROGRAM OF INSTRUCTION

Arranging your program of instruction in reality is filling in the details of the broad outline furnished by the War Department, through the corps area commanders. This outline is published this year in the letter (A.G. 354.1, Jan. 9, 1925) from the War Department to all corps area commanders. The problem is not to produce soldiers for the Spring Drive, but the ultimate building up of the national defense. Keep in mind that the success of these camps and the whole preparedness program depends not so much on the volume of military facts the candidate takes away with him, as on the proper ideals you have implanted and the interest and enthusiasm you have aroused in the candidate and his family and friends.

With the above in mind arrange a well-balanced, logical, and progressive schedule that will cover the training and combat activities of your arm and those closely associated with it. Terminate the camp with one or more problems, exercises or demonstrations, involving every man and using service ammunition if possible. Thus the candidate comes away with a completed picture and remembers especially the last few days, full of events, that will always grip his imagination.

Because perfection in performance of the combat function of a battery unit can not be attained in thirty days, *do not* limit the instruction to what can be thoroughly mastered in that time. Permit

the candidate all of the salient experiences, except facing enemy fire, he would encounter from the day his training begins on mobilization to the end of a campaign. This can be accomplished by including marches with field equipment, a night march, bivouac, occupation of positions, field exercises, and field firing of service ammunition, and making them as realistic as possible. Long periods of setting up exercises, saluting and close order drill are to be avoided. Periods for drills and instruction in such subjects as draft and manœuvres limbered should be about two hours in length. Those involving the use of the rifle, pistol and the service of the piece, from one to one and one-half hours' duration.

Athletics, both individual and mass should be stressed and have daily periods, and so should instruction which improves the physical set-up, muscular coördination, alertness and endurance of the candidate. Formal lectures of an hour or more should be avoided, especially in the lower courses. Fifteen-minute talks to the Reds will in the end accomplish more. If you feel yourself under a pressure that indicates you have a lengthy and complicated dissertation to vent on the candidates, get a brother officer to deflate you privately, for the C.M.T.C. will lose interest in it in a few minutes and may even nod. Great care should be taken that the language or technique of a lecture is not beyond the student. Men of this age learn best by actually doing things under guidance and supervision. They crave to do things with their own minds and bodies. Theory had better be administered in small doses. If your ideal is to have an organization perfect in the execution of close order drills, ceremonies or any other limited number of the phases that make up general military excellence in a unit, you will not have done your part to fulfill the mission of this system of camps, for when the unit is demobilized the beautiful machine no longer exists to please the eye; but if you have fairly well covered the activities of a war-time soldier, you have aroused interest and usually a desire for future experiences in the profession of arms.

Correctness of bearing, appearance of person, uniform, arms, animals, carriages and camp must be stressed and constantly improved, yet limited time can be devoted thereto. Ceremonies, but not too frequent, should be the occasions for competitions in these phases. Ceremonies become simply close order drill to the men in ranks and by careful coaching of the critical individuals their number may be much reduced.

To many the question comes, "What can be accomplished in these thirty days?" Answer—the following has been done by several field artillery units: On the first day of camp the men were in civilian clothes, just so many potential soldiers. During the

fourth week they harnessed and hitched their teams, drove them on the march, occupied positions, and under their own cadet officers delivered effective fire on a variety of targets. They also served the pieces in demonstration firing for the other arms. Their camps were exceedingly neat, and their saluting and carriage were better than the average regular unit. On the last day of camp these student batteries passed in review at a walk and a trot in a creditable manner.

The program of instruction covering every hour of instruction, and including a rainy day schedule, should be completed before the candidates report. Provide a sufficient number of copies of this program for every possible use within the camp, records and publicity. This detailed program having been carefully reviewed and coördinated should be religiously followed.

ESTABLISHING THE CAMP

The camp will have been laid out and built by officers from the headquarters of the corps area and the local post. The instructional and administrative personnel should report long enough prior to the date of opening, that when the candidates begin reporting everything will have been done and all hands may be assigned to their reception. By that date it is desirable that everything be in order and that the first impression created on the arriving candidates is that "These people are sitting here waiting for us." This preparation should include the completion of training schedules, receiving and supply arrangements, target ranges, erection of camp, welfare and entertainment features, and organization as far as pertains to the administrative and instructional personnel. The supply problem merits a great deal of forethought—look-ahead, and remember that the local commanding officer has orders to place all available facilities at your disposal.

RECEPTION OF CANDIDATES

Arrangements should be made for specially instructed, considerate officers to meet all trains with adequate transport for students and baggage. This transportation should take them to a receiving station where the student should be given a few minutes for refreshments, lunch, and to use the toilet facilities. They will be tired and thirsty and hungry and dusty. After this the student presents his travel order and vaccination and inoculation certificate if completed. Next, record their number serially and assign the students to companies, using their applications and copy of their authority for attending, both of which come to you by mail, to roughly rate them so as to keep your companies about even in quality. As far as possible, men desiring to serve in the same unit should be so assigned.

Next have a medical officer conduct the examination for communicable disease and, if free therefrom, put their name and serial number on duplicate copies of Form 637. They and their 637's and records should then be turned over to a representative of the unit to which assigned and conducted to the organization where they are assigned to tents, squads, duties, etc. As soon as this is completed, and yet not to interfere with meals, they should be taken by transportation, if the distance is material, to the place designated for complete physical examination and issue of clothing. The following is suggested as a scheme for doing this: Have the student strip, submit to physical examination; if passed, he checks in to the quartermaster his civilian clothing and such valuables as he cares to do without, and draws his uniform. The quartermaster representative retains one copy of the Form 637 (Individual Equipment Record), the other goes to the battery commander, as the man's record and a check against the memorandum receipt, to be signed to the quartermaster.

The following method of fitting and issuing the uniform is suggested: When the student has completed his physical examination, issue him his barrack bags, into one of which he puts his civilian clothing for storage. Still stripped, he passes by a suitably instructed noncommissioned officer, who measures him and has an assistant insert the sizes on the 637. On completion of this, the student passes by a long counter and in turn puts on one shirt, breeches, hat, pair of shoes, and other odds and ends. At the end, have him initial or sign his 637, and when he has put on the complete uniform, report to an officer for inspection, including fit of both pairs of shoes. If not completely fitted, turn him back for a refit. Students are now returned to companies by transportation on its return trips. Provision should be made for exchange of misfit uniforms. Due to the difficulty of fitting canvas leggins, it is better to issue spiral puttees. For the same reason the cotton O.D, coat should not be issued. The shirt looks much neater. For all artillery, engineers, and for a limited number of the infantry, the denim should also be issued.

Arms and equipment should be issued to students in the battery at such times as their cleaning and care can be immediately attended to. Arms must be under lock except when in use. Kerosene baths are a quick and economical method of removing cosmoline from small arms. Having each man to do it for his own arms, means a ruined uniform at once.

The required inoculations should be now started for those not having completed them before arrival. This phase often requires extreme tact and patience, as some men report without certificates, yet have taken the treatment. As some men will report several days

early, there must be an ever-increasing number of messes in operation until such time as the bulk are present, when each battery should have its own mess hall.

PRELIMINARY WORK

The reception phase mentioned above will require two or three days. During this period the students should not have lengthy periods of idleness. At odd minutes available, carry on instruction in the elementary duties of the soldier to include at least military courtesy and the school of the squad, thus enabling the officers to move bodies of students about in a military manner. Their previous training and ability can be studied during this period and when the formal work begins more logical assignments to duty can be made.

OPERATING THE SCHEDULE

A program of instruction having been carefully worked out, all concerned should be caused to religiously follow it. Junior officers often have desires to depart from it and have profuse excuses when detected so doing. The senior officers on duty in each branch should prepare the detailed schedules under the supervision of the camp commander and no others should change them. War Department orders require official visitors and inspectors to generally confine themselves to observing current work of the camp instead of ordering an extra review for example.

As a general rule, not over five hours of instructional duty should be required in the Basic and Red courses, six hours in the White and seven hours in the Blue. The last two classes should be required to devote one hour per evening five days per week to study. Recreation and competitive athletics are not included in these hours. A delicate balance between underwork and overwork is desirable. It must be remembered that the weather is usually hot, and that many of these men are not in condition physically on reporting.

MESSES

To a great measure the success of a camp depends on the mess. The physical exertion required whets the appetite. It is always difficult to obtain competent enlisted or civilian cooks and kitchen police. With the present ration allowance it demands the selection of an enterprising and hard-working mess officer to provide the menus that will satisfy both in quality and quantity. There is always a demand for fruit and great quantities of milk, but storage eggs and often repeated doses of "Slum" are not in demand. Students should be marched to meals under their cadet officers and mess hall discipline maintained by them. It is desirable that Blue students

have separate tables. It is suggested that portions be dished out to each man, otherwise some will get little or none of the most popular dishes, yet much food will be wasted. Seconds should be served only after all have had one portion. All meals should be inspected by a battery officer before his organization enters the mess hall. If not entirely satisfactory, the mess officer should be interviewed at once and positive remedial measures taken by him.

UNIFORM

Great care is required to keep the uniform in presentable condition. In spite of special rush laundry arrangements it is often necessary for men to wash their own breeches and shirts. Even so the correct appearance must be maintained. The cotton coat as issued is nearly always a misfit, so it is suggested it not be issued. Constant supervision is necessary to reduce loss and theft of shoes and shirts by a variety of persons who have the opportunity. At this point it might well be urged that the moral training of the student be begun early by impressing on him that it is even worse to take or wrongfully dispose of his country's property than that of an individual.

SANITATION AND HYGIENE

Special attention should be paid to the subject of police. All of such work except garbage disposal, and care of latrines should be a part of the daily routine. A daily or weekly rating on police of each battery makes it competitive and less obnoxious. During the first few days especially rigid attention must be paid to bathing, as duties are irregular and as a result the bath is omitted. Long, highly scientific lectures on social hygiene simply induces sleep in the student. An occasional remark on the subject by those directly in command, accompanied by an appeal to the student to keep himself fit to play his part in the team of which he is a member, is most effective. His curiosity outweighs his fear of the lurid results pictured by a medical officer, so the appeal to his sense of loyalty to his organization is more practical.

While the attendance at religious services should not be compulsory, opportunity should be afforded (and in camp, if at all possible) for attendance at service of their own particular faiths.

Energetic representatives of welfare organizations will be very useful. A live hostess or two is a necessity.

AMMUNITION

The small arms ammunition allowed by A.R. 45–400, as amended by annual order, is ample, but the twelve rounds of shrapnel and eight rounds of high explosives per Blue student is too limited.

The allowance can be increased by the following expedients: In the O.R.C. camps it will be found practically impossible to fire the reserve officers' allowance of 100 rounds of 75-mm. ammunition. The unexpended portion can be carried over into the C.M.T.C., where both the reserve officers on duty and the C.M.T.C. can profit by its expenditure. Also the demonstrations required and their rehearsals, require an expenditure that can be authorized by the camp commander. By having officers check the laying of the pieces before each round, the batteries may be manned by C.M.T.C. personnel for demonstrations during the last ten days or so of the camp. At a camp where this was done in 1922, it was possible for the student batteries to fire seven half days, and for each Blue to fire nine problems. Reserve officers on duty as assistant instructors fired high explosive and smoke for their instruction with regular gun squads, as C.M.T.C. students were only permitted to fire shrapnel.

ATHLETICS

The Immortal Teddy once said that "many of America's battles have been fought and won on her athletic fields." This is truer today than when he uttered it twenty years ago. Individual, team, and mass athletics should play a major rôle in the development of the individual and in building up organization spirit. However, care should be exercised not to permit battery commanders and athletic officers to excuse men from instruction to practice athletics. Athletics should be a military duty and a recreation and not a means of avoiding duty. The forms to be taken up will depend on the equipment supplied or that can be improvised. Baseball is the best of the team games. As a field day near the end of the course should be held, training for these events should begin early. The extreme heat and the lack of condition of many should be borne in mind. Swimming, including instruction in it, is one of the best refreshers and means of general development known. Regulations require students be checked in and out of bathing areas to avoid accidents. Boxing and wrestling tournaments are fine. An important item in the training for citizenship is insistence on clean sports and sportsmanlike conduct, whether winners or losers.

ENTERTAINMENT

Some form of entertainment should be provided every evening after study periods and on Sunday afternoons. Free moving pictures within the camp are almost necessary, as spending money is scarce among the students. Amateur vaudeville shows, boxing and wrestling bouts and student orchestras are important.

An army band should be on duty at each camp, and the time of students to form a band should not be permitted. Something in

the nature of a service club should be provided where they can write home. The outgoing mail is very heavy. One or more dances should be provided for Whites and Blues. The large number of Reds makes this impracticable for them. Local organizations will provide desirable girls needed beyond the students' families and friends. Elaborate arrangement should be made for visitors. When the friends and families of students arrive they should be shown every courtesy, but the student should not be excused from instruction except long enough to greet them. One or two days near the end of the course should be designated as visitors' day. One of the best demonstrations of the camp should be staged on that day, preferably in the forenoon, with a field day the following day. One of the dances fits well on this occasion. The day should be definitely announced to the students early in the camp and they should be urged to have their families visit them on that day. The delivery of mail should be expedited. To aid in this, have a member of your camp postoffice force at the receiving station to make out the cards for the locator file as they report for duty. If the mail is well handled, less men will go home from homesickness during the camp.

PUBLICITY

We have an army that is "Of the people, by the people, and for the people," hence they are entitled to know what their army is doing. The Army needs friends now and in the future. If the personal touch with such a large number of the public, made possible by these camps, is developed to its fullest, many friends can be made this summer. The principal events of the camp should be given the greatest publicity; the public invited to attend, prominent national, state and local officials, and civic bodies urged to be present and provisions made for their entertainment. One of the camp commander's personnel staff should be in charge of all publicity and of keeping the press, especially the papers in the students' home towns, well supplied with the proper kind of copy.

DISCIPLINE

It must be borne in mind that the C.M.T.C. student is not as a rule enlisted and so is not subject to the Articles of War. He submits voluntarily to this discipline and the oath prescribed is only a statement of his good intentions. Only members of the Regular Army and National Guard are subject to the Articles of War.

The high standard of discipline attainable must be obtained by clever use of appeal to the pride of the individual and his natural loyalty to the gang, which in this case is the organization. The disapproval of his comrades is really the worst penalty that it is

possible to inflict in these camps. For breaches of discipline students may be deprived of privileges, but unless the individual is made to feel the justice and necessity of the measure taken, it is wasted effort and he may leave the camp whenever he chooses. In the case of breaches of discipline involving moral turpitude the student should be dismissed at once. Actual crimes may be punished by the federal courts. Practically all breaches of discipline will be from an excess of animal spirits. The conduct and influence of enlisted men and civilians on duty at the camp bear very close supervision. Noticeably foul-mouthed soldiers should be placed on duty not immediately connected with C.M.T.C. students. Differences between soldiers and students soon develop into near riots. Tactful but most positive action by officers is necessary to quash these affairs.

CONDUCT AND ATTITUDE OF OFFICERS ON DUTY

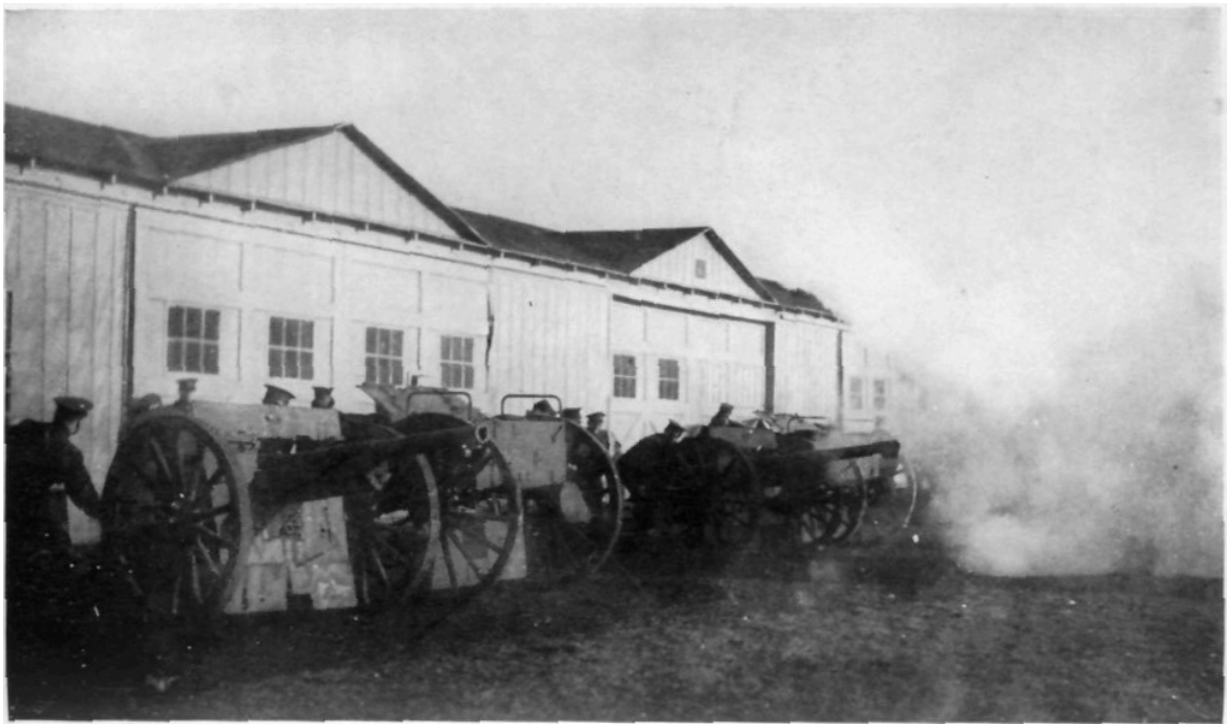
The day when the principal mission of the Regular Army was to have well-trained regular units is passed. Preparation for mobilizing and training the entire man power of the nation is the big mission of today. The "hard-boiled" methods which were supposed to work, and did work to some considerable extent, on the old regular, are not suited to the present problem. Painstaking explanations, real interest, a firm dignified bearing, a human viewpoint, careful preparation for each duty, tolerance and courtesy will soon have these youngsters imitating your every action. Special attention should be paid to the carriage and uniform of officers and enlisted men on duty at such camps. They should be a model. Some officers soon prove to have no ability as instructors. They should be tried out at administrative duties, if this can be discovered in time. At least subalterns who refuse to respond to the requirements of this class of duty had best be eliminated at an early date, as their usefulness in our future military machine is in general too limited for retention.

These provisional student organizations can not be operated like a regular organization. Far more detailed supervision and instruction is necessary. At least one officer must be constantly present for each company unit, night and day, including week ends. It is desirable that most of the company officers actually live within the camp. Every formation, including reveille, retreat and mess should be supervised by an officer. A great deal more of the "older brother" attitude is needed than we are accustomed to in the regular organizations. This does not imply that they are to be pampered—far from it. Constantly hold before them the ideal that to be a real *soldier* is to have industry, energy, alertness, honor, self-control, fortitude and endurance.

Aside from any benefit derived by the students at these camps, we will gradually refine, speed up and in every way improve our training system and methods so that when another major emergency must be met there will not be the lost motion, lack of uniformity and delay that obtained in the last one, despite our most strenuous efforts.

A FEW MISCELLANEOUS POINTS

Full use of the complex of "gang loyalty" lightens the problem. A few students get homesick. Most of them are earnest, live, clean boys whose ideal is to be as soldierly as possible, and they prove wonderfully responsive to both instruction and discipline. A considerable number of reserve officers will be held over from the O.R.C. camps. In selecting them the younger ones, especially graduates of prior C.M.T.C. and R.O.T.C. camps, are the best material to choose from. Their instruction is more detailed and recent and they are more in sympathy with the system. Enlisted men of the regular army serving as students should not be used simply to expedite business as clerks, supply men, etc., but should be given the same opportunity as others. Remember that the youngsters wearing the Red, White and Blue hat cords this summer will be voters in a few years, will be at least the battery officers of our next war and in fifteen years some of them will be members of congress and will be making the laws of the land and voting on its budgets. Prepare them properly for these rather serious duties.



