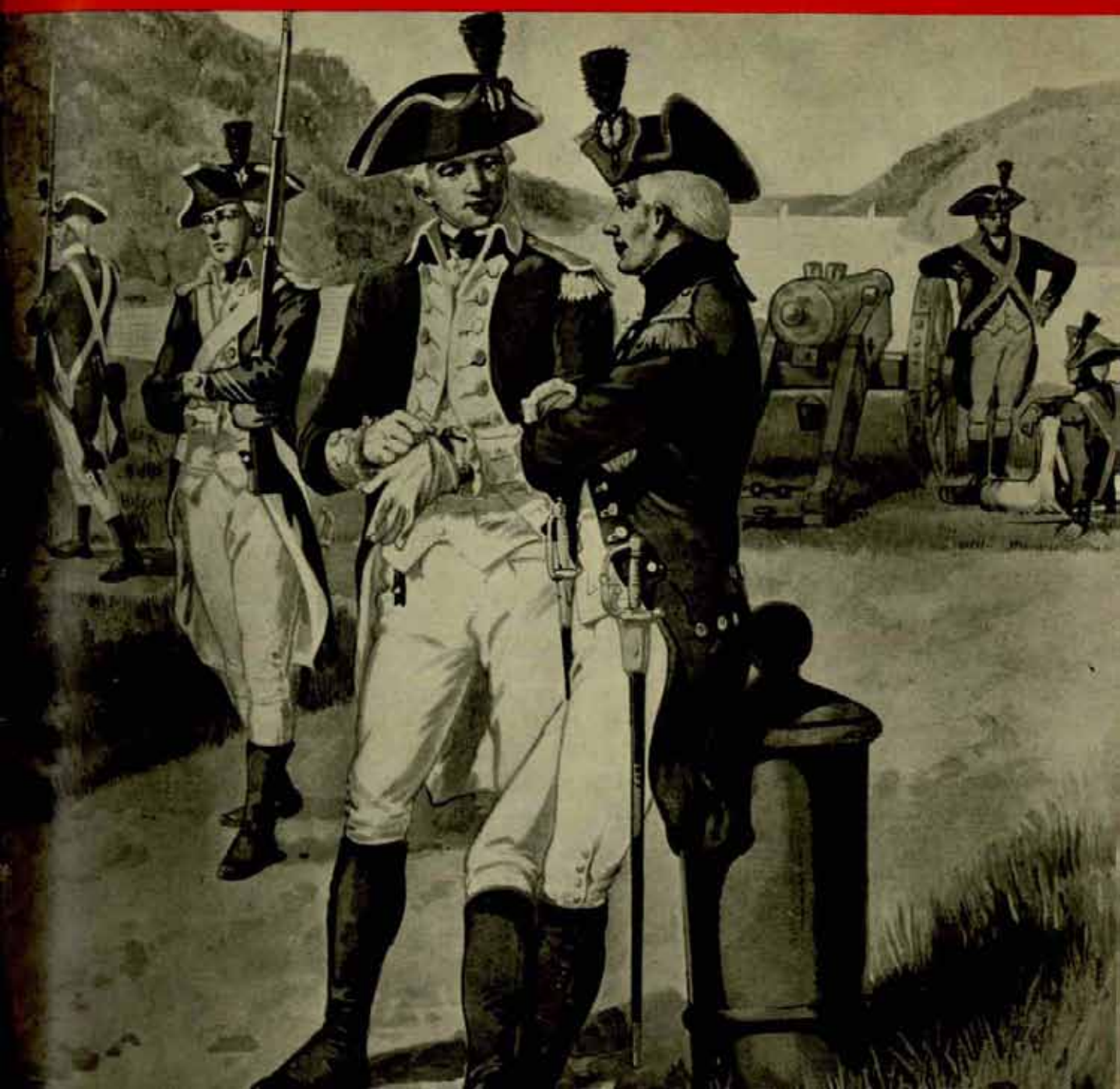
THE COAST ARTILLERY JOURNAL



Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
APR 1937		**00-03-1937 to 00-04-1937**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
The Coast Artillery Journal. Volume 80, Number 2, March-April 1937	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Coast Artillery Training Center,Coast Artillery Journal,Fort Monroe,VA,23651**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**Same as Report (SAR)**	**100**	

THE COAST ARTILLERY JOURNAL

Published as the Journal of the U. S. Artillery from 1892 to 1922

MAJOR AARON BRADSHAW, JR., C.A.C., *Editor*

VOLUME LXXX | MARCH-APRIL, 1937 | NUMBER 2

Publication Date: April 1, 1937

Contents

Opinions expressed and conclusions drawn in articles are solely those of the authors and are in no sense official. They should not be considered as those of the Chief of Coast Artillery or any other branch of the War Department.

THE COAST ARTILLERY JOURNAL pays for original articles upon publication.

Published bi-monthly under the supervision of the United States Coast Artillery Association for the information of the Coast Artillery personnel of the Regular Army, National Guard and Organized Reserves.

Publication Offices, 1406 East Franklin Street, Richmond, Virginia; Editorial Offices, 1115 17th Street, N.W., Washington, D. C. Terms: $4.00 per year. (Coast Artillery Association members, $3.00 per year.) Single copies, 75 cents.

Entered as second class matter at Richmond, Virginia, under the Act of March 3, 1879, for mailing at special rate of postage provided for in Section 412, Act of October 3, 1917.

Our Commander in Chief

ADEQUATE NATIONAL DEFENSE IS ASSURED

1. MONTOIR FRANCE 1918
2. CITADEL VERDUN 1918
3. INSPECTING RAILWAY BATTE FRANCE 1918
4. HAWAII 1934
5. STANDING ON BIG GERMAN G EMPLACEMENT
6. PANAMA 1935

Gun Defense Against Bombardment Attack

By Major K. McCarty, C.A.C.

Photos Courtesy Army Air Corps

Initial density of fire is essential to success for if we don't get him with the first burst we will be lucky if we get near him again.

ANTIAIRCRAFT gunnery and the technique of fire at towed targets have developed to the stage where we must look to the ordnance and the mechanics of the matériel rather than to the science of its service for any considerable improvement. Before we flatter ourselves that we have solved the antiaircraft gun defense problem to the limits of the capabilities of the matériel, it may be well that we stop to consider the nature of our true target and its tactics, what our chances are of getting in war the results that we have come to expect as a result of target practices, and further, how best to employ tactically the precise and powerful weapons that have been entrusted to us. If the trend of thought in our Corps may be judged by the articles appearing in the JOURNAL, not much consideration is being given to these questions for there have been dozens of articles on fire adjustment, preparation of fire and the like to every one mentioning the true functions of the technical processes in the tactical employment of antiaircraft gun batteries against hostile airplanes. The following is offered with the hope that thought may be stimulated concerning the employment of antiaircraft gun batteries when they are shooting at something even more elusive than the Knox Trophy.

The first proposition, which should be accepted without argument, is that the tactics of the location and fire of antiaircraft gun batteries must conform to the tactics of the hostile aerial attack. As this attack is in turn predicated on the nature of the objective we can, to a large extent, determine from our mission the correct tactical employment of our batteries. Facts which are generally accepted in our service and which bear on this subject, and some facts which have been deduced from personal observations will be presented but conclusions will be left more or less open to discussion.

The airplane is free to maneuver in three dimensions. It can turn and change its direction, its altitude and also vary its forward speed. It can do these things one at a time or simultaneously and in almost any degree. Subject only to the limitations of large tight formation flying, it can initiate any or all of these maneuvers a split second after the impulse is given or the decision made. There is no use in counting on modern bombers being limited in maneuverability because this is not the case, for while they, of course, have a wider turning radius than smaller ships, the advance of aerodynamic engineering has given these great ships an ever-increasing speed, speed range and ceiling. It is somewhat needless to point out that any maneuver which is initiated or under way at the time the shell leaves the gun will upset the calculations of the best director and entirely confuse the best efforts at fire adjustment. So we should give thought to when and where maneuver can and will be employed by the airplane in its attempt to avoid ground fire.

The two types of combat aviation which are normal targets for antiaircraft guns are observation and bombardment planes. Pursuit and low flying attack planes, due to their characteristics and tactical employment, will seldom be targets for antiaircraft guns and therefore have no place in the planning of the gun defense. Our considerations should therefore be confined to observation and bombardment planes and the probable tactical evolutions of these two types on their normal missions.

Observation planes, by the nature of their missions, operate alone and are probably the only type of plane likely to fly solo over our batteries. It will be shown later how unlikely the solo

bombardment plane will be except as an element of a force mission. In the observation plane the appointed task is flown alone and at an altitude which will not be excessive, for obvious reasons. Even mapping missions are flown usually at altitudes not over 19,000 feet and only under ideal conditions. The course on an observation mission will usually be fairly steady, for both visual and photographic observation are upset by erratic flight. We are therefore likely to find observation planes flying more or less rectilinear courses at mid altitudes. Nothing is more important to the observation team than that they get back with the information they have secured. With the arrival of the first shell in the vicinity of the plane we may reasonably expect that the pilot will immediately abandon his rectilinear flight and employ every maneuver he has ever heard of to avoid the shells he knows will follow. No amount of heroism will justify the observer-pilot letting himself be shot down if he can avoid it. If we don't get him with the first burst we will be lucky if we ever get near him again. What is required to bag our duck is a tremendous burst of well aimed fire right at the start, and maybe a little splattering around wouldn't do any harm. The observation plane is a target of opportunity whose probable route of approach cannot be predicted, and the tactical employment of antiaircraft guns when combating them revolves around the simple problem of providing the densest possible volume of fire over the defended area.

Boeing B-17 Bomber—"The Flying Fortress."

It has been stated that the solo bomber will be a rarity and it will be shown later how reasonable this statement is; but in any force action of a type in which the bomb sighting operation is carried out by individual bomb sighting teams (pilot and bomber) as opposed to salvo bombing from a formation, the individual planes will be operated as if they were alone. For a bomb to hit a given point, the plane must be headed in such a direction that the forward speed vector combined with the lateral speed vector of the wind in which the plane is flying results in a directional speed vector which passes over the target as shown in Figure 1. The bomb is dropped from a point which is indicated by the bomb sight and is dependent on the directional speed and the altitude.

In its approach to the target, the plane under threat of AA gunfire will indulge in free maneuver up to the point P, at which point the bombing team gets down to business. It is believed that the point P is now accepted as some 45 seconds of flight from B, the bomb release point. This is only an average value and varies with the training of the crew and bombing conditions. It is, however, the time of rectilinear flight which we count on to get in our aimed fire. However, the plane must be placed on the line P-T by means of the bomb sight and between P and A there will be some adjustment of direction to accomplish this. A is the point at which the direction is correct and the bomber is all set to pull the release. It is problematical how long B is before A and it may be anywhere from 0 to 45 seconds.

The maneuver between P and A will not be violent—merely adjustment of direction at constant altitude. However, the fact remains that the only true rectilinear flights that there is any reason to count on is the flight from A to B. If our fire is adjusted on the basis of observed bursts on the course from P to A the adjustments will probably throw us off the course from A to B. It is on this part of the course that our maximum effort must be concentrated. After dropping the bombs at B the bomber should have every reason to be quite sick of gunfire and there

Douglas B-18 Bomber—Our Latest Type Bombing Plane.

is no director known which will predict the future position of a scared pilot.

Dropping a bomb is a ballistic problem just like shooting a gun, with some of the variables easier and some more difficult to adjust for. The bomb sight does not take into consideration the ballistic winds acting on the bomb after it leaves the rack, but on the other hand it bases its principal estimate on a "G" factor which is much less temperamental than our powder pressures. However, the pattern formed by the impacts of dropped bombs indicates a dispersion identical in principle to the dispersion of our gunfire and subject to the same analysis into longitudinal and lateral probable errors. The largest single factors in bombing probability are personnel errors. There is a very definite and expected probable error which varies with altitude and from time to time as equipment and training improve.

Just as in gunnery, the determined bombing probable error will dictate the expectancy of results and the number of shots (drops) which are required to obtain the desired assurance of hits. The latest tables of probability are not available but with the figures in use last year it is indicated that to obtain a 90% assurance of getting three hits with 300-lb. bombs on a building 200 by 500 feet, from an altitude of 16,000 feet, not less than 54 bombs must be dropped, or all that can be carried by a squadron of nine planes. These are of course all carefully aimed shots. The number of bombs required to hit a smaller

or larger target will vary with the well known rules. Also the above conclusions would be affected by increased accuracy of the new bomb sight. Calculations of this nature are accepted by bombardment tacticians as arbitrarily dictating the employment of large bombardment forces in the attack of any objective which is worthy of the risk of an expensive bombardment plane, to say nothing of its

CENTER: *British Whitely Heavy Bomber.*

BOTTOM: *British Newest Fairey Battle Bomber.*

TOP: *British Bristol Blenheim High-Speed Bomber.*

crew. This and the extremely effective defense against pursuit aviation afforded by the mutually supporting machine-gun fire of a large force of bombardment planes entirely eliminates the solo bomber from the present picture, except under the one possible situation which will be discussed under types of objectives and the methods of their attack. Much as a little refined target practice at a nice big bomber on a solo raid is desired, it is feared that we will rarely have such a chance.

Accepting the fact that decisive results can only be obtained by bombardment in force, we should next consider the nature of the defended objective and its influence on the nature of the attack. All objectives we may be called on to defend can be divided into three general types, namely, the point objective, the definite and the indefinite area objective. The tactics of the attack on and the gun defense of these three types will now be considered.

A *point objective* is, as its name implies, one of comparatively restricted dimensions and in the attack of which the sighting operation must be directed at one point. Examples of this type are bridge abutments, power houses and seacoast batteries. To be effective the bomb must fall so that the point aimed at is within the destructive radius of the bomb. The nature of the target and the economical use of bombs dictate that the bomb sighting operation be performed by each individual bombing team. The laws of probability would apply if the bombs were dropped in salvo from a tight bombing formation but in the face of antiaircraft gun fire this would be suicidal and need not be considered. However, the raiding bombers must be held in defensive formation up to the last possible moment before entering the zone of antiaircraft gun fire to provide defense against enemy pursuit aviation attacks. Thereafter the bombs will be dropped from a succession of individual attacks. These attacks will probably execute their approach to the bomb release point along approximately the same path or within a narrow sector and the interval between attacks will be only great enough to permit freedom of maneuver to each individual bomber. The tactics of the attack will be to prevent deliberate fire on each individual bomber in turn. We may be sure the bombs will be dropped from as low an altitude as our defensive measures permit. The bombing probable error increases rapidly with altitude, as well as with the adverse effect of

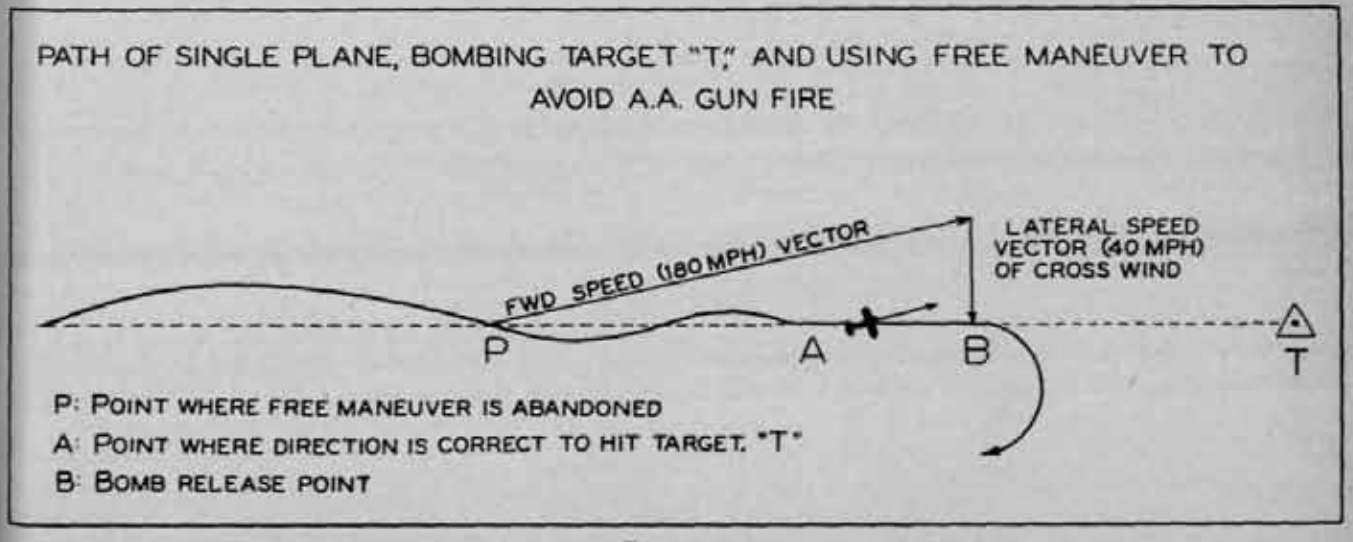


FIGURE 1.

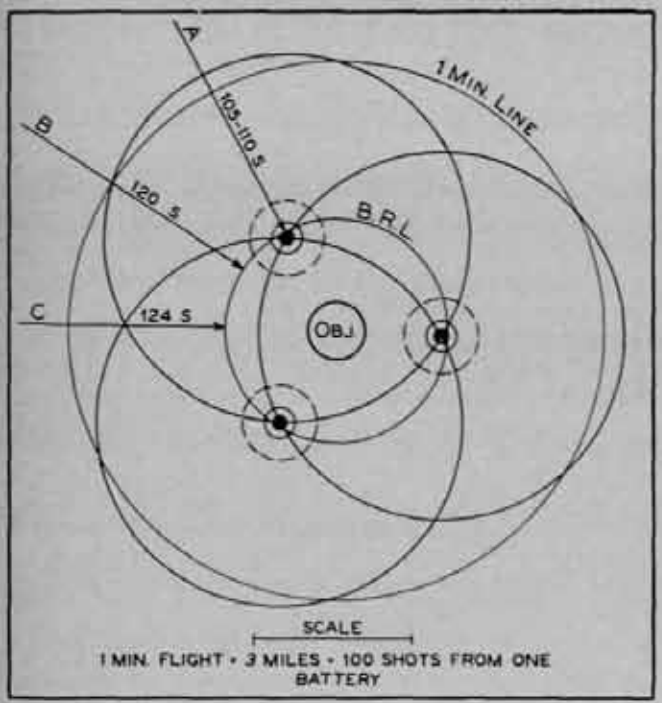


FIGURE 2.

GUN DEFENSE — EXTENSION.

Objective one mile in diameter.

Bomb Release Line 2,700 yards from the objective, based on bombardment from 15,000 feet altitude by plane flying 180 miles per hour.

One Minute Flight Line 5,280 yards from the Bomb Release Line.

Batteries arranged to give maximum coverage to the critical zone.

Course A: 110 shots can be fired on incoming plane from one battery.

Course B: 100 shots can be fired on incoming plane from one battery, 20 shots from another; total 120 shots.

Course C: 62 shots can be fired on incoming plane from each of two batteries; total 124 shots.

atmospheric conditions. New bomb sights greatly reduce this probable error. Since bombing at night will present illumination and navigation difficulties, night attacks will be made normally on point objectives only when the defensive measures render day attacks too expensive and when the objective is of real vital military importance. The effectiveness of night bombing on point objectives has not been demonstrated.

Tactical employment of guns in defense of a point objective calls for concentration of fire on a succession of targets, the bursts of fire to be short and of maximum intensity and the time allowable for shifts to subsequent targets a minimum. A barrage might be established if the axes of the attack were known in advance, but with the time factors as they are the best hope lies in aimed fire. Certainly in this type of action the results to be expected from adjustment of fire in pursuing any one target are not encouraging because there will never be time enough if subsequent targets are to be engaged. The doctrine of bombardment is to accept the losses which may be necessary if by so doing the mission is accomplished. A defense will not be effective if the last bomber gets through unhindered to his attack on the target. The tactics of the defense must contemplate:

1. The destruction of the maximum number of airplanes.

2. The prevention of precise sighting operation in the A-B zone, by the concentration of fire on all planes entering this zone.

3. Provisions against the defensive batteries going out of action through over-heating before the last element of the attack formation is engaged.

A *definite area objective* is one in which its vulnerability is more or less evenly distributed over an area of well defined limits and in which the maximum results can best be obtained by a distribution of bombs over the entire area. Such an objective is an oil tank farm, an airdrome, a cantonment, an ammunition dump or a factory area. To assure coverage with bombs, the simplest and most effective method is to fly over the objective along one of its axes, in a formation the width of which is the width of the area. The bombs are dropped in trail at predetermined intervals, on signal from the formation leader, in whose plane the sighting operation is performed. The number of planes employed is determined not by the laws of probability but by the area of the objective and by the bomb density or amount of destruction desired. A large number of small bombs are most effective against this type of objective and the distribution is gained by the shape of the formation and the bombing interval. As accuracy is not essential, such an attack may be expected from the maximum altitude and either by day or night. The necessary illumination for night operations will normally be provided by accompanying observation.

The vulnerability to gun fire of bombardment flying in close formation is accepted and consequently this method will not be employed in the attack of a well defended objective. When bombardment aviation is forced by enemy pursuit aviation and antiaircraft artillery to resort to special night operations against this type of objective, it will employ a scheme of maneuver designed to confuse and confound the sound locators, the searchlights and the gun-

Boeing Pursuits, 34th Squadron, Corona, Cal.

ners. Several such schemes have been worked out by our own air corps. It can be demonstrated to the satisfaction of the tactician that any intelligently directed attack against a well defended objective of definite area will have the following general features:

1. Confinement of the attack to a comparatively narrow sector with the axis of attack along the line where the antiaircraft defense is thought to be weakest with a view of permitting the engagement of but the minimum number of defensive batteries.