A R.O.T.C. BATTERY AT PRINCETON

A PRINCETON BATTERY ON THE ROAD

R.O.T.C. AT PRINCETON

BY MAJOR E. R. VAN DEUSEN, F.A. (D. O. L.), PROFESSOR OF MILITARY SCIENCE AND TACTICS

MUCH interest has been aroused in "What should constitute a R.O.T.C. course?" One hears many views.

In approaching this subject it is believed the first thing to be considered is "What is the objective of the average college student regarding his college education?" for it is apparent that you must first enroll the student in order to have the R.O.T.C. The answer appears to be something like this: "I want to take courses that will give me: (*a*) a general education, (*b*) subjects that will be of assistance to me in life after graduating, as well as purely military subjects."

Now admitting this to be true, let us then approach the subject from another standpoint. Is it logical to expect the college man to spend say a thousand dollars a year on education and take for one of his courses, such subjects as gun drill, school of the soldier, etc., unless they are largely supplemented by other subjects of educational value? The answer would appear "No." As a rule a student is limited to say five courses each year. He wants full educational values. It is therefore doubted if a course without such a value will appeal to the average college man.

It would appear as a result that the R.O.T.C. course must be so drawn up that both the college authorities and students will recognize it as a course of value from a civil as well as a military standpoint. It is doubted if any R.O.T.C. will have trouble getting full credit as an "elective" if this is done, assuming the college is in sympathy with R.O.T.C. work. On the other hand, it is doubted if any college would consider R.O.T.C. a full value course if one attempts to offer the drill in the school of the soldier, etc., as an elective of the same educational value as history, economics, etc.

The next question is "How can a course be drawn up and have two values?" The answer is difficult but it seems to be partially solved at this university. Our course is divided into two distinct phases—class work and laboratory. R.O.T.C. comes under the general head of "Science." All science courses have class work and laboratory work. The class work is three hours per week and the laboratory two hours per week. At this university the problem then is solved by using class work for educational or theoretical work and the laboratory as practical work—disciplinary drills, equitation, etc.

Now in drawing up the Basic Course, the War Department specifies certain objectives. We must comply with these demands and

still make our course comply with the wishes of the college authorities and the students as pointed out above. It is supposed that this can be done in many ways. At this university we have solved it as follows:

BASIC COURSE

FRESHMAN (First Term):
- Class:
  - Ordnance and Gunnery.
- Laboratory:
  - Equitation until December first (4 hours per week for Freshmen).
  - Gun Drill—December first to the end of the term.
  - School of the Soldier (extra men at equitation).

FRESHMAN (Second Term):
- Class:
  - Battery Instruments.
  - Reconnaissance and Occupation of Position (practical and theoretical).
  - Radio (practical and theoretical).
  - Telephones (practical and theoretical).
- Laboratory:
  - Gun Drill (February to April first).
  - Equitation (April first to June fifteenth).

SOPHOMORE (First Term):
- Class:
  - Hippology (practical and theoretical).
  - Administration (battery paper work—practical).
  - Military Law (Manual of Courts-Martial).
- Laboratory:
  - Equitation until December first (2 hours per week for sophomore).

SOPHOMORE (Second Term):
- Class:
  - Topography and Orientation (Topography for Field Artillery). (Practical and theoretical.)
- Laboratory:
  - Equitation after April first.

What has the Basic Course accomplished? To date we produce a man who should be excellent on a battery or battalion detail (radio, observing instruments and telephones, topography); who has studied thoroughly the mechanism of the 75 mm. and 155 mm.; who has had very thorough practical instruction in duties of the cannoneer; and who has had a good course in equitation. We have not attempted to drive, for two reasons; primarily, because a man should learn to ride well before driving, and second, we have no facilities for teaching draft due to the small size of our equitation field. We find a good rider can be instructed in driving while at camp and at completion of same he is a very creditable driver (See Junior laboratory work below).

We have given the "School of the Soldier" to the extra men at equitation for whom there are not enough horses, but foot drill has not been stressed as the other subjects are considered so much

A CLASS IN MOTORS

A CLASS IN EQUITATION

THE WINNING GUN SQUAD
Prepare for Action—Eleven Seconds; March Order—Twenty-three Seconds.

PREPARING FOR A MANŒUVRE

more important. If the student drops the course, he has had throughout the two years, excellent theoretical instruction in "class" work and disciplinary drills in "laboratory" work.

ADVANCED COURSE

JUNIORS (First Term):
- Class:
  - Motors.
- Laboratory:
  - Equitation until December first.
  - Pistol until March first.
  - Motor (practical instruction) until April first (12 hours per student).

JUNIORS (Second Term):
- Class:
  - Conduct of Fire (includes smoke bombs in the last two weeks).
- Laboratory:
  - Harness instruction (3 hours per student only).
  - Equitation (April first to June).

SENIORS (First Term):
- Class:
  - Minor tactics.
- Laboratory:
  - Instruction at equitation assisting regular officers until December first.
  - Pistol until March first.
  - Assisting in freshmen gun drill (cadet officers).

SENIORS (Second Term):
- Class:
  - Military history (includes Campaigns of Jackson in the Valley; Battle of Princeton (Revolutionary War); America's participation in the World War).
- Laboratory:
  - Equitation.

What has the Advanced Course accomplished? If the student goes to a motorized outfit he has had a thorough course in motors. He has had a thorough course in pistol markmanship, *viz*: we have finished the Seniors and qualified 19 experts, 16 sharpshooters, 4 marksmen and 1 unqualified. He has acted as an officer during all instruction of riding and gun drill of Freshmen and has developed a certain self-confidence. The course in minor tactics tries to show the student the function of artillery as regards the other branches, tactical employment, types of fire, etc. within the battalion and battery. It includes selection of positions, communications and liaison within the battalion and battery.

Now comes the question of discipline. It is believed that the higher the type of men, the less will discipline have to be drummed into the individual. We get discipline at gun drill, equitation, pistol instruction, etc., but it is purely applied individually so to speak. Our cadet officers gain self-confidence by conducting equitation and gun drill. The entire scheme is along individual instruction lines.

Basic students act as noncommissioned officers at gun drill, dismounted drill; Juniors act as sergeants at equitation; Seniors as cadet officers.

For intensive instruction in the school of the soldier, military courtesy, etc., we rely on camp. We use the "click" method which was so successful in dismounted training at Camp Jackson, S. C., during the war. It all works out very satisfactorily.

It is believed the success of a course drawn up along these lines is shown in the percentage of students taking R.O.T.C. Practically twenty-five per cent. of all Princeton take R.O.T.C.

The answer seems to be, "give the student his money's worth." He will not take the course unless it is interesting, instructive, and valuable. Use your laboratory for practical drills which will naturally be of a disciplinary nature. Use your camp for the practical application of college work and for putting on the finishing touches of discipline. Use polo, riding, paper chases, pistol teams, horse shows, officers' clubs, etc., as "activities" to keep up interest.

One may recall the immense amount of time that "training camp officers" consumed in undergoing instruction at schools. The texts used in our course are the standard texts used in the various army schools, *viz*: Topography for Field Artillery, Technique and Tactics of the Separate Branches, The Army Horse in Accident and Disease, Howland's History of the World War, Motor Transportation, etc.

From the above it will be seen that three-fifths of the course is class work and two-fifths practical work consisting largely of instruction where discipline forms a component part. The course has an immense value from the civil standpoint as well as the military and it is believed that it is the "double value" which makes R.O.T.C. at Princeton appeal to the high per cent. of students in the University.

ROTOR SHIPS AND DEFLECTION

BY COLONEL JOSEPH W. KELLER, 310TH F. A.

SO FAR as the following article is concerned, I am a firm adherent to the adage that "he who fights and runs away, will live to fight some other day." In short, while I may be "starting something," I have neither the time nor facilities to finish it. Hence, what is here written is primarily to supply food for thought or work by others; what I may believe—well, what does that matter?

In 1853, Heinrich Gustav Magnus, the great chemist and physicist, then professor in the University of Berlin, while engaged in the study of aerodynamics, attempted to explain the side deviation of artillery projectiles fired from rifled bores on the basis of a physical effect of which he was the discoverer and which has since been known as the "Magnus effect." Simply stated it was this, that when a cylinder is placed in an air current the air will encircle it equally on both sides but, if the cylinder be rotated, the air current will be strongly diverted toward the side on which the circumference is moving in the same direction as the air. He suggested that on one side the air friction, or perhaps a film of air that traveled with the surface of the cylinder, built up congestion of the air, and on the other side it produced a suction.

Many students of exterior ballistics have accepted Magnus' explanation in whole or part; some have steadfastly rejected it. The whole discussion has been given new interest and impetus by the recent construction of a "rotor" ship by Anton Flettner, a German marine engineer of note, who is seemingly demonstrating the soundness of the Magnus theory and at the same time bringing forth new statements which, if proven facts, may have a direct application in the future study of ballistics. Every bit of knowledge that will serve us in better understanding how to bring our trajectory into an ideal vertical plane is invaluable to the artillerist.

It will readily be seen that, due to the unequal pressures produced on opposite sides of the rotating cylinder, a force results operating at right angles to the air current direction. This force, which is the algebraic sum of the air pressures on the opposite sides of the cylinder, is claimed by Herr Flettner to considerably exceed the air pressure on the same cylinder when it is stationary. Flettner claims that when the circumferential speed of the cylinder is three and a half times that of the air current, the force caused by the Magnus effect is about ten times greater than the pressure of the same air current on the stationary cylinder, or rather a surface having the same cross section as the cylinder. Incidentally, he also claims that at the ratio of 3.5 to 1, the Magnus effect gives its greatest efficiency.

Herr Flettner has applied his theories in the construction of a 600-ton "rotor" ship, the *Buckau*, which he equipped with two light steel rotating cylinders in place of the usual masts. These cylinders are ten feet in diameter and about fifty feet high. They are rotated by a small Diesel engine and are, of course, reversible. No screw is used, the force of the Magnus effect on the vertical rotors being depended upon to furnish the propulsion in the same general manner as is accomplished ordinarily by sails. It is apparent that by reversing one or the other of the rotors the ship can also be steered if desired. It is not pertinent to discuss in this article the feasibility or desirability of this application of the force of the Magnus effect to marine engineering. Suffice it to say that while the tests of the *Buckau* up to the time this article is written have not entirely come up to the preliminary claims of Herr Flettner, neither have they been by any means the dismal failure that many engineers predicted for them. Indeed, there has been enough demonstrated to well warrant further extensive research of the possibilities of the Magnus effect, a thing physicists have long known but not deemed worthy of extended study.

The writer knows of few problems of practical ballistics that are more difficult to satisfactorily explain than "drift" unless it be the vagaries in both deflection and range that are caused by air currents. What light will be thrown on the subject by Flettner's development of the forces of the Magnus effect? Such forces do occur. Flettner has driven his vessel more efficiently with his rotors than could have been done with an equal sail area. Is a field gun shell rotating too fast in flight to be appreciably affected by this force? With lateral winds will the resultant force of the Magnus effect appear as a factor in range? Is this force as potent a factor as decreasing gyroscopic effect in forming the drift and deflection curve's characteristics toward the end of long ranges? What part does it play in the proportionately increased dispersions of long ranges? These and dozens of other questions naturally arise in our minds with continued consideration of the question. And following an affirmative decision will come the study of how to overcome or utilize this "new" force, with a view to improvement of the ever important trajectory.

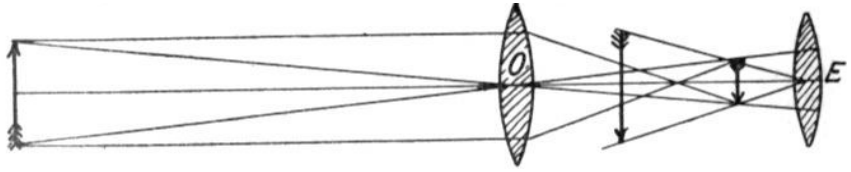
As stated in the beginning, the foregoing is written with no desire of initiating controversy but rather thought and study. If we have opened your eyes just a mite wider to the close relation that exists between the daily happenings of life and the problems of a good field artilleryman, then our "mission is accomplished." Whatever you may think now, at least, watch Flettner and the *Buckau*.

NOTES ON FIELD GLASSES

BY FIRST LIEUTENANT LECOUNT H. SLOCUM, F.A.

FOR the field artilleryman good field glasses are of the utmost importance. Training Regulations state that they are indispensable for study of the terrain, quick identification of objectives, and for conduct of fire. Under service conditions the field glass is the one, ever ready means for prompt and efficient observation, and is relied upon as is no other instrument. Regulations require every field artillery officer to own a field glass, but do not fully state the points that must be noted in the selection of an instrument in order to guard against serious faults in design and workmanship. These notes are intended to cover in brief form certain facts which should aid an officer to obtain a field glass that is well suited to his individual requirements.

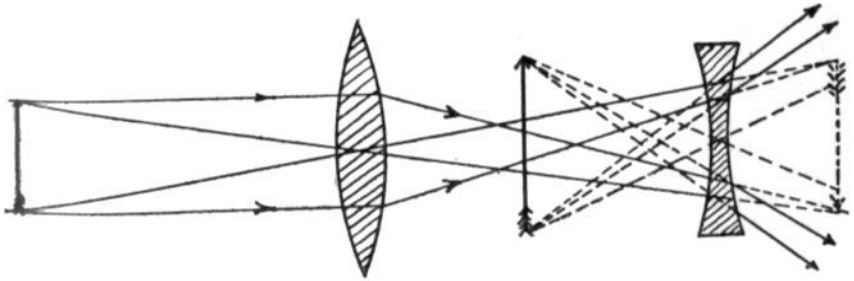
Since a field glass is a telescope of low magnification, it follows that the optical system may be of any form used in a telescope. The most elementary form of telescope as well as the most efficient from a standpoint of optics, is the astronomical telescope. This instrument consists of an objective and an



Astronomical Telescope

eye lens, both of the convex type. The image formed by this instrument is inverted and, while for astronomical observation this is not a drawback, it is inadmissable in an instrument designed for terrestrial observation.

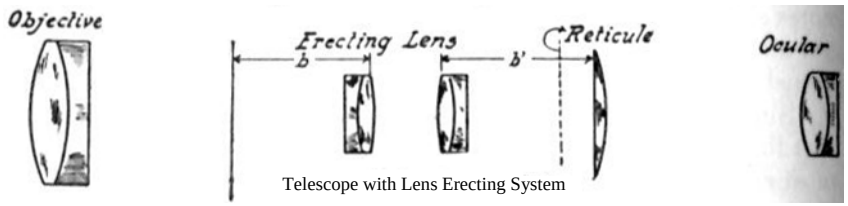
Another simple telescope is the galilean type. In this glass the



Galilean Telescope

eyepiece is a concave lens. This arrangement results in an erect image with but two lenses, which means that very little light is lost in passing through the system. This is an advantage over any other

system used for a field glass in which additional, light-consuming prisms or lenses must be introduced to make the image appear erect. In addition the length of the telescope is reduced, due to the fact that the lenses are placed at a distance equal to the difference in their focal lengths instead of a distance equal to the sum of their focal lengths as is the case in the astronomical telescope. However, the galilean telescope has two serious disadvantages. On account of the divergence of the rays in passing through the concave eye lens much of the image fails to enter the eye, thereby causing the field of view to be materially reduced. The second disadvantage of this type of glass is that it is impossible to place a reticule in the instrument because no real image is formed. A reticule must be placed exactly in the plane of the image formed by the objective.



Telescope with Lens Erecting System

The terrestrial telescope, the system usually utilized in a field glass, varies from the astronomical telescope only in that an erecting system, which may consist either of lenses or prisms, is placed between the objective or forward lens, and the ocular or pair of lenses at the eye end of the instrument. The use of prisms has a double advantage. In the first place, the length of the instrument is materially reduced, since in the porro prism system the light is twice turned back upon itself in its passage through the instrument. The length of the devious path of the light in this case is just as effective as if the rays passed through a straight tube of the same length. The second advantage comes when the glass is a binocular, as most of our field glasses are. This second advantage, stereoscopic vision—that quality which gives depth and body to the image, is gained through magnification and also because the centres of the objectives are separated by a greater distance than are the pupils of the eye.*

* The radius of stereoscopic vision is taken as 500 yards for the unaided eye. That is, the distance up to which we ordinarily see with two-eyed effect with the unaided eye is 500 yards. This radius varies directly with the power of the glass and with the ratio of the distance between the centres of the objectives to the distance between the centres of the ocular. This is expressed by

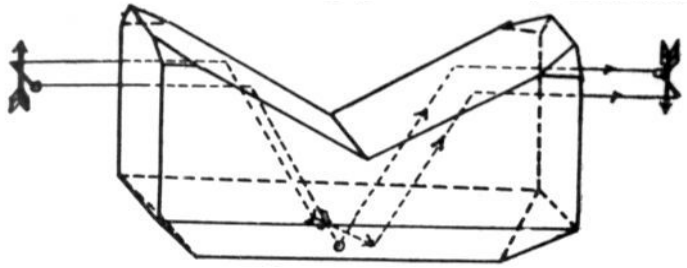
$$R = M \frac{L_2}{L_1} 500$$

Where M is the power of the instrument

L_2 is the distance between centres of the objectives

L_1 is the distance between centres of the oculars (the distance between the pupils of the eyes, of course, for our purposes).

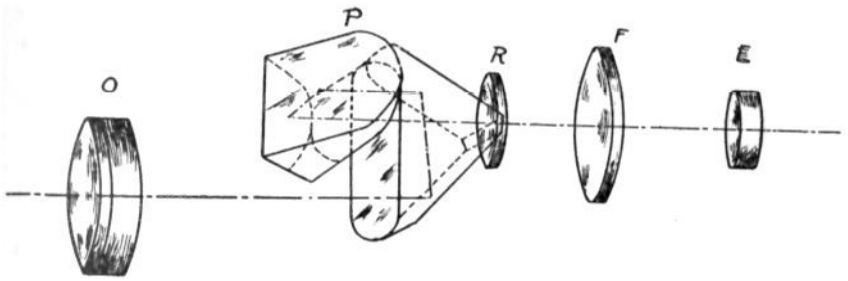
There are several manufacturers making excellent glasses, using the roof type prism as an erecting system. This prism is efficient in that there is



Roof Type Prism

less light lost than in a porro prism system. Its disadvantages lie in the sacrifice of stereoscopic vision, and in some designs in increased size.

The optical system of a prism binocular is shown in the accompanying

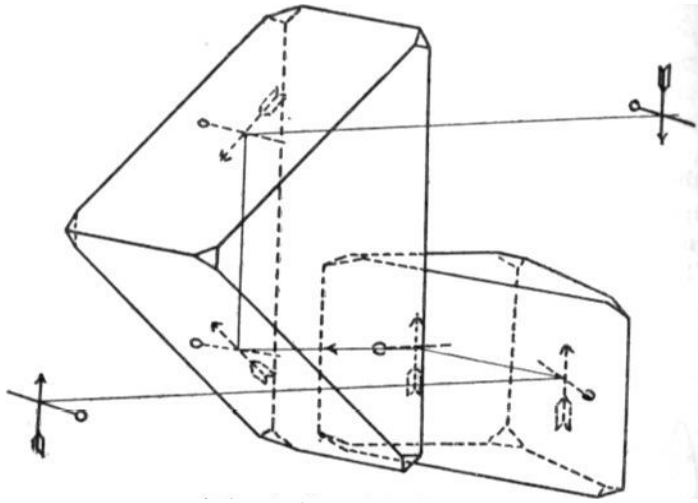


The Optical System of a Prism Binocular

cut. (The left telescope only is shown.) Referring to the cut, the objective lens is shown at *O*. This lens is of the converging type and serves to collect the image and to invert it. At *P* are shown the porro prisms, which serve the purposes mentioned above; that is they erect the image and at the same time shorten the length of the instrument, and, by *off-setting* the path of the light, as will be noted in the cut, they enable the object lenses to be further apart than the pupils of the eyes, thus improving the stereoscopic effect.

In the prism binocular the objective forms an image at *R,* where in some glasses a reticule is placed. Whether or not a reticule with a mil scale is a help to a field artilleryman is a matter of much discussion. A well-designed reticule which does not obstruct the centre of the field of view is regarded as a help in observation by some experienced officers while others prefer a field entirely free. In any case a heavily marked reticule is a detriment to good observation. The placing of a mil scale in a field glass is mechanically a simple task, but it must be remembered that the slightest misplacement of this reticule will not only give a false scale of measurement, but it

will result in an unpleasant movement in the relative positions of field and mil scale, which is called parallax. In placing the reticule it must be adjusted for the interpupilary distance of the observer. Some makes of field glasses are equipped with reticules which are capable of rotation by means of an adjusting ring placed on the outside of the instrument. It will be found poor economy to allow anyone to tamper with the optical system of a prism



Action of a Porro Prism System

binocular who is not an expert on that particular instrument. Lenses *F* and *E* together form the ocular. *F* is the field or collecting lens and *E* is the eye lens.

The objective is also made up of two or more lenses as shown at *O* in the cut. The purpose of these compound lenses is to overcome distortion and color effects, called respectively spherical and chromatic aberrations. Spherical aberration is due to the fact that the angles of refraction near the edges of a lens are slightly different from the angles of refraction near the centre. This results in an image which is not flat. As to chromatic aberration, the angle of refraction for each color of light in the spectrum is slightly different from that of every other color. Since white light is a combination of all the colors of the spectrum, it follows that in passing through a lens, light will be broken into its component parts. Both of these defects, which are found in simple lenses, may be corrected in a compound lens that is made up of a convex lens and a concave lens, or two convex lenses, so combined that the aberrations of one are neutralized by the other.

The points just covered are general in nature and apply to any prism binocular as well as to other telescopic instruments. In selecting a particular field glass that is required to be suitable for field artillery use, it should first be tested for soundness of mechanical

and optical design, and then if it passes this preliminary test, it should be used in actual observation for as long a period as is practicable under varying conditions of light and weather.

Practically all suitable field glasses are of the prism binocular type. The glass should be equipped with independently focusing eyepieces. In order to facilitate the rapid adjustment of the glass for use, each eyepiece carries a scale and index. These scales are graduated in a unit called diopters. A diopter is a unit which is the measure of the converging power of a lens. The relation is given by the equation which follows in which P is the converging power in diopters, and f is the focal length in metres.

$$P = \frac{1}{f}$$

Some glasses are equipped with the so-called twin focusing system. In this type both telescopes are focused together to the correct value for one eye and then any difference between the eyes is taken care of by a separate adjustment on the right eyepiece. This system allows a quick change in focus to be made for an object at very short range, but this feature has no advantage in military work. While this type of focusing in itself does not appear to have any serious disadvantages, yet such a system so affects the design of the instrument that it is impossible to make it dust and moisture proof. Since the manner in which a glass is sealed determines its useful life, this consideration alone makes this type of instrument undesirable.

It is easy to tell if a glass is dirty, or blurred by moisture, by carefully examining the interior through the objective with the ocular directed at the sky. However, there is no way to tell if a glass will remain clear and bright for a long time if it is used in all kinds of weather. The safest way is to select an instrument of standard make. The manner in which a glass is sealed is of very great importance. This emphasizes the point that a glass should be opened as seldom as possible and then only by an expert who has complete facilities at hand for the work. Some manufacturers claim accessibility for their field glasses. This is not an advantage. To the expert, accessibility is not essential. Attempted adjustments in the field upon a prism glass by a layman will usually result in more damage to the instrument, since the slightest disarrangement in the position of a prism will result in a double image by destroying the parallelism of the lines of collimation.

Glasses must be equipped with an interpupilary adjustment for setting the instrument so that the distance between the centres of the ocular exactly corresponds to the distance between the pupils of the eyes. This distance is measured in millimetres. The frame of the instrument should be made of noncorrosive material—durable,

light and rigid. Under service conditions a field glass is certain to be subjected to all kinds of rough handling. Mechanical strength and rigidity are essential.

Size and weight are considerations in the selection of a glass, but since these considerations are intimately connected with the optical efficiency they should, within reasonable limits, be regarded as a secondary importance.

There are three main optical characteristics in field glass design of such importance that a deficiency in any one is sufficient cause for rejection. These are magnification, brightness of image, and field of view. Most makers list these points in their description of the instrument, but tests to determine the values of these optical features are so simple that if for any reason the data is not available, a glass may be rated on these points very quickly.

The magnifying power of a field glass is expressed by the ratio of the focal length of the objective to that of the ocular. Algebraically, $M = \frac{f_1}{f_2}$. Or from a different standpoint, the power is the ratio of the angle subtended at the eye by the image, to the angle that the object at its actual distance subtends at the unaided eye. Practically the power of a glass may be found as follows: Hold the glass about ten inches from the eye and look through the ocular while directing the objective at the sky. The image of the objective formed by the ocular will appear as a small, brightly illuminated circle, called the exit pupil, in front of the eye lens. With a finely divided rule, measure the diameters of the objective and the exit pupil. Divide the former by the latter and the result is the power of the instrument. This rule may be expressed by means of an equation, $M = \frac{d_1}{d_2}$, where d_1 is the diameter of the objective lens and d_2 is the diameter of the exit pupil. When combined with the other expression given for magnifying power, we have,

(1) $$M = \frac{d_1}{d_2} = \frac{f_1}{f_2}.$$

This equation is important for it brings out the relationship between the principal optical characteristics of the instrument.

The importance of high magnification in a glass to be held in the hand is often overestimated. As the power of a glass is raised, it becomes increasingly difficult to hold it steadily for observation, until a point is reached where the value of magnification is lost due to the movement of the field of view, caused by the unsteadiness of the observer's hands. On the other hand, a glass of very low power does not present an image in sufficient detail to make it satisfactory for target finding and for observation of fire. Long experience by field artillery officers using all types of glasses has shown that the

most effective compromise between the conflicting considerations enumerated above is reached in a glass whose power is not less than six nor greater than eight.

Due to the exacting nature of the work and the constant need for intense concentration, the prolonged use of an observation instrument is at best a source of eye fatigue and defective vision. It is a common, although mistaken, belief that the strain is a result of the magnification given by the field glass, but poor definition and lack of light on the image causes most of the trouble. Theoretically the best instrument can deliver at the eye only the same amount of light that would be received by the eye unaided. In practice all instruments lose a certain fraction of the total amount of light that enters, at each refracting and reflecting surface. The amount of light thus lost is very rapidly increased if the light passes through glass of inferior transparency such as is used in cheaply constructed field glasses. In a poor prism binocular over half of the incident light will be lost in transmission through the optical system.

In order to give as much light as possible to the eye the field glass must be so designed that the exit pupil, which is the emergent light, shall have a diameter equal to the maximum diameter of the pupil of the eye. This is an invariable rule where brightness of image, with consequent reduced eye strain, is considered paramount. The pupil of the eye in daylight seldom exceeds 5 millimetres in diameter. At night it may be as much as 8 millimetres. Since the area of the pupil determines the amount of light that can enter the eye, and since the area of a circle varies as the square of its diameter, therefore the square of the diameter of the exit pupil of a field glass gives a measure of the light gathering power of the instrument. By a generally accepted convention among manufacturers, light gathering power is expressed by the square of the exit pupil in millimetres. Thus a glass with an exit pupil of 5 millimetres has a light gathering power of 25, while if the exit pupil is 3 millimetres, the light gathering power is 9, or only 36 per cent, that of the first glass.

It must be remembered that this rule considers design only and does not take into consideration losses in the instrument due to poorly cut prisms and lenses, or to the use of glass of low transparency. For this reason, as between two glasses of the same rated light gathering power, there may be a decided difference in the actual illumination of the field, which can only be determined outside of the laboratory by a thorough comparison in actual observation. These two elements are sometimes combined in an expression which gives the light efficiency of an instrument. By this system a glass that transmits all of the incident light and that is so designed that the exit pupil is 7 millimetres or greater, is rated at 100 per cent. The relative light efficiency of a glass is then obtained by multiplying

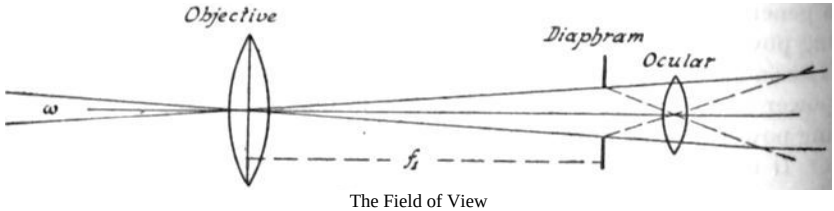
the per cent. of light transmitted, by the square of the exit pupil in millimetres divided by 49. A good prism binocular should pass 50 to 60 per cent. of the incident light. Thus an instrument which passes 50 per cent. of the light and has an exit pupil of 5, has under this system a light efficiency of $\frac{.50\times25}{49}$ per cent.

A certain firm which makes a very compact glass of the roof edge prism type, emphasize the fact that their instruments pass 66 per cent. of the incident light and claim greater illumination based on this fact. This statement, however, ignores the fact that the small exit pupil cuts down their overall light efficiency, except at such times as the pupil of the eye is 3 millimetres or less.

An eight-power glass of this type has an exit pupil of 3 millimetres. The light efficiency is then $\frac{.66\times9}{49}$ = 12.1 per cent., while a typical porro prism type of the same magnification, but which passes only 50 per cent. of the light, has a light efficiency of $\frac{.50\times25}{49}$ = 25.5 per cent. This comparison illustrates the necessity for considering both quality and design in the selection of an instrument.

Night glasses are designed to have a light gathering power of 50 or more. Since no glass can put more light upon an object than is actually there, the gain in visibility which results when it is used is due to the fact that a small, very poorly illuminated object appears to become much brighter when magnified, even when there is actually no gain in illumination. For this reason there is frequently a gain in visibility in spite of the inevitable loss of light due to the use of a telescopic system.

Another major consideration in a field glass is the field of view. Referring to the accompanying cut, it is seen that the field of view is dependent upon



The Field of View

the angle formed by the two rays from the centre of the objective to the extremities of the ocular. It follows that the field of view depends upon the diameter of the ocular and upon the length of the tube. In practice the rays that are refracted from the extreme edges of the ocular result in a blurred effect at the edges of the field of view. To eliminate these undesirable rays a diaphragm is placed at a distance equal to f_1 from the objective. It is the outline of this diaphragm that gives the black frame in which the field of view rests. The only practical way in which to test a glass for

field of view is by observation. Any instrument that gives a field of less than 90 mils will not be satisfactory, and 150 mils is desirable and easily obtainable.

In the equation given below, which follows directly from the cut just discussed, u is the field of view, r is the radius of the diaphragm, and f_1 is the focal length of the objective.

(2) $$u = 2\ tan^{-1}\ \frac{r}{f_1}$$

Equations (1) and (2) together clearly show how considerations of power, illumination, size, and field of view effect one another in field glass design.

Take as a standard a six-power glass with light gathering power 25 and field of view of 150 mils. Suppose that it is desired to design a glass of eight power, but retaining the other features of the six-power instrument. In equation (1) it is seen that when the power (M) is 8 and the exit pupil (d_2) is 5, the diameter of the objective (d_1) must be 40. This means a greater focal length for the objective, hence the instrument will have to be larger. The field of view will be reduced since f_1 becomes greater in equation (2), unless the ocular is increased in diameter so as to permit a larger diaphragm (r). In order to increase the power of a glass and keep the size of the instrument the same, light gathering power must be sacrificed, for in this case the diameter of the objective (d_1) must stay the same so that the length will remain unchanged, hence (d_2), the exit pupil, is reduced.

When the optical design of the field glass considered has been checked as being suitable, the instrument should be used in observation to test for certain faults that can be detected in no other way.

Sharpness of definition is of great importance in a field glass. A glass with which sharp focusing cannot be obtained will never make a satisfactory observing instrument and moreover the attendant eye strain is very severe, no matter what the brightness of image may be. In testing a prism binocular it is well to select an object on which two well-defined cross-lines are available. If one or both of the lines appear to be curved slightly, it indicates the presence of astigmatism, due to prisms whose sides are not plane surfaces. If the definition at the centre of the field is satisfactory the edge of the field should be tested. Even in very good instruments definition suffers slightly at the extreme edges of the field, but the definition should be sufficiently sharp so that details are not lost. Color effects near the edge of the field are not ordinarily a serious drawback, but the centre of the field must be free of all color.

The parallelism of the lines of collimation may be tested by separating the oculars to a distance slightly wider than that between the eyes and viewing a horizontal wire while holding the glasses

about a foot from the eyes. When the circles seen through the glasses are tangent the wire should appear continuous. This test is an important one. When the eyes have to strain to accommodate themselves to a double image, however slight, headache and eye trouble are sure to follow.

Near-sightedness and far-sightedness are both correctable in the adjustable oculars. Astigmatism, however, is not correctable in the ocular. It is always desirable to remove eye glasses when using field glasses where correction is possible, for eye glasses prevent the use of the full field of view and cut down the illumination, unless special precautions are adopted to correct this latter fault. By removing the eye cups and fitting large leather shields to the glass, the disadvantages of eye glasses while observing are minimized. To correct for astigmatism it is also possible for the individual to have a small correcting lens of the same diameter as the eye lens set in rubber and fastened to the eye guards. If these are made so as to be removable, an index must be provided so that the lenses will be in the correct axis when they are replaced.

Protection from the weather and care in cleaning is all a field glass requires to keep it in condition over long periods. In cleaning great care should be used not to scratch the surfaces of the lenses. A camel's hair brush and a piece of old, soft, linen cloth, or clean chamois, may be used without damage.

ANIMAL TRANSPORTATION FOR FIELD ARTILLERY

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

(Continued from last issue)

THE OX

THE animals now known as cattle or oxen have originated from a number of wild species, first domesticated apparently in Asia, and in Europe, but at what date no man can say. Certainly we know that domestic cattle are figured on ancient Egyptian monuments, and the ox hitched to a wheeled cart appears in old Assyrian carvings. At the present time there are four principal types of cattle in existence, all used more or less for draft.

One type is the European, represented not only by our present more or less gentle and rotund dairy and beef breeds, but by the wild-eyed, scrawny and now nearly extinct Texas Longhorn. The coats of these cattle are fairly fine and smooth; as a rule, their horns are cylindrical, or rather circular in section, and they have no humps on the back. They are now found not only in Europe, where they originated, but throughout the Americas, and in Australia. The employment of this type for moving cannon in Italy, at an early date, has already been mentioned.

The second kind is known as the humped cattle, or zebu type—smooth-haired, round-horned animal, with a distinct dorsal hump, represented by the zebu or so-called "sacred cow" of India. This type, existing in many breeds and sizes, is found in southeastern Asia, particularly in India, and over the greater part of Africa. The "bullock," of India, such as was used for moving heavy howitzers, according to Colonel Faunthorpe, as late as 1906 (and which may be still employed for the purpose), belongs to this zebu type.

The third type is the domesticated buffalo, of which there are numerous breeds, scattered throughout the Malay countries, including the Philippine Islands; also in India, a large part of China, Afghanistan, Baluchistan, Persia, Mesopotamia, and now even in parts of Gascony, Italy, and perhaps Spain, as well as in Egypt, Algeria, Tunis, and probably Morocco. The buffaloes in the rest of Africa are decidedly wild. Buffaloes are usually characterized by enormous broad, flat, angulated horns, sometimes meeting in the centre of the forehead, and by their coat, which is thin and coarse. The writer has found but one definite mention of the use of these animals for military purposes; which was in Persia, for moving

heavy artillery, about the year 1726, but the fact that they are frequently employed for general draft, shows that they could serve if necessary. Buffaloes, however, have a reputation for a wildness and intractability that never seems to be entirely trained out of them.

The fourth type of cattle is the yak, or "grunting ox," of which a number of breeds exist in the highlands of Thibet and northward into Mongolia and parts of Siberia. These animals are noted for the long hair on their flanks, which in some cases reaches nearly to the ground, and for their great bushy tails. They are very strong and sure-footed, but like the buffaloes, never seem to be entirely tamed. Their greatest use is for riding and pack purposes, for which they are the only available animal in some parts of their territory. They also serve for draft in some places, especially for the drawing of logs; but a pure-bred yak, it is said, does not take kindly to traction. There is, however, a hybrid of the yak, with one of the zebu breeds, which is claimed to be really useful for drawing vehicles.

We have then four distinct types of cattle used for draft and pack purposes, any quantity of breeds, and all varieties of size from tiny zebu and buffalo varieties only about 9 hands high to huge specimens 15 to 17 hands high. It would take a book to merely outline the capabilities of the various animals grouped under the head of oxen, provided all the material were at hand, which it is not.

The best we can do under the circumstances, then, is to give typical examples of what may be expected of average oxen. Let us first consider the ordinary "scrub" ox of the American farm, which in the writer's experience stands 13 to 14 hands high, and weighs 800 to 900 pounds. The writer found that two yoke were required to do the work, drawing a wagon, of two good horses, each ox pulling a net weight of about 750 pounds at the start. The terrain traveled was the pine barrens between the Florida Everglades and Lake Okeechobee on the one hand, and the Atlantic on the other.

The oxen plodded along at the rate of 2 to 2½ miles per hour, about 15 miles per day, through deep sand, through miles of shallow ponds, their backs covered with buzzing swarms of biting flies, conditions which would have fretted a horse to distraction. Their walk was a steady one except when we had to turn out of the beaten trail, where it was blocked with fallen trees. Then, as always on rough ground, the steers trotted briskly, bumping the wagon over the palmetto roots. When the sun became too hot for them, and the trail passed near a pond, they would rush into the water, dragging the wagon after them, and nothing could stop them, and no one could start them again until they were ready. Then they emerged and resumed the march. They were each fed several quarts of grain morning and evening, and during the night grazed about the wagon, one wearing a bell by means of which we could find them in the

morning. At noon we unyoked them, and during our two-hour lunch and siesta, they grazed in the vicinity.

Major Leonard states that an average bullock in India, of the zebu type, will pull 800 pounds net in level country, but only 500 pounds in the hills; as a pack animal he will carry from 160 to 200 pounds. In south Africa the freighters use large wagons to which are hitched seven or eight yoke of oxen, and which can carry up to 8000 pounds of freight under favorable condition of roads and weather; with very bad traveling and long distances they may carry as little as 5000 pounds. For the more favorable conditions this figures out only about 500 pounds per ox.

Oxen are too slow for field artillery, and too awkward to manœuvre, but they might be used on long and difficult marches to relieve the horses. It would probably take at least six yoke to pull the 3-inch field piece, with its limber, and carrying the cannoneers with their kits. For moving heavy guns, of which speed and mobility are not expected, they have been used since field pieces were first equipped with carriages, and will probably be so used in some localities, and in the absence of better means (such as tractors) for many years to come. Although the pack load for an ox seldom exceeds 200 pounds, strong breeds could probably be found or developed that would transport the parts of the mountain gun. Oxen, although slow, are perfectly capable of drawing the wagons of ammunition, supply, and other trains.

THE CAMEL

A very important animal whose history is interwoven with that of oriental peoples in war and in peace is the camel, mentioned in many ancient writings. Marsh pays him this tribute: "The Ship of the Desert has navigated the pathless sand oceans of Gobi and the Sahara, and thus not only extended the humanizing influence of commerce and civilization alike over the naked and barbarous African and the fur-clad Siberian savage, but, by discovering the hidden wells of the waste and the islands of verdure which surround them, has made permanently habitable vast regions not otherwise penetrable by man." The camel's ability to accomplish this depends largely on the fact that he can travel without food or water, particularly the latter, for days at a time, and feeds on harsh and bitter plants few other creatures would touch. Useful as he is, and enduring, he is also stupid, self-centred, and rarely shows even a spark of affection for any living creature—he appears too deeply absorbed in contemplating his own grievances.