2. Simultaneous employment of three or more attacking elements with a view of causing the antiaircraft batteries to concentrate on one element of the attack while the others proceed to the accomplishment of the mission.

3. Freedom of maneuver to the last possible moment with a view of minimizing the chance of hits when observed and fired on.

4. High coördination. It was once conceived that the final attack would be delivered from all altitudes and angles of approach, in order that the complete absence of system confuse the defense. Such an attack by a large force would cause danger of collision and loss, and by spreading over a wider sector they would come under the fire of batteries which might otherwise be forced to remain out of action.

Further consideration of the gun defense of a definite area can best be taken up after disposing of the remaining type of objective.

The *indefinite area* objective is one whose limits are imposed more by the amount of matériel available for its defense than by its exact area. An example of this type is a city where the number of gun batteries and other defensive means available determine how much of the suburbs can be included within the defensive cordon. The forward area of a field army, with certain restrictions, is another example of this type of objective.

An attack of an objective of this type may be expected by any number of planes from a single bomber to an air force, for the purpose of the attack is the destruction of morale rather than anything material. The tactics of attack and defense are separate special problems, the most potent factor in the defense probably being retaliation, both by gunfire and by repayment in kind. The bombardment will consist of a number of single attacks, either simultaneous or continuous, when it is not forced to fly in close defensive formation due to the threat of enemy pursuit aviation. In an operation of this nature, as there is no need for precise sighting, maneuver will be maintained even during the time the bomb or bombs are dropped, and the attack may logically be expected from the maximum altitude and at night. It is a difficult gunnery problem to counter an attack of this nature and it is possible that an entirely illogical location of the gun batteries may gain through surprise fire the results that are denied to careful planning.

The "Axis of Attack" has been mentioned several times, and it may be well now to discuss the method by which the bombardment tactician selects the axis of attack or the route along which the attack enters the defended zone. When other factors, such as the shape of the

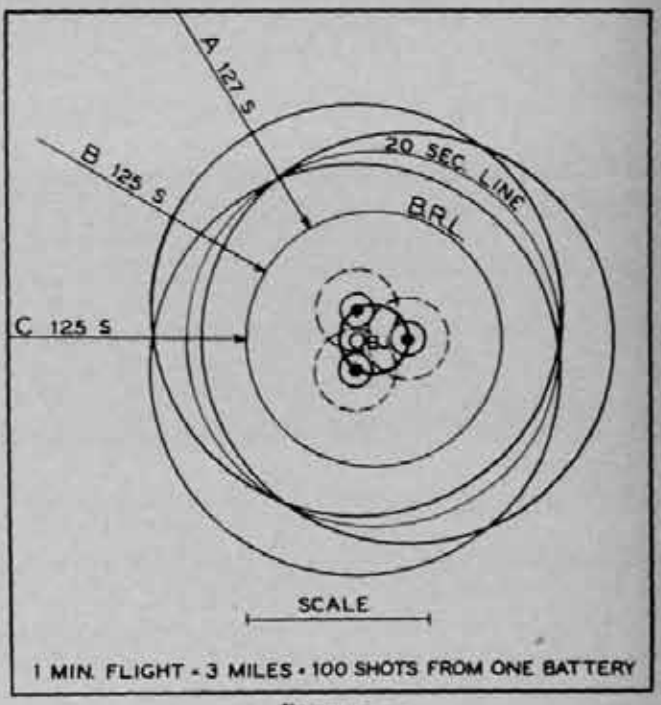


FIGURE 3.
GUN DEFENSE — CONCENTRATION.

Objective one mile in diameter.
Bomb Release Line 2,700 yards from the objective, based on bombardment from 15,000 feet altitude by plane flying 180 miles per hour.
Batteries withdrawn to the perimeter of the objective.
Course A: Incoming plane comes under fire of one battery for 37 seconds, and two more batteries for 20 seconds, a total of 127 shots fired.
Course B: Incoming plane comes under fire of one battery for 35 seconds, one battery for 24 seconds, and a third battery for 16 seconds. A total of 125 shots can be fired.
Course C: Incoming plane comes under fire of two batteries for 30 seconds and a third battery for 15 seconds. A total of 125 shots can be fired.

Martin B-10 Bombers, 9th Bombardment Group.

objective, do not control, and the routes are not restricted, the bombardment attack is led into and out of the defended zone on the line along which the smallest number of antiaircraft shells can be delivered. The selection of this line or axis is a matter of simple calculation, and requires only a scale made to conform to the scale of the map, with divisions of one hundred shots per minute of flight (25 rounds per gun per minute). With the AA gun batteries plotted, each with its 6,000 yard radius of effective fire, the scale is applied in various positions and that axis selected along which the minimum number of shells can be delivered from all the batteries. The results of this procedure often indicate as the weakest line of the defense an axis which from a casual examination of the dispositions would seem to be the strongest. As will be shown later, an extension of the defense in the expected direction of attack may have an effect entirely opposite to the one intended, when subjected to examination by this method. Antiaircraft gun batteries are usually sited on the presumption that the bombardment attack will probably be delivered from a certain direction, while bombardment tactics are designed to exploit any weakness in the disposition of the batteries, whose positions will be known or predicted in advance.

The gun defense will not be considered in detail. It is not the purpose of this discussion to go into the question of how many guns there should be per director, or any other organizational or equipment problems, but simply to examine into the proper tactical use of antiaircraft artillery, organized and equipped as it now is, in the light of our knowledge of the proposed aerial attack. Take, for example, a simple geometric defense established by a three battery regiment in accordance with the present doctrine and measure its chances of success against the bombardment attack. The only deviation from the basic data presented in the CAFM will be that bombardment must be conceded the speed and altitude it has now unquestionably attained. Also in the interest of exactness it is necessary to take into consideration the dead space existing over a battery. The disc of 6,000 yard radius accepted as the field of fire of an AA battery is in reality a ring, with a hole approximately 1,000 yards in diameter (at 15,000 feet altitude) which is an important factor in the measuring of the strength of an AA defense by the methods of the bombardment tactician.

Any established gun defense of a small objective is a compromise between extension and concentration. Our present tactical doctrine favors extension. Quote, CAFM:

> "If batteries are available in addition to those required to cover a critical zone of the normal width of one minute of flight, this additional strength should be utilized in such a way as to increase the depth of the defense—to 1½ minutes of flight or more—all portions of this wider zone—covered by the fire of at least one battery."

In the light of our knowledge of bombardment tactics, it is desired to present a comparative analysis of extension and concentration as a basic principle of defense.

The principle of extension will be considered first as it is in keeping with our published doctrine. Figure 2 represents a gun defense of an objective one mile in diameter. The bomb release line is placed 2,700 yards from the objective, which is approximately correct for a 180 mile-per-hour bomber at 15,000 feet. The critical zone for one minute of flight is 5,280 yards wide. In order to give the maximum coverage to the critical zone, and at the same time afford mutual support, the batteries are placed symmetrically 6,000 yards apart, which brings them just inside the BRL. Around each battety has been drawn a small circle (1,000 yards diameter) representing the dead space at 15,000 feet and a larger circle, in broken line, representing approximately the dead space at maximum altitude.

A scale is prepared on the basis of 100 shots per minute of flight. Applying this scale to Course A, coming in directly over the battery, it will be seen that 110 shots can be fired at the target before it reaches the BRL if the battery dead area is not considered, and 105 if it is. On this course only one battery can fire up to the time the plane reaches the BRL, so any additional targets coming in close to Course A will not be fired on. Furthermore, the last twenty seconds of the flight will be under conditions that are increasingly unfavorable to accurate fire, due to the angular height. Now consider Course B about thirty degrees from A. On this course one battery can fire for one minute, or 100 rounds and another battery about 20 rounds, making a total of 120 rounds. On Course C the plane comes under fire of two batteries simultaneously, each being capable of firing 62 rounds before the BRL is reached. From the above it is quite obvious that Course A is the line of weakest defense and Course C is the strongest.

Coöperation of attack aviation with bombardment will be discussed later at more length. It is obvious that, if such coöperation can be made effective, Course A lends itself particularly to the success of the bombardment mission, because only one battery must be neutralized to entirely eliminate the antiaircraft defense. Unquestionably it will be chosen as the axis of attack. Even if the enemy is unable to definitely locate the batteries, there exist three weak lines of defense and one of these lines is very likely to be the line along which we expect to meet the enemy by our greatest extension.

The inherent weaknesses of the arrangement of gun batteries as shown in Figure 2 are as follows:

1. Only one battery can engage the attacking planes if they come in along the axis of attack which would normally be selected by the enemy if his intelligence service is adequate.

2. While the extension of the batteries permits the engagement of targets for more than one minute of flight for approximately half of the perimeter, the outer third of this fire will be at targets which are free to maneuver. Thus the advantage of extension is lost in part by the difficulty of firing at a maneuvering target.

3. Not more than two of the three batteries can participate in the defense in the critical zone on any axis of approach.

4. Along the weak line of defense, the dead area of the most favorably located battery is entered just at the time the battery should be capable of delivering its most effective fire, i. e., at the bomb release line. The fire of this battery cannot be utilized to prevent the target from proceeding to a point from which other parts of the objective can be bombed.

Consider a defense in which the principle of concentration is predominate as shown in Figure 3. The same objective, one mile in diameter is defended by three gun batteries. The bomb release line is again 2,700 yards from the objective. Acting on the assumption that the attacking bomber will fly a rectilinear course for 20 seconds prior to the BRL, a circle indicating this zone is drawn. For 180 mph bombers this zone will be one mile wide. The batteries are located symmetrically on the perimeter of the objective. Analyzing this defense by the same line of reasoning as the former, the following is disclosed.

1. Targets coming in on Course A can be fired on by one battery for 37 seconds, 61 shots, and by two batteries for 20 seconds, 33 shots, each. A total of 127 shots. The 20 second zone is covered by the fire of all three batteries.

2. Targets coming in on Course B can be fired on by one battery for 35 seconds, 58 shots, the second battery 24 seconds, 40 shots, and the third battery 16 seconds, 27 shots. A total of 125 shots. The 20 second zone is covered by the fire of two batteries and the last 16 seconds of it by three.

3. Targets coming in on Course C can be fired on by two batteries for 30 seconds, 50 shots each and one battery for 15 seconds, 25 shots. A total of 125 shots. The 20 second zone can be covered by the fire of two batteries and the last 15 seconds by three.

The above is based on the assumption that all the attacking planes are bombing the near edge of the objective. If the attack is directed at the center of the target, an increase of fifty shots is possible on all axes of attack as the dead space of no battery will be entered until the bomber has passed beyond the danger zone.

There is little to choose from in these three courses in selecting the axis of attack. Along all three approximately the same number of shells will be delivered and three batteries engaged. Course A presents the greatest extension and the fire of all the batteries completely covers the 20 second zone. Along Course C the fire of two batteries is encountered at the same point well outside the 20 second zone and the third just inside. An even more effective defense would result if the batteries were withdrawn 5 seconds inside the perimeter of the objective in which case all parts of the twenty second zone would be covered by the fire of three batteries. It will require the neutralization of all the gun batteries to eliminate the gun defense. In examining this defense the bombardment tactician will be forced to select his axis of attack on the basis of some other reason than the weak line in the defense.

It appears that the principle of concentration has definite advantages over the principle of extension in the defense. Taking in order the weaknesses which were indicated in the first defense, it would seem that they have been corrected.

1. There is no weak line of defense and consequently no indicated best axis of attack. On all avenues of approach the fire of three batteries will be received before reaching the bomb release line and three target planes can be fired on simultaneously. The neutralization of all three batteries by attack aviation is necessary before the gun defense is neutralized. On all lines of attack the defense is as strong as the best defense offered by the extended batteries.

2. While extension has been sacrificed a much greater volume of fire can be delivered in the zone in which the bomber is forced to fly in rectilinear flight.

3. All three batteries participate in the defense against an attack from any direction.

4. The dead area over a battery is not entered by any target plane which is still an immediate threat against any part of the objective. All the fire against approaching planes will be delivered at favorable angular heights.

It is evident that the searchlight problem in support of the concentrated defense is much simpler.

In the organization of the Air Force, attack aviation is made an organic part of the Air Division for the purpose of facilitating the support of bombardment in the attack on an objective defended by antiaircraft artillery. The object of this support is the neutralization of the artillery either immediately prior to the arrival of the bombardment or immediately after the guns disclose their positions by opening fire. Neutralization is effected by blinding the batteries by smoke screens or by direct assault with fragmentation bombs, chemical spray and machine-gun fire or the combination of these means which offers the best chance of success in the particular situation. The strength assigned to a mission is in the general proportion of one flight element of 3 attack planes to each battery to be neutralized, or, in daylight actions, three flight elements (nine airplanes) to each two batteries. The assaulting strength which can thus be brought to bear on a gun battery is consequently in excess of the organic defensive strength of the gun battery and it would seem to follow that a gun battery would not offer sustained resistance to a bombardment attack effectively supported by attack aviation unless the attack aviation could itself be neutralized. Obviously, the simplest means of accomplishing this would be to withdraw the gun batteries as deeply into the machine-gun defense of the objective as possible and still permit them to perform their missions. This consideration would favor withdrawing the gun batteries to the perimeter of the objective or within it even in situations involving objectives of large area where this withdrawal would not present the advantages indicated in the second defensive arrangement discussed above. This is entirely in accord with the conclusions drawn from the comparison of extension and concentration methods of siting the gun batteries.

In the endeavor to ascertain whether any tactical conclusions could be drawn from the actual performance of

gun batteries firing under different target practice conditions, an analysis of all the practices of the year 1934 was made. The 1934 records were the latest that were available. The first presumption made in the analysis was that one hit is all that is necessary to destroy or drive back a plane. A hit, unless it is accidental, indicates that the target is in the hitting area. If it in itself is not conclusive, it will be immediately followed by others. The other presumption was that a battery can open fire at such a time that the first shot can arrive at the target at the maximum range. The first object was then to find out how much time is required to get the first necessary hit, and then to discover any other generalities that would have a bearing on tactical employment.

There is no need of tabulating all the data extracted, but the results are interesting and a recapitulation is given below:

	0 degree Incoming Courses.	90 degree Rectilinear Crossing Courses.	Maneuvering, diving and quartering Courses.	All Courses.
Per cent of courses on which one or more hits were obtained to total number of similar courses fired on	73	60	50	
Percentage of hits to total rounds fired on similar class of courses	10.9	7.2	4.9	
Average time, first burst to first hit, for each class of course, seconds.	12.1	13.2	8.8	12.7

The 1934 target practices were fired by batteries of two guns and unquestionably the target practice directive of that year was not designed to bring out these particular data. However, it is reasonable to take the results as indicative and to expect any series of firings to follow the same general distribution.

Taking the first factor, the percentage of courses on which hits were obtained to total number of similar courses fired on, a definite indication exists that there is a greater certainty of obtaining hits on an incoming course than on a crossing or maneuvering course. It would be natural to conclude from this that a battery sited as in Figure 3 where all its targets would be incoming would have a greater certainty of hitting sometime during the engagement than one sited as in Figure 2 the greater part of whose fire will be at targets flying crossing and maneuvering courses. This favors withdrawing the battery as close to the objective as possible, even to its center.

With the second factor, the percentage of hits to total rounds fired, the distribution is the same as with the first factor. The difference in favor of the battery sited to fire head-on to the incoming enemy is here more marked and a very definite indication exists in favor of the defensive plan of Figure 3.

As to the average time to the first hit, in all classes of fire the variation from the year's average of 12.7 seconds was not great. It is probable that this would not have been true had there been a large number of maneuvering courses fired on, but if such was the case it would only support the argument in favor of concentrating the bulk of the fire in the zone of certain rectilinear flight. The indications of these data are that, even with batteries of two guns firing under the 1934 conditions, by far the greater number of targets were hit well within the twenty seconds of flight which is the allowed limit in the concentrated defense, and there is a reasonable expectancy that with batteries of four guns firing at their maximum rate, the time required to get the first hit would be materially reduced.

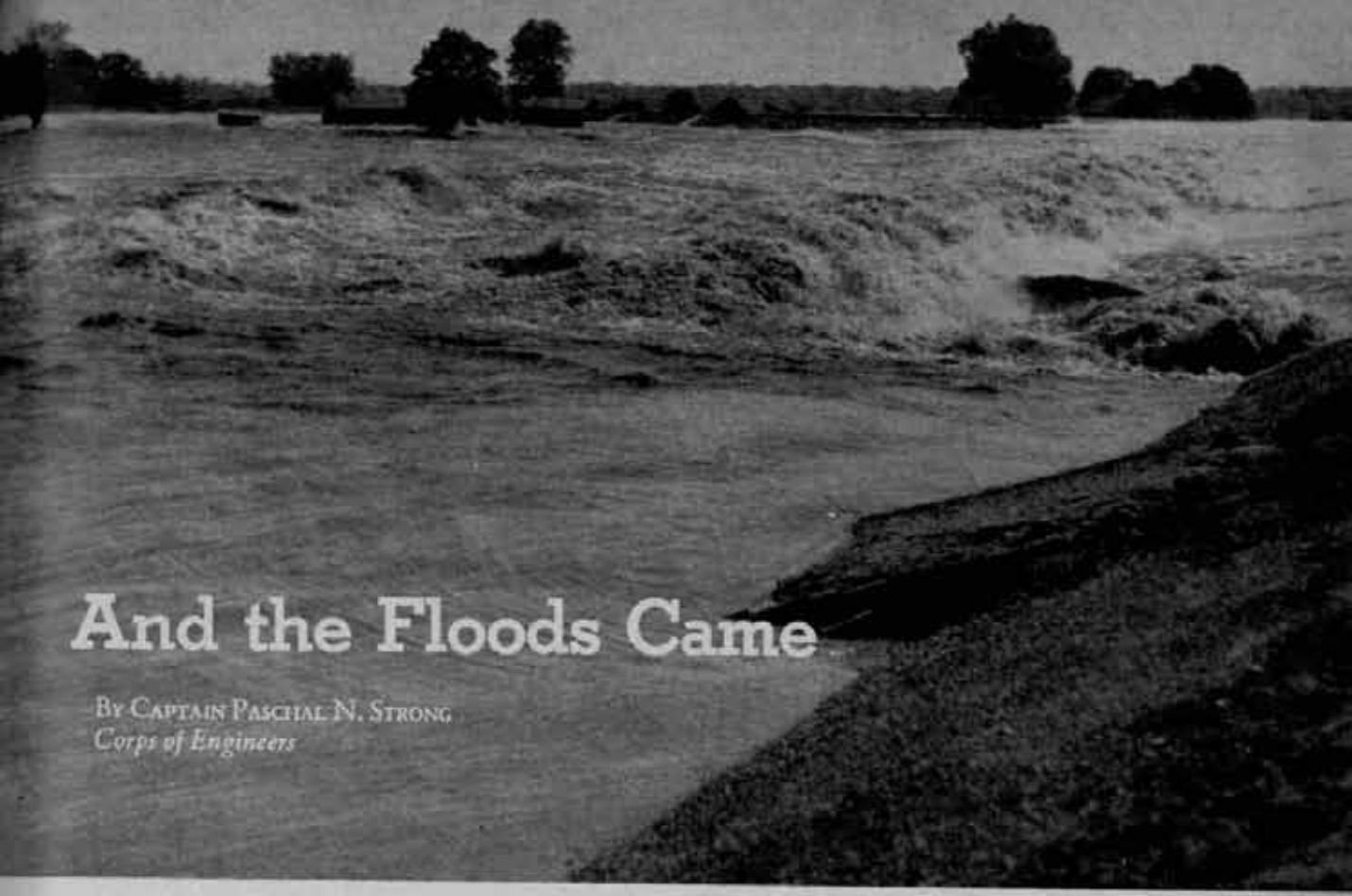
There are not enough data to draw any definite conclusion as to the tactical effectiveness of fire in comparison to slant range. The following analysis is, however, presented for what it is worth:

	0 Degree Courses		90 Degree Courses	
Average Slant Range:	Courses hit to courses fired on, per cent	Hits to total shots fired, per cent	Courses hit to courses fired on, per cent	Hits to total shots fired, per cent
2000-4000 yards	50	7.5	50	20.0
4000-5000 yards	71	13.5	57	9.4
5000-6000 yards	100	10.7	68	7.8
6000 yards up	...	....	42	3.9

There is a general falling off of per cent hits to total shots with increase in range, but this is somewhat offset by a general improvement in the per cent of courses hit to courses fired on up to 6,000 yards. If any conclusion can be drawn from these data, it is from the negative information that there is no indicated serious decline in tactical effectiveness of fire with increase in range through the mid ranges.

There is no particular end to be gained by restating the conclusions drawn from the analysis of the 1934 firings as opposed to the 1935 bombardment tactics. It is preferable to leave the question open so that the data may be supported or contradicted by future studies or analysis along this or similar lines. It is believed that this presentation of the gun defense problem is sound because it is the point of view of our own air corps bombardment tacticians and they have somewhat more than an academic interest in the problem of avoiding AA gun fire. It would be interesting to see a target practice conducted under a scoring system in which the penalty time started when the target plane came within maximum range (6,000 yards horizontal range) and stopped when the first hit arrived. This may be impracticable for many reasons but it is the true measure of the tactical effectiveness of AA gunfire. It would encourage opening fire at the maximum rate, thereby gaining the initial density of fire which is believed absolutely essential to success in almost all conceivable actions. It would discourage the deliberate fire and intentional delay that so often are noticed when there is an attempt to take full advantage of fire adjustment to secure many hits. I have been rather discouraging as to the availability of either the time or opportunity for fire adjustment and I believe properly so.

The above discussion has been offered in the hope that it will help to crystallize thought on the rôle of the antiaircraft gun battery in the most acute military problem of today, the defense against the aerial attack.



And the Floods Came

By Captain Paschal N. Strong
Corps of Engineers

Signal Corps P

The waters prevailed exceedingly upon the earth.—Gen. 7: 9.