There are two species of camel; one of which is the Arabian, or one-humped type, found, as a rule, in hot and dry countries, such as Arabia and northern Africa, but which is also seen in India. The

other species is the Bactrian, or two-humped camel, confined to higher and colder regions, including a great part of Asia north of India, while many varying breeds exist of both species, especially the Arabian. The average Arabian camel when full grown weighs from 1000 to 1200 pounds, while his height at the hump is 19 hands; the Bactrian camel is more heavily built, and his weight and height are somewhat greater. As might be expected of an animal adapted to cold climates, the Bactrian's coat is heavier than that of the Arabian kinsman; moreover his feet are better adapted for walking on slippery footing.

The typical saddle for the Arabian canal, whether for riding or for burden, is made by stuffing a bag seven or eight feet long with straw or grass, doubling it, and sewing the ends together. This forms an oblong ring, which is furnished with a rope crupper and placed on the back so as to enclose the hump. Upon this cushion rests the saddle, made very much like the "cross-tree" or "sawbuck" pack-saddle sometimes seen in this country. The Bactrian camel, on account of his two humps, requires a somewhat different rig.

The weight carried by the average burden camel is between 350 and 500 pounds; he travels about 2½ miles an hour, and covers from 20 to 25 miles in the course of a day. The animal is guided with a simple halter, or by means of a rope attached to a ring in his nose. A much more rapid pace is maintained, however, by riding camels, which are specially bred for the purpose, and far greater distances are covered.

In draft, camels are frequently yoked in pairs like oxen, but the writer has seen pictures of them equipped with breast-collars and traces. It is said that they can pull, in a wagon, a net weight of from 1200 to 1600 pounds to each animal, about the same as a horse of similar weight.

Camels should be fed at least twice a day, the daily ration, if grazing is good, being only three or four pounds of grain; if grazing is poor, the grain may be increased to six or eight pounds. Should there be no grazing at all, fifty or sixty pounds of clipped straw or other forage should be fed with about 4 pounds of grain. About 3 ounces of salt is required three times a week. The camel can go without water a number of days if necessary, but should be allowed to drink every day if possible, and after, not before, he gets his feed.

The camel has been employed for military purposes in desert regions from time immemorial, either as a soldier's mount, or for the transportation of supplies; and after the introduction of cannon, for moving artillery carriages. For this last purpose he does very well on a straight road, but is too awkward and stupid apparently

to properly go through the rapid evolutions necessary to place light artillery guns in position for firing.

In Persia, however, an unique form of light artillery has been evolved especially for the camel—a little one-pounder cannon called zembourek or "wasp," with a stock like a musket, and mounted on a pivot working in an iron-lined socket in the pommel of the saddle. This was customarily loaded, aimed, and fired in place, with the camel kneeling; but it was sometimes removed from the saddle, and the iron pivot-rod stuck into the ground for firing, and could be even fired on the march. At first the little cannon was loaded with loose powder, and with one-pound iron balls, or with grape shot, all kept in place with felt wads, and was fired with a slow-match; but later a flint-lock was attached for firing the piece, and cartridges, some containing ball, some grape-shot, some blanks for saluting, were carried in the ammunition pouches hanging from the saddle. Only light charges could be used for fear of the recoil.

The last improvement on record was to place small wheels on the lower corners of the camel's saddle, which was so shaped that when removed from the animal's back it could serve as a gun carriage for firing. These zemboureks manœuvred in companies of fifty, and were very effective against enemy tribesmen, especially where grape-shot was used.

It may not be generally known, but it is a fact, that the U. S. War Department in 1857 made a determined effort to introduce camels for military purposes into the desert regions of the southwestern United States. Strange to say, Jefferson Davis was at that time Secretary of War. More than forty camels were imported that year, and were tested in actual service, with the result that the gentleman in charge of the test, a Mr. E. F. Beale, was very favorably impressed with their work as pack animals, and with the fact that the camels grazed only on tough and bitter plants that no other animals would touch, and ignored the tender grasses. But the Civil War came up soon after, and the camels were lost to view—they seem to have escaped to the desert, and to have been killed off by hunters, Indian and white, who had no appreciation of their value. A few lived for years, however, for it is said that a pair were seen in the mountains of Arizona as late as 1887. For some reason the experiment was never repeated, which is unfortunate, in view of the fact that a similar one, made in Australia about the same time, proved a great success. This is evident from the fact that by 1894 the Australian camel herds from a small beginning had increased to 2000, and have proved of great service.

Today, the camel would doubtless be found of value in any campaign carried on in a desert country, mainly, however, for transporting supplies, but also for dragging heavy ordnance in the

absence of tractors, and for carrying dismantled mountain guns. By selecting specially strong camels for the heavier parts, it might be possible to carry also the parts of dismantled standard 3-inch and 75-mm. guns as well.

THE ELEPHANT

There are two distinct species of elephants still extant—the Asiatic and the African, which differ in many particulars—in teeth, in ears, in trunk, the conformation of the back, in the number of toes, and in habits. But most important to us is the fact that the Asiatic elephant alone has been domesticated to any great extent; in fact, in the year of 1904, Tournier says there were only forty-five domesticated elephants in Africa, and although the statement was not clear on this point, probably part at least of these were of Asiatic origin. About this same time the British Army alone had upward of one thousand trained elephants in India.

Both species, especially the African, may be subdivided into a number of varieties. The Asiatic elephant is found, in a wild state, in India, Burmah, the Malay Peninsula, Cochin China, Ceylon, and Sumatra. In India it seldom breeds in captivity, so it is necessary to depend on fresh captures from the wild herds for replacements, hence the "domesticated" elephant in India is really merely a trained wild animal. In some of the other southeastern Asiatic countries the attempts to breed elephants in captivity have been more successful.

The height of the male adult Asiatic elephant at the shoulder is usually from eight to ten feet, occasionally as much as eleven or even more; the weight runs from 9000 to 14,000 pounds. The female is usually somewhat smaller. Elephants live sometimes to be over 80 years old, but do not get their full growth until 25, nor their full force and vigor until 35 years of age. Their natural food consists of grass, leaves, succulent shoots and fruits. Asiatic elephants, differing from the African, do not like to expose themselves to the sun in the heat of the day, and require a great deal of water.

About the first historical reference to their use in warfare was at the Battle of Arbela in 331 B.C., when Alexander the Great crushed the Persian Army under Darius. From that time on we find mention of their military use by Greeks, Romans, Carthaginians, and others, for about six hundred years, when they seem to have been abandoned. They carried miniature towers on their backs filled with archers and spearmen, but their principal use must have been to terrify the enemy, and break down his morale. It was found, however, that when wounded, the great beast had a tendency to bolt back through the ranks in panic-stricken flight, and really proved as

dangerous to friends as to foes; this prevented wider use and seems to have finally led to their abandonment for warfare in the West.

In some Asiatic countries their use in war was continued, however, for we learn that in 1191 a number of native Princes assembled a great army, which included three thousand elephants, to repel an invasion of India by a combined force of Turks, Persians, and Afghans, after which military employment seems to have been continuous for hundreds of years. In 1790 and 1791 we hear of their being used by the British under Lord Cornwallis to carry military supplies.

From this time onward during their campaigns in India the British have experimented with the elephant in many ways, and have tested out his military usefulness to the fullest extent. He has been used to draw field artillery carriages, both heavy (such as 40-pounders) and light (16-pounders); cannon have been carried on his back, not only in a dismantled condition, but assembled, carriage and all, in the case of 8-pounders, at least. The sum total of their investigation seems to indicate that the elephant is a very useful animal for transport under certain conditions—in thick jungle, extensive bogs, or in rough mountainous country; but is useless on the battlefield. The reason is, as Colonel J. C. Faunthorpe, who has seen long service with the British Army in India, told the writer, that "the elephants were found unsatisfactory, as they always ran away when they came under fire." The elephant has his uses, however, in field artillery. A certain number of elephants are, or were until recently, assigned to each battery on the march in difficult country (but not in the presence of the enemy), to assist in pulling the carriages out of deep ruts and mud-holes, and to help them over rough places. The animals do this work with great intelligence, pushing with their foreheads and lifting with their trunks.

In transport it is stated that fifty elephants can carry supplies for a force of 8000 men, but they are very expensive to feed, and for this reason, in districts where roads are available, camels and bullocks are preferred for military transportation.

The elephant can carry a load of from 1200 to 2000 pounds; he can pull from 4800 to 8000 pounds on wheels over ordinary roads. These weights are only approximate, as much depends on the size, the age, the sex, the health, and the disposition of the individual, the food he is receiving, the weather conditions. As a regular thing, he may be worked from six to seven hours a day, if well nourished, and in case of necessity, an hour or two longer per day for a few days, if he receives extra food; in fact, although he is strong, he is not so enduring as might be expected. He does not work well in the heat of the day, and needs considerable rest. In

level country and with good roads he can travel with an average load some times as much as 32 miles a day; in heavy pathless jungle only about 10 miles; his average will be around 20 miles per day.

Feeding differs according to circumstances, and to the individual elephant; the average ration is from 17½ pounds to 33 pounds of grain, such as rice or paddy, per day, and from 500 pounds to 650 pounds of green fodder, such as sugar-cane or green grain (stalk and all), or from 250 pounds to 330 pounds of dry fodder. Salt and oil in small quantity are regularly fed to the elephant, and balls of spices from time to time, to stimulate his digestion. Sometimes a sort of bread is baked especially for him. An elephant drinks from 110 gallons to 160 gallons of water per day.

Various forms of pack-saddles and pads are used for elephants, some of the former suggesting the cross-bar pack-saddle used on horses and mules, some of the latter, thickly stuffed, resembling the aparejo. Besides these there are "howdahs" and panniers of different forms for transporting people and goods.

The writer has seen pictures made in India, of a field gun, carriage and all, lashed fast on one of these pads; and of three elephants hitched tandom to a heavy field piece, the harness consisting mainly of a breast-collar with chain or heavy rope traces and a back-band to keep the traces in place.

THE DOG

While dogs are used to a certain extent for light draft in Belgium and other countries, in some regions, such as parts of northern Alaska and Canada, where Arctic or sub-Arctic conditions prevail, and neither horses nor reindeer are obtainable, he is the sole animal available for transportation. The native Eskimo dog or "Husky" formerly was the only type used, and still remains the principal reliance in many regions. He will stand more abuse and less food than any other dog, yet, all things considered, the best breed known in Alaska and in Yukon Territory, Canada, is the Yukon Malamute, a mixture of the Husky with large "outside" breeds, and with perhaps a touch of wolf, each animal weighing from 80 to 125 pounds. These Malamutes will haul one hundred pounds per dog on a toboggan, and will carry a pack weighing from thirty to seventy-five pounds, according to the size and disposition of the individual animal, some taking more kindly to this work than others. In rough snow, breaking fresh trails, they will make, drawing a loaded toboggan, some twenty miles a day; on a trail already broken, as much as thirty miles; while, as pack animals, they will average fifteen miles a day, although extra good dogs may make twenty miles. In winter, to keep the teams in the best possible condition they should be fed daily, in the evening, about 1½ pounds of uncooked

dried dog-salmon, per dog, or 1 pound of dried king-salmon, which is richer. Once a week they should be given a mixed ration consisting of their dried fish boiled with about one-half pound of split-rice, per dog. Husky dogs being smaller, can not pull as large a load as the Malamutes, and eat proportionately less.

In summer it is usually easy for the traveler to kill enough rabbits or other small game to keep a small train of pack-dogs supplied, but with a large train it is necessary to provide one-quarter pound of rice and one-half pound of dried fish, per dog, per day. Some edible oil, like seal oil, may be mixed with the rice after boiling, or rice and fish may be boiled together. In dragging toboggans or sledges over rough ice in winter the pads of the dogs' feet may become worn and sore, and their traveling ability seriously impaired. Under such conditions this may be prevented by shoeing the animals with dog-moccasins made of light canvas, which is sufficient to protect their feet.

The toboggan is merely a thick board, or series of boards, split—not sawed, from birch wood, fastened side by side, in all about fifteen inches wide, and seven to ten feet long. In front the board is bent up and back in a graceful curve. Various cross-pieces fastened on the top add to the toboggan's strength, and side ropes running between them serve to lash the load fast. The bottom slides directly on the snow. The sledge is merely a long slim sleigh with runners, built so as to combine strength with great flexibility—a necessity on the rough trails frequently met with in the North.

The driver of a dog-team usually runs or walks along behind the load, balancing it with the trail rope in the case of the toboggan, or by means of the handle attached to the rear of the sledge. In the case of sledges very heavily loaded, he may walk in front, between the team and the sledge, steering and balancing with a "gee-pole" attached to the latter. Rarely in any case does he get a chance to ride.

In the West the dogs of each team are hitched tandem, and two or more teams may be used side by side if necessary, but in the East each dog, on a separate trace, is hitched directly to the front of the sledge, and the team travels spread out like a fan. In the Western tandem hitch it is very necessary to have a well-trained leader to locate and follow the trail, and to start the team, and a good "wheel" dog who understands how to swing the toboggan right or left, as ordered. "Marche," frequently pronounced "Mush!" is the signal to start; "Whoa!" to stop, while "ee" means "turn to the right," and "chah" turn to the left, the last evidently derived from "gee" and "haw," the time-honored cries for guiding oxen.

For field artillery purposes, dogs are useless in summer, when they can be used only as pack animals, for the parts of even the mountain gun, dismantled, are far too heavy or too bulky, or both, to be accommodated in dog-packs. At this time of year, therefore, unless pack-horses or mules can be brought into the country from outside, artillery operations must be confined to the vicinity of streams large enough to float canoes or other boats, by means of which the matériel can be transported. In winter the case is different, for a standard team of five Yukon Malamute dogs can be depended upon to pull a toboggan with 500 pounds of freight (for greater weights, more dogs), while under traveling conditions favoring the use of the sledge, for instance, when the snow is soft in spring, an even heavier load per dog may be drawn. It is perfectly possible, therefore, to transport the parts not only of mountain guns, but even of regulation 3-inch field pieces, in dog sledges or toboggans. Some difficulty will doubtless be found in fastening the wheels of the latter to a sledge so as to ride securely without upsetting, if carried vertically, or catching in the bushes on both sides of the trail, if carried horizontally. The best method in this case is to lash them vertically on a loaded sledge, whose load is heavy but low, and whose centre of gravity is close to the ground.

For a winter campaign in Arctic or sub-Arctic countries, it should be possible to replace the wheels of field pieces by specially made strong runners, while a separate sledge, provided with a pintle, or suitable lashings, could take the place of the limber. Some difficulty might be anticipated in shifting the trail to give general direction to the piece when unlimbered on account of the runners being imbedded in the snow, but by carefully smoothing and packing the snow, on which the runners stand, this difficulty should be overcome. Some method could doubtless be found for blocking the runners, and for digging, in the ice or frozen ground, a semicircular trench for the trail spade.

Another difficulty is that the piece with its runners would require a wider trail than is common in the North. This means that two men on snowshoes must break trail, instead of one, and that in some places bushes and trees must be felled to broaden the trail. For pulling a field piece so equipped, several standard dog-teams could be hitched to the limber sledge; this has proven successful in transporting such heavy articles as a forty-horse power tubular old-fashioned steam-boiler, weighing, without the tubes, more than a ton. This was transported nearly four hundred miles with dog-teams, to the writer's knowledge.

In some Northern countries regular sledge carriages are manufactured for field pieces.

THE REINDEER

The importance of the reindeer in transportation over all the vast territory reaching from Norway and Sweden across Russia and Siberia to the Pacific, especially a hundred or more years ago, is little realized by the average man whose impressions of reindeer for draft purposes are entirely derived from pictures of Santa Claus' famous team, and a perusal of "The Night Before Christmas." Despite his importance for many centuries, however, the reindeer seems to have been domesticated rather late, for we find the first mention of him not in the classics of Greece and Rome, but in Chinese writings of about the fifth century, A.D., as being used at that time by peoples to the north of China. The first European notice of what seems to be domesticated reindeer occurs about the year 890, but his documentary history in Europe does not really begin until the latter part of the fifteenth century.

The domesticated reindeer may be divided into many breeds, some larger, some smaller, in different parts of northern Europe and Siberia; his height at the shoulder, therefore, will vary between nine and twelve hands, and his weight between 175 and 400 pounds. In northwestern Europe he is employed for drawing a boat-shaped sledge which rides high over the soft snow like an American toboggan, and for packing; while farther east some Siberian tribes use him for sledge draft alone, some as a pack animal; some as a mount for riding, usually combining two, if not all three, of these uses. Domesticated reindeer were introduced in Alaska in 1891, with Siberian and Lapp drivers to teach the Eskimo how to manage them; here they have achieved considerable success as a source of meat and skins, and, to a somewhat less extent, for draft and pack purposes.

In Alaska both the Lapp boat-shaped sledge or pulka, and the Eskimo types of dog sledges, are used with reindeer. Sledges in all regions are usually pulled by one or two animals only.

Regarding harness, the Siberian type, in very common use, consists of a strap or collar "passing over and across the upper half of the fore-shoulder and between the fore-legs, where the ends pass under a girth and are attached by a horn button to the single trace, which passes outside the right hind leg. The leading deer's trace is made fast in the centre of the front of the sledge, the off-deer's trace to the middle of the left side of the sledge. The team is guided by jerking one of two lines attached to a halter passing around the deer's horns." The lines are fastened tightly to the wrists of the driver so that, if the deer attempts to run away, he will be obliged to drag the driver too. This harness is not altogether satisfactory, as the animal must pull at an angle, and the single trace chafes his belly and his right hind leg; so a new type

has been evolved, and is coming into use, consisting of a collar and two traces, which enable the deer to pull a heavier load.

The typical saddle for pack and riding purposes consists of two pads of deerskin, stuffed with hair or moss, connected at the ends by curved bars of deer horn. Saddles must be placed on the shoulders of the reindeer, as his back is weak.

According to breed and size, the reindeer can carry from 100 to 240 pounds on his back, or pull on a sledge a weight of from 200 to 360 pounds, net. As a pack animal he travels from 3 to 3¾ miles per hour, and covers 20 to 25 miles in a day, but his special province is the sledge, for the authorities agree that he can easily make 8 to 10 miles an hour, and cover 50 miles a day, under favorable conditions.

The typical reindeer caravan as seen in northwestern Siberia, say between Okhotsk and Yakutsk on the Lena River, consists of 100 sledges. There are ten drivers, who manage ten sledges each, each man driving the head team, while the other teams follow, tied by the halter lines, each to the sledge in front.

A typical pack train of reindeer as seen among the Tungus tribe of Siberia, consists of one man riding a deer and leading eight others, followed by another man similarly equipped, and so on, one mounted driver to every eight pack-deer. The drivers urge their mounts along by kicking them on the ribs, and thwacking them with a stout stick. The bridles are made of braided skin thongs.

The writer has found no mention of the use of deer for military purposes, except for the transportation of supplies and personnel in Siberia, and for the rescue, in 1899 or 1900, of two detachments of U. S. Infantry in Alaska, numbering in all one hundred and ten officers and enlisted men, who were marooned by heavy snows their pack mules could not negotiate, and were approaching starvation when the reindeer sledge train came to their rescue.

It is obvious, however, that dismantled guns up to the standard 3-inch and the 75-mm. could be carried in sledges drawn by reindeer, and perhaps the deer might be induced to draw field pieces mounted on sledge carriages. Besides this, it is possible that some form of mountain gun might be carried by pack-reindeer, and then, of course, pack deer and reindeer sledges would surely serve for transporting ammunition and supplies.

The great advantage of the reindeer, aside from his speed, lies in the fact that alone of all animals used in Arctic transportation, he can forage for himself, digging the reindeer-moss, which constitutes his food, out from under 6 feet of snow when needed. In districts where there is no natural moss, it may be necessary to carry a supply, in which case 4 to 5 pounds daily will keep the reindeer going.

One of the great disadvantages of reindeer lies in the fact that in country where dog teams are also used they are liable to attack and destruction by dogs at any time. Besides, they have a strong tendency to run away, and occasionally, especially at certain times of year, they are prone to fits of rage, when they turn on their driver and attack him. When this occurs, it is said the Lapp driver will turn over his sledge and hide beneath it until the deer cools down, whereupon he rights his vehicle, and goes ahead as if nothing had happened.