THE great Ohio flood of 1937 has passed. River towns have emerged from the débris, and although a bit punch-drunk, have taken a tuck in their belts and set about rebuilding their homes and restoring their economic lives. The papers have been full of the activities of the Red Cross, the WPA, disaster committees, state organizations, and other civilian agencies whose energetic and essential activities have been duly reported to the public through the proper publicity departments.

The papers raised the cry of red tape.

But what of the Army? *Vas you dere, Sharlie?* Or vas you too busy to tell the newspapers about it?

The Army was there—very much there—with its engineers, its signal troops, its doughboys, its transportation, its medical units. In one way or another, practically every arm and service was represented. Only one thing did the Army forget to bring with it — a publicity department.

The Army was there. Let's look back and see what it did. If, in this backward glance, the Engineers seem to loom too large, let the reader remember that the writer was on duty with the Army Engineer headquarters at the Ohio River division office, and is inclined to write what he saw rather than what someone else saw.

The beginning of the flood found the engineer fleets in winter quarters, undergoing annual repairs. The flood itself found every available engineer hull, from the lowliest skiff to the mightiest dredge, on active duty twenty-four hours a day. The personnel of every engineer district were working without regard to hours, food, or sleep. And as the flood waters rose to heights that drowned out all previous high records, the engineer units scattered up and down the river became nuclei of civilian relief organizations.

The mission of the Army Engineers during flood emergencies is twofold: First, they must protect government property, which in this case represented millions of dollars' worth of floating plant and lock and dam installations. Second, they may render all possible assistance to local authorities whenever requested. The first phase of this mission is simple, well-defined, and reasonably easy to execute. The second phase is complex and vague, and though capable of elastic interpretation it must be kept in bounds or the engineer department would become the sole custodian of the relief problems of river communities.

When the great flood struck, the Army Engineers from river foreman to division engineer found themselves under tremendous pressure to forget their mission and accede to the demands of certain communities that they move in and take charge. Only by withstanding this pressure could they prevent their vessels from being "frozen" to those localities that made the most noise. Only by adhering to their mission could they dispose their floating plant and personnel to lend maximum assistance to the suffering valley.

The Engineers have permanent offices or sub-offices along the Ohio River at Pittsburgh, Pennsylvania; Mar-

ietta, Ohio; Huntington, West Virginia; Cincinnati, Ohio; Louisville, Kentucky; Owensboro, Kentucky; and Paducah, Kentucky. In addition, there are forty-nine locks and dams along the Ohio, manned with personnel and small floating plant. Some of these locks and dams were used as engineer bases. To supplement these bases, additional offices were set up at Tell City, Indiana; Evansville, Indiana; Golconda, Illinois; and other places. Thus the river was studded with nerve-centers.

Engineer problems during flood pivot on information, evacuation, and supply. In the lower Ohio these problems were accentuated by the partial or complete isolation of the river towns. Many of these towns were built on river bluffs higher than the immediate interior. The result was that highway and railway communication were severed first, with telegraph and telephone lines soon following. Consequently, these towns, confirmed in the belief that it was contrary to nature for a flood to go higher than it ever had before, suddenly found themselves, first, completely isolated, and second, huddling in second stories and attics to keep their feet dry.

In order to keep informed of the needs of river towns, the river was divided into sections which were patrolled daily by fast boats. These patrols kept in touch with designated engineer bases, and the information thus gained was transmitted to the Red Cross and other interested agencies. Then the cry for boats began. Boats and more boats. The Engineers furnished boats and crews to the limit of their capacity. The Coast Guard shipped in hundreds. Private boat owners donated generously. But only the Engineers could furnish the steamboats and the river barges needed to transport large quantities of food and supplies. Hence they soon found themselves doing the bulk of river supply for stranded communities.

They did more than that. Their towboats stood by at sizable towns where only roof tops showed above the waters, and evacuated the stranded population to places that could be reached by road. Their smaller boats roamed among the inundated farm lands, carrying the farmers and the farmers' daughters to safety.[1] Their flatboats assisted in removing live stock to high ground. In Cincinnati, where a $3,000,000 fire was caused by a gasoline storage tank floating away and igniting, they battled with other gasoline tanks to secure them or haul them to safety.

But it was at places like Paducah where a concentration of engineers and engineering facilities prevented a catastrophic loss of life. Fortunately there was a large engineer sub-office, repair yard, and dépôt at Paducah. The big dredges, towboats, barges, survey boats, quarter-boats, launches, and other items of plant were in for the winter.

The city, with about 25,000 inhabitants, was nearly 100% flooded. Evacuation in large numbers in a minimum time was essential. And the Army engineers, in charge of a vast fleet of small boats which arrived from hundreds of miles around, took over the job and saw it safely through.

So far we have given a thumbnail sketch of the non-military activities of the Army. There remain the military activities and these involved Regular troops, the National Guard, Reserve units, the ROTC, and the CCC. With the exception of the Regular troops, all of these units could be brought into action with a little impetus from local and state authorities. But the participation of federal troops in local situations is definitely restricted by law, by regulation, and by policy. Before picturing the activities of federal troops in such critical situations as existed at Louisville, a brief review of these restrictions may be in order.

The law says in part:

> It is unlawful to employ any part of the Army of the United States, as a *posse comitatus* or otherwise, for the purpose of executing the laws, except in such cases and under such circumstances as such employment of said force may be expressly authorized by the Constitution or by Act of Congress.

The penalty for violation of this law is a fine not exceeding $10,000, or imprisonment not exceeding two years, or both.

The regulations, of course, repeat these legal restrictions, and outline a very definite procedure to follow before federal troops may enter the local scene. This procedure is based on the provisions of the Constitution and on various Acts of Congress. Stripped of legal hocus-pocus it boils down to the following essentials:

(1) The President alone may order federal military participation in local situations.

(2) Such participation will normally be resorted to when illegal violence must be met by a show of force.

Pictorial, Inc.

Militarist — 1937.

[1] Wonder what happened to the farmers' sons?—Ed.

(3) The request for such participation must be made to the President by the legislature of the state involved, or, when the legislature is not convened, by the state executive.

(4) In emergencies due to public calamity which disrupts the normal process of government, where it is dangerous to await instructions, an officer of the Army may take such action as the circumstances of the case appear to require, and as he may reasonably expect to be able to justify before the civil courts upon a plea of necessity.

(5) Troops cannot be directed to act under the orders of any civil officer.

(6) The use of troops should end the moment the necessity for them ceases.

Bearing these essentials in mind, let us now see where the military forces of the Army were, and what they did.

The garrisons nearest to the scene of action were Fort Thomas, Kentucky; Fort Hayes, Ohio; Fort Knox, Kentucky; Fort Benjamin Harrison, Indiana; Fort Sheridan, Illinois; and Jefferson Barracks, Missouri. Each of these posts formed a reservoir of federal troops and essential supplies, such as tentage, cots, bedding, and the like.

Early flood predictions gave little cause for alarm. There was no reason to believe that a flood of catastrophic proportions was just around the corner. The water on the ground, plus the precipitation that could be foreseen, led only to the belief that a mildly exciting flood was on the way, and that the usual lowlands would be flooded out in the usual manner.

And then, for nearly a week, the heavens opened in riotous abandon, and the valley awoke to the fact that an unprecedented flood was upon them. The trickle of requests to army posts for transportation and supplies suddenly swelled to a deluge of urgent appeals. The Army, recalling the Mississippi flood of 1927, swung into action. The National Guard, the Officers' Reserve Corps, and the CCC were already in the field, and Regular troops were issued warning orders. Staff officers from the corps areas involved were dispatched on reconnaissances by motor, by rail, and by plane. The supply organization of the Army found itself on a war-time basis, and the large dépôts hummed with more activity than they had experienced since the war.

Then, as the cities found themselves without light, power, or heat, panic set in. Local police protection became woefully inadequate; looting commenced, and some sizable communities tottered on the brink of anarchy. National Guard troops, though doing yeoman service, were insufficient in numbers. The Reserve Corps had no troops. Inevitably came the call for the Regulars. Some of the calls were based on hysteria, some on an improper conception of the functions of federal troops, and some on a very real need. It became the duty of Corps Area to appraise these requests and to keep Washington informed. One of the most difficult things was to convince various municipalities that the request of the city fathers direct to the Army could not get the Regulars there. The requests had to be made by the legislature or the state executive, or the Army's hands were tied.

Pictures, Inc.

Chow Line.

As soon as the reports of the staff officers began coming in, the several corps areas were able to differentiate between hysteria and need, and recommendations flashed to Washington. Soon the Regulars were speeding to the critical points—Frankfort, Louisville, Paducah, and southern Illinois. And the most critical of these was Louisville.

A very delicate situation had arisen in Louisville. A city of a quarter-million population suddenly found itself three-quarters submerged, with all power and water gone, and blanketed at night by desolate darkness. No fire or police signals functioned — but for that matter little could be done had the signals functioned. The threat of pestilence hung over the population, looting was prevalent, and the people panicky. Parts of the city, higher than the rest, were islands, their darkened streets and buildings jammed with refugees. In other parts of the city upper stories housed those die-hards who had refused to be evacuated, and who therefore had to be furnished food and water. No blame can be attached to the mayor of the city when, foreseeing this emergency, he remembered the Regular troops at Fort Knox, thirty miles out, and sent out an SOS.

Now from such records as are available, it appears that the mayor at first wanted the Regulars to move in, take over the city and declare martial law. When he was informed that such a request would have to come from the governor, he suggested that the troops move in and operate under the civilian authorities. This, under the law, was manifestly impossible.

At once the papers raised the cry of red tape and lack of coöperation on the part of the Army. This, in spite of the fact that prior to the mayor's call the Regulars at Knox had been busy evacuating West Point, Kosmosdale, and other river towns, in issuing supplies where needed, and in caring for thousands of refugees at the post. Fortunately, a proposal was soon worked out whereby the Regulars moved into Louisville in a coöperative capacity.

At the same time, the need for communication between the isolated parts of the city and the high ground of the interior became apparent, and a request was sent out for a regular engineer company with pontoon equipment. Fort Belvoir, Virginia was the nearest Engineer post, and Company B, 5th Engineers, was immediately dispatched. The need for medical troops was growing rapidly, and Company G of the 1st Medical Regiment was sent from Carlisle Barracks, Pennsylvania.

By the time the Louisville situation reached its gravest phase, the following Regular troops were in Louisville:

(1) Troop A, 1st Cavalry (Mechanized) from Fort Knox with additional scout cars from Brigade Headquarters and Headquarters 68th Field Artillery. These armored cars and other vehicles assisted in evacuation, and coöperated with local police and National Guard troops in patrolling such parts of the city as were out of water. Their radio equipment proved particularly valuable.

(2) Truck transportation from the 68th Field Artillery. In addition to the usual transportation mission, these trucks were of use in handling heavy electrical equipment which materially speeded up the return of light and power.

(3) Maintenance detachments of Quartermaster and Ordnance personnel.

(4) A composite battalion of the 11th Infantry from Fort Benjamin Harrison. These troops were used largely for police duty.

(5) Company B, 5th Engineers, from Fort Belvoir, Virginia. This outfit brought heavy pontoon equipment, transportation, and a water purification truck. The distances to be spanned exceeded the length of the pontoon bridge, and pontoon ferries were used to ferry supplies, mail, and refugees. The water purification unit proved invaluable. This company also constructed a tent camp for refugees.

(6) Company G, 1st Medical Regiment, from Carlisle Barracks. This company was largely engaged in superintending sanitary measures and rendering medical aid.

Leaving Louisville for the moment, we find Company K of the 10th Infantry en route from Fort Thomas, Kentucky to the state capital at Frankfort. Frankfort is on the Kentucky River, whose flood waters were rushing down to swell the Ohio. A sudden storm of cloud-burst proportions sent a flash crest down the already swollen river, and water began rising ominously in the cells of the state penitentiary. The prisoners had to be removed in a hurry—or drown. The evacuation was handled by National Guard troops, but the imperative haste made close supervision impossible and several prisoners escaped. For a time there was wild talk of a general jailbreak, and the heavily burdened people thought they faced an additional tribulation—hundreds of desperados loose in the city. An improvised tent city for the convicts, surrounded only by barbed wire, was not calculated to reassure the citizenry, so the Regulars were dispatched to assist the National Guard and state troopers in keeping order.

Returning to the Ohio again, we find Paducah in the state of flood siege previously described. Long before the crest of the flood arrived, the city was completely inundated, and the city manager and the flood committee radioed a request to the governor, through the Engineer officer on the scene, for federal troops. National Guard troops were on hand, and the need for federal troops was not apparent at that time. As the waters continued to rise, the request was repeated, and Companies B and C, 2d Infantry, were dispatched to Paducah from Fort Sheridan. There they coöperated with local authorities, established a tent camp, assisted in police, and helped handle the never-ending stream of refugees.

The Army made extended preparations in southern Illinois to handle the refugees from the towns of the lower Ohio. The burden of these preparations fell on the 6th Infantry at Jefferson Barracks, which responded promptly and efficiently. Several CCC camps in lower Illinois were at once made ready to care for refugees, and the Regulars took the field with their troops, trains, and supplies. Companies A and E of the 6th Infantry were at Camp Anna. Company B was at Camp Marion, and detachments of the 6th were at camps at Hutchins, Carbondale, and other places. Overland evacuation was accomplished by the 6th from the towns of Villa Ridge, Mound City, Homestead, Rosiclare, and Metropolis. An emergency hospital was set up at Marion with doctors and nurses to care for the sick among the refugees, and a Signal Corps detachment assisted the engineer base at Golconda in keeping in touch with engineer rescue work up and down the river. It should be mentioned that all of this was done in coöperation with the National Guard of Illinois, and that a National Guard Engineer company from Chicago, with pontoon equipment, was of great assistance in maintaining overland communication from the river base at Golconda. The CCC personnel and facilities were also of prime help.

Although the presence of Federal troops was evident in a relatively small number of cities, the Army's contribution of essential supplies was a major factor in alleviating suffering along the entire valley. Among the supplies dispatched to the flooded states in the Fifth Corps Area were 89,000 blankets, 42,000 cots, 26,000 mattresses, 23,000 bed sacks, and thousands of such items as pillows, comforts, socks, raincoats, hip boots, overcoats, mess tents, large tents, canteens and cups, sheets, clothing, towels, shoes, and candles. These supplies were issued from dépôts to the Red Cross and other relief agencies, and do not include those that the troops carried directly in the field. The Fifth Corps Area issued similar items for the lower river, and the Fourth Corps Area contributed

to the Mississippi area. It is safe to say that without these supplies which were promptly made available to relief agencies, the suffering among refugees would have increased tremendously and the death rate would have soared.

The story of the Army in the flood would not be complete without mention of the Officers' Reserve Corps. In each flooded community there was a great need of large numbers of responsible individuals, working in a going organization, and trained to leadership. The Officers' Reserve Corps exactly filled that need, and responded unselfishly to the demands made upon them. The procedure adopted in Cincinnati was typical of that in effect in every large community. City officials and relief agencies were contacted and the assistance of the Regular officers in charge of Reserves proffered, together with such Reserve officers as might volunteer. Then a letter was sent by special messenger to all Reserve officers, requesting volunteers. The response was immediate. In Cincinnati, over 500 out of 700 officers volunteered. These officers furnished a splendid example of teamwork by voluntarily placing themselves under the direction of responsible heads of relief organizations. A partial list of the type of service rendered is indicative of their achievements:

Supervision of refugee stations which were established in schools, churches, and other public buildings.

Superintendence of volunteer and government relief labor in transporting food, supplies, boats, etc.

Procurement of food supplies and distribution to relief centers.

Custody and care of government property.

Service on relief committees of various sorts.

Establishment of sub-bases along the river to furnish liaison between engineer boats and local relief agencies.

Establishment of message centers to coördinate city and relief agencies.

The CCC has a large part on the Army canvas. Every camp in the long, broad zone of the Ohio River laid aside its normal functions and turned to rescue work. Supplies were sent out, evacuation assisted, herculean labors accomplished in keeping roads open, and facilities established to provide food and shelter for thousands of the homeless. Motor transportation from camps outside of the zone of activity was mobilized and dispatched to the front.

To the charge that the National Guard, the Coast Guard, and other agencies have been neglected in this account, the writer must plead that he is dealing only with the narrative of the Regular Army. No one is more aware than he of the splendid part they played, no one more appreciative of the whole-hearted coöperation with which they worked side by side with the Regulars during the emergency. Come what may, the Regulars ask no more than the privilege of again working side by side with their gallant comrades of the late high water.

KNOX TROPHY WINNERS — BATTERY H, 241ST C.A. (H.D.) MASS. N.G.

Fourth Row: Corp. G. A. Leach, P.F.C. V. A. Antonelli, P.F.C. M. H. Chetwynd, P.F.C. J. L. Foran, Pvt. F. J. Stevens, Pvt. J. M. Wyse, Corp. E. J. Congigliando, Pvt. J. E. Harding, Pvt. B. C. Foster, Pvt. D. A. Goodwin, P.F.C. R. F. Winam, P.F.C. F. J. Petrilli, P.F.C. M. Raduazzo, Pvt. J. A. Sudanowitz, P.F.C. C. V. Winam.

Third Row: Sgt. A. J. Rasmussen, Corp. H. J. Ball, P.F.C. H. T. Flaherty, Corp. R. G. Hudson, Pvt. J. W. O'Donnell, P.F.C. R. E. Richmond, P.F.C. N. Ball, Pvt. C. R. Peavey, Pvt. J. A. Myles, Pvt. G. F. Horner, Pvt. C. H. Sullivan, Pvt. W. Romanchuk, Pvt. E. Gisetto, Pvt. N. J. Cormier, 1st Sgt. C. P. Mahoney.

Second Row: Sgt. I. Kloper, P.F.C. O. Yarsin, Pvt. A. G. Walley, Pvt. C. M. Barrett, Pvt. J. DiVito, 1st Lt. W. M. Bacheller, Capt. F. E. Pereira, 2nd Lt. F. S. Grant, Jr., Pvt. W. A. Tedesco, Pvt. J. A. Sciaraffa, Pvt. D. Scenna, P.F.C. C. E. Leach, Pvt. A. L. Drinkwater, Corp. N. J. Caputo.

First Row: Sgt. V. J. Furlong, Sgt. A. C. Dorrer, Sgt. R. J. Dedham, Pvt. A. J. Lupo, Pvt. E. J. Gallant, P.F.C. E. F. Burgess, Pvt. L. T. McVay, Pvt. D. D. Congigliando, Pvt. K. H. Harrington, Pvt. A. F. McGuirk, Pvt. J. H. Boudreau, Pvt. J. F. Seamon, Pvt. J. W. McGuirk, Corp. A. J. Gallant.

Seacoast Fortifications of the Future

By Major Charles W. Bundy, C.A.C.

Overhead Protection from Hostile Aviation is Necessary.

HEADLINES such as "Great Britain to Refortify Hong Kong, Singapore, and Home Bases"—"Turkey to Build New Fortifications at the Dardanelles"—"Ceuta—Spanish Fort—Big Fortifications to Rival Gibraltar" are carried nearly every day in the press. It is evident that an era of world wide seacoast refortification is being initiated. Our foreign neighbors are apparently turning away from being "air mad" to a state of rational preparedness.

Many laymen offer positive curbstone opinions to the effect that seacoast fortifications are obsolete and that seacoast forts are unnecessary if we have a strong navy and sufficient aviation. The military man, who reasons things out in an intelligent manner, is convinced that a navy with unfortified bases is in almost as bad a fix as an airplane without a landing field; and that an air force frittered away to protect harbors is lost as an effective weapon of war. Airplanes are best employed as offensive weapons.

The real purposes of seacoast fortifications are to deny the use of harbors and their facilities to the enemy, to assure the use of harbors and their facilities to the friendly navy and to protect friendly ships and harbor facilities from enemy attacks.

To accomplish these purposes fortifications are provided with major caliber long range batteries for firing on battleships, and medium and minor caliber batteries for firing on less heavily armored ships and for the protection of mine fields.

Since nearly all of their targets will be those of opportunity, it is most important that seacoast batteries be so emplaced as to give the utmost protection to the guns and personnel serving them, to the end that when the necessity arises the guns will be fit and ready for action. Seacoast targets will be exposed normally to fire for but short intervals. Naval commanders may be expected to take full advantage of high speed, rapid turning movements and sinuous courses, smoke screens and low visibility in order that the time ships will be exposed to seacoast artillery fire be reduced to a minimum. As compared to heavy artillery in land warfare, the requirements of seacoast artillery are much more severe, for its successful operation will depend upon the rapidity with which accurate fire can be delivered upon short notice. Opportunities for effective fire will be rare; so it follows that when one presents itself it should not be lost due to neutralization of the seacoast batteries.

Seacoast batteries may be neutralized from the sea by naval gunfire or by attack from the air. It has been demon-

Our Modern Long Range Guns in Action.

Note absence of overhead protection.

(Signal Corps Photo)

strated repeatedly in the past that little material damage is to be feared from naval bombardment and although neutralization may be accomplished by this means it is highly improbable. Effective fire from the sea depends, in a large part, upon accurate spotting and it is here that naval artillerymen are greatly handicapped. Against area targets such as cities and ships at anchor in a restricted harbor, long range naval bombardment can obtain results, whereas against relatively small targets, such as seacoast batteries, the damage to be expected, will hardly justify the required expenditure of ammunition. Consequently, in the emplacing of seacoast batteries, no great consideration need be given to protection against naval gun fire, other than to concealment from observations from the sea.

The other method of neutralization or destruction of seacoast batteries is by attack from the air. Although an air attack on any type of seacoast battery is a possibility, there seems to be little probability that minor or medium armament will be subjected to attack by hostile aviation, due to their comparatively short range and the small target that they present. For modern long range batteries, it is far different. Long range batteries will probably outrange considerably any armament carried by modern battleships. These batteries have sufficient range to prevent hostile long range naval bombardment against cities, ships at anchor in restricted harbors, and similar area targets. They alone have sufficient range to cover the debouchment of a friendly fleet.

Let us suppose that a friendly fleet has met a reverse at sea and has retreated to a fortified base to be refitted, has left control of the sea to the enemy and that control of the air has also passed to him. Let us further suppose that the base is strongly fortified with medium and minor range batteries but has only two modern long range batteries and that the enemy is in close pursuit, realizing that if the friendly fleet can be further damaged and bottled up, the temporary control of the sea can be made permanent and the war probably won. The friendly fleet is at anchor in the harbor undergoing repairs, with ships in drydock.

What armament prevents the enemy from completing his job by long range bombardment of ships helplessly at anchor, of the repair facilities of the base, of the ships in drydock? The answer is, *the two long range batteries.*

Can the enemy destroy or neutralize these batteries by naval gun fire? Probably not. But, if these batteries are unprotected from aerial attack, it is very probable that they will be neutralized or destroyed by attack from the air. It seems reasonable to expect that the importance of these two batteries would lead to air attacks of the greatest intensity and persistence, and that such attacks would be

TSINGTAO
15 cm. Battery at Hui tsch'uen Huk

Note the turrets which provide overhead protection.

(U. S. Naval Institute Photo)

pushed home with the utmost determination. The conclusion cannot be escaped that if such long range batteries are to accomplish their mission that their emplacement must be designed so as to furnish overhead protection from hostile aviation.

The present policy of our government with reference to seacoast emplacements is outlined in the Coast Artillery Field Manual which says: "Bombproof construction is such an expensive form of protection against powerful airplane bombs that, at the present time, reliance for minimizing the effect of enemy fire upon fixed harbor defense artillery must be placed chiefly upon concealment, and separation of guns, with bombproof construction for certain of the most essential elements, such as plotting rooms and switchboards, and upon dispersion of certain of the other elements, such as magazines and power plants."

An analysis of the above is interesting. Common sense says that the guns are the most essential elements of a battery. Nobody ever heard of a battleship being kept out of range by a switchboard. Again, expense is only relative; if a comparatively huge expenditure will save a nation, it is a bargain. Bombproof construction is the one sure protection against bombs and this statement is made even though it is realized that there are other means of protection from air attack, namely; antiaircraft artillery, camouflage, smoke, dummy emplacements, and the substitution of railway for fixed batteries.

The most enthusiastic antiaircraft artilleryman can not substantiate a claim that, under ordinary circumstances, antiaircraft artillery can prevent all airplanes in a large scale attack from reaching their objectives. Antiaircraft artillery is a strong deterrent but not an absolute preventive. And the circumstances surrounding antiaircraft defense of seacoast batteries are not ordinary. When the installation is practically at the shoreline, antiaircraft ground defense is particularly difficult. At the coast line it is impossible to cover the part of the critical zone out of range of the antiaircraft guns by advancing the guns to gain greater depth to seaward. The effect is that the interval between the time the plane gets within range and the time that it reaches the bomb release line is so short that the possibility of effective antiaircraft fire is greatly lessened. A simple calculation will show that a 3-inch antiaircraft battery defending installations near the shoreline will have but twenty seconds to fire on a bombardment plane approaching at 200 miles per hour at an altitude of 17,100 feet.

Another disadvantage peculiar to coastline antiaircraft defense is the fact that it is practically impossible to establish an adequate aircraft warning service to the seaward even with real cooperation from the inshore and offshore naval patrols. Thus surprise attacks by day or night are harder to discover and more likely to be made. A surprise attack might cause irreparable damage to the seacoast guns. The situation is fundamentally different from that encountered by heavy artillery in the World War, when a brief period of neutralization was of but little moment. In the case of seacoast defense, where the hostile targets are capable of maneuver at such high speeds, even a brief period of neutralization might prove serious to the defense. The possibility of neutralization should be forestalled by a proper combination of antiaircraft fire and overhead cover.

Another feature to be considered in planning antiaircraft protection is the dearth of antiaircraft equipment in relation to the enormous demands which will be made for protection in any war. Any remunerative air bombing target which can be rendered unremunerative by means other than antiaircraft fire represents a gain for the protection of other objectives. A really adequate antiaircraft defense of long range seacoast batteries would be very expensive in first cost. It would needlessly deprive other important installations of antiaircraft protection, if bombproof protection can be given to the seacoast batteries.

Camouflage of such huge installations as long range batteries is so difficult as to warrant only small reliance on this form of deception. Once a gun is fired a blast mark appears like a pointing finger and marks the position of the battery. Camouflage does not offer material protection.

Batteries under favorable climatic conditions may be concealed by smoke. Smoke once released is beyond human control. Where visibility is essential to fire control the release of smoke may conceal the battery and also blind it. The great danger of blinding observation renders the use of smoke for concealment in seacoast

Note the exposed personnel.

fortifications infeasible.

Dummy emplacements are excellent deceptive devices. But the expense of constructing dummy long range batteries argues against such artifice. The question may be raised as to why not substitute railway batteries for fixed batteries and use their great mobility to deceive the enemy as to the location of a battery. It must be realized that a railway battery always has a railway track leading to it, pointing to its position and this fact makes concealment difficult. Also railway artillery of heavy calibers is not really tactically mobile, that is, the time required for its emplacement is so considerable as to preclude rapid, short, changes of position. So, for a particular vital point long range railway artillery has no advantage over fixed artillery for seacoast tactical use, and has certain disadvantages.

Seacoast batteries, once installed, last for years. Airplanes, combat cars, small caliber weapons wear out in a few years. Opportunity to keep up to date is recurrent for most military equipment. But the long life of a seacoast battery makes a demand for forward vision greater than for any other weapon or equipment.

We now have batteries in out service built since the advent of the airplane. Most of these batteries are constructed with great skill to satisfy the requirements of protection from naval gun fire, but are vulnerable to air attack. It is easy for us to exercise hindsight, saying that the builders of these batteries should have envisioned the development of the airplane as a weapon of war and so to have designed these batteries for protection from the air. But, whatever our opinion, the lesson is there for us to learn.

When we advance and join the rest of the world in rational preparedness and refortification, let us base the military characteristics of new batteries not alone upon the experience of the past, nor alone on conditions obtaining at present, but also upon the vision of developments fifty or a hundred years from now.

A distinguished artilleryman once concluded a vigorous letter with the words: "I sincerely hope that the normal inertia that must always be overcome in order to make any progress will not be too great in this instance." Let us hope that this normal inertia will be overcome, that we may have batteries for the future, not of the past.

JAPANESE ARMY MANEUVERS.

Members of the 101st Artillery manhandling matériel across a rice paddy. Note that the personnel have camouflage material wrapped around their caps.

Highway Traffic and Modern War—II

By Captain Joseph I. Greene, *Infantry*

In Part I we studied the traffic on the primary highway net and determined the maximum capacity of typical primary roads for war-time motor movements. We saw that this maximum flow can be realized by setting highways aside for exclusive military use during the passage of motor columns, and by using two-lane roads for one-way traffic with both lanes occupied by vehicles.

For many motor movements, however, these excellent conditions may not exist. Only secondary roads may be available; or a single feasible primary highway route may make two-way traffic unavoidable. Of course, there will often be no need to strain every nerve to get motor columns over the road in the shortest possible time. But whatever the circumstances, we cannot begin to calculate modern logistics until we take into consideration every factor that may affect the capacities of the routes we plan to use. A flat rate of march for motor movements, varied only to allow for movement at night with and without lights, is far too simple to fit the facts. True, a recent official text[1] states that "liberal allowances must be made for retarding conditions, such as . . . bad roads . . ." But we must have something more definite to go on than this general statement. Therefore, in this article, we shall consider what some of these "allowances" must be.

* * * *

When two-way traffic is necessary, the amount of military traffic that a given primary highway can carry depends on: (1) The types of military traffic; (2) The amount of non-military traffic on the highway; (3) The number of lanes; (4) The amount and types of cross traffic, and the methods used to get it across the main route.

From the viewpoint of motor movements, the most important type of two-way traffic is that in which a motor column, with vehicles moving at regulated driving distances, travels in the right-hand lane. The left lane is presumably left free for traffic by individual vehicles in either direction. On a road closed to all but military traffic, the left-lane traffic may be typically composed of antiaircraft and antitank units moving by bounds; and of command, staff, and messenger vehicles.

With the road closed to cross traffic, the maximum capacity of the motor-column lane would be as given in Part I: 1,020 vehicles passing a given point per hour, at an average speed of 30 miles an hour, a maximum running speed of 40 miles an hour, and a driving distance (including vehicle length) of 52 yards. In the other lane, the maximum capacity would be the same, but only if all traffic in that lane moved in one direction. For two-way traffic, the capacity of the left lane alone, with the right lane occupied, is very limited. In passing forward along the column, individual vehicles must move at high speeds whenever they find the left lane open, and must frequently dart into and out of the column itself, which cannot be done very often without seriously interfering with the column.

The study of Dean A. N. Johnson[2] referred to in Part I, contains the statement that "when traffic on two-lane roads is 80 to 100 per cent in one direction congestion does not occur until vehicles are passing at a rate exceeding 1,300 per hour." Thus, if 1,020 vehicles per hour are passing in the right lane of a two-lane highway occupied by a single motor column, the left lane may have at best a working capacity of some 280 vehicles per hour. If, however, both lanes are occupied by motor columns travelling in opposite directions, the highway can be used to its full capacity of 1,020 vehicles per lane. On a two-lane road, this, of course, permits no other traffic in either direction, and no passing.

In free-flowing civil traffic, when vehicles are moving in roughly the same numbers in both directions, congestion begins when 1,000 vehicles are passing per hour. As high as 2,100 civil vehicles per hour have been counted on a two-lane road, but only when congestion was great, with vehicles crowding up far below safe road distance and moving at much slower speeds than 30 miles per hour.

* * * *

Now let us consider the matter from the viewpoint of operating motor columns through existing non-military traffic—a factor that may often have to be considered.

It is now taught in our Schools, in view of peace-time convoy experience, that the best way to superimpose a military column on the general traffic is to use long driving distances (100 to 250 yards) in the open country; and in passing through urban districts, to close up to 20 or 25 yards driving distance. Thus, out in the country, faster non-military vehicles have room to drive between the vehicles of the column when they must wait for opposite traffic to pass, and the same obtains in cities to a lesser extent at the slower speeds and shorter driving distances. Actually when such a peace-time convoy gets into heavy traffic, in either country or city, the civil traffic wedges in and all advantage of driving distance is lost. Each driver in the convoy must then take his opportunities like the driver of the delivery truck just ahead, or of the freight van behind.

In considering the ratios of civil and military traffic on a given highway, it should first be noted that no highway carries its full capacity except for brief periods usually measured in hours. This is readily apparent from data obtained in various traffic surveys. In one survey covering 23,000,000 vehicle-miles of travel in 11 Western States.

[1] *Reconnaissance, Security. Marches. Halts.* C. and G. S. S., revised to July 1, 1936.

[2] Dept. of Engineering, University of Maryland.

the average traffic ran from 326 vehicles per day in Wyoming to 1,862 per day in California. New Jersey and Connecticut roads carry about 5,000 per day.[3] These figures, of course, cover all kinds of roads from secondary township and country roads with from 20 to 200 vehicles per day, to super-highways with 17,000 per day. But the fact remains that the reasonable maximum civil traffic flow on any good two-lane highway of 24,000 vehicles at 35 miles an hour is seldom if ever reached.

It is also worth pausing here to ponder briefly on the Maryland-Pennsylvania-Virginia areas on which so many map wars are fought. According to the 1935 registration figures, this area contains roughly 575,000 civil vehicles, which run more than 11,000,000 miles per day. Is it unreasonable to suggest that such traffic can hardly be disregarded? Indeed, we need to know in every case what traffic a road already bears before we can dare to superimpose our motor columns upon that traffic.

We saw above that a motor column on the right lane of a highway leaves room for a maximum of 280 vehicles per hour, or 6,720 per day. But we must remember also that the daily civil traffic is not even. In suburbs and cities it moves in waves, with the busiest times from 8 to 9 AM, 5 to 6 PM, and 8 to 9 PM. Out in the country there is one peak—5 to 6 PM. Sunday traffic is about half again that of week days.

Allowance must also be made for changes in civil traffic due to war itself. A highway that ordinarily carries a thousand vehicles per day on the peaceful pursuits of their owners may carry several times as much civil traffic when battle threatens in the neighborhood. There may be refugees by tens of thousands, fleeing in their family cars. And the very presence of a friendly force may call out an army of sightseers, peddlers, and local dealers in supplies.

But if we know what civil traffic to expect, the capacity of any highway for additional military traffic is simple to find. On a two-lane road the maximum practicable free-flowing traffic, without congestion, is 1,000 vehicles per hour; for a three-lane road, 2,000 vehicles per hour; and for a four-lane road, 3,000 vehicles per hour. By subtracting the usual civil traffic from these figures, we can find very approximately what room is left for military traffic.[4] This has to be done, of course, for numerous points along the highway, since traffic is not uniform.

Such detailed studies apply mainly to routes that are to be used for military purposes for a period of some length. An army may first bar the roads entirely as it advances, and then open them again for combined military and civil traffic. All roads in rear areas, which are to bear much military traffic, will need to be studied similarly; for example, highways near cantonments, depots, and other semi-permanent installations.

* * * *

The factor of cross traffic is highly important, especially when we think of rapid movements of large columns. In the first place, it is evident that vehicles cannot cross through a military column that is moving at 30 or 40 miles an hour. We may assume that civil cross traffic from small side roads can be closed off indefinitely when the necessity requires. But at important highway and street intersections, unless some chance is given to cross traffic, a hardship to necessary civil activities is bound to result. Moreover, there is always the possibility of urgent military cross traffic.

There are four ways in which cross traffic can be allowed for: (1) gaps between serials; (2) lights or signals; (3) temporary overhead viaducts; (4) traffic circles or their equivalents.

Operating a motor column in serials lengthens the column, and hence its total travel time. The amount of cross traffic determines the sizes of the gaps between serials. Ordinarily, the maximum continuous cross traffic at any one point on the route would have to be the governing factor. This might be the traffic in the center of the largest city passed through. At all other points of cross

[3] All data is from various surveys in *Public Roads*, U. S. Dept. Ag.

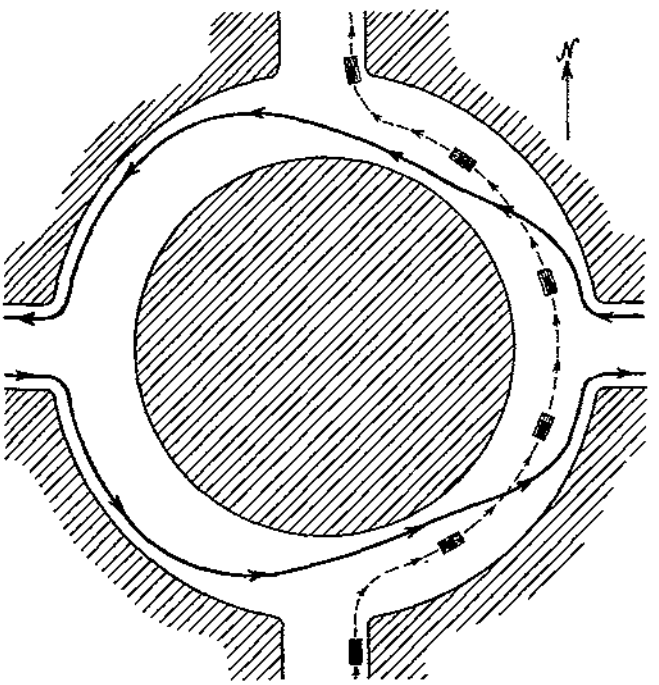


FIGURE 1. Heavy lines and arrows show the traffic-circle path of east-and-west traffic through a north-bound single motor column. Such a circle must be at least three lanes wide, and about 150 yards in circumference to permit smooth intersection with a column moving 20 miles an hour. Note that the motor column travels on the middle lane of the circle. Several hundred cars an hour can easily pass through the column in both directions, east and west. If there is another motor column moving south at the same time, cross traffic can get through it by using the left half of the circle in the same manner as shown.

[4] These figures, from *Highway Capacities*, by Dean Johnson, are for traffic flowing very approximately the same amounts in both directions.

traffic there would thus be more allowance than necessary. At busy intersections in cities the rate of cross traffic often rises above 2,000 vehicles an hour,[5] which is approximately the rate of flow of a double staggered column moving at an average speed of 30 miles an hour. For such cross traffic, the total length of gaps between serials must be equal to the total length of the serials themselves, thus doubling the length of the column and increasing its total time of travel by the time required for the column to move its own closed-up length. This method permits serials to travel at steady speed, assuming of course, that each cross traffic point would be controlled by adequate police personnel, either military or civil.

Where the maximum cross traffic intersecting the route is less than that of the column without gaps; for example, 1,000 vehicles per hour as compared to 2,000 per hour for the column, then the gaps between serials would only need to be in the ratio of 1,000 to 2,000. Different lengths of gaps may also be used in various parts of a long column. In a column expected to cross other traffic at an important point between 4:00 and 10:00 AM, an occasional gap one or two minutes long might take care of the early morning traffic between 4:00 and 6:00. From 6:00 to 7:00 more gaps would be needed. During the morning rush, from 7:00 to 8:30, there would need to be as much gap time as column-passage time. Then from 8:30 to 10:00, the ratio of gaps could be somewhat reduced. In calculating this, allowance must be made, of course, for the extension of the column by splitting it into serials. If heavy cross traffic is expected at two or more points, this fact must also be allowed for. If it occurs at several points well distributed along the route, we would then have the maximum case; and the total gap time would have to be at least equal to the total column-passage time.

Here again the value of the double-staggered column is evident. Its use doubles the number of vehicles in a serial of given length, thus passing twice as many across a given intersection per hour. The cross traffic itself should also be one-way traffic, using every lane of the street. This of course, is only possible where there are parallel cross routes close together as in cities.

In passage through populous districts at reduced speed, each serial of a column should be closed up to the minimum safe driving distance for the lower speed of passage. This should be permitted to occur automatically as the leading vehicle of each serial enters a slow-speed zone. There should be no halting of any vehicle simply for closing up. It should often be possible, however, to keep up speeds of 30 or even 40 miles an hour through many parts of a city where cross traffic can be closed off and diverted to a few main crossings.

When cross traffic is controlled by lights or other signals, it is best to allow for this by providing gaps in the column beforehand. Otherwise there will be much jamming up. Arrangements can be made for the traffic lights to fit the gaps, thus eliminating stopping by any part of the column.

[5]On streets three or more lanes in width.

Traffic circles are still another practicable method of handling cross traffic. These, of course, cannot be built in a few hours. But they already exist on many highways, and workable equivalents of most types can be established. Figure 1 shows a common type of traffic circle. Figures 2 to 5 show how the equivalent of a traffic circle can easily be established by using a block in a town or city, a courthouse square, or even a wide street, provided there are cross streets on which the cross traffic can enter and leave.[6]

The ideal method, however, of taking care of cross traffic is by installing temporary or semi-permanent overhead viaducts for its passage, or for the passage of the motor column itself. This eliminates conflict of traffic, and what may be most important of all, permits two military columns to cross readily.

Two types of temporary viaducts seem desirable, a light and a heavy.[7] The light viaduct should be strong enough to carry any loaded 2½-ton vehicle (a gross capacity of 8 tons).[8] The heavy viaduct should permit the passage of 20-ton vehicles. Both light and heavy types should have a sidewalk for foot traffic.

Ordinarily, a single lane of 10 feet, open to continuous 24-hour traffic, would be enough to take care of civil cross traffic except at busy points, where two such viaducts, one for traffic in each direction, would be desirable. All viaducts should permit the under passage of at least two columns of military vehicles, and if necessary, one or more columns of other traffic.

In cities where two or more viaducts are necessary, traffic should be made one-way on all viaducts in accordance with the main flow of traffic. The direction of flow can, of course, be changed in accordance with normal changes in flow, as in the morning and evening. Bearing one-way traffic, each single-lane bridge will carry 1,000 vehicles per hour. From this can be calculated the number of viaducts necessary to handle the necessary civil or military, light cross traffic at any point. Heavy vehicle traffic could be confined to one or two 20-ton viaducts at suitable points.

Where the erection of heavy viaducts is not feasible, light viaducts could be built to carry all except heavy traffic, and this could be allowed for by gaps in motor columns. Traffic studies of the Bureau of Public Roads show that the number of vehicles of a gross loaded weight of more than eight tons varies from 6 to 80 cars per thousand in different States. Hence gaps in a motor column totalling about ten per cent of those which would be necessary for all cross traffic would take care of the heavy cross traffic.

Unless there are an unusual number of railroad crossings on the route of a motor column, interference by trains should not total many minutes. A passenger train ordi-

[6]*Steadflow Traffic Principles*, by Fritz Malcher (Harvard University Press), contains a thorough analysis of traffic circles and the manner in which cross traffic filters through.

[7]A third type for the use of foot troops or pedestrians only may also be of value.

[8]A gross capacity of 9½ tons would support light tanks.

narily takes less than a minute to pass, and a long freight train, about five minutes. It is just as desirable, of course, to build temporary viaducts over railway tracks as over intersecting highways; and this may have to be done over busy lines. It is also possible to hold up unimportant rail traffic for important motor moves.