Taken as a whole, however, the reindeer seems an exceedingly useful animal for transportation in northern regions, especially in winter.

THE ASS

Of ancient, if not exactly high lineage, is the humble ass—an animal frequently mentioned in classic writings, and still well known in all parts of the world, especially in the torrid and the temperate zones. Whether known as donkey, ass, or burro, or by any other name, he is undoubtedly one of the toughest pack animals of the lot, can stand more hardships than the mule, even perhaps more than the camel, and requires less feed. Anyone who has ever visited Mexico has often seen a good size wood-pile or stack of hay moving along the road without any visible means of support or motive power, but closer examination reveals four tiny feet slowly stepping along beneath the load, and at the forward end a sleepy equine face crowned by a pair of long furry ears.

For field artillery purposes, however, the burro is of course too slow, and his diminutive size is against him, for he is too light to be of much good in traction, pulling only 400 to 500 pounds. He carries from 130 pounds up to, say, 175 pounds, according to size, and larger loads, of course, for short distances. He will travel about 2½ miles an hour, and his average day's march is from 12 to 15 miles, according to conditions. A light field piece with its limber might be pulled on the road by burros, but it would take perhaps 8 or 10 pairs, a long and awkward team. And unless mountain guns exist, constructed in such a way that the heaviest part when dismantled weighs not over 150 pounds, the ass can not be used as a pack animal for the regular transportation of mountain batteries. Doubtless the burro might serve for pack-train transport, if necessary, in rough and barren districts where pasture is poor, and for bringing up ammunition and supplies to the lines when roads are bad. In such circumstances his small size would be of great advantage, as it reduces his visibility.

THE LLAMA

The largest and most important of the few species of animals domesticated in the Western Hemisphere before the Spanish Conquest, was the llama, a distant cousin of the camel, but much smaller in size, and showing no trace of a hump. The llama's home is the Andean highlands of Peru, and Bolivia, where his services in transportation were an important factor in the development of Inca civilization in pre-Columbian times. Here in some districts he is still the principal beast of burden, in spite of the horses, mules, and asses brought in by the whites.

The llama stands only nine or ten hands high, at the shoulder, and about 5 feet to the top of his head, weighs about 600 pounds, and, like his relative, the camel, he can abstain from water a number of days without serious injury. When there is plenty of water, however, he drinks frequently. He will carry a load varying from 100 to 125 pounds, according to the individual animal, and the distance to be traveled. If he thinks he is overloaded he has a very effective method of protesting; he simply lies down, and neither coaxing nor abuse will get him up again until the load is reduced. The cargo, divided into two equal balancing parts, is lashed on the animal's back by means of a soft llama-hair rope, without a pack-saddle, there being only a cloth or a skin between his back and the load. With this weight the llama can travel from nine to twelve miles a day, according to the road. He travels at a slow pace, and it is no use to try to hurry him, for if this is attempted he will stop altogether in a huff, and will not proceed again until his anger has cooled off a bit. For this reason the local Indians, who understand him perfectly, make the best llama drivers—they alone have the patience to deal with such animals.

One driver can handle a train or thirty-three llamas, of which a sagacious old one is selected as leader, and wears a bell, very much like the "madrina" or bell-mare of a mule train. Frequently extra llamas are taken to relieve the loaded animals from time to time. On the road the driver selects, late in the afternoon, some spot where there is plenty of pasturage, and here camp is made for the night, the llamas being turned out to graze. In the morning they will be found nearby. A little grain may be fed daily.

From the fact that the llama is not used for draft, and from the small weight carried, it is clear that he would be worthless for the transportation of ordnance, unless a practical mountain gun has been, or may be invented, all of whose parts weigh under 100 pounds. In a campaign through the Andes, however, mules might be used to carry standard mountain guns, with llamas, if necessary, to transport ammunition and supplies.

GOATS AND SHEEP

Goats are occasionally used as draft animals, for instance, in the hands of our own American children, to pull their little wagons; and both goats and sheep serve occasionally as pack animals in various parts of the world. It is said, for example, that certain Tartar bands in the interior of Asia customarily carry their smaller belongings on the back of sheep and goats, when moving from one place to another. It is obvious, however, from the necessarily small load carried, that these animals are useless for military purposes.

CONCLUSIONS

In conclusion, let us sum up the possibilities of the various kinds of animals for field artillery transportation. For all light artillery purposes we find the horse, particularly the light draft type, the best on account of intelligence and ability to learn the necessary movements, and his tractability, combined with strength and speed when needed. Next for light artillery comes the mule; he is tough and enduring, but is subject to fractious moods, and has not the speed, dash, intelligence, and quick response of the horse. Third on the list stands the camel, good for straight pulling, but too awkward and stupid to be efficient in manœuvring. Dogs and reindeer may be used in winter to move guns, either dismantled on sledges or on toboggans, or mounted on sled carriages. Heavy artillery, of which a high degree of mobility and speed is not expected, may be moved by heavy draft horses, mules, oxen, or camels, when circumstances require, but should be drawn by tractors if possible. Elephants may also be used in their own or similar countries, when not in the presence of the enemy; but elephants are worthless in battle, for they are sure to run away under fire.

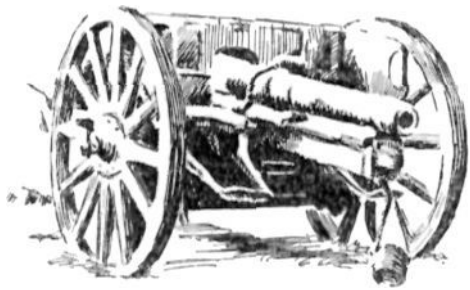
For carrying the standard mountain gun, dismantled, the mule is considered best, but horses, camels, and large oxen, perhaps even reindeer, may also be employed. In conveying ammunition and supplies, horses, mules, asses, camels, elephants, oxen, also in winter reindeer and dogs, may be employed for draft purposes, according to the location of the seat of war and local conditions. All may be used as pack animals, also, with the addition of the llama, but dogs, like goats and sheep, can not carry heavy enough packs to make them of service for military transportation.

Finally, the writer feels that a table suggesting the capabilities of the different animals might prove of interest here. Unfortunately, authors differ widely in their estimates of how much an animal of a certain species can carry, and how much it can pull; carriages vary greatly in case of draft; while the animals themselves differ in the same species according to breed, weight, sex, age,

condition, and other factors, besides which the time of year, the roads, the weather, and other things must be considered. For these reasons our table makes no pretence at strict accuracy, but represents an approximation for which comparisons may be drawn. The weights given are net:

TABLE OF APPROXIMATE CAPABILITIES OF ANIMALS IN PACK TRANSPORTATION AND IN DRAFT

Animal	Carries lbs.	Draws on wagon lbs.	Draws on toboggan lbs.	Draws on sledge lbs.	Miles per hour	Miles per day
Horse (1200 lbs.)	250–275	1500			3–4	15–25
Mule (1000 lbs.)	200–250	1000–1200			3–4	15–25
Ox	160–200	500–800			2½	15–20
Camel	350–500	1200–1600			2½	20–25
Elephant	1200–2000	4800–8000			3–4	21–28
Dog	30–80		75–100	150–200	pack 2½ draft 2–3	15–20 20–30
Reindeer	100–240			200–360	pack 3–3¼ draft 8–10	20–25 30–50
Ass	130–175	400–500			2–2½	12–15
Llama	100–125				2–2½	9–12



A METHOD OF CALCULATING LATERAL DISPLACEMENT ERRORS

BY MAJOR J. G. BURR, F.A.

IN MANY battery positions distant aiming points cannot be used. This is becoming more and more the normal condition due to the necessity of obtaining overhead cover. Where the guns are in such a position, aiming stakes must be used. Please notice the "S" on stakes. Two aiming stakes must always be used; the failure to use them cannot help but cause erratic shooting as far as deflection is concerned. For instance, if the aiming stake is 100 yards from the gun, a displacement of one foot at the sight will cause an error of over three mils. The deflection error of the 75-mm. gun is only ¾ of a mil at 4000 yards, so the displacement has added over three probable errors to the gun. Such an error is inexcusable, especially when it can be prevented or corrected.

The use of the two aiming stakes is provided for in the regulations, but no method is given for calculating the error caused by displacement. The regulations do provide that when the gun moves off the line of the aiming stakes, that it is to be moved back on the line. That will work all right when the light guns are being fired, but if the unfortunate executive is firing G.P.F.'s or 240-mm. howitzers he is out of luck, unless he stops the firing for the day and spends it, instead, in moving his guns a couple of feet.

In the following paragraphs is described a method for measuring this error with the sight on the piece. It is very simple and requires no other equipment than the gun sight and a small amount of brains. Consider the diagram herewith. T is the target, G and G' the gun sight before and after moving, P and P' the two aiming stakes. Angle $''a''$ is the base deflection, and angle $''A''$ the deflection which it will be necessary to use after the piece has moved laterally the amount $G–G'$.

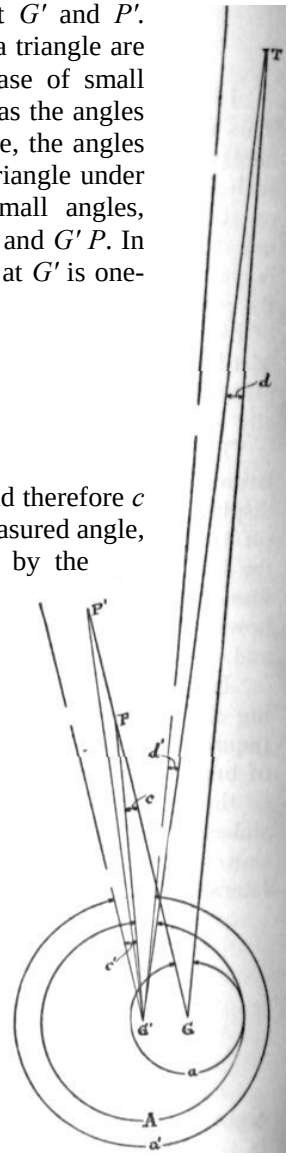
$a = a'$ (By construction.)
$A = a' — d' + c'$ (By inspection.)
$d' = d$ (Opposite interior angles.)
$c' = c$ (Same.)
$A = a — d + c$

But the angle $''d''$ is very small. If the displacement of the sight is one foot and the target is 2000 yards off, the angle $''d''$ is 1/6 of a mil, too small to be considered. Therefore we can say that

$A = a + c$.

The only problem left then is to find a way of measuring the angle *"c"* with the gun sight. This is done as follows:

In the triangle *G', P, P',* the exterior angle *"c"* is equal to the sum of the two opposite interior angles, *i.e.,* the angles at *G'* and *P'*. Further, we know that the sines of the angles in a triangle are to each other as their opposite sides. In the case of small angles, the sines of two angles are to each other as the angles themselves, therefore we can say that in that case, the angles are to each other as their opposite sides. In the triangle under consideration, the angles at *G'* and *P'* are small angles, therefore they are to each other as the sides *P P'* and *G' P*. In other words if *P P'* is one-half of *G' P* the angle at *G'* is one-half the angle at *P'*.



Now, since, $c = G' + P'$

and $P' = 2G'$

$c = G' + 2G'$

or $c = 3G'$

G' can be measured by the use of the sight, and therefore *c* can, then, be found by simply multiplying this measured angle, in this specific case, by three and, in general, by the relation between the two sides of the triangle discussed.

If *P'* is placed at the same distance from *P* as the gun, we have an isoceles triangle and the angle at *G'* is one-half the angle at *c*. This makes a very simple case to solve since the correction is twice the measured angle. The distance *P G* can be used instead of *P G'* as the difference between the two is very small, in all cases.

To reduce the above to the language of the regulations:

"In placing the aiming stakes for firing, where possible place the far aiming stake at the same distance from the near, as the gun is from the latter. If, during the firing, the gun moves off the line of aiming stakes, measure the angle between the two stakes on the gun sight, multiply by two, apply to the base deflection and use the result as the new base deflection."

If it is not possible to place the aiming stakes as above, measure the distances between the two aiming stakes and between the further one and the gun. Take these distances as a proportion, *i.e.*,

$$\frac{\text{Distance between further aiming stake and gun.}}{\text{Distance between aiming stakes.}}$$

This ratio will always be greater than unity. In reducing it, one decimal place will be sufficient. Multiply the measured angle between the aiming stakes by this ratio and apply the result as the correction to the original deflection.

In applying the correction in either of the above cases, the rules for its sign are the same as in figuring offsets in the parallel method.

It is believed that this method will insure great accuracy in firing and save much time in hauling around guns in order to keep them on the line of aiming stakes. Once the error is found and applied, the further aiming stake can be moved onto the line instead of the gun, a much easier proposition; and, in case there is further displacement, the same method can be repeated. There is one caution to be observed. The gun must be laid on the nearer aiming stake with the corrected deflection and not on the further. After this is done and the stakes are lined up again, there can be no confusion.

THE VACUUM TUBE OF RADIO

BY CAPTAIN M. A. STUART, 76TH F.A.

A FILAMENT enclosed in a vacuum, and heated to incandescence, will emit negative particles of electricity called electrons. The heating may be accomplished by connecting a battery of sufficient potential to the ends of the filament. We have such a filament and vacuum in the ordinary incandescent lamp. The emission of these negative particles of electricity or electrons from the heated filament will continue until the walls of the lamp globe are brought to the same potential as the source of emission, *i.e.,* the filament, and after that stage is reached no further emission of electrons will take place. For a given amount of heat applied to the filament there will be a certain emission of electrons. We are able to control the amount of heat applied to the filament by means of a rheostat which is in series with the heating battery.

If we could prevent the walls of the lamp globe and the space within the globe from being brought to the same potential as the source of emission, the emission of electrons would continue as long as the filament was heated. This we are able to bring about by introducing into the lamp a second element, which we call the plate. By connecting the plate to the positive terminal of a battery of sufficiently high potential, and connecting the negative terminal

of the same battery to the filament, we are able to keep the plate at a positive potential, with relation to the filament, and the electrons, being strongly negative in character, will be attracted to the plate as long as this potential is maintained. Under these conditions, a current will flow in the plate circuit or high tension circuit, which includes the plate, the high tension battery, the filament, the space between the filament and the plate, thence to the plate, closing the circuit.

As the positive potential applied to the plate is raised or made greater, it will finally reach a potential sufficiently great to attract all of the electrons emitted, and it can readily be seen that there is no advantage in raising the plate potential above this point, inasmuch as all of the electrons emitted are already being carried off. When the plate potential reaches the point where all the electrons emitted from the filament are attracted to it, "saturation" is said to have been reached. Similarly, inasmuch as the quantity of electrons emitted from the filament depends on the heating applied to it, if the degrees of heat applied are reduced, it will require less potential applied to the plate to bring about saturation. It will thus be seen that the potential of the plate battery and the heating of the filament are important things to be considered in using the lamps, either as a means of transmission or as an amplifier. Saturation must always be avoided.

If a telephone receiver is inserted in series with the plate, high tension battery, filament and space circuit, the current flowing in this circuit (assuming the filament to be heated and the emission of the electrons taking place) will pass through the telephone receiver, but being a direct current and of a constant value, no manifestation, or sound, will be heard in the receiver, for the telephone receiver is a device which functions with a variation of an existing current, rather a stopping and starting of current, the variations passing through the magnet coils causing alternate pulls and releases on the diaphgram as the magnets are made stronger or weaker by the variation of the current.

If saturation be not reached, and it may be avoided by a careful regulation of the heating of the filament, any variation in the number of electrons reaching the plate will, of course, cause corresponding variations in the current flowing in the plate circuit, and such variations will be audible in the telephone receivers under certain conditions, if they are of audible frequency.

We may cause a variation in the number of electrons reaching the plate by inserting into the lamp a third element, which we call the grid. If the grid be brought to a positive potential, with respect to the filament, *i.e.*, a higher voltage applied to it than is applied to the filament, it will be seen that the electrons will be attracted to

the grid by virtue of the fact that the negative electrons are attracted to any positive object. Keeping in mind, however, that the terms positive and negative are *merely comparative values,* and that the grid is still at a much lower or more negative potential than the plate, the electrons pass on to the plate, and the combined effect is really that of adding the positive potential of the grid to the positively charged plate. In other words, the two positive potentials are now combined, and therefore the emission of electrons is greater, and the maximum amplification is reached on the upper swing of the current, *provided the sum of the two positives does not cause saturation*. The strength of the current in the plate circuit is increased.

Now suppose we bring the grid to a negative potential, with respect to the filament, *i.e.,* apply a lower voltage to it than we are applying to the filament. It being negative, the negative electrons are repelled, and it tends to interfere with their flight to the plate. Some of the electrons are turned back to the filament or create a negative field between the grid and the filament which tends to still further stop the emission from the filament. All of the electrons are not stopped, however, and some find their way to the plate, but the total number reaching the plate is greatly reduced, and therefore the strength of the current in the plate circuit is now less than at first.

IT WILL BE SEEN THAT ANY CHANGE OF POTENTIAL OF THE GRID, HOWEVER SLIGHT, WILL CAUSE COMPARATIVELY LARGE VARIATIONS OF THE CURRENT FLOWING IN THE PLATE CIRCUIT AND LIKEWISE IN THE TELEPHONE RECEIVERS.

Now, if we connect the grid to one end of a secondary winding of a transformer, and connect the other end of the same secondary to the filament, and then connect the primary of the induction coil in series with a telephone, we see that the variations in the strength of the current flowing from the telephone, which are alternating in character, will induce in the secondary winding of the coil connected to the grid and filament, like alternations, and such alternations will cause alternate positive and negative potentials to be applied to the grid and thereby increase and decrease the strength of the current flowing in the telephone receiver which is in the plate circuit, and will now become audible if the variations occur at *audible* frequencies. The rate of variations per second will determine the tone heard in the receivers, the higher the rate the higher the note heard.

The results gained by using the properties of the lamp are that very weak currents, too weak to be audible to the human ear, are sufficient to operate the grid and thus release a very large current, comparatively speaking, to operate the telephone. The action is

that of a valve which is operated by a feeble current releasing a strong current to do the required work, hence the name valve, which is usually applied to the so-called vacuum tube.

If, instead of connecting the telephone receivers in the plate circuit, we insert a primary of a transformer, and connect the secondary of the same coil in series with the grid and filament of a second lamp as we did in the case of the first lamp, we will now cause the variations of the plate current of the first lamp to be relayed into the secondary of the transformer so connected, and thereby actuate the grid of the second lamp; only now the changes of potential applied to the grid of the second lamp will be very much greater than was the case with the first lamp, because we are now using the much stronger current which flowed in the plate circuit of the first lamp as the actuating means instead of the feeble current of the telephone which we used to actuate the grid of the first lamp. If the telephone receiver be connected in the plate circuit of the second lamp the variations of current will be much stronger and the sounds heard in the receiver correspondingly louder. This arrangement would be termed two-step amplification. Other lamps might be connected together in the same manner, and, *within limitations,* any degree of amplification attained.

By connecting all of the filaments in parallel to one common heating battery, and all of the plates in parallel to one common high tension battery ("B" battery), only two sets of batteries are required. Such an arrangement exists in the type of amplifier used by us for ordinary work.

The valve may also be used as a detector by inserting in the grid filament circuit a condenser shunted by a high resistance leak. In this case the grid is connected with one of the terminals of the oscillating circuit condenser of the radio receiver, the other terminal being connected with the positive pole of the heating battery.

Due to the difference in the hardness of the vacuum of each lamp, they do not function exactly alike. It is always advisable to change the position of the lamps in order to determine which one will function best as the first lamp. This is particularly true in the case of the SCR 77A Set as at present issued to the Artillery.

USEFUL HINTS IN CARE AND MANAGEMENT OF HORSES AND MULES

BY FIRST SERGEANT MICHAEL RUDDEN, SERVICE BATTERY, 12TH F.A.

THE following are a few practical hints in the care and management of horses and mules that may be of help to the new recruits, as well as the older men of the Field Artillery. It is the little things that are generally overlooked and they may be the cause of grave trouble and annoyance.

How often have we heard the expression, "as stupid as a mule"? The mule is in no way more stupid than a horse, and the horse is supposed to rank high in intelligence. Most of the trouble is that the mule, as a rule, is poorly trained and very much abused. It is difficult to obtain the same loving affection for the mule that we see lavished on the horse. Has anyone in the service ever seen a driver buy lump sugar or apples for a mule? Quite frequently we see them buy the most dainty morsel for the horse.

How many teamsters know that a mule's ear is the most sensitive part of his body? There are thousands of mules spoiled and made head-shy by ignorance in this small thing alone. The most common ways through which a mule becomes head-shy are: an ill-fitting bridle, by being hit on the head and ears with a whip or the end of a halter shank, and, last but not least, by applying the twitch while being clipped, shod or groomed. When a mule becomes head-shy it takes patience and perseverance to break him of this habit. From my experience I find there is one good rule to follow: Do away with the bridle entirely—it isn't necessary. Have the bits equipped with snaps so that they may be snapped onto the halter when the mule is going into harness. The bits can be easily adjusted by raising or lowering the halter. If this plan is followed it will remove the necessity of handling the ears, and in time the habit will be forgotten. Remount mules should never be worked in pairs, if it can be avoided, but teamed up with old and well-trained animals until the habit of pulling freely has become fixed.

The casualties from kicking horses would be a great deal less if the recruits were instructed in the proper manner of picking up the horse's feet. How often have I seen the groom grab the horse or mule's leg below the hock, frightening the animal and causing it to defend itself with the only means it knows—by kicking. The horse or mule perhaps thinks it is a wolf or dog that has caught him by the leg.

The proper ways to pick up the feet are: for the front leg—place one hand on the horse's shoulder, just where the U. S. brand appears,

and shove him off his balance with the other hand. Catch him by the fetlock, or pastern, and no difficulty will be met in picking up the foot. For the hind leg—stand facing the horse on the side on which the leg is to be picked up. If on the left side, place the left hand on the point of the hip, running the right hand firmly down over the croup and leg, grasping the leg at the fetlock or a little above, and lifting with a forward motion; when the foot leaves the ground rest it on your thigh and move it backward, putting your left hand around the hoof and turning it up, cup shape. In this manner there is no strain on the animal, and the sole can be seen and readily picked out.

Grooming has never been a success in the American Army, in my opinion. I have seen good soldiers that were perfect in every other duty, but the sight of a grooming kit or the sound of stable call made them sick. The system of grooming is at fault. We will say, for instance, that Private Jones and Private Wells come in from horse exercise and each has two horses to groom. Jones, by being energetic and paying attention to his work, can do a good job of grooming on his horses in half an hour, while Wells, being lazy, takes an hour and a half. He does a poor job at that. It is a crucifixion for Jones to be killing time when his work is finished, waiting for Wells, or for the chief of section to command "Cease grooming." The remedy for this is to have the driver report to his chief of section when his animals are in order, and for the chief of section, finding the horses in condition and properly groomed, to dismiss him as a reward for his good work. This would speed up, and tend to improve, the grooming. Wells, who used the grooming period as a time for rest, would start to work and the improvement in his grooming would soon be apparent.

A few years ago it was strictly against regulations to bob an animal's tail, but lately scarcely any uniformity in regard to this matter exists. It seems to be left to the driver's individual taste. The English prefer docked tails which make a smart appearance. The American idea is, or at least was, to leave the tail on, for the horse to use it in the manner nature intended it to be used—to flick flies off that part of his body not covered by the Pavniculas Cornocious (Fly Shaker), but at the present in many outfits, we haven't the smart appearance of the docked tail or the tail that is beneficial for chasing flies, but a bundle of hair that is neither beneficial nor ornamental; it only destroys the graceful lines of the horse or mule.

The tail should be pulled or plucked to three inches below the hock, and kept thinned out from time to time, care being taken not to take too much out at one plucking. No more do we see the driver clean out the dock and nostrils with a wet sponge while resting on the hike; there is nothing so refreshing to the animals.

It has the same action as a bath to the sweaty body of the human. We all know how good a bath feels after a day's march; sponging out the dock, nostrils and mouth is just as refreshing to the horse. So why let a good thing die out?

STABLE MANAGEMENT

It seems to be the policy today in the army to buy large horses and issue less rations, and I expect that in a few years oats and hay will be a thing of the past; the stable sergeant will line his horses up three times a day and give them a hypodermic in lieu of forage. At least the ration at this post for the past year points that way.

The oats allowance for all horses has been on the average; oats 10 pounds, hay from 12 to 14 pounds per day. This is a sufficient ration for polo ponies of about 900 pounds, but hardly a maintenance ration for the average draft horse in the artillery today, its weight being, on the average, about 1300 pounds. On top of this short ration comes the carelessness in which it is handled. At every stable today can be seen a waste of oats, a few pounds here and a few ounces there, and by the time it reaches the animal for consumption, there is about two-thirds of the full ration allowed by regulations.

This wastage, to a great extent, can be remedied within the organization, first, by the choice of a properly qualified stable sergeant, and second, by a closer supervision by a commissioned officer of the battery.

To be a good stable sergeant the first requisite is a love for horses; second, a graduate of the Fort Riley school or a school just as good; third, a glutton for work, as a stable sergeant's work is never done; and last, but not least, he must be able to find work for idle hands, and to be constantly on the lookout for things to remedy, and for the improvement of existing conditions.

One of the greatest sources of annoyance around a stable is loose animals during the day, and more especially at night. This is due entirely to careless tying in at night, and lack of supervision by the stable sergeant. Rope burns and horses becoming cast are in all cases due to the same cause. We do not have to seek far for the remedies for this—proper methods of tying in, proper supervision and more instruction in the right length of halter shank, and a safe but secure tying hitch. In every case where an animal is found roaming around at night the entire stable force should be aroused to round him up, unless the sentry can see that the animal has snapped his halter shank, which happens in rare cases.

The more often the stable crew is awakened at night, the better. The following night no horses will be loose. I have seen whole batteries held up because of horses getting loose and wandering off, and complete sections late into action for the same cause

during the war, when one section might mean defeat or victory. The stable sergeant's last round for the day should be a close check on the tying as to security and length.

The feeding should be done at least three times per day—morning before the battery goes to drill; noon, after the horses have cooled off; and about *six* o'clock in the evening. The present system is to feed the last feeding of oats about *four* o'clock in the afternoon, which is too early, as it does not allow the stomach to get rid of, and rested after, the noon feeding; also it allows too long a period between the evening and morning meal. Regularity, however, is the main thing, and should be adhered to strictly. There is one exception to this which I will refer to under *Marching*.

Look in the mangers of any army stable after feeding time, and you will find a considerable amount of oats mixed with the dust and dirt in the bottom of the manger. This is caused by some horses that root the oats out with their noses with each mouthful they take. This, to a great extent, can be remedied by the simple expedient of putting a piece of bailing wire diagonally across the feed box, allowing the horse less opportunity to root.

Bran should not be fed in mash form when cold water is used in making it, as this form of mash is nothing more than an indigestible mess. When scalding is not feasible, it should be fed mixed with the oats. When fed in this manner it has the advantage of compelling the horse to chew its food. For horses that bolt their food a couple of handfuls of bran should be mixed with the oats before feeding.

Before prohibition went into effect a lot of poor hay was used to pack bottles. Now there is a surplus, and it looks as though the army gets it all for feeding.

MARCHING

Since the World War I have rarely made camp where it was not necessary to pitch camp by the light of the moon, generally starting at daylight and trifling along the road until dark. The trot seems to be a thing of the past. What are the consequences? Sore necks, lame backs and galled shoulders on the animals, and stiff muscles and nasty tempers on the part of the men. The men get saddle sore from sitting in the same position from eight and a half to nine hours, which seems to be the length of time required to make 24 to 27 miles. That, in my opinion, is poor marching time for mobile artillery. In my experience in marching, which embraces three years along the border with the 6th Field Artillery, from El Paso to California, and over roads mostly sand, the trot was the salvation of both horses and men. The march was started in the cool of the early morning and camp was usually made around two or three

o'clock in the afternoon, allowing a thorough care of the animals and giving the men an opportunity to get settled before dark. We had the ten-minute halt, as we have today, but we made good use of it in sponging out the dock, nostrils and mouth of the animals we were caring for, and also in removing the sweat from the steel collar which was used at that time. The average day's march was twenty-five miles, but often well over thirty.

Horses cannot rest by the side of the road with harness and full pack on. The place for the animals to rest is on the picket line with all harness off and their hides clean, which cannot be done if the unit makes camp after dark.

If a one or two day hike is the extent of the march, and camp is to be made for the day at around two or three o'clock, *don't* feed or water *on the road* at noon. It is a waste of time, as horses, with few exceptions, will not eat while tired; when the whistle goes to hitch in, the oats not eaten are dumped on the ground—wasted. The outfit getting in camp by *two* or *three* o'clock in the afternoon can feed by *four,* with a late feeding around seven o'clock in the evening. This is the only time that the regularity in feeding should be changed, if it can be avoided.

No matter what contrivance or collar pad is experimented with in field artillery, there are always going to be sore necks when the collars are left on for *nine* to *ten* hours, with a Texas sun and alkali dust to help. The number can be kept down if the pads are kept clean and the sweat crusts are removed at each halt. There are many other things which can be done, but they are set down in the various manuals and textbooks. It would not help to mention them here.

One more thing before I finish—the artillery horse as he was, and as he is today. As he was: A horse not weighing over 1100 pounds and running all the way down to 850 pounds, with good feet and some marks of intelligence. As he is today: A lymphatic clatch weighing from 1200 to 1400 pounds with breeding no one can tell, flat feet, generally the Roman nose of the Clydesdale, massive head, the slow walk of the Shire, small, thick neck of the Suffolk Punch, very often the canon bone of the thoroughbred, and the disposition of the bronc.

Today the bridle is superfluous. What is needed is a rudder to steer, and about one-third more rations to fill the big bellies of the monstrosities called horses, which are issued to the mobile artillery today.

REGIMENTAL NOTES

TWENTY-FOURTH FIELD ARTILLERY (P.S.) — CAMP STOTSENBURG, PAMPANGA, P.I.

Colonel Philip R. Ward, *Commanding*

Roster of Officers

Lieutenant-Colonel James P. Robinson

MAJORS

John O. Lackey
Raymond E. Lee

CAPTAINS

Stanley Bacon
Wallace W. Crawford
Kenneth Rowntree
Edward T. Eneboe
Channing R. Toy
Ernest T. Barco
John J. Atkinson
Louis J. Fortier
Lloyd S. Partridge
Leslie M. Skerry
Leonard H. Frasier
Richardson L. Greene
Charles R. Hall
Russell G. Barkalow
Joseph W. Loef
Edmund C. Sliney (Chaplain)
Ernest T. Stevens (M. C.)
Clifford C. Pickering (V. C.)

FIRST LIEUTENANTS

Fidel V. Segundo
Salvador F. Reyes
Robert L. Allen, Jr.
Stephen E. Bullock
Julius T. Berry
Harry L. Watts, Jr.
Raymond T. J. Higgins
Thomas F. Keefe
John C. Grable
Alfred M. Gruenther
Robert R. Raymond, Jr.
Elton F. Hammond
Francis O. Wood
Edward O. Hopkins
Edward Freeman

SECOND LIEUTENANTS

Mariano S. Sulit
Thomas A. Roberts, Jr.
Francis H. Morse
Edward M. Edmondson
William I. Brady
William H. Bartlett
Millard Pierson
Escalus E. Elliott
Wray B. Avera
Luis M. Alba
Edwards M. Quigley
Amado Martelino
Victor Z. Gomez
Nemesio Catalan
Alejandro Garcia

IT HAS been generally observed that so little is known, by the Service as a whole, about the Twenty-fourth Field Artillery (Philippine Scouts), that we welcome this opportunity of presenting an outline of our activities and feel that a short sketch of the regimental history will be appropriate.

The Regiment has the distinction of being the only Filipino regiment of the arm in existence and one of the two regiments of pack artillery in the Service. It was organized provisionally in February, 1918, from the 11th and 12th Battalions of Philippine Scouts, and on May 15, 1921, was made a regular regiment of the U. S. Army and given its present designation. Although as a regiment

it has had no opportunity to take part in campaigns, all the organizations of which it is composed were organized in 1901, and possess stirring records of gallant exploits.

The Regiment is maintained at practically maximum strength at all times and is fortunate in having more old soldiers and reënlisted men than any other field artillery regiment; 39 having more than twenty years' service; 68 more than fifteen years; and 418 serving beyond their first enlistment. Many of these men have served with their respective organizations since their original organization. It is a matter of interest that a considerable number of them have served under three flags, Spanish, Filipino and American.

Camp Stotsenburg is located 65 miles north of Manila. Excellent roads and good train service enable one to make the trip by automobile or train in less than three hours. The reservation and surrounding country are ideal for the training of pack artillery, varying from extensive plains of rice paddies and sugar cane fields to very difficult mountain country.

We are able to devote the entire year to our own training. The dry season from November first through May is devoted to manœuvres and field training and the rainy season from June through October to schools and indoor work. Service firing is distributed throughout the year. We are brigaded with the Twenty-sixth Cavalry (P.S.), our neighbors, and many joint manœuvres are held. Pistol firing is held during March and gunner's examination during June. Last year 624 men qualified with the pistol and 853 qualified as gunners. It is worthy of note that the First Battalion Headquarters Detachment and Combat Train, under the instruction of Lieutenant William I. Brady, qualified 100 per cent. with the pistol.

Battery "A" with attached athletes, Captain Leslie M. Skerry, commanding, marched to Fort William McKinley in December and represented the Regiment in the Annual Department Military Tournament, winning a cup in the Military Exhibition Class, as did Battery "B" last year, and several championships in athletics.

The Regiment will march to Manila the latter part of January for the Manila Carnival, February 7th to 15th, camp in the vicinity of the Luneta, and give daily exhibitions and demonstrations. After the Carnival it will proceed to Fort William McKinley for the Division Manœuvres, February 16th to 21st, returning to Stotsenburg about March 1st.

It is not all work and no play at Stotsenburg. Ample time is devoted to diversified sports and recreation; one day each month is set aside for a post field and track meet and during the rainy season soccer and volley ball leagues are conducted. The Regiment has scored a total of more points in the field and track events than

all of the other organizations together, and Battery "E" holds the soccer and Batery "B" the volley ball championships.

The Regimental Organization Day is May fifteenth. The last one is worthy of note, starting off with a "bang" at reveille with the 24 guns in line, firing a salvo as a salute to the Regiment, followed by: "Regiment, 1 Round," as a salute to the Field Artillery. The band then marched through the entire Artillery Garrison playing the new regimental march, composed by Master Sergeant Reyes. At 8:00 A.M. a dismounted review was received by all soldiers of over 23 years' service. The balance of the day was devoted to a sports carnival, battery dinners, a reception by the Regimental Commander, Major Raymond E. Lee, for the officers, and an enlisted men's dance and an aquatic fiesta for officers in the evening.

Last October 24th–26th, The Annual Stotsenburg Sports Carnival was inaugurated with the slogan, "A Visitor in Every Home." Scores of visitors from other posts and Manila came, saw and vowed to come for the next one. Notable among the distinguished guests were, Governor General Wood and our Division Commander, Major General McRae. The mask of formality was cast off and athletic and social events of all kinds enabled every one, officers, ladies and soldiers to take part. It is needless to say that it was a "howling" success and every one is looking forward with pleasure to the next one.

The Regiment's championship polo team, composed of Captain John M. Jenkins, Jr., No. 1; Lieutenant Hobart D. (Cowboy) Reed, No. 2; Captain Oscar I. Gates, No. 3; and Captain Percy C. Fleming, No. 4, won the Far Eastern Inter-Port Championship in 1923 and the Stotsenburg Elimination Tournament in 1924. All of these officers have returned to the States except Lieutenant Reed, who has built up a team composed of Lieutenants T. A. Roberts, Jr., W. H. Bartlett, W. B. Avera, T. F. Keefe and G. H. Beverly, A. S., which will, it is expected, bring home the cups from The Manila Polo Club Tournament in February and the Stotsenburg Tournament in March.

This article would not be complete without mention of The Artillery Trail to The China Sea. The possibility of a trail over the mountains lying between Stotsenburg and The China Sea was conceived by several officers serving with the Regiment in April, 1924. Major Raymond E. Lee, commanding officer at that time, heartily indorsed the project and work was started immediately. The work was done without any outside assistance and without interruption to our training program, each battery constructing successive portions, the Headquarters Battery doing the topographical work and maintaining radio communication between the working parties and the post and the combat trains packing out supplies and tools.

Many miles were constructed before we were forced to stop by the rainy season. The new regimental commander. Colonel Philip R. Ward, gave his enthusiastic approval, and on November first work was begun again, and in a few weeks time the Trail was an accomplished fact. In addition to being a military asset, approved by the department engineer, the Trail opens up country previously unexplored, except a portion covered by Captains Inglis, Snyder and Campbell during their expedition to the peaks of Pinatubo in January, 1923. Open only to pack artillery and cavalry, it climbs to an altitude of 4000 feet in Zambales Pass and thence descends to the low coastal plains bordering the China Sea. Space does not permit a lengthy description; we can only say "make the trip over The Artillery Trail to the China Sea and you will marvel at the scenic wonders and obstacles overcome in its construction." Difficult problems were encountered in jungle growths, steep grades and swift-flowing mountain streams. Ward's Bridge, constructed by Lieutenant Victor Z. Gomez, over the Pinatubo River, making use of natural rock foundations, is a masterpiece of pioneer engineering.

If we have seemed to boast of some of our various activities and accomplishments we feel that we are justified, for everyone from the commanding officer to the newest recruit ever bears in mind our unofficial motto:

"No hill too steep; no sand too deep;
No trail too rough; no job too tough."

as well as the dignified Regimental Motto: "VIRTUE INCREASES UNDER A LOAD," carrying a deep significance to all, but particularly to those who have served with the mountain artillery.

FOREIGN MILITARY JOURNALS A CURRENT RÉSUMÉ

ENGLAND

"The Journal of the Royal Artillery," January-March, 1925

"SNOW CAMPAIGNS," by Major General Sir W. E. Ironside, K.C.B., C.M.G., D.S.O., describes a winter campaign of the British in North Persia after the Armstice. The British troops found themselves involved in a war between the White and the Red Russians in the neutral country of Persia.

The Persian Cossack officers were White Russians who openly declared that they were keeping the North Persian sphere of influence in bond for a future Czarist Government. This attitude was of course well known to the Soviet Government, which accused the Persian and British Governments of harboring White Russians in a position from which they could menace peace in Soviet territory. To improve the situation the White Russian officers were relieved from the Persian Cossack forces. They did not give up their commissions without some trouble, but they were finally compelled to accept their dismissals by British force.

The Bolsheviks now began to become active. They had taken the White Russian fleet. The British decided to hold the Menjil Pass and allow the Bolsheviks to stay on the northern slopes of the Elburz Mountains and die of malaria. The Menjil Column consisted of two battalions of infantry, four guns, eight armored cars and a troop of cavalry. All supply was to be by motor.

It was found that snow shoes would have helped during the winter raids and the transport could have been done more easily with some sleds available. The health of the column remained excellent. The Bolsheviks were kept behind their breastworks all winter and they dwindled all along from disease and desertion.

The question of the line of communications was a difficult one to solve. It was shown that the line of communications was something more than a mere line for food and ammunition. It is a link which binds the army to its homeland. There is nothing so detrimental to morale as a feeling of isolation. A steady flow of letters and parcels is ocular proof that isolation is not complete and will go farther towards cheering up the men than even the loud speaker issuing the football score which may be expected in future small wars!

The line of communications was 400 miles long and went over two passes 6000 feet and 9000 feet high, respectively. It was very

difficult to keep the roads clear of snow. Fords were used extensively. The Persian three-horsed cart had to be used in many places. Sleighs fitted with airplane propellers would have been valuable. Airplane communication was maintained.

When the thaw arrived the roads became badly washed out. The washaways were numerous and the rockfalls dangerous.