We should not leave the subject of cross traffic without considering briefly cross traffic of a military nature. Few wars have occurred in which time was not lost by the inability of one column to cross another. Doubtless the idea of using overhead viaducts for such purposes is not new. But it has not, in the past, been used to any great extent. A modern army may have to fight in any direction at short notice. Security has become a matter of a perimeter rather than simply a front. And if that is true, defense and attack likewise have rounded out the circle. Advances in many columns on a wide front as now taught at the Command and General Staff School, make it easier to change direction through the fact that columns are shorter, hence easier to reverse. Nevertheless, in any advance to battle yet devised, columns still have heads and tails, and are difficult to turn without confusion. When this must be done, many a column stands idle for hours waiting for others to pass at right angles, even when the best of logistic calculations have been applied. Temporary viaducts would give columns a chance to cut back over their own tails or across other columns, no matter what their length. Often, too, such viaducts may well be left in place for considerable periods, especially in defensive areas. Those erected during an advance may prove invaluable in an ensuing retirement. They are also desirable for switching troops within a large unit from one position to another; for example, a corps from the right to the left of an army. The switching unit can cross over the flow of supply and evacuation traffic in rear of other corps without interrupting it.

It may also be desirable to equip large units with portable viaducts—one or two to each corps, let us say. Such simple aids to traffic in a future conflict with motors multiplied will indeed be necessary.

It is not proposed that these various methods of handling cross traffic can be used extensively for tactical movements involving small columns. But even here, it is well worth noting, it may be advantageous to detour a small column a number of miles to an installed overhead viaduct or a temporarily established traffic circle, when otherwise its movement may be delayed several hours by the passage of a long column.

It is also true that these suggestions will require much detailed study, and experiment and test as well, to determine what their full value is.

* * * *

Weather, too, must be fully considered. It affects road surfaces, road visibility, hence running speeds and road capacities.

On primary highways light rainfall will not ordinarily necessitate reduced running speeds except on slippery

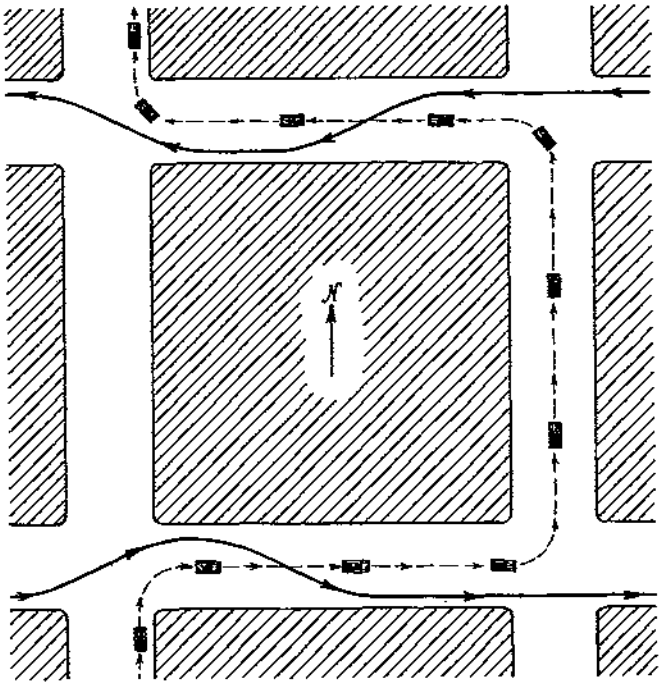


FIGURE 2. A city block or courthouse square used as a traffic circle to permit east and west traffic to pass through a northbound single motor column. The column keeps to the center lane. The square should be at least 200 feet on a side. Other traffic must be barred.

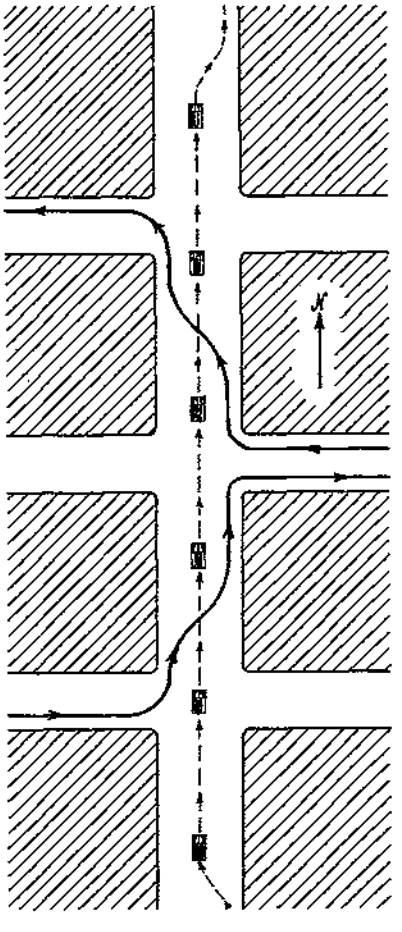


FIGURE 3. The use of a wide street for passing east and west traffic (heavy lines) through a single motor column.

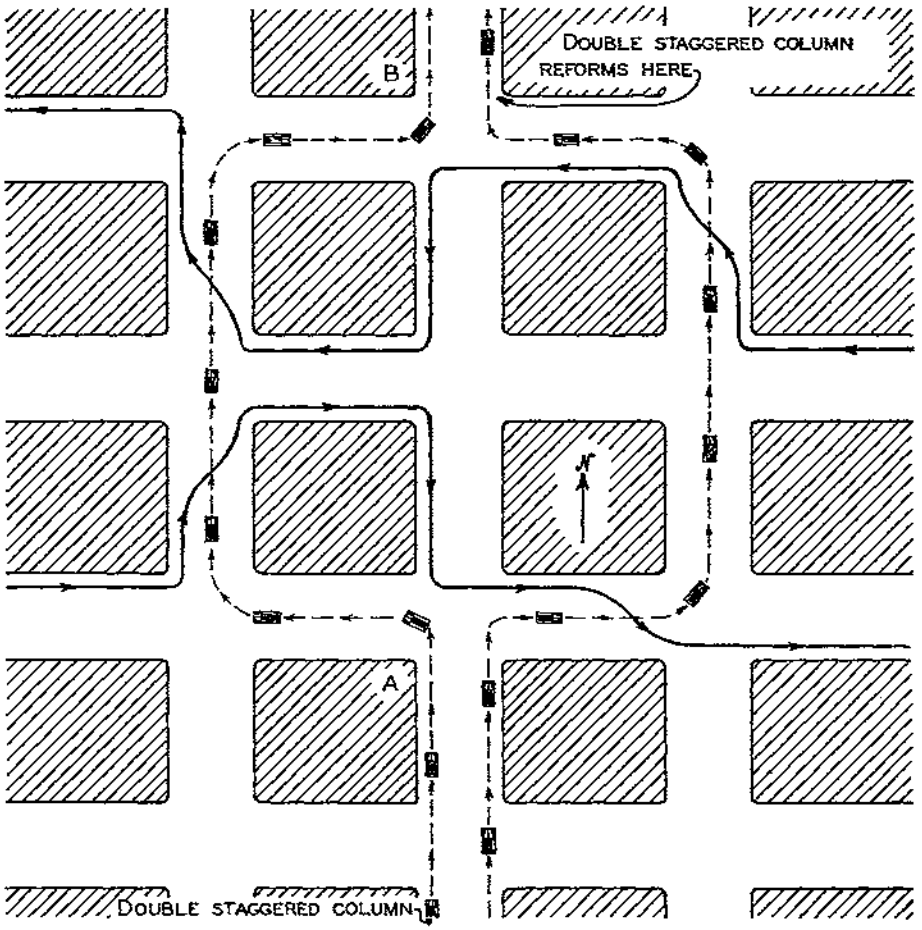


FIGURE 4. The use of four city blocks as a traffic circle to permit east and west traffic (heavy lines) to pass through a double staggered column moving north. The double staggered column splits to right and left at *A* and forms again at *B*, between these points travelling in the middle of the streets, which must be at least three lanes wide. All local traffic must be barred.

stretches.[9] On the common road surfaces speeds of 35 to 45 miles an hour are safe, especially for six-wheeled vehicles with their extra traction. On slippery-surfaced roads a reduction of maximum running speed to 30 miles an hour is probably enough.

Snow requires a similar reduction. Chains can be used if there is enough snow to cause skidding. Deep snow, not too deep to prevent traffic altogether, slows up the leading vehicle and hence, all the vehicles of a column. This points to small advance columns sent out to improve the road, when special equipment is not available.

Icy roads are difficult at best. Vehicles can usually do better without chains. Advance columns can use chains to roughen the ice and throw dirt and sand on the worst stretches. (Tables given later include estimated speeds for ice- and snow-covered highways.)

* * * *

Night, lack of lights, fog, smoke, dust, rain, and snow, all affect road visibility in varying degrees. Studies show that the average open highway driving speed of civil vehicles is 43.3 miles per hour by day, and 41.5 by night.[10] Allowing a reasonable safety factor, we can set 35 miles per hour as a maximum running speed for night movements with lights. In one-way traffic on good roads, the main object of lights is to see the vehicle ahead, and there is no need of brilliant lighting which may easily betray a motor movement to hostile air observers. This suggests the necessity for investigation into the practicability of deeply hooded, faint headlights, and—to catch their light—similarly hooded reflectors on the rear of vehicles.

Movements without lights require a great reduction of running speed, but often not so great as we are accustomed to think necessary. Visibility varies in different weather and different moon phases. We need experiment to determine what speeds are practicable under these different conditions, and experiment also in the use of tail lights hooded from air observation. On good roads such lights might permit running speeds as high as 25 miles an hour except on very dark nights. There is also the possibility of using an invisible ray to cause the tail light ahead to glow.

Fog, dust, and smoke may reduce road visibility to zero, especially smoke. Fog and dust, however, may cover great stretches of road, whereas smoke is more likely to cover limited stretches and to dissipate far more quickly. In all three, speeds must be greatly reduced, and in smoke it may be impracticable to move at all. Lights are of assistance in all three but may at night reflect upward through thin layers of fog, but not through fog of any thickness.

Rain interferes only slightly with road visibility owing

[9] The U. S. mileage of slippery types of primary highways is considerably less than one-tenth of the whole primary net.
[10] *Automotive Industries*, May 16, 1935.

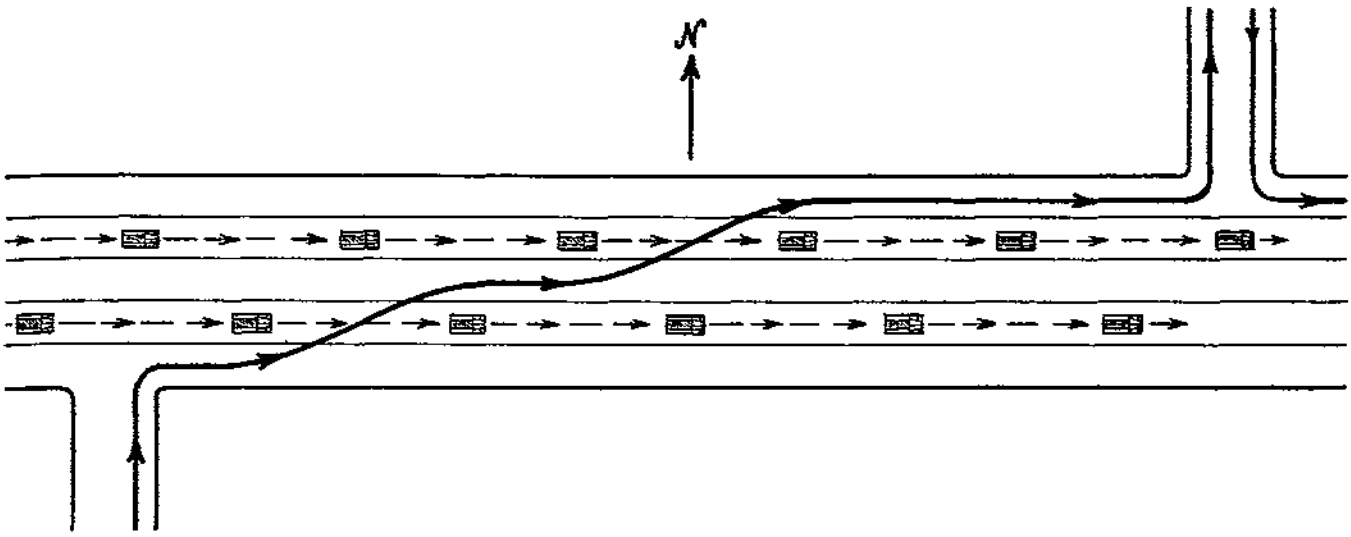


FIGURE 5. North-bound traffic crossing a double staggered column on a wide street or road (at least 50 feet wide). The double column opens out (travelling on the second and fourth lanes of a five-lane road), thus permitting cross traffic to get through. South-bound cross traffic can pass through from left to right on another stretch of the highway or street on which the column is travelling.

to efficient windshield wipers. A downpour may temporarily lower maximum running speeds to 30 miles an hour. A heavy snow may require a greatet reduction.

* * * *

To complete our brief survey of the conditions under which motor movements may be made we must now consider secondary highways. We have approximately 350,000 miles of primary highways, but our secondary road net has nearly eight times that amount, some 650,000 miles of which is surfaced. In general, motor movements on secondary roads are subject to the laws of road capacity and speeds of movement heretofore discussed.

Few narrow roads are actually a single track. Most roads narrower than two lanes (18-20 feet) have shoulders that give room for passing, at least at occasional points. On the best of such roads two vehicles can pass at any point with reasonable care in driving, and perhaps two-thirds of our whole road net falls in this bracket. From the viewpoint of motor columns, then, such roads are one-lane, one-way roads on which a small amount of traffic can pass in the opposite direction. On them, motor columns can seldom travel at an average speed of 30 miles an hour; something like half that speed is more probable.

Assuming 20 miles an hour as maximum running speed, with a safe-driving distance of 24.2 yards (Table II, Part I), and an average running speed of 15 miles an hour, the traffic flow of the single column such roads will carry is 1,090 vehicles per hour. Under these conditions it would take 700 vehicles (a brigade), 10.6 hours to go 150 miles; 2,000 vehicles (a division), 11.3 hours; and 10,000 vehicles (a corps), 19.2 hours. This is between 4 and 5 hours longer than the same movements would take in single column at 30 miles an hour, and, of course, considerably longer still than a double staggered column would require.

But even a narrow country road will carry an enormous amount of traffic if only the bridges are strong enough and the road will stand up—the two main difficulties. Country roads require something like 50 times as much maintenance per 1,000 miles of vehicle travel over them, as ordinary, two-lane, hard-surfaced highways; and in wet weather especially, heavy traffic may soon wear them out.

Bridges form a similar limitation, particularly to mechanized columns, although it will often be possible to strengthen them beforehand for a motor movement.

The military use of secondary roads comes, in the end, to one main thing—detailed advance knowledge of the route. We can and must make much use of secondary roads. But foolish indeed is the commander who permits his motor columns to turn off the main highways without knowing what they will get into; or the commander who counts optimistically on poor roads to get a large column over long distances with dispatch. When we have to—yes; we can manhandle vehicles through swamps and over rocky broken ground. But when speed is a foremost consideration, it pays to remember that ten miles on pavement are usually better than one through the mud.

We may now consider more adequate rates-of-march tables for practical use than those we now have. It should be understood that Tables XI to XIII are largely composed of the writer's estimates, and are simply presented as samples of what we need. Experiment should determine more closely the estimated speeds given in these tables.

TABLE XI

MAXIMUM SUSTAINED DAYLIGHT-RUNNING SPEEDS ON PRIMARY HIGHWAYS

Type of Road Surface	Condition of Road: Good	Rough	Ice	Wet	Dry	Visibility: Dust	Rain	Snow	Smoke or Fog
Concrete	40	30	5-10[1]	35	40	..	25-35	15-30	1-15[3]
Asphalt	40	30	5-10[1]	30	40	..	25-30	15-30	1-15
Gravel	40	20	20[1]	30-40	30-40	30	25-30	15-30	1-15
Sand-clay	40	20	15[1]	15-40[2]	25-40	25	15-20	15-20	1-15

NOTES—[1]With chains on gravel and sand-clay; with or without on harder roads.
[2]Sand-clay roads are at their best when slightly wet.
[3]It is assumed that vehicles can creep forward at at least one mile an hour in blinding smoke.

TABLE XII

MAXIMUM SUSTAINED NIGHT-RUNNING SPEEDS WITH LIGHTS ON PRIMARY HIGHWAYS

Type of Road Surface	Condition of Road: Good	Rough	Ice	Wet	Dry	Visibility: Dust	Rain	Snow	Smoke or Fog
Concrete	35	25	5-10[1]	30	35	..	20-30	15-25	1-15[3]
Asphalt	35	25	5-10[1]	25	35	..	20-25	15-25	1-15
Gravel	35	20	20[1]	25-35	25-35	20	20-25	15-25	1-15
Sand-clay	35	20	15[1]	15-30[2]	25-35	20	15-20	15-20	1-15

NOTES—As in Table XI.

TABLE XIII

MAXIMUM SUSTAINED NIGHT-RUNNING SPEEDS WITHOUT LIGHTS ON PRIMARY HIGHWAYS

Type of Road Surface	Condition of Road: Dry	Ice	Wet	Visibility: Poor	Fair	Excellent
Concrete	20	5	15	1-5	12-15	20
Asphalt	20	5	15	1-5	12-15	20
Gravel	20	10	15	1-5	12-15	20
Sand-Clay	20	10	15	1-5	12-15	20

* * * *

One of the greatest problems in modern warfare is that of moving armies without detection by hostile air units. Up to the present, night has been considered the one feasible cloak for large troop movements. But if we extend our knowledge of modern traffic along the lines indicated in these two articles, it seems probable that high speed in moving modern forces will take its place beside night movement as a chief method of obtaining secrecy.

A speed of 30 to 40 miles an hour, on primary highways used to full capacity, and a comparable maximum use of secondary roads when it is necessary to use them, will enable a commander to gain secrecy through speed in two ways. First and most important, he can use days and even hours of low air visibility to the greatest advantage, often basing his plans on the weather forecast. Through this alternative to night movement he can use daylight speeds from three to six times those of night speeds without lights, thus covering far greater distances, or equal distances in far less time.

The second way of obtaining secrecy is the use of short dashes. Carefully planned fast movements of from two to four or five hours in duration may well become important in modern war. To prevent them the enemy would need to have overwhelming air superiority and would have to keep up a continuous patrol over vast areas—a patrol of attack and bombing planes preferably, since observation units by themselves would first have to discover a movement, and then report it to the fighting units, which would in turn have to fly out to make their attack.

* * * *

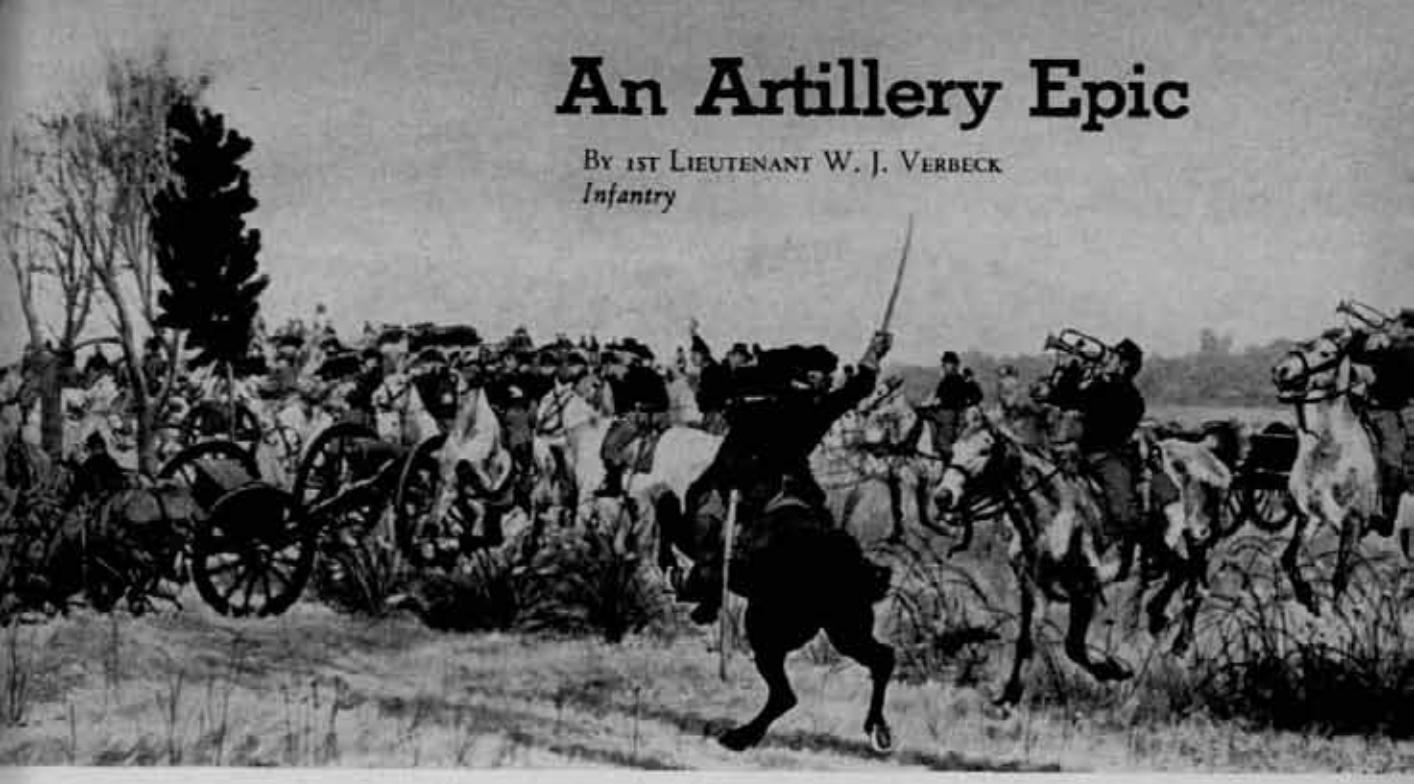
All in all, the study of traffic deserves our closest attention. Of course, we must give full value to its limitations as well as to its capabilities. There are several aspects of the subject that have not been touched upon in these two articles. For one thing, traffic distribution is highly important. The actual motor movement is only part of the job; and unless each unit of a force can proceed without hitch to its final stopping place after each move, or find without delay its own road toward battle—the hours saved on the highway will be lost. The effect of speed variations, halts, and accidents on fast movements; the effect of increased driving distance for use with heavy vehicles; the best means of parking within bivouac and other stopping areas; the operation of advance reconnaissance and traffic details; the elimination of stops at regulating points—these and other matters pertinent to traffic must be thoroughly investigated. There is, in fact, much more to learn.

And finally, when we know in full whereof we speak, we must apply our new knowledge to the specific problems of strategy and tactics.

THERE IS A RANK *due to the United States among nations which will be withheld, if not absolutely lost, by the reputation of weakness. If we desire to avoid insult we must be able to repel it; and if we desire to secure peace—one of the most powerful instruments of our prosperity—it must be known that we are, at all times, ready for war.*—GEORGE WASHINGTON.

An Artillery Epic

By 1st Lieutenant W. J. Verbeck
Infantry



AMONG the many stormy controversies that developed from the Battle of Gettysburg, that concerning the action of General Sickles on the second day of the fighting, was one of the most violent. This paper, however, has nothing to do with the merits of the III Corps commander's decision to defend a position in advance of the one assigned him. It deals only with the action of a small unit of the III Corps—and that a battery of artillery. It is an account of the activities of a Massachusetts Battery which found itself in a precarious situation, and was more than equal to it.

* * * * * *

At 4:00 P.M. the full force of Longstreet's infantry attack struck the Union salient at the Peach Orchard. The attack was supported by massed Confederate artillery which swept the two lines forming the angle with enfilade fire. The Federals stood their ground for a time but the odds against them were too great. Gradually the lines gave way.

The 2d Division (III Corps) strongly attacked in front and flanks, fell back obliquely to the right rear, while the 1st Division was forced back to the left. This created a gap in the center of the III Corps—a gap through which Longstreet could pour his troops to roll up the open flanks and strike the rear.

General Sickles having been badly wounded, the command devolved on General Birney. His first order went to Humphries, commanding the 2d Division:

> The 1st Division is going to fall back and form a line extending toward the right of the 2d Division from Round Top Ridge. The new line will be in rear of and oblique to the present 2d Division line. The 2d Division will change front and form on that line.

No point of contact between the divisions was designated. To carry out the order the 2d Division not only had to fall back while in active contact with the enemy, but had to change front in the process. It was not a simple maneuver. Humphries knew of the gap but was unable to extend his left because Confederate brigades appeared and charged that flank. The gap remained and shortly after 6:00 P.M. Confederate units began to move toward it.

Let us go back a bit—to 4:00 P.M. The 9th Massachusetts Battery, commanded by Captain John Bigelow, had just gone into action near the Wheatfield Road about 400 yards east of the Peach Orchard. This battery was a part of the 1st Volunteer Artillery Brigade, Artillery Reserve, Army of the Potomac, and this was its first action. Prior to this campaign its station had been in the defensive works around Washington. Captain Bigelow, a veteran of the past two years' fighting had had the battery for the past four months. The men were an exceptionally fine lot—well trained and well disciplined. There had been no courts-martial in the battery. Just before reaching the battle position the gunners had examined all chests and weapons. Horses had been fed and watered. Both men and officers had been fairly well acquainted with the situation from officers of other units and from the wounded who had been cared for at an earlier halting place.

As the battery came up it was taken under fire by the Confederate artillery. Several men fell, but there was no faltering on the part of the others. The six 12-pounders went into action with speed and precision. They first engaged an enemy battery along the Emmitsburg Road at a range of 1,400 yards. Then, as orders were being shouted to shift the fire to another battery, several large bodies of infantry appeared in close formation near the Rose House. Two of the guns on the flank were defiladed from this more favorable target. These were immediately moved by hand to the other flank and the whole bat-

tery took the target under fire at 600 yards, alternating case with shell. The Confederate commander and his horse went down and the mass of infantry melted away toward the nearest woods. Later, 120 bodies were counted in front of the Rose House, and 270 lay around the barn. Nearly every shot had been a direct hit.

Scarcely had this second target been disposed of when the men at the guns saw a battle line in blue moving east from the Emmitsburg Road. Blue infantry attacking in the wrong direction! Something was wrong. But the battery had no choice: it withheld its fire.

The blue line came on until it presented an almost perfect enfilade target, its near flank being only 200 yards from the guns. Then suddenly Confederate battle flags broke out along the line.[1] It was Kershaw's Brigade driving forward to sweep the Union artillery from the Wheatfield Road. A misunderstood order had caused the infantry to oblique too far to the right thereby leaving the 9th Massachusetts Battery undisturbed on its flank. Here was the opportunity for which the more devout of those thoroughgoing artillerymen had doubtless prayed. Captain Bigelow did not overlook it. At his command the gunners raked the Confederate lines with canister. It was surprise fire of the most deadly sort and under it the Southerners broke and disappeared in the woods 500 yards in front of the battery, leaving only rows of dead and wounded to mark where the attack had passed.

But the triumph was short-lived. The brigade reformed and advanced again. This time the Massachusetts battery was not neglected; its cannoneers began to drop. Other batteries along the Wheatfield Road started pulling out, Graham's infantry brigade had already fallen back from the Peach Orchard position, and Thompson's Batteries C and F from Pennsylvania went with it. At 5:20 P.M. the 15th New York Battery withdrew, followed by Clark's New Jersey Battery and Randolph's Rhode Island Battery. Meanwhile the nearby infantry was falling back in all directions without a rallying point. At 5:30 P.M., however, Bigelow's Battery was still hotly engaged with the advancing skirmish line.

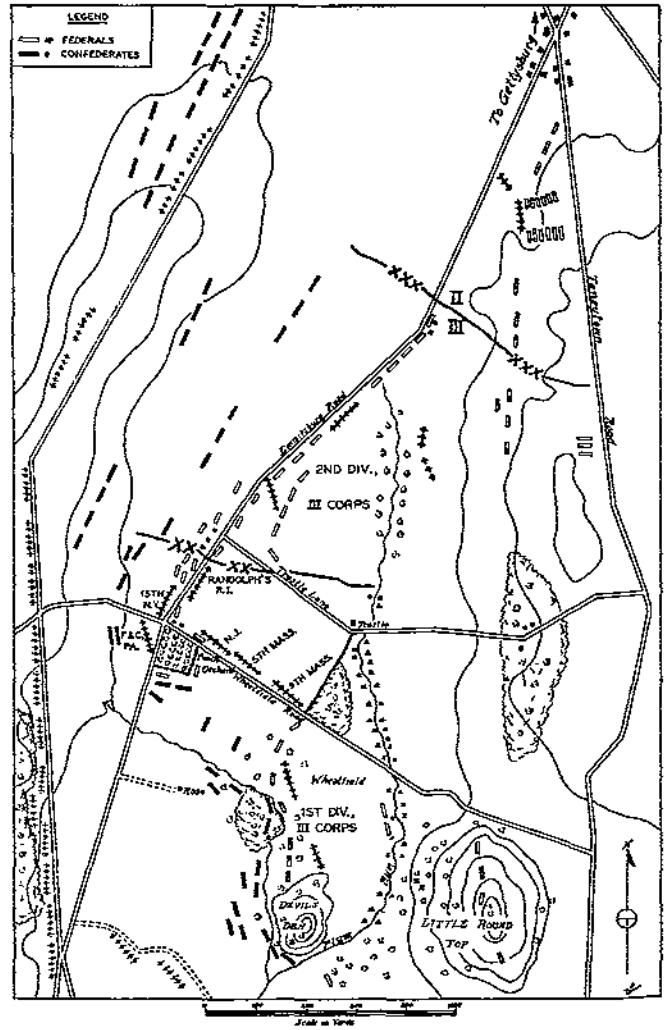
At this moment Colonel McGilvery, who commanded the 1st Brigade, Army Artillery, rode up. Noting the exposed position of Bigelow's guns, he shouted on order above the noise of battle: "Limber up and get out"—a simple order, but hard to execute. There was a shortage of horses and the Confederates were pressing close. Bigelow solved the problem by the drill-ground order, "Retire by prolonge." Slowly the battery withdrew, keeping up the fire.

It was a difficult maneuver. At one time Barksdale's Confederate Brigade advancing into the breach left by the withdrawal of Graham's Brigade, got within 400 yards of the right of the battery. Bigelow replied to this threat by having one section fire solid shot to the right while the other four guns continued to fire to the front. They kept this up until they reached the angle of the stone wall at the Trostle House. Here a fold in the ground 50 yards away hid the guns. Hoping to get them out before the enemy closed in, Bigelow had just given the order to limber up, when Colonel McGilvery reappeared. McGilvery had noted the long gap in the Union line. The Confederates must be stopped or the main battle position would be broken. There was no infantry at hand to throw into the breach. Therefore, Bigelow's Battery would have to retard the advance until the Federal line could be reëstablished. McGilvery gave his orders:

> Our lines are open between the Round Tops and to the left of the II Corps. You must remain here at all costs and check the enemy until I can form a second line in your rear.

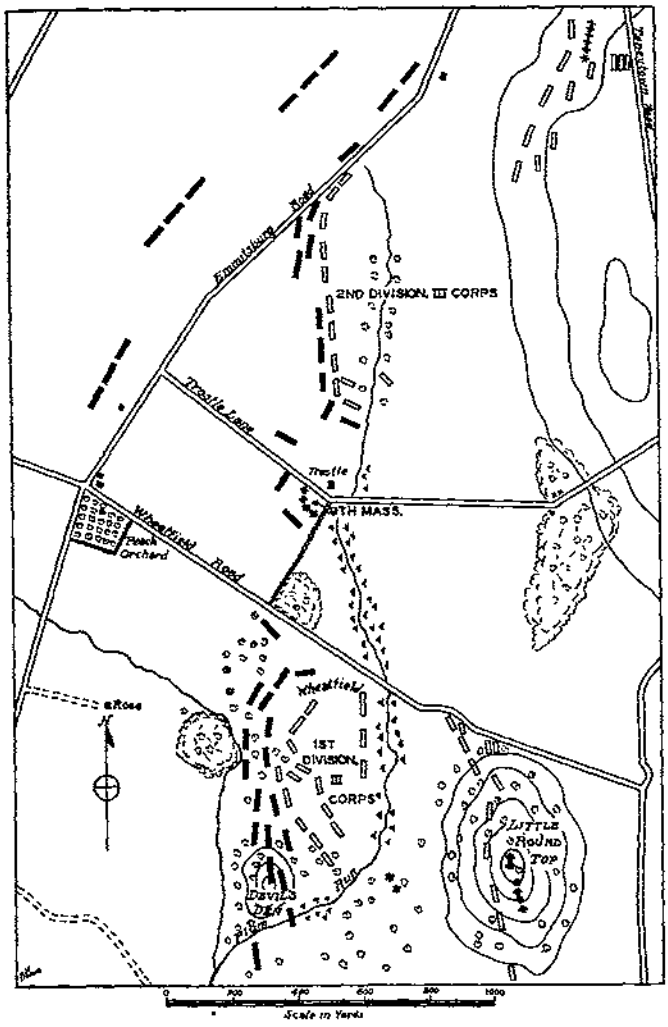
The battery was to be sacrificed! Captain Bigelow realized this and so did his men. There were no Union troops near enough to come to their rescue, and the Confederates in overwhelming numbers would be on them in a moment.

Colonel McGilvery rode off to collect what troops he could to form the line to the rear, leaving the Massachusetts battery to its fate. Captain Bigelow took quick



At 4:00 P.M. the full force of Longstreet's infantry attack struck the Peach Orchard.

[1] The blue uniforms came from the Federal supply depot at Harper's Ferry which the Confederates had captured a few days before.



Shortly after 6:00 P.M. Confederate units began to move toward the gap in the Union lines.

stock of the situation. Half his men and horses had been killed or wounded, and only a few rounds of ammunition remained. The position occupied by the battery could accommodate only four guns. Since the right section had no field of fire Bigelow decided to save it from capture. Accordingly, he ordered Lieutenant Milton to take all the horses and move the guns to the rear, leaving the ammunition. The four remaining pieces, with their scanty supply of ammunition stacked near the muzzles for rapid fire, awaited the onslaught.

It was not long in coming, and there was no stopping it. But the doomed battery gave a good account of itself in its last minutes of action. As the Confederates appeared over the knoll it greeted them with a salvo that brought the advance to a momentary halt. Then came a brief duel between the infantry and the artillery. At that close range the advantage lay with the infantry. But in spite of the murderous small arms fire that poured in from front and flank, the gunners continued to serve their pieces until the end.

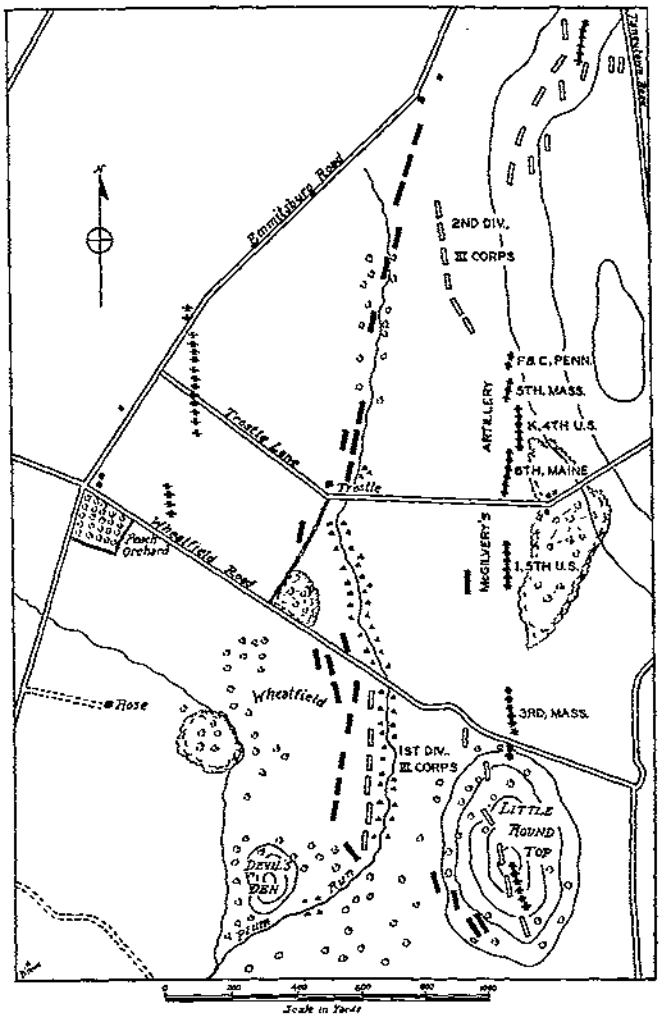
There were many incidents of heroism. Lieutenant Erickson, shot through the lungs and reeling in the saddle, continued to command his section. He was killed while directing one of his guns to a better position. Private Gilson, badly wounded, refused to be evacuated. He met his death while coolly lighting his pipe. Gunner Murphy was killed just as he was about to fire No. 3 gun. Private Fen who stepped forward to replace him, fell as he reached for the lanyard. Private Crossen, the next man to try it, met the same fate. Then Private Smith clambered over the bodies and fired the gun.

The nervy Bigelow, although wounded, carried on mounted until a second bullet toppled him from his horse. Even then, supported in a sitting position by his orderly, he continued to direct the fight.

A short savage charge was stopped at the guns. One of the gunners saved himself by braining an attacker with a rammer staff. Another fought with a primer spike. But courage and determination could not prevail against heavy odds. With a rebel yell the Confederate line surged over the position.

Bugler Reed lifted the captain on the only remaining horse, and led it at a walk to the rear. Then an amazing thing happened. The victorious Confederates withheld their fire and let them go!

Meanwhile McGilvery had brought his other batteries



For a crucial half hour the 9th Massachusetts Battery had held the line.

to defend the gap. At 6:35 P.M. the men of one of these —the 6th Maine—saw through the smoke around Trostle's Lane a Union soldier leading a horse with a badly wounded officer hunched forward in the saddle.

One of the battery officers rode out. "Hurry! For God's sake, hurry!" he cried. "I can't hold my fire any longer; the enemy is about to charge."

"I can't hurry," replied Bigelow. "Go back and open fire."

That was the thing to do and that is what they did. A storm of solid shot and canister swept past Captain Bigelow but they came on unmindful of the fire. Still at a walk they passed the cheering cannoneers and continued on to the field hospital on the Taneytown Road. Bugler Reed well earned the Medal of Honor he received for that day's work.

The timely arrival of successive reinforcements brought Longstreet's power drive definitely to a standstill. But one wonders what might have happened had not the 9th Massachusetts Battery held up the Confederate advance for the crucial half hour that McGilvery needed to plug the gap in the III Corps line.

A Battle Over a Battle

FOR many years after the events which are related in An Artillery Epic, Major John Bigelow read that Gettysburg was being made a national shrine. The work of marking the places where various men and units had distinguished themselves met with his approval. Finally, in 1909, he went to see for himself. He found many markers and many streets named in honor of regiments and soldiers who had taken part in the fight. But, to his dismay, he discovered that the artillerymen had been neglected.

Undoubtedly this was merely an oversight. Bigelow wrote a courteous letter to the Gettysburg Commission pointing out the omission and suggesting that a street be named in honor of General Hunt or Colonel McGilvery, both leading artillerymen of the Army of the Potomac. He proposed that Trostle's Lane, which had been named United States Avenue, be dedicated to the gunners.

The reply from the Commission said "We do not see any valid reason for the change." The major's response has a slight ironical tinge—"Your suggestion that I did not suggest 'any valid reason' requires me to be a little more specific." He pointed out that the fight along Trostle's Lane had been almost exclusively an artillery one. Again he asked for consideration for the names of General Hunt or Colonel McGilvery.

To this letter he got *no* reply, whereupon Major Bigelow unlimbered and went into action. He published *The Peach Orchard—An Appeal*, and broadcast it to veterans. Before long the Gettysburg Commission began to get resolutions asking that something be done for the artillery.

Then followed a long, and at times acrimonious, correspondence. General Sickles, the commander of the Third Corps, stated in reply to the Commission's request for his opinion—"The avenues embracing my position are all properly marked." Major Bigelow's rejoinder was to the effect that at one stage of the proceedings the Third Corps might be said to have been without any position. As far as he knew, he said, "the Third Corps line at the Peach Orchard ceased to exist after 6 P.M., July 2, 1863."

Major Bigelow did not succeed in getting a street named for General Hunt or Colonel McGilvery, but the 1916 report of the Gettysburg Commission shows markers not carried in the 1907 report. Among these markers are three honoring the artillery. One indicates the Headquarters, Artillery Reserve, Army of the Potomac, commanded by General Hunt, and two the positions of the 1st Volunteer Artillery Brigade, commanded by Colonel McGilvery. Here undoubtedly we have a compromise—all could again quit the field of Gettysburg with honor.

The Will of the Leader—III

By Major Richard G. Tindall, *Infantry*

French strategy had failed, French tactics had failed and there were grave doubts about French leadership.

SELDOM has a commander in chief, in the early days of a war, faced a bleaker situation than that which confronted Joseph Césaire Joffre, Generalissimo of the French Armies, on August 24, 1914, as he received the evening report at Vitry-le-François, "The headquarters of lost illusions."

His plan of operations had proved faulty and he had been strategically surprised. All his armies had been defeated with heavy losses, his general reserve had been used long ago, and his left wing was being enveloped by superior forces whose rush he was powerless to stem. There had been numerous failures of leadership among his subordinate commanders. There was even a question as to whether or not the troops would continue to fight. Confronted by defeat wherever they looked, it was only natural that the government's confidence in the Army should be badly shaken and that Joffre's own position should swing precariously in the political balance.

To make matters worse, on the extreme left flank, at the decisive spot, stood an army that Joffre did not command. He could request, he could urge, but he could not order the British Army.[1] Furthermore, the relations between this army and its nearest French neighbor, the Fifth Army,[2] were badly strained and their commanders cordially despised each other. And against these disunited forces a powerful German wing, far stronger than any French force that could be brought against it, was sweeping down in the direction of Paris, the heart of France.

This German right wing had beaten the British at Mons (Map 1) and the Fifth Army on the Sambre. The French Third[3] and Fourth[4] Armies had suffered a like fate in their attack in the Belgian Ardennes. The First[5] and Second[6] Armies had come to grief in Lorraine and in the Vosges. Along the entire front there was but one faint ray of light: On the extreme right, where it mattered little, the situation was favorable.

The fundamental ideas on which French tactics were based—the uselessness of liaison between units advancing to battle; insistence on a headlong and simultaneous attack along the entire front; security obtained solely through the rapidity of the attack—all these had proved to be illusions.

To sum up, French strategy had failed, French tactics had failed and there were grave doubts about French leadership. At GQG[7] Joffre and his collaborators knew that many of their important subordinates had failed miserably. But they also recognized the fact that they and they alone were largely responsible for what had occurred. There could no longer be any question about it—German skill, not German numbers, had won the first round of the World War. France could not afford to lose the second.

Some two weeks later the French armies turned and attacked. Their strategical situation was excellent. The French and British left wing overlapped and enveloped the German right. At the decisive spot the Germans were greatly outnumbered. Where the French were numerically inferior, skillful use of terrain and fortifications made up for the weakness. French tactics had improved to the point where they could scarcely be compared to the tactics in vogue two weeks before. Vacillating leaders had been weeded out[8] and the spirit of team-play had been infused throughout the Army. Between British and French a measure of coöperation was beginning to replace suspicion.

In Parts I and II of this study, OHL's contributions to this remarkable reversal have been examined. It is now proposed to do the same for Joffre[9] and GQG.