Wind-proof clothing is essential for winter campaigning. Overalls are fine. All clothing must be loose, both boots and socks, or there will be frost bites. Colored glasses are very necessary. Material for winter sports would raise the spirits of all.

"Artillery Command from the Air," by Colonel H. Rowan Robinson, C.M.G., D.S.O., is a new idea; that the artillery commander of the division artillery should observe and command from the air. The questions that arise are: does he have his own private plane; how long does he remain in the air; what means of communication has he; how do his orders take precedence when some one on the ground may have better information?

The idea was tried out in India and it failed. The objections developed were that aircraft and wireless were not sufficiently developed; artillery commander, being inexperienced in the air, might make serious mistakes; too far from his division; too much responsibility placed upon his staff. Some officers think it would work if these obstacles could be overcome. The technical obstacles will, in time, be overcome.

The question arises, is it really desirable to have the artillery commander observe from the air? The author's answer is, yes. The artillery commander on the ground is continually engulfed in the fog of war and receives information too late. He should *see* his friendly troops himself in order to give continuous support. An airplane observer can not be relied upon to convey the correct picture quickly enough.

Some objections not given at first are: First, the division commander would lose the services of the artillery commander; but the staff remains on the ground and can advise. Second, there would be too many casualties among artillery commanders—but the author thinks they will better die in the air in the execution of a real command than by being bombed at the end of a cut telephone wire. When an artillery commander crashes there will be no real disorganization, for when he ceases to send messages, his staff will resort to normal ground command until a successor can be sent up into the air.

The division commander must delegate to the artillery commander full powers. There must be only one authority controlling the artillery. Neither can the corps artillery commander interfere with the division organization; he can give administrative details

before the action, but when the battle starts he should confine his activities to the direction of medium and heavy batteries.

To sum up: It may be that the control of the artillery is not feasible at present, that is, in the manner described, but it seems to be the proper solution of the most urgent of artillery problems and steps should be taken to make the control of artillery from the air a practical proposition. Airplanes and wireless must be further developed and commanders trained to observe from the air. One thing seems certain, and that is that we shall use the air more and more, so let's start now.

"The Evolution of Artillery in the Great War," by Lieutenant-Colonel A. F. Brooke, is a continuation of an article which started in the last number, when the artillery situation as it existed in 1914 was examined. This time the author begins by considering the factors which effect the evolution of artillery.

The first of these factors is artillery power and that is divided into two parts: the "power of movement" and the "power of fire." These two "tools" as they are called, go hand in hand, and one is dependent upon the other, the "movement tool" being the more important. In the field artillery, the ability to move rapidly gives more fire power, according to the author; in the infantry it is reversed, the fire power makes it possible to move.

It is difficult to determine the artillery power available at any moment. There are other factors than the number of guns and the amount of ammunition which affect it. We should study the evolution of artillery power by turning to three retarding influences. The first of these is the lack of facilities for the transportation of artillery matériel. Modern railways and motor transport are solving this problem. The second limitation is in the facilities for the observation of fire. Two avenues are open here for development; either increasing the power of observation or else increasing the power of unobserved fire. The airplane is increasing the efficiency of observation and gunnery, and topography have reached a stage where accurate unobserved fire is possible. The final retarding influence has been the facilities for communication. As ranges increase the concentration of fire from dispersed batteries becomes more and more desirable in order to develop the full artillery power available. But the telephone and wireless are solving this problem.

There are five possible lines of artillery evolution. They are respectively rate, weight, range, accuracy and control of fire. Regarding the rate of fire, that will depend upon the rate of fire of the individual guns, the number of guns available and the rate of ammunition supply. It is the rapidity of ammunition supply that

we need to develop most. The weight of fire depends upon the rate of fire, concentration of fire and the weight of individual shells. Greater range of fire makes it possible to obtain concentration of fire from dispersed batteries but intercommunication presents some difficulties. An increase in the ranging power reduces the necessary moves during the critical periods of the attack. It makes it possible to keep the enemy back in the rear of the decisive points. Increased range may be obtained by increasing the muzzle velocity, by increasing the elevation, and by reducing the delaying factors during flight. As to the control of fire; we wish to centralize the control as much as possible and at the same time not cut down the zone of fire of each calibre. If there is great mobility in the operations, the communication is difficult and the decentralization is necessary. Finally there remains the accuracy of fire. Accuracy of observed fire leaves little room for improvement, but the further utilization of artillery power demands that we increase the accuracy of unobserved fire. The things which will help to improve unobserved fire are an increased knowledge of topography by artillery personnel, accurate methods of calibration, meteorological reports and a systematic sorting of ammunition.

FRANCE

"Revue Militaire Générale," December, 1924

Colonel Monsenergue, in his article "Le Corps de Cavalerie Conneau," tells of the important part played by the cavalry during the last three days of the retreat from the Belgian frontier to a position south of the Marne.

On the 3rd of September, 1914, von Kluck's left and von Bülow's right reached the Marne at Chateau Thierry. The French 18th Corps on the extreme left was at that moment crossing at Dormans, a few kilometres to the east. The British right was inclining to the west toward La Ferte-Sous-Jouarre and a breach of several kilometres was left open to the pursuing German columns. von Kluck accordingly planned to make a forced march through this gap, to strike the flank and rear of the 18th Corps and thus demoralize the entire French Army.

At this critical moment the cavalry corps was hurriedly assembled and thrown into the breach. In covering the threatened flank, and in stopping the enemy advance, it gave the infantry time to recover, to disengage itself from the enemy and reorganize for the battle of the Marne.

As means of combat the French cavalry at that time had: (1) the lance and charge; (2) fighting on foot; (3) the machine gun; and (4) its supporting artillery. In the face of a victorious and

advancing infantry the charge was found to be futile. Combat on foot when supported by no other arm proved to be almost as ineffective, cavalry weapons being inferior to those of the German infantry. The Corps lacked sufficient machine guns to hold the line with that arm alone. There remained the supporting artillery and the cavalry quickly realized that sufficient fire power to break up the enemy advance could be gained only by attaching to the brigades as much artillery as they possibly could support. This was done. To protect their batteries from capture by the rapidly advancing enemy, the cavalry troops used squadrons on foot, cyclist platoons, and any available machine guns. Whenever necessary, cavalrymen filled in as drivers for the artillery pieces. When the infiltrating enemy became so numerous that they could be checked only with difficulty by the cavalry carbines and machine guns, the batteries were able to change position with remarkable speed, thanks to the increased mobility gained by the coöperation of their cavalry escort. It was an effective arrangement, as results proved; an ideal combination of fire power and mobility.

Commandant Perney, a cavalry squadron commander, describes the operations of 1923 against the Moroccan tribes in the Marrakech region. He remarks that very little actual fighting took place; that the only ammunition expended was by the artillery.

The campaign was a continuation of that of 1922. All remaining objectives were reached in a minimum of time, with but very few casualties. The natives were apparently awed by the artillery fire of the previous year and those who had experienced it spread the word that the shells came from a distance equal to a day's march and it was useless to combat such a scourge. Many tribes ran up the white flag at the first round. Their only alternative was to desert their crops, then ready for harvest, and find protection, but also starvation, in the ravines of the nearby mountains. They did not wish to prolong the war at such a cost. The expedition was soon ended. Great credit was given to the 75's and 65's (mountain). In this rugged and almost trackless country it was considered well worth while to drag these guns everywhere any fighting took place.

The author makes a few interesting and entertaining remarks about the troops of the expedition: "The artillerymen of the 75's and the 65's vied with each other in zeal and enthusiasm, and these mixed batteries composed of Europeans and Senegalese gave the best results. The other troops were as they had been in 1922; the legionaire with his same good and bad points, the Moroccan rifleman as usual was a thief, liar, and pirate, but useful in attack. The local gendarmes were the best soldiers of Morocco and admirable troops for any mission. The troops furnished by the friendly

tribes had many faults and few good qualities; one must know how to use them and how to choose their chiefs. The Senegalese rifleman is usually physically weak and difficult to acclimate, either too hot or too cold, always sleepy and lacking in energy. Rare are the officers today who understand him—who can lead and inspire him."

Commandant Weil contributes his article "The Court Council of War" as another example of the necessity of unity of command. He describes the condition which existed in Austria at the beginning of the Napoleonic wars; a condition which permitted a very inefficient and ignorant group of men in Vienna to interfere in even the slightest details of matters effecting the army in the field.

In the December number Commandant Pierre Raoult concludes his article "Essays on G-4 of the General Staff of the Army."

CURRENT FIELD ARTILLERY NOTES

Changes of Address

THE time is approaching when there will be the usual considerable number of changes of station among our members. Those who are moving are requested to send in their change of address. Our Association does not change the mailing address for members, except upon notification. This policy is not one willfully chosen; it is chosen because with our present decentralized army, it is impossible to do otherwise.

Major-General George C. Rickards Retires

Upon expiration of his four year tour Major-General George C. Rickards will retire from the office of Chief of the Militia Bureau, in June. He has had a long career in the National Guard, having enlisted as a private in the Pennsylvania Guard in 1877. He advanced through the commissioned grades up to colonel, with which rank he commanded the 16th Pennsylvania Infantry during the Spanish War, on the Mexican Border in 1916, and through the World War. He was wounded twice during the World War and was awarded the Distinguished Service Medal.

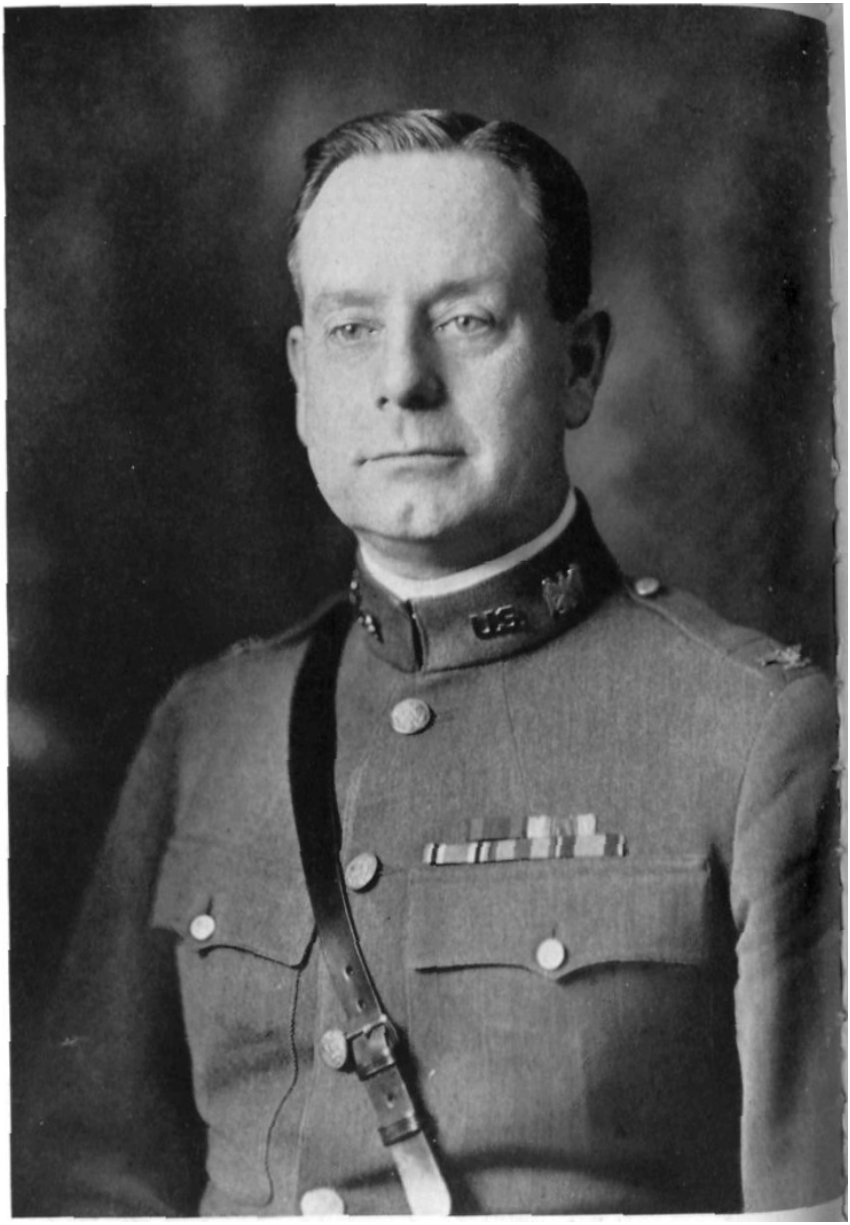
General Rickards is the first National Guard officer to fill the position of Chief of the Militia Bureau, his predecessors all being regular army officers. He has guided the affairs of the Bureau during the important period of growth and organization since the passage of the National Defense Act, with marked success and distinction, and he leaves the Federal Service in the highest esteem and with the good wishes of the Army.

New Chief for the Militia Bureau

Colonel Creed C. Hammond has been appointed Chief of the Militia Bureau with the rank of Major-General, effective June 29, for a term of four years, vice Major-General George C. Rickards, whose term expires June 28. Colonel Hammond holds a commission in the Reserve Corps and is a member of the Oregon National Guard. He has a record of military service covering thirty-two years, nine of which were in the federal establishment. He served a year and a half on the General Staff, and was a member of the original committee which was appointed in 1920 to assist the War Department in putting the amended National Defense Act into effect. In civil life he was a banker, having been cashier of a Portland, Oregon, bank.

Colonel Hammond enlisted in Company C, Second Oregon Infantry

MAJOR GENERAL GEORGE C. RICKARDS
RETIRING CHIEF OF THE MILITIA BUREAU



COLONEL CREED C. HAMMOND
New Chief of the Militia Bureau.

on April 8, 1892; was commissioned as second lieutenant in the Fourth Oregon Infantry in 1901, and served in the infantry and coast artillery through all the grades up to colonel, which rank he reached in 1911. He served in the Spanish-American War, the Philippine Insurrection and in the World War and is borne on the General Staff Eligible List. Since October, 1922, he has been on duty in the Militia Bureau as Assistant Chief and as Chief of the Finance Section. His work has met with wide approval throughout the National Guard and he enters upon his new office under gratifying circumstances.

Organization and Training of Organized Reserve Units

There are at present approximately one hundred and sixty regiments or separate battalions of reserve corps field artillery, to which reserve officers are actually assigned. Many of these have nearly a full quota of officers. In case of a war emergency these units must function; our plans are based on this assumption. But how to assure that this assumption is a true one and not a weak reed, whose breaking in an emergency would be a catastrophe, is not an easy problem. These units are scattered all over the country under every sort of local conditions. The whole movement is in its infancy with few precedents to guide it. The local officers cannot be blamed for wondering just how they may best discharge their responsibility.

With these conditions in mind, our Association has requested the views of several widely separated reserve officers, commanders or responsible staff officers, and these views appear in the series of articles in the front of this JOURNAL. The interchange of experiences should help to crystallize opinions into practical methods.

Recent Aircraft Discussion

Much discussion in the press and in the War Department has centred around a bill in the last congress to create a new executive department in the President's Cabinet. This proposed department was to include all civil, army and navy aviation. The proponents of the bill sought by this step to more efficiently exploit the possibilities of aircraft.

From a field artillery point of view, the complete efficiency of our arm demands close and effective coöperation between the artillery and the air service—closer and more effective than has yet been achieved. This degree of coöperation requires long and intimate training together, yet the general opinion seems to agree that it can be achieved. But it is not clear how removing one of the coöperators from the army can do anything but add obstacles to the task. Other branches of the service, besides the Field Artillery,

seem to experience a similar difficulty. Unless we can be assured of some compensating, general military advantage that will accrue from the adoption of a separate air service, the new step in organization seems questionable.

In seeking for a general military advantage of aircraft, the possibilities of bomb dropping gives perhaps the most conspicuous promise. But while many military men do not question the effect of a single well placed bomb, they do question the ability of airplanes to carry the bombs in sufficient quantities the necessary distance and launch them with the necessary accuracy. There will always be the defense of hostile planes and eventual anti-aircraft guns with which to contend.

In seeking for the military advantage of aircraft a serious deficiency in their power is also discovered—their inability to seize any objective of military value. Nobody has estimated the tons of high explosive shells the German field artillery fired into Verdun; it was as much as any advocate of the power of aircraft would offer to drop. But the city of Verdun never fell. A similar amount of shells were fired on the infantry defenders of Verdun, but they never surrendered. The point is that no matter how much high explosive the aircraft or artillery can launch, the results are not decisive unless the infantry man-power is there to exploit the effort. This characteristic of aircraft power stresses impressively the element of team work and coöperation.

The congressional committee to whom the bill for a separate department for aviation was referred held extended hearings. In the course of these hearings an extract from a letter from General Pershing to General Menoher, Chief of Air Service, dated January, 1920, was read. It is quoted here:

> "(*a*) Military forces can never be efficiently trained nor operated without an air force.
>
> "(*b*) An air force, acting independently, can of its own account neither win a war at the present time, nor, so far as we can tell, at any time in the future.
>
> "(*c*) An air force by itself cannot obtain a decision against forces on the ground.
>
> "(*d*) A military air force is an essential combat branch and should form an integral part of the army.
>
> "(*e*) If success is to be expected the military air force must be controlled in the same way, understand the same discipline and act in accordance with the army command under precisely the same conditions as other combat arms.
>
> "(*f*) An air force, as well as all other branches of the military organization, must fully understand its exact functions in working with other branches, must know the needs of other

branches, be in full sympathy with them, think in the same military atmosphere, and have the same esprit de corps in order that effective battle control may be established.

"(*g*) No such force can realize the above condition unless it is an integral part of the command not only during battle but also during the entire period of doctrinal training.

"(*h*) To realize these conditions the different arms of the service must live together and train together.

"(*i*) An air force should be established as a separate arm of the service, coördinate with the Infantry, Cavalry and Artillery.

"(*j*) An air force should not be established as a combatant force distinct from the Army and Navy.

"(*k*) The only view that I have ever expressed on the question of the air force for military purposes is that such service should be established as a separate branch within the army, and separate only in the same way that Infantry and Field Artillery are separate."

Brigadier General Hugh A. Drum gave what was generally considered the views of the War Department before the congressional committee referred to above. An extract from his testimony, that pertains to the military aspect of aircraft employment follows:

"In considering the powers and limitations of aircraft there are various factors connected with performance which are always closely related one to the other and must be considered together when judging of the possible performances of aircraft. For instance, it is not safe to assume that because a plane has flown across the United States, a distance of 2520 miles without stopping or refueling, and a plane has also flown with a weight of 16,000 pounds, that as a consequence eight tons of bombs can be carried that distance or even half that distance by any plane now existing, or possible of development. There is a certain balance between the various desirable characteristics of aircraft, and usually excessive performance in one essential characteristic is gained at the expense of others. That is, the longest trips must be made with no load other than fuel, and the heaviest loads can be carried only comparatively short distances."

* * * * * *

"Many extravagant statements have been made especially in the press, with reference to the use of gas by aircraft. Most of these statements if analyzed may be discounted as very misleading. As a matter of fact, aircraft provides a convenient means for the distribution of gas either in bombs or by

sprinkling or spraying directly from the plane. However, the quantity of any particular gas on any particular locality in order to have any desirable effect on human beings is as follows:

Phosgene	185 lbs. for each area 100 yds. sq.
Phosgene and Chloropicrin	250 lbs. for each area 100 yds. sq.
Chloropicrin	500 lbs. for each area 100 yds. sq.
Mustard Gas	185 lbs. for each area 100 yds. sq. 515 pounds per 100 yards square will cause evacuation of area.

"As the weight of the bombs will be about twenty per cent. more than their gas content, it is seen that it will take many tons of bombs to have any effect on large areas. Gas must have a certain density or concentration in order to be effective, and this density is greatly decreased by wind or by sprinkling or spraying, especially if this is done from high altitudes. One of the most effective defenses against a gas attack from aircraft against military forces, will be to force the hostile aircraft to high altitudes, which will practically eliminate any effect on the ground of gas distributed in any other way than by bombs. The effect of a gas bomb will always be local and disappears more or less rapidly depending upon the type of gas used. The number of such bombs in order to effectively gas any considerable area *is so large* as to make such a use of aircraft uneconomical except on very important concentrated military objectives.

"For instance, in order to effectively gas an area the size of the District of Columbia, about 60 square miles, it would require:

3,439,150 pounds of mustard gas for a concentration which would have a material effect; or

9,575,850 pounds of mustard gas to cause evacuation of the area.

"This would mean about 2000 heavy bombing planes in the first case and 5630 in the second case, each carrying 1700 pounds of gas, or 2000 pounds of gas bombs.

"As the Washington Treaty for the Limitation of Armaments limits the tonnage of aircraft carriers so as to permit the construction of carriers capable of carrying only about 160 bombing planes by the most powerful navies—Great Britain and the United States—the impracticability of such a huge flight of bombers over any of our cities is at once apparent.

"With reference to the distribution of disease germs from aircraft, it is only necessary to remember that this means of

warfare has always been available and has practically never been used. The poisoning of wells and water supply in general with disease germs or any other poison is more practicable and effective than is their distribution from aircraft and yet such a method has never been seriously contemplated.

"Humanity has not and will not stoop to such a level.

"The distribution of smoke from aircraft has been perfected to such an extent as to be of considerable value in military operations.

"The smoke screen laid by the NBS-1 airplane (bomber) is 700 feet high and approximately one mile long. It will totally screen a battleship for a period of twenty minutes, provided there is no wind. The smoke screen laid by the DH-4-B is about 700 feet high, one-half mile in length, and is considerably less dense than the screen laid by the NBS-1 airplane. Experiments are now being carried on in connection with the laying of smoke screens with pursuit planes. It is expected that about three pursuit planes will lay a screen as effectively as one bomber. The pursuit planes are much better suited to this type of work on account of the fact that they are less vulnerable to anti-aircraft gun fire while engaged in low flying."

Meeting of State Adjutants General

The Adjutants General from the various states of the Union met in their second annual conference with the officers of the Militia Bureau from March 5th to 10th, in Washington. The members were divided into committees, to which the various questions affecting the National Guard were referred. The committee reports were acted upon by the whole conference. The resultant recommendations cover many points of interest to the Guard and are now being printed by the Militia Bureau, from which office they will be available in the near future. Besides the coördinated effort, enabled by this conference, it has been valuable in making for a better mutual understanding between the states themselves and between the states and the Militia Bureau and the War Department as a whole.

New Tables of Organization for the National Guard

The Militia Bureau is preparing new organization tables for the National Guard. The tables for division artillery, except that for the ammunition train, are now being distributed. The tables for the 155-mm. howitzer and gun regiments and for the 75-mm. tractor drawn G.H.Q., are in the hands of the General Staff for action and should follow the division artillery tables very shortly.

These tables are an innovation in the matter of set-up. National Guard Regulations specify certain strengths for each unit: the recognition strength, which must be reached before recognition is granted; the maintenance strength, which must be reached within six months after recognition, and thereafter maintained in order to continue recognition; the peace strength, which is the same as the strength of the corresponding unit of the Regular Army; and the maximum strength, beyond which the unit cannot go.

The unassisted organization commander has had difficulty in planning the best set-up to utilize the number of men he may actually have in his unit. These tables will show him what experienced field artillerymen deem to be the best. For instance the new tables show the desirable grade and rating and duty of each man when the unit is at recognition strength. Then as each new man is enlisted, the tables show what new duty may be undertaken and what new grade or rating, if any, may best be created.

As an example, take a gun battery, with a recognition strength of fifty men. It is obvious that there are many ways these fifty men might be used; they might, for instance, be equally divided between the battery headquarters, each of the four gun sections, the fifth section, and the maintenance section; but the result would probably be a poorly working, disproportioned machine. The new tables, on the other hand, show this battery organized with practically complete personnel in the battery headquarters, with reduced first and second sections, and with the necessary number of maintenance section personnel to care for the property and messing; nothing is put in the third, fourth and fifth sections. The next few men that are enlisted, go to fill out the battery headquarters and to give enough men to the first platoon and the maintenance section to enable the battery to function with that organization. Then, as more men come in, the remaining gun sections are built up to the same strength as the first two. As the strength still further grows, additional necessary personnel for the maintenance section is added. The last section to be organized is the fifth.

As has been stated the tables show the strengths at which addititional noncommissioned officers and rated specialists may be appointed as the unit grows from recognition to maximum strength. This part is mandatory to the extent that such appointments may not be made in excess of the number given at any stated corresponding strength of the unit. The suggestions to guide the unit commander in the build-up of his organization from its recognition strength to its maximum strength, are optional but it is believed they will prove of great value in assisting units.

It may happen that the enlisted strength will fall off after

additional noncommissioned officers and rated specialists have been appointed. As these men would then become excess in their grades and ratings, it is necessary to save them from reduction and the new tables provide that they may be retained in their status until absorbed.

In certain units a few additional men beyond peace strength are authorized. This is the case in those units that either have no build-up or where the peace and maintenance strength differ by less than ten enlisted men. The purpose of this additional allowance is to provide a leeway for recruiting and enables the unit to maintain its maintenance strength required by regulations.

One governing principle is that no officer, noncommissioned officer or rated specialist can hold any grade or rating in time of peace that is not provided for in time of war. In other words, provision is made for expansion and promotion in passing to a war footing, and nobody will have to take a "bust." This entails one major change in gun batteries. As now organized in the National Guard there are two first lieutenants and one second lieutenant, whereas the new tables specify one first lieutenant and two second lieutenants. The additional first lieutenants that now exist will not be reduced, but will hold their grades until absorbed.

Reserve Officers' Conference on Training

Eleven reserve officers, all of the rank of colonel or lieutenant-colonel, reported on March 16th to the War Department General Staff for five weeks of active duty. Each of the nine corps areas are represented by them. They are:

1st C.A.—Col. George L. Taylor, F.A., resident of Alstead, N. Y.
2nd C.A.—Col. Newbold Morris, F.A., resident of New York City, and Lt. Col. Weston Jenkins, Inf., resident of Rome, N. Y.
3rd C.A.—Col. H. C. Jones, Inf., resident of Baltimore, Md.
4th C.A.—Lt. Col. L. Kempter Williams, Inf., resident of Patterson, La.
5th C.A.—Lt. Col. Jesse Peck Dice, F.A., resident of Akron, Ohio.
6th C.A.—Lt. Col. Grant N. Miles, resident of Peoria, Ill.
7th C.A.—Col. A. J. Elliott, F.A., resident of Kansas City, Mo. Lt. Col. Stanley Gale Eaton, Inf., resident of Sioux City, Iowa.
8th C.A.—Lt. Col. Ralph H. Durkee, Inf., resident of San Antonio, Texas.
9th C.A.—Lt. Col. Harry V. G. Wurdemann, M.C., of Seattle, Washington.

These reserve officers are in Washington for the purpose of familiarizing themselves with existing policies governing the direction, operation, and administration of organized reserve matters both in the War Department and the field, and to make practical criticism and suggestions for the improvement and the perfecting of these. They have formed themselves into three committees for the purpose of making their reports. One committee is studying

and drafting recommendations on active duty training for reserve officers and enlisted men; another on inactive duty training; and a third on organization for training. These subjects will be considered from the standpoint of practice in performance of initial mobilization duties, practical training for combat, and the maintenance of interest and efficiency between periods of active duty.

Among the subjects to be considered are methods, means, frequency and time of training; the establishment of prescribed courses for inactive training; credits for performance of military duty on an inactive status; responsibilities of unit commanders for the efficiency of their organizations when inactive; and the re-allocation of reserve units in order that these may fulfill their mobilization and training requirements more satisfactorily.

R.O.T.C. Progress

In several past JOURNALS have been articles reflecting the work of the field artillery R.O.T.C. units at the several colleges. In this issue is one from Princeton. The field artillery units of the R.O.T.C. are making gratifying progress. While no one unit can yet be taken as a model in all respects, each one does present some special excellence. There has been a gradual and steady improvement in courses, which to gain student and faculty approval and support must be interesting in content, attractively and skilfully taught, and be of unquestioned educational value. The Training Section of the Office of the Chief of Field Artillery and the various units are working together constantly to coördinate and improve the field artillery courses. The time is looked forward to when our experience will warrant the recommendation of a standard course to be varied to fit to the local conditions in each unit.

Knox Trophy Terms

It is expected that by the first of May the terms of the Knox Trophy test for regular army field artillery units, will be mailed out to local commanders. In general the terms follow those of the test given last year, though the changes in details are sufficient to make useless a rehearsal of last year's test. The date for holding the test may be set by the local commanders any time after receipt of the terms from the Chief of Field Artillery.

The 1925 Endurance Rides

The Eastern Endurance Ride this year will be held in Vermont beginning October 19th. The conditions will be the same as last year, except that the weight carried will be 200 pounds instead of 225. In addition to the usual prizes, the Morgan Horse Club has

offered a prize of 500 dollars to the rider of the horse whose score for condition at the finish is the highest, regardless of his horse's final all-around score in the test.

The Colorado Endurance Ride will be held at Broadmoor, Colorado, September 21st to 25th.

Field Artillery Board Notes

The tests which have been completed or on which partial reports have been submitted are given below:

Comparison of Re-rifled and Un-rifled 240-*mm. Howitzers*.—In re-rifling the 240-mm. howitzer, the driving side of the lands was cut out so as to give an approximately radial driving surface. One each of the re-rifled and un-rifled howitzers were fired at a range of about 13,000 yards, at elevations above and below 45º. The shots were plotted from three points and then surveyed on the ground. The results showed that for all practical purposes there was no difference in accuracy between the two guns. The probable errors obtained agreed very closely with the range table probable errors as furnished by the Ordnance Department.

Pavesi Tractors.—The test of the Pavesi tractors has been completed and the report is being prepared. However, since the latter has not been forwarded, only general conclusions can be given. The Board found that this tractor, while satisfactory on good ground, rapidly digs itself in, in soft, sandy, or marshy ground. In general its mobility is about seventy-five per cent. to eighty per cent. of the corresponding caterpillar type. See the accompanying photograph.

Best Tractor.—The Best tractor has, also, completed its tests. The tractor is a four-ton tracklayer of rugged, well-built construction. It has plenty of reserve power and traction, starts easily and altogether has proved very satisfactory.

Indian Motorcycle.—The Indian Motorcycle is in the same status as the Pavesi tractor. This motorcycle is a light, two-cylinder solo with reduced gear ratio and balloon tires. In general, the machine has proved very difficult to ride at tractor speed in any sort of rough going.

Device for Plotting Dead Spaces.—This is a mechanical device for computation of dead spaces. By knowing the difference in elevation between the gun position and any crest intervening between it and the target area, it is possible to determine the elevation necessary to clear the crest. The Board found that the device has no advantage over the method already given in the regulations, but has the disadvantages of being fragile, and liable to shrinkage with resultant inaccuracy. In addition, one for each charge and projectile would have to be carried. It was recommended that it be not adopted.

Wire Pikes.—This was a test of the standard Signal Corps pole, fitted with the new duraluminum hook. The Board recommended that the new hook be fitted on a jointed pole of two sections, each section of a length of three and one-half feet.

Gas Mask Carrier, M-1924.—The Chemical Warfare Service submitted the new carrier for test. This carrier is carried on the back, either on top of the pack or flat on the back when the pack is not carried. It was found to be a decided improvement and was recommended for adoption.

Store Limber, M-1902.—This is one of the series of tests which are being conducted to determine methods of carrying the equipment in the battery. Heretofore whenever any considerable change has been made in this equipment, it has been necessary to alter the chests of these vehicles or carry new equipment in a haphazard manner. By means of sliding trays and other similar devices, these vehicles can now carry equipment of all sorts and sizes without trouble. They are, of course, especially designed to carry the present equipment.

Battery Reel, M-1917.—This test besides being of the same series as that above, also included specifications for the new reel, whenever it is decided to design one. The following is quoted from the report:

* * * * * *

"Recommendations: (*a*) (1) That the design of a new reel and cart be undertaken to replace the present battery reel at the earliest practicable date and to meet the following requirements:

"(*a*) The vehicle to be a limbered vehicle.

"(*b*) The front axle to consist of a reel that will carry a minimum of three miles of twisted pair wire . . . . . .

"(*c*) The drum of the reel to carry the original spools on which the wire is issued and to be so designed that these spools may be easily placed thereon or removed therefrom. . . .

* * * * * *

"(*e*) (1) That all telephone wire for field artillery be issued on steel spools of a uniform size and shape that will permit of a minimum of three miles of twisted pair telephone wire to be carried on the drum of the reel.

"(2) That the maximum weight of a steel spool of wire do not exceed 300 pounds."

* * * * * *

The other recommendations include a chest on the rear axle to carry fire control, reconnaissance, and communications equipment; the chest not to be divided into compartments but to carry

THE BRACKET FOR ADDITIONAL WIRE

THE PAVESI TRACTOR UNDER TEST


O.M.C.
STABLE

liners supported on springs. The weight of the reel and cart is not to exceed 4000 pounds; six horses to be used in the team; and the vehicle is to be standard for all battery, battalion, regimental and brigade headquarters batteries of all types. Each battery should be issued one reel and cart plus one reel without the cart, this latter with a four-horse team.

In connection with the present battery reel, various modifications in line with those mentioned under the store limber were recommended. In addition, a bracket arrangement for carrying additional wire was approved. The accompanying photograph shows this arrangement. Under test it worked satisfactorily.

Training Regulations 430–30. Service of the Piece. 155-mm. Gun.—This was returned by the Chief of Field Artillery for revision, was rewritten, and was forwarded during February.

Training Regulations 430–165. Dismounted Drills and Ceremonies.—This Training Regulation was finished last spring and was returned for revision the following fall. The rough draft of the revision is at present in the Chief's office.

The Board at present has under test the following new guns:

155-mm. Howitzer, M-1920-E.—The firing tests of this gun are completed and have shown it to be a remarkably accurate weapon. The mobility tests with the 10-ton tractor are completed, but further tests are awaiting the Best "cruiser," an approximately seven and one-half-ton tractor.

155-mm. Gun—8-inch Howitzer, M-1920-E.—These guns have completed two mobility tests. Their firing tests will start probably at the end of March.

75-mm. Gun, M-1923-E.—This gun has just arrived. Its mobility tests start this month (March).

4.7-inch Gun, M-1922-E, on the 1921-E Carriage.—Tests have not yet started.

In addition to the above, the following may be of interest to the service:

Signal Equipment Allowances.—The matter of what signal equipment should be carried in each of the various units, is receiving a thorough study. This includes, of course, wire, telephone, switchboards, etc.

Firing by Means of Airplane Photographs.—In this test, problems with the single-lens, tri-lens and four-lens cameras have been fired. Firing with a mosaic have been completed. No definite decision has been reached.

Other uncompleted tests are: Sound and flash ranging, training regulations, machine gun brackets, high burst ranging, raincoats, Ford reconnaissance car, cargo carts, helmets, modifications of 75-mm.

matériel, effect of fire, harness, storage batteries, modified McClellan saddles, Moeller field glasses, tracer ammunition, calibre 45, and modified five-ton tractors.

Polo

International Military Championship

The American Army Team sailed from New York March 28th, and arrived in England April 6th, going directly to Aldershot where they will be quartered as guests of the British Army until about July 4th, when they expect to sail for home.

Beginning early in May, they will enter various tournaments, meeting representative British teams at Ranelagh, Hurlingham and Roehampton, until the final championship series Saturday, June 20; Wednesday, June 24; and Saturday, June 27. During this time they will have finished their preparation to defend the Military Polo Championship of the World, now held by America.

The team took thirteen enlisted men and twenty-five ponies, with the players as follows:

Major A. H. Wilson, Forward; Captain C. H. Gerhardt, Forward; Lieutenant E. McGinley, No. 2; Captain P. P. Rodes, No. 3; Major L. A. Beard (Capt.), Back; Lieutenant J. A. Smith, Back.

The team practiced in Miami, Florida, about six weeks before returning to Fort Myer, Virginia, where they refitted and rested the ponies, which must inevitably be reconditioned in England before the final play.

Major Beard, the team captain, had the misfortune to accidently break his thumb in the latter part of the play in Florida. This injury will have recovered by the time preliminary play starts abroad. Due to the interest and liberality of supporters of the team in making private contributions of money and ponies, the team is as well mounted as could be desired. As it was found that Captain Craig was not up to Major Wilson or Captain Gerhardt in the forward positions, it was necessary to replace him by Lieutenant Smith; this arrangement gives a substitute forward and a substitute back.

The team gives promise of fulfilling our highest hopes, and England is not only going to know that she has been in a game, but America intends to win. Beard and Wilson are veterans of proven metal, while McGinley and Rodes, though comparatively young for this class of work, have on the other hand, not only the spirit and strength of youth, but they are surprising every observer with their play. In a letter written shortly before leaving Miami, Major Beard wrote: "The recent activities have been directed toward mallet work and participation in low goal events. Craig, McGinley and Rodes, with a Mr. Young, made up a team

that won easily against a team which had Harry East and Earl Hopping playing on it; the score was 16 to 5. McGinley shot seven goals out of eleven attempts, the other four missing by inches. Rodes, indifferently mounted, was the star; he uses his head, hand and heart more than any player I know of and if his name were Milburn he would be famous."

Besides this regular line up, we have in Gerhardt a forward who closely rivals Wilson; and Smith, who played with our Junior Championship Team last year, is a very strong back. He played this winter on the Army team which represented us at Mexico City and has just taken part in the San Antonio Mid-Winter Tournament.

San Antonio Second Annual Mid-Winter Tournament

The Second Annual Mid-Winter Tournament at San Antonio, Texas, held between February 15th and March 1st, witnessed one of the largest assemblies of teams in recent years. The meet included three tournaments: The Low Goal Tournament for the Texas Cups, limited to teams of five goals handicap; the Southwestern Circuit Tournament, played with United States Polo Association handicaps; and the Southwestern Elimination Tournament, in which no team was allowed to receive more than six goals by handicap. This latter event determined which team should represent the Southwestern Circuit in the Inter-Circuit Tournament to be held in the northeast some time this summer.

Fort Bliss won the Texas Cups, eliminating Detroit, Fifteenth Field Artillery, Camp Marfa, Kelley Field, Fort Sill, Second Division Infantry, San Antonio, Fort Brown, Headquarters Eighth Corps Area, Austin, and Fort Clark.

Camp Marfa won the Southwestern Circuit Cups, eliminating Detroit, Fort Clark, Fort Sill, San Antonio, Fifteenth Field Artillery, Fort Bliss, Headquarters Eighth Corps Area, Fort Sam Houston, Kelley Field, Fort Brown, Austin, and Second Division.

In the Southwestern Elimination Tournament Fort Bliss won. The contesting teams were San Antonio, Camp Marfa, Second Division Infantry, Kelley Field, Fort Clark, Detroit, Eighth Corps Area Headquarters, Fort Sill, and Fort Sam Houston.

International Tournament with Mexico

For some time efforts have been made to effect polo relations between Mexico and the United States. In last December the first international tournament was held in Mexico City. Our teams were the guests of Mexico and received the marked courtesy and consideration of their hosts. The return tournament in which we will be hosts to our neighbors to the south, is now looked forward to. The relations established in this first tournament have been

valuable, not only from a polo point of view, but it has done much to foster a friendly feeling and mutual understanding between the countries.

Our first team consisted of Lieutenant Guy C. Benson, 12th F. A. (Captain); Lieutenant John A. Smith, 15th F.A.; Lieutenant Eugene McGinley, F.A.,A.D.C.; Lieutenant M. Mc D. Jones, Cavalry, and Captain John A. Hettinger, Cavalry. On our second team were Major John F. Lapham, F.A.-Res. (Captain); Major Frank M. Andrews, A.S.; Major C. B. King, 15th F.A.; Lieutenant B. M. Fitch, 12th F.A.; and Lieutenant J. M. Clark, A. S.

Our first team defeated the Mexican first team in two games on December 13th and 16th, the scores being 9 to 1 and 11 to 1. Our second team defeated the Mexican second team on December 15th and 17th, with scores of 11 to 2 and 14 to 2.