August 24

On this day Joffre realized that he must play for time—time to regroup his forces and fill up his shattered ranks with replacements. Later he could try his fortune again, but not at once. Now, the whole of his left and center must go back, fighting a delaying action. True, this was one of the things which French pre-war tacticians had pronounced impossible, but since so many of their cherished

[1] Commander, Field Marshal Sir John French; two and a half corps.

[2] Commander, General Lanrezac; I, III, X, XVIII Corps and three reserve divisions.

[3] Commander, General Ruffey; IV, V, and VI Corps.

[4] Commander, General de Langle de Cary; II, Colonial, IX, XI, XII, XVIII Corps, and two reserve divisions.

[5] Commander, General Dubail; VIII, XIII, XIV, XXI Corps and some reserve divisions.

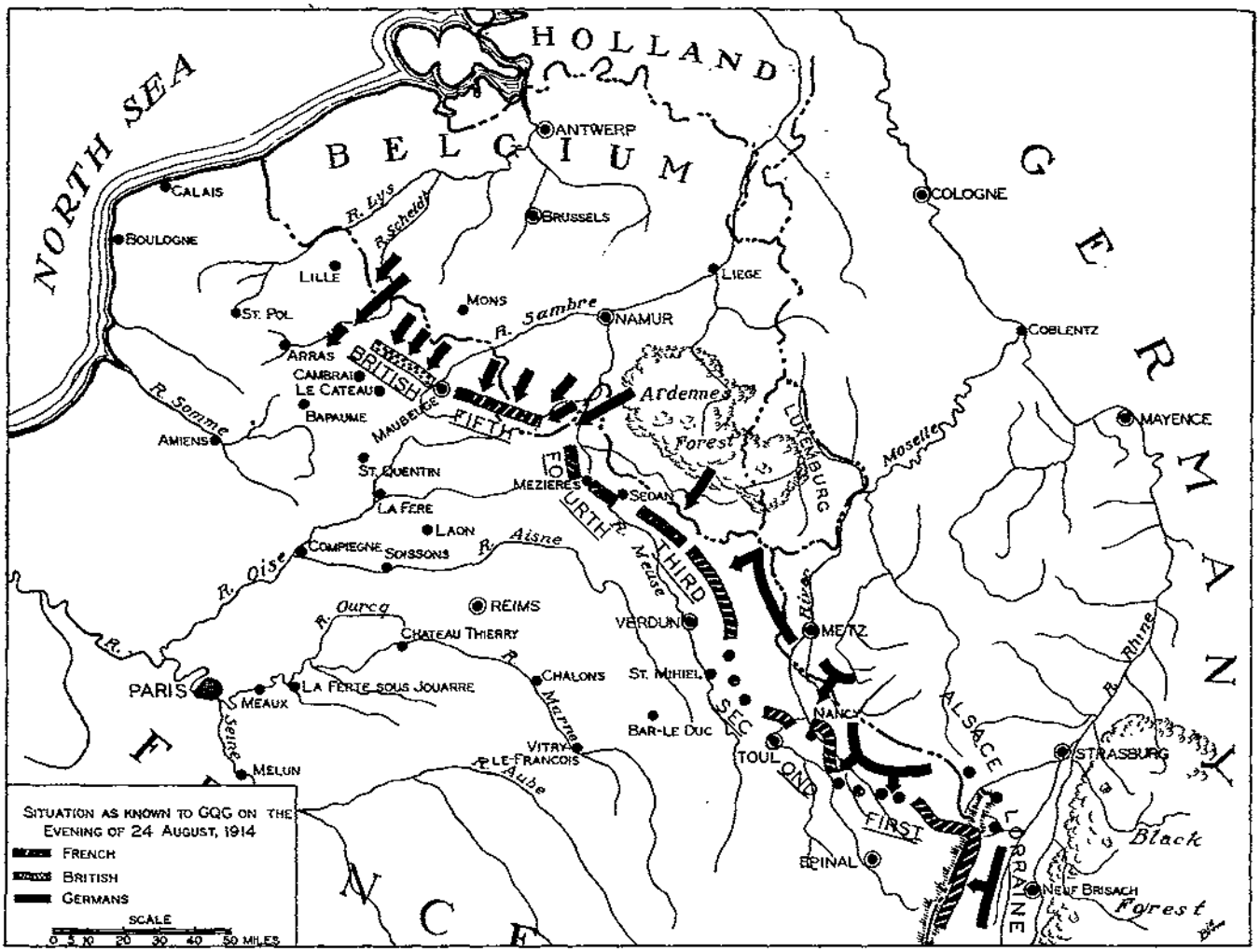
[6] Commander, General de Castelnau; XV, XVI and XX Corps; 18th Division and some reserve divisions.

[7] *Grand Quartier General* or General Headquarters.

[8] In the first two months of the war, two army commanders, 10 corps commanders out of 25 and 42 division commanders out of about 80 were relieved.

[9] The typical routine for Joffre was as follows. He rose at 5:00 A.M., ate breakfast, and went to GQG at 6:00 A.M. The Grand Report at which Joffre "took his bearings" was held in his office at 7:00 A.M. First Belin, Chief of Staff, and Berthelot, Deputy Chief of Staff, read the news of the night, commenting upon this. Joffre then made the necessary decisions. After this he received other staff representatives and handled matters dealing with supply, matériel and transport. Lunch at 11:00 A.M. was followed by a quick tour of GQG, and a walk for exercise. The afternoon he spent in the office. Shop talk was forbidden at dinner, which was at 6:30 P.M. At 8:00 P.M. he received the evening report. At 9:00 or 10:00 P.M. he went to bed and only a national crisis justified awakening him.

Joffre was capable of original ideas at times but for the most part he worked on suggestions and proposed solutions furnished him by his staff. He accepted, rejected and altered. Somewhat slow, careful and thorough, he nevertheless was able to transact an immense amount of business.



MAP 1 — *The French right . . . must be weakened in order to strengthen the critical flank.*

tactical preconceptions had proved false, this, too, could well go overboard.

The French right, not so hard pressed as the left, must be weakened in order to strengthen the critical flank. This was robbing Peter to pay Paul and Joffre knew it, but it was a case of paying Paul or else. So an order was issued coördinating the withdrawal of the left and center armies, while emergency steps were taken to ward off the German envelopment. Joffre gave orders for railway demolitions and directed that prepared inundations be effected near the English Channel. The 61st and 62d Divisions, sent to Arras from Paris, were given the mission of covering the left flank of the British, and Cordet's Cavalry Corps, which was south of Maubeuge, was ordered to pass behind the British and gain the outside flank. Joffre likewise ordered the VII Corps withdrawn from Alsace and moved by rail to the west. He thus started building up a mass of maneuver on the extreme left.

By this time Joffre's liaison officers had thoroughly acquainted him with the tactical errors prevalent in recent fighting. He now took steps to correct these. The note he issued on this subject may sound elementary today, but to the French of 1914 it was revolutionary. In part it read:

> The lesson to be learned from the fighting up to date is that attacks cannot be carried out without an intimate combination of infantry and artillery.
>
> Every combined operation comprises a series of minor operations which have as objectives the gaining of supporting points. Whenever it is desired to occupy a supporting point, the attack must be prepared by artillery, the infantry must be held back, and the assault must only be launched from such distance as will permit the objective to be reached with certainty. Whenever the infantry attack has been launched at too great a distance, and without the artillery having had time to make itself felt, the infantry has fallen under machine-gun fire and has suffered losses which might have been avoided. . . .
>
> The practice has been to immediately throw forward numerous units in dense formations, which are at once exposed to hostile fire and are decimated. The result is that the offensive is stopped dead and the infantry is often left at the mercy of a counter-attack.
>
> The combat must be carried out by a line of skirmishers in sufficiently extended order, continually fed from the rear and supported by artillery. The fight can thus be carried on until the moment when the assault can be launched under the most favorable conditions.

Joffre also prescribed that cavalry divisions should always have the support of an infantry detachment, and emphasized

> . . . the absolute necessity of insuring complete cooperation between infantry and artillery. The one has at-

tacked in too much of a hurry, the other is too often engaged after much delay, hesitatingly and sparingly. It is to this capital error that the greater part of the losses of the infantry are imputable.

He called for better coördination and more massive employment of artillery and directed that the use of airplanes in conducting artillery fire be made more general.

Joffre believed in supervising subordinates. Therefore, after issuing this note, he took steps to see that its provisions were being carried out. Liaison officers got special instructions to observe and report upon the tactics of lower units. The next offensive must be made effective. True enough, the French Army was retreating now, but during that retreat it would study offensive tactics.

August 25

While liaison officers went to the armies to transmit the new tactical Bible, and ascertain the morale and condition of troops, Joffre and his collaborators estimated the situation.

Colonel Dupont, G-2, submitted a report showing that most of the German regular corps had been recently identified on the French front. The question of the German reserve corps, some of which had been identified, was also discussed. Colonel Dupont concluded that not more than 28 reserve divisions could be employed against France. As a result of his estimate Joffre was given a definite idea of the total strength of the German forces opposing him, but there was still considerable question as to their distribution.[20]

Joffre and his principal assistants then took up the question of the forthcoming French offensive, which all felt was imperative. When should it be launched and what form should it take?

General Berthelot, the Deputy Chief of Staff, strongly urged a central maneuver. He wanted to concentrate all available forces behind the Fifth Army, and as the British fell back, to strike at the inner wing of the German forces pursuing them. By this offensive from east to west he hoped to separate the German right from the rest of the German forces. He pointed out that the plan was simple and could be executed rapidly.

Joffre's own conception was to build up a mass of maneuver on his left, capable of enveloping the German envelopers. The discussion of these two plans lasted the entire day. Berthelot returned to the charge again and again. In the evening, after weighing all factors, Joffre decided in favor of his own envelopment idea. Accordingly, General Instruction No. 2 was signed and sent out. In his memoirs Joffre says:

> My decision once made, Berthelot, putting aside his own preferences, applied himself with the utmost energy to ensuring by every possible means the success of the new plan.

The nature of the plan, which has been called *The Genesis of the Marne,* is indicated in the following paragraphs of the instruction:

> It being impossible to carry out the offensive maneuver which had been projected, the object of future operations will be to reform on our left a mass of maneuver capable of resuming the offensive. This will consist of the Fourth, Fifth, and British Armies, together with new forces, drawn from the eastern front, while the other armies contain the enemy as long as necessary.
>
> During the retirement, the Third, Fourth, and Fifth Armies will conform to the movement of their neighbors, and each will remain in liaison with the others. The retirement will be covered by rear guards established on favorable topographical positions so as to take advantage of every obstacle to arrest or at least delay the advance of the enemy by short and violent counter-attacks, the principal elements of which will be artillery. . . .
>
> A new group comprising formations transported by rail (VII Corps, four reserve divisions, and perhaps in addition another active corps) will be formed between August 27 and September 2 in front of Amiens . . . or behind the Somme. . . . This group will be in readiness to assume the offensive in the general direction of St. Pol—Arras or Arras—Bapaume.

While the basic decision for the future employment of all the French armies was being made, reports flowed in from the front. French forces near Verdun were making a successful counter-attack against the left flank of the Crown Prince's army. It promised considerable results if the advantage were followed up. Joffre, however, sacrificed the local success. Here was a place where he could lay hands upon troops to strengthen his left. Major Bel, one of his liaison officers, was sent to Verdun with orders for the attacking troops to fall back on the defensive and give up two divisions. By 4:00 P.M. Joffre was assured that the 55th and 56th Divisions were being directed toward entraining points.

The First and Second Armies were both engaged in a violent battle, so Joffre felt he could not weaken these armies for the present.

There remained the matter of coördination on the left wing. Sir John French and Lanrezac were both going their own way and operations were suffering. Of course, the success of the new offensive plan depended on the British and the French Fifth Army delaying the enemy, thus giving time for the formation of the new mass of maneuver. In view of this, Joffre wished to discuss his new orders with the British and therefore arranged for an interview with Sir John French and Lanrezac at St. Quentin the next day. Perhaps the three of them could reach an understanding.

Late that evening Joffre received a telegram from the Minister of War, directing him to send three regular corps to defend Paris "if victory does not crown our arms and if our armies are forced to retreat." Considering as undesirable both governmental interference in the conduct of operations and the proposed weakening of his forces, Joffre took advantage of the wording of the telegram, and decided to suspend the execution of these instructions.

[20] Of the active corps actually engaged on the Western Front, the French at this time had not identified the III Corps (Kluck's First Army), any units of Hausen's Third Army, or the III Bavarian Corps (Lorraine). Moreover they were still skeptical as to whether all the reserve divisions had been grouped in corps, for only two reserve corps had been definitely identified. Therefore, to a certain extent the French still persisted in their erroneous estimate of German reserve formations, which was one of the principal reasons for their faulty original deployment. However, the estimate of 28 reserve divisions was quite accurate.

August 26

Joffre and Berthelot reached St. Quentin at about 10:30 A.M. where they met French and Lanrezac. The feeling between these two key commanders was unmistakable. They acted like two strange bulldogs. French complained that Lanrezac had let him down by retreating without giving warning. Lanrezac's attitude indicated that he considered the British commander an ignorant amateur not worthy of a reply.

After this auspicious start, Joffre got down to the principal purpose of his trip—a discussion with Sir John French of the part the British were to play in the new offensive. As Joffre began to explain the details of his plan, French appeared puzzled. Suddenly the British commander exclaimed: "But I know nothing of this order!"

A British staff officer then stepped forward and explained that the instruction had been received during the night but had not yet been studied. To learn that the British staff had not studied such a fundamental order, or even taken the trouble to notify their commander of its existence, was a bewildering blow to Joffre. He went over the plan again, but obviously the conference had failed. It disintegrated, rather than ended. Joffre went back to Vitry with the impression that the Allied left was fragile in more ways than one.

However, he had been able to take one step toward improving Franco-British relations. During the conference he had learned that part of the British forces were engaged in a desperate struggle at Le Cateau, and therefore he at once sent orders to Sordet's Cavalry Corps to intervene in the battle "with all available forces and the greatest energy." Sordet's action helped take pressure off the British.

The evening of the 26th was a bad one for Joffre. The reports he found awaiting him at Vitry were anything but encouraging. The Fourth Army was falling back behind the Meuse; the Germans had already forced a crossing near Mézières; counter-attacks had failed. Joffre ordered the Third and Fourth Armies to at least delay the Germans from behind the Meuse.

To make matters still worse, a ministerial crisis was on and the Minister of War, a staunch supporter of Joffre, had lost his position.

But the climax to this evil day came in the form of a telegram from Colonel Huguet, French liaison officer with the British. That telegram read:

> Battle lost by British Army which seems to have lost all cohesion. It will demand considerable protection to enable it to reorganize.

For the moment Joffre could send no more troops to the left flank. However, he could organize an army out of the miscellaneous French units that were to operate on the left flank of the British. And this task he immediately began. He selected General Maunoury, then at Verdun, to command this army and directed him to report to GQG for instructions. Thus did the famous Sixth Army come into being.

August 27

Early on the 27th Joffre learned that the Fifth Army was still retreating. Lanrezac had promised that he would counter-attack just as soon as he reached terrain favorable for the employment of artillery. Joffre believed that the time for the counter-attack had now arrived. He thought it necessary for two reasons: first, to help the hard-pressed British; and second, to gain time for the execution of the new offensive plan. He therefore ordered the Fifth Army (now about to retreat behind the Oise east of Guise [Map 2]) to execute a counter-offensive to the north, and urged the British to slow up their retreat while this army attacked.

During the afternoon Joffre learned that the British had evacuated St. Quentin. Upon receipt of this unwelcome word GQG called Sir John French on the telephone and again emphasized the undesirability of the British uncovering the Fifth Army's flank at the very moment that army was about to attack.

Meanwhile, Maunoury had reported at GQG for instructions relative to the organization of the new Sixth Army. There he was directed to dispose his forces, as they arrived, in such a manner as to be able to act offensively against the German right flank. But shortly after Maunoury left Vitry with the directive for the new army, bad news came in. The German right wing was advancing so rapidly and the Allied left was in such disorder, that Joffre realized that his plan for an Amiens—Laon—Reims battle was about to fall to pieces. It appeared that the Sixth Army would not only be too weak but too late. One chance remained.

G-2 reports dealing with the German units detached to besiege the fortress of Maubeuge led Joffre to believe that pressure from the north against the French Fifth Army would be relaxed. Therefore, it seemed to him that the Fifth Army, now behind the Oise, could attack toward St. Quentin—northwest instead of north—and at the same time protect its north flank. Joffre hoped that this attack would strike those units pursuing the British, thereby helping their ally, and perhaps give the Sixth Army time to concentrate and strike. Orders for this change were sent to the Fifth Army about 7:00 P.M.

A liaison officer soon afterward informed Joffre that Lanrezac strongly objected to the new orders.[11] GQG at once sent Lanrezac another message insisting upon strict execution of the orders and Joffre, himself, decided to go to Lanrezac's headquarters the next day.

About 10:00 P.M. Joffre learned the result of his intervention with the British. They would fall back again, despite plans for the Fifth Army's attack. This retreat would uncover the left of the attacking Fifth Army, as well as the right flank of the newly formed Sixth Army.

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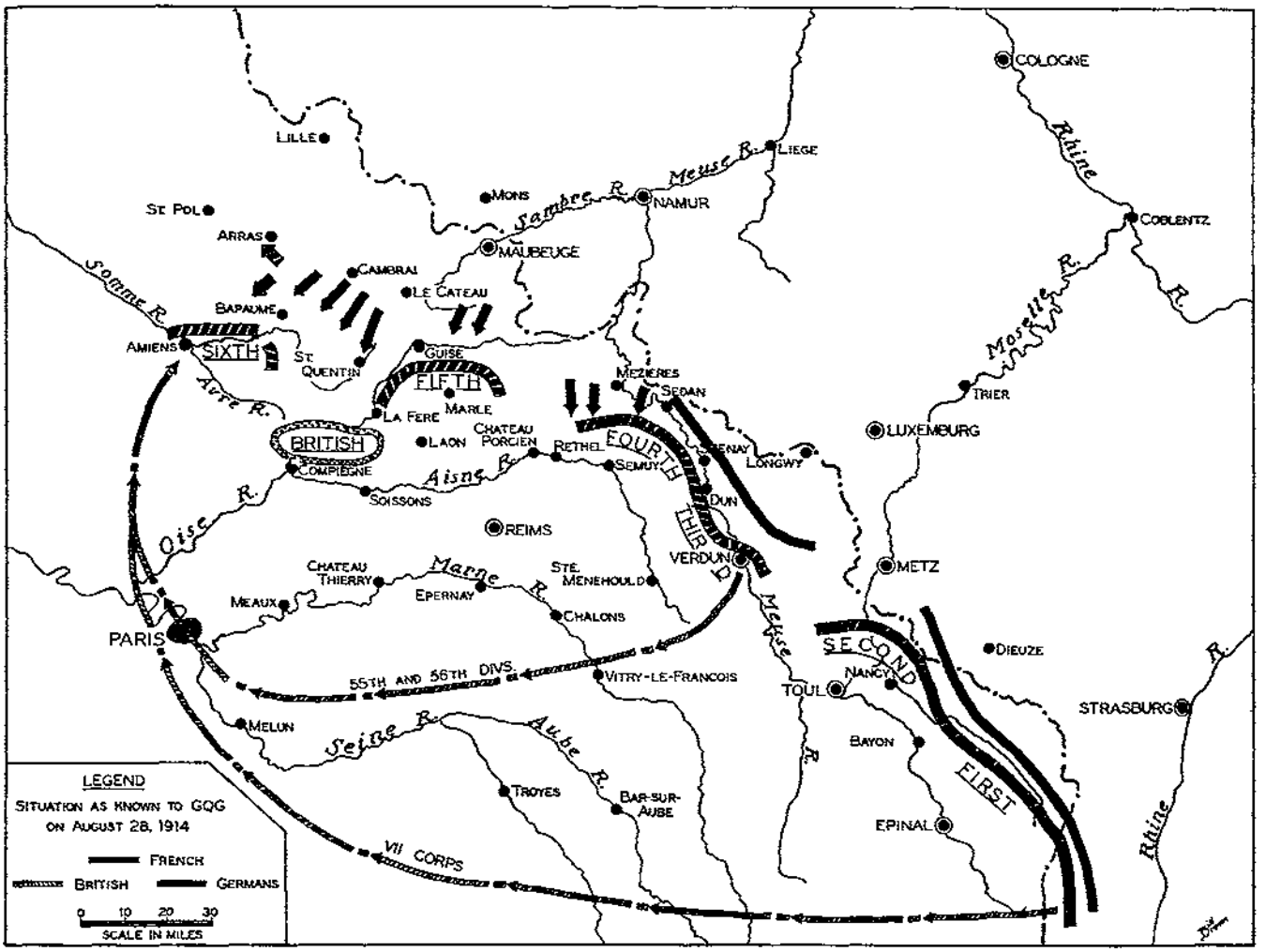
[11] A dangerous and difficult operation had been thrust on Lanrezac. It involved a change of front of his entire army and a flank march in the immediate presence of a victorious enemy. The logistics of the movement are alone sufficient to drive the average staff officer into hysterics. In any case, a violent scene resulted between the liaison officer, Lanrezac, and Lanrezac's G-3.



MAP 2 — *GQG learned that there was grave danger of a penetration in the large gap between the Fourth and Fifth Armies.*

A letter from Huguet, written a few hours earlier, painted the following picture of the British:

> For the moment the British Army is beaten and incapable of any serious effort. The right column, the 1st and 2d Divisions, . . . still presents some aspect of cohesion; the same may be said for the 4th Division, but the 3d and 5th Divisions . . . are nothing more than disorganized bands incapable of offering the slightest resistance.

In contrast was the situation of the First and Second Armies. These forces had been rather successful in a vigorous counter-offensive. Joffre issued an order congratulating them upon their courage and tenacity and directed the First Army to send a cavalry division back to entraining points. He felt that he would soon be able to draw still more troops from the east to help the west.

Early in the morning Joffre had indicated to the Fourth Army his desire that it strengthen its left at the expense of its right. Major Gamelin,[12] liaison officer to the Fourth Army, reported to Joffre that evening at dinner. He told Joffre that a successful counter-attack had been made against German troops that had crossed the Meuse below Sedan. The coolness of General de Langle and his chief of staff had particularly impressed him. He had also noted a marked improvement in French tactics.

All in all, though it was still touch and go on the left flank, there remained at least three French armies capable of driving home a successful attack. After the agonizing doubts of the last few days, Joffre's faith in his troops was now restored.

AUGUST 28

On the morning of the 28th, GQG learned that there was grave danger of a German penetration in the large gap between the Fourth and Fifth Armies. Upon receipt of this information, Joffre decided to form an army detachment charged with the mission of linking these two armies together. The oversized Fourth Army would furnish the necessary troops. A general officer named Foch, then in command of the XX Corps in Lorraine, would assume command of this army detachment. General Foch would report to GQG at once. He would bring with him a certain Colonel Weygand,[13] whom Joffre had selected to be chief of staff of this new command.

Having made these arrangements, Joffre left for Fifth Army headquarters at Marle to see Lanrezac. Immediately upon his arrival, Lanrezac, tired and nervous, broke into a torrent of complaints and objections to the proposed attack. Joffre suddenly interrupted. He threatened

[12] Present French Chief of Staff.

[13] General Gamelin's predecessor as French Chief of Staff.

to deprive Lanrezac of his command. He told him he would have to obey orders without this eternal procrastination and apprehensiveness. He told him that the British grievances against the French were all his fault, that he had let the British down, and now they distrusted everything French.

Lanrezac then complained that he had not received a written order, whereupon Major Gamelin sat down, wrote one of some thirty words, and Joffre signed it. Lanrezac professed himself satisfied.

A few moments later, General de Mas Latrie, commander of the XVIII Corps, reported at army headquarters with a long string of complaints and a longer tale of woe. Lanrezac turned on him vigorously, and passed on some of Joffre's expressions which were fresh in his memory. Joffre added a few new ones for good measure. The crestfallen Mas Latrie left in a hurry.

Thereafter the tension lessened perceptibly. Just before leaving Joffre placed his large hand on Lanrezac's shoulder and said: "It's a question of the salvation of two armies—the British and the Sixth. I am counting upon you."

Nevertheless Joffre's impressions of the Fifth Army and its commander were so unfavorable that he decided to return to Marle on the 29th, the day of the attack. He even considered relieving Lanrezac on the spot but after thinking the matter over he decided to wait at least until the next morning.

Although previous efforts to obtain British participation in the St. Quentin attack had failed, Joffre made another attempt on this day. He asked Sir John French to maintain liaison beween the Fifth and Sixth Armies, pointing out that it would only be necessary for the British to halt rear guards behind the Crozat Canal (west of La Fère). At 8:30 P.M. the British reply came through Huguet:

> Sir John French regrets that he cannot coöperate in the general action to the extent requested by you. His troops are worn out and require at least one day of rest in the quarters they occupy this evening. The day after tomorrow they will be capable of holding the line of the Crozat Canal if necessary. If, later on, the French Army is victorious the Field Marshal will put his troops at your disposal as reserves.

Thus the British Army, located one to two days' march back of its French neighbors, was to rest on August 29th while the Fifth Army attacked to help it.

Then more bad news came in—this time from the detraining Sixth Army. The line of the Somme had been lost. The Fourth Army was fighting hard on the Meuse. De Langle informed Joffre that he had received instructions from GQG which called for withdrawal behind the Aisne, but the situation was favorable and he had ventured to postpone execution of the retreat. Joffre authorized a short delay for the sake of morale, but added that de Langle must then resume the retreat in conformity with adjacent forces.

The Third Army's situation appeared relatively good, but there were reports that the army commander was losing his grip and that his staff had made blunder after blunder. Joffre warned this army that its VI Corps, a crack unit of three divisions, would be taken from it for employment elsewhere.

By this time the counter-offensive of the First and Second Armies was being checked. Joffre did not persist, since he was preparing to weaken them. He informed these armies that their mission now was merely to hold.

August 29

At the Grand Report Joffre learned that the Germans were about to break into the detraining area of the Sixth Army. However, he still had a faint hope that the attack of the Fifth Army would reëstablish the situation sufficiently to let him fight a decisive battle north of Paris.[14]

At about 9:00 A.M., Joffre arrived at Lanrezac's headquarters. To all appearances the Fifth Army commander had recovered his calmness and confidence. Therefore Joffre did not relieve him. However, he remained at Marle throughout the morning, watching Lanrezac conduct the battle. The attack to the northwest was launched successfully but soon afterward the Fifth Army was struck from the north by forces crossing the Oise—forces that Joffre believed to be about Maubeuge.

Joffre left Lanrezac at noon. Strong intimations had reached him that Sir John French was going to call off the war for a week or ten days, retire somewhere and refit. This, of course, would have created an immense gap between the Fifth and Sixth Armies and would have precluded any chance of launching the Allied counter-offensive. So Joffre went to French's headquarters at Compiègne and put up his best arguments.

He met with little success. Joffre says he saw the British Chief of Staff, Sir Archibald Murray, twitching French's tunic, as if to prevent him from yielding. French said he would coöperate after his troops had had 48 hours of rest.

Joffre started back to Vitry in a thoroughly bad humor. By accident he met the one Englishman he thought might help him—General Sir Henry Wilson, the Deputy Chief of Staff and a friend of Foch. Joffre talked to Wilson frankly and the Englishman promised to try to change Sir John French's attitude.

On arrival at Vitry, Joffre learned that the French Fifth Army had suffered a slight reverse on its left and scored a success on its right. Various reports indicated that this attack had succeeded in diverting some of the German columns that had been marching against the British and the Sixth Army. Joffre thereupon issued an order for the Fifth Army to withdraw.[15]

Joffre's last hope of executing his plan of August 25th without radical alterations was now gone. He realized that he had underestimated the power and mobility of the German right wing and that his time and space calculations had been faulty. On the evening of August 29th all

[14] This hope was founded on an overestimation of the forces left to besiege Maubeuge and a consequent underestimation of the strength of the German right wing.

[15] Through an inexcusable error by GQG's message center, the order was not dispatched for ten hours.

that remained of his plan was the fundamental idea of strenghtening his left and gaining a decision over the German right wing.

This strengthening of his left was proving difficult. His subordinates kept insisting that it was not an easy thing to pluck entire divisions out of the battle front. During the evening a message came in from General Ruffey, the Third Army commander, protesting against giving up the VI Corps. Ruffey said he was about to be attacked by strong forces at any minute. Ruffey was known to have a vivid imagination, and Joffre suspected that his apprehensions were groundless. But in view of the protest Joffre ordered that only the 42d Division of the VI Corps be withdrawn to reinforce Foch's detachment.

However, the opposition to giving up the VI Corps again focused Joffre's attention on the fact that the Third Army command and staff were not "clicking." He decided to investigate personally the next day.

August 30

The 30th started off with word that the Sixth Army, attacked while detraining, had fallen back behind the Avre in confusion. The Fifth Army, owing to the delay in transmitting orders for its withdrawal, was in great danger of being enveloped and cut off. This army was much farther north than its neighbors, since it had been halted on the Oise for two days during the battles around Guise and St. Quentin. Its flanks were exposed and there was considerable doubt as to whether it would be able to escape intact.

Under these circumstances Joffre was more than grateful to learn that Sir John French had agreed to slow up his retreat and maintain contact with the Fifth Army by means of rear guards. He wrote immediately to thank French. He stated that he intended to withdraw all the French armies, avoiding any general engagement for the present. He added that the British should keep in close touch with the Fifth Army so as to take advantage of all favorable opportunities "to give the enemy a severe lesson, such as that of yesterday."

But Joffre was too optimistic. A short while after the dispatch of the thank-you note, word came in that the British had resumed their retreat. A letter from French stated that the British Army would not be fit to take its place in line for another ten days and therefore could not hold the front between the Fifth and Sixth Armies. The British commander wanted to fall back behind the lower Seine, northwest of Paris, and reorganize. He wanted to make the movement by marching and thought it would take four or five days. This rather remarkable proposal seemed to ignore the fact that such a movement would cut squarely across the lines of communications of the Sixth Army.

Joffre accepted French's propositions on the conditions that the British first retreat to the east of Paris behind the Marne and then go to their destination by moving south of Paris. In this way they would not interfere with the Sixth Army.

With the British at least temporarily out of the war, and the Sixth Army in disorder, there seemed little chance in the near future of building up a mass of maneuver on the German right flank. GQG therefore abandoned the strategic conception of August 25th and seems to have swung back on this day to Berthelot's idea of a central offensive, directed against the German right wing. But this still demanded the transfer of troops from east to west to build up a strong left wing. These various considerations resulted in an order to the Sixth Army to fall back in the direction of Paris.

In the afternoon Joffre went to the Third Army. There he verified the reports concerning Ruffey and his staff. He shook up the staff, relieved Ruffey, and turned over the Third Army to Sarrail, who at that time commanded the VI Corps. He capped off his cyclonic visit by inviting the relieved army commander to dine with him at GQG. Ruffey accepted.

From the Third Army Joffre motored to the Fourth. He found the contrast striking. De Langle was calm and full of fight. He wanted to resume the offensive and Joffre authorized a strong counter-blow in conjunction with the Third Army.

The evening closed with a jolt. The Russians, who had been counted on to take off some of the German pressure, had been badly defeated at Tannenberg in East Prussia. Intercepted German radios exulted about 70,000 prisoners and an annihilated army.

On every hand discouragement and despondency were increasing; not even GQG was immune. But Joffre maintained an Olympian calm. Although he did not know it, the blow he had dealt the Germans on the Oise had, to quote the British General Spears, "set the wheel of fortune turning in his favor."

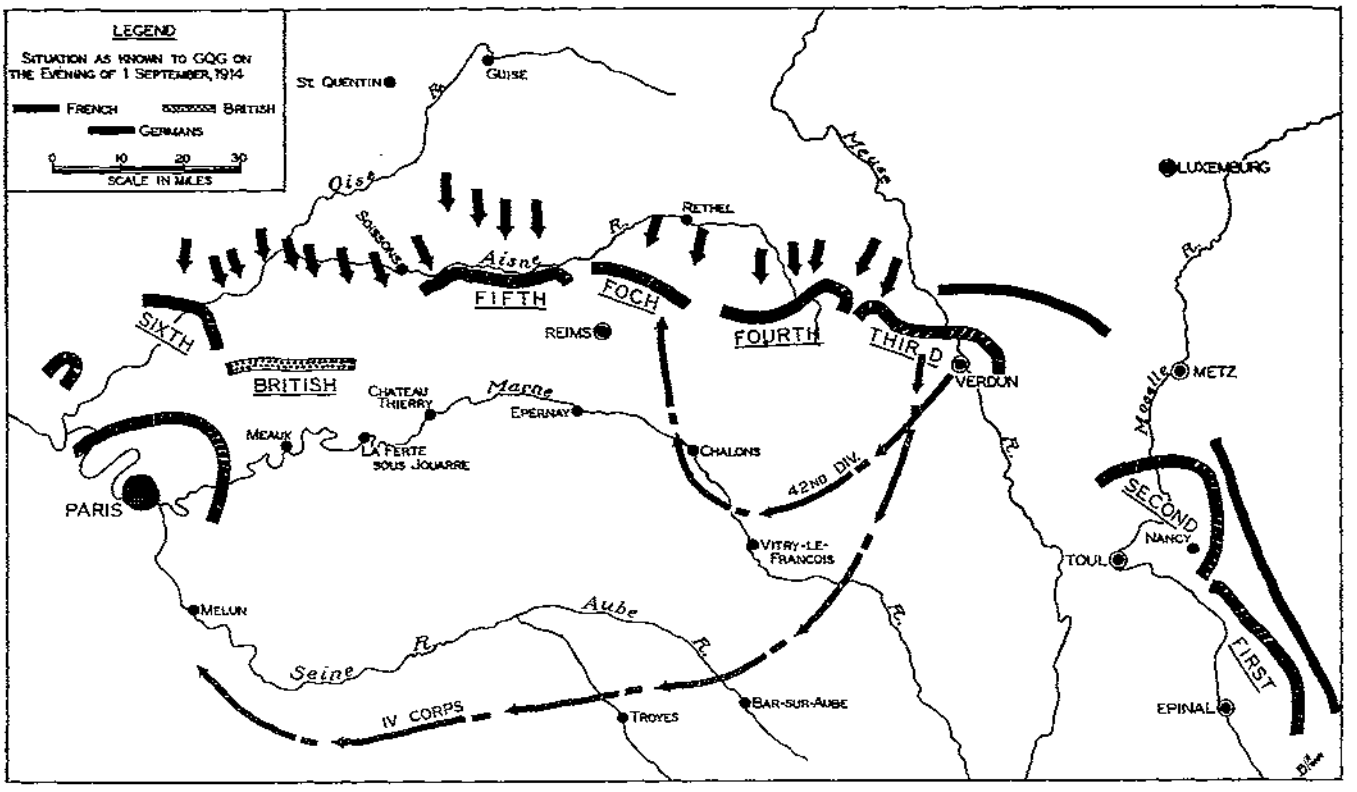
August 31

The next morning at the Grand Report things looked better. G-2 had unmistakable evidence that the Germans were moving troops from the western front to face Russia in the east. Thirty-two trains had been counted in Belgium and checked again as they went through Berlin. Furthermore, it was evident that the Fifth Army had struck a hard blow at Guise. Intercepted German radios spoke of "concealing the repulse from the troops." Moreover, in spite of the delayed GQG order, the Fifth Army had made a successful daylight withdrawal from the German forces with which it had been in contact. At present, its exposed left flank was the danger point.

Joffre now issued an order to the Fifth and Sixth Armies to fall back only if pressed. He even felt up to trying his luck with Sir John French again. He asked that the British commander

> . . . at least handle his rear guards in such a fashion as to prevent the enemy from getting the impression that a distinct retreat is under way and that a gap exists between the Fifth and Sixth Armies.

French replied that he would retire to a certain line which he would hold as long as the Fifth and Sixth Armies remained in their present position. If those armies fell



MAP 3 — *The fact that the whole German First Army was advancing to the southeast was clearly exposed.*

back, he would fall back too. The joker in this lay in the fact that the line indicated by the Britisher was about a day's march behind the French front line. It was obvious that Sir John was not even willing to fight a rear-guard action; this in spite of reports that a German cavalry corps, followed by two of Kluck's corps, were moving across the British front to strike the Fifth Army's exposed flank.

In characteristic fashion Joffre did what he could. He directed that a cavalry corps made up of troops being railed from the east, be assembled so as to protect the flank of the Fifth Army. Unfortunately, this cavalry would not be available for one or two days.

The proposed counter-blow of the Third and Fourth Armies and Foch's detachment did not materialize. De Langle was eager to attack; in fact, he had even issued orders to his Fourth Army. But when Joffre consulted Foch about the attack, Foch stated that he thought the conditions were unfavorable. Joffre agreed with this view and thereupon ordered the Fourth Army and the Foch detachment to fall back while the Third Army pivoted about Verdun.[16]

SEPTEMBER 1

On the morning of September 1st, G-2 gave Joffre the first complete and accurate picture of the German armies. Ably assisted by the British Intelligence,[17] Colonel Dupont was beginning to call the turn. From this point on, Joffre was to be, if not perfectly informed, at least better informed about the location and operations of the German right wing than was German OHL back in Luxemburg.

Early in the morning a bold suggestion came in from General Maunoury. He had been informed of the danger threatening the flank of the Fifth Army (Map 3) and proposed that his own battered and disorganized Sixth Army launch an attack to the northeast to help Lanrezac. Joffre had the will power to avoid the temptation and ordered Maunoury to fall back on Paris.

At Bar-sur-Aube, where GQG was now established, Joffre spent most of the day in an estimate of the situation. He concluded that all his forces must continue to fall back until the Fifth Army had made good its escape. Until that army was out of the toils, battle could not be joined under favorable conditions. Joffre had resolved to have the chances on his side when he resumed the offensive. The result of the day's meditation was General Instructions No. 4. This prescribed the *limit* of the French retirement and foreshadowed an offensive in which all troops, including Maunoury's Sixth Army, would be employed. Joffre was careful to state that the limit of the retirement need not necessarily be reached at the time of the counter-offensive.

To comply with the ministerial order that three active corps garrison Paris, Joffre placed the Sixth Army under Gallièni, the Governor of Paris. He then took steps to have Gallièni placed under *his* orders. Thus he complied with the order of the Ministry without weakening his combat strength for, as shown earlier, he intended to use the Sixth Army in his offensive.

That evening a highly important document, sent post haste from the Fifth Army, arrived at GQG. It was a

[16] It was this countermanded counter-attack which Moltke believed to be a supreme French effort to gain a decision.

[17] The Royal Flying Corps achieved remarkable results and seems to have been most ably handled.

stained and crumpled map with a few numbers and pencil marks on it. That was all, but it was enough to make eyes grow big and hearts beat faster at Fifth Army headquarters and at GQG.

The map had belonged to a German officer, apparently from the Guard Cavalry Division, who had been shot when his motor car ran into a patrol of the French III Corps. The numbers on the map referred to the corps of the German First Army, thus verifying its order of battle. The marks showed the line of advance and destination of each corps for the night of September 1st-2d. The fact that *the whole army was advancing to the southeast* was clearly exposed.

Joffre began to feel that the opportunity for a decisive blow might come sooner than he had expected—that is, if the Fifth Army could only escape. Kluck now appeared about to give the Allies a chance to build up a maneuvering force on his flank, after his vigor and rapidity had prevented their first attempt to do so. The envelopment conception again began to take form.

Another document of the highest significance reached GQG about the same time. The French Minister of War enclosed a general plan of action, approved by none other than Sir John French! He urged Joffre to accept it. The plan envisaged a defensive action behind the Marne with strong forces on the left, available to counter-attack. The important thing was not the nature of the plan itself, but the change in French's attitude. He was back in the war and seemed willing to fight, provided both his flanks were well covered.

The change of heart evidently had been the result of a conference in Paris to which French had been summoned by Kitchener, the British Secretary of State for War. The plan had been drawn up at the end of the conference.[18]

Joffre slept on French's proposition. Meanwhile the IV Corps had been withdrawn from the Third Army and directed to Paris, and the First and Second Armies were told to designate one corps each, to be sent to another part of the front.

September 2

Joffre believed that a defensive battle on the Marne was no solution, and that things were not yet ripe for a counter-offensive. Realizing that Sir John French's susceptibilities must not be hurt again, Joffre wrote a nice, tactful letter, thanking French and explaining that the unfortunate situation of the Fifth Army would not allow it to cover the flanks of the British adequately, so the proposition had to be regretfully declined. He suggested that the British first hold the line of the Marne and then retire to the left bank of the Seine, which they might hold to the southeast of Melun.

Nevertheless the time for the counter-offensive was obviously approaching. Colonel Pont and his Operations Bureau were clamoring for an attack. But on the other hand, Berthelot did not think the troops were up to it yet. He preferred to retire behind the Seine and reorganize before attacking. Belin, the Chief of Staff, advised avoiding decisive action for a few days more. He said the thing to do was to last, to hold out. The enemy would grow weaker. Finally, delay would allow the completion of troop movements in progress to strengthen the French left and center. Joffre rallied to this idea.

A note went out to the armies, slightly altering General Instruction No. 4. The object of the new plan was to relieve the French forces from hostile pressure by a continuation of the retirement, to fill up the ranks with replacements, to reinforce the center[19] by two corps taken from the right, and then pass to the offensive. In this offensive the garrison of Paris (Sixth Army) *would act in the direction of Meaux*. The note stated that the British would be asked to attack from the line of the Seine in conjunction with the Fifth Army.

Joffre also issued an order of the day to the troops, in which he said that the purpose of the retreat was to prepare a general offensive, the order for which would be given in a few days. And then he added:

> The safety of the nation depends upon the success of this offensive which must break the German armies.

The exact form the offensive would take was somewhat difficult to determine at this time, for the movements of Kluck on this day indicated that he might, after all, advance on Paris. The direction of his march no longer seemed to be to the southeast.

During the evening of this day, which, incidentally, was the anniversary of the capitulation of Sedan, the French government decided to leave Paris for Bordeaux. This movement attracted world attention, for it seemed to foreshadow a repetition of 1870. However, in Lorraine, at the other end of the long battle front, a more significant, if less publicized movement was in progress. The XV and XXI Corps were withdrawn from the First and Second Armies to strengthen the French center,[20] which had been weakened by its contributions to the left. These two corps were sent to that part of the front where, on Septem-

[18] When Kitchener received a series of reports from French, showing his refusal to coöperate with the French Army, Kitchener became alarmed. One particularly ominous phrase spoke of the necessity of retaining "independence of action and power to retire on my base when circumstances render it necessary." French also stated that he had lost confidence in the French higher leadership. Kitchener promptly rushed to Paris and ordered French to keep his troops in the fighting line and conform generally to the movements of the French.

[19] The wording of the note said "reinforce the right army by two corps taken from the Nancy and Epinal (First and Second) Armies." The note had been referring to those French armies west of Verdun, so the Third Army was meant by the expression "right army." Actually, one corps went to the Third and one corps to the Fourth Army.

[20] The use of these corps has been adversely criticized, notably by Gallièni, who thought they should have been sent to the Sixth Army. However, these corps arrived just in time to save the Third and Fourth Armies in the Battle of the Marne. Without these corps, the center would have been beaten. This defeat would have forced the First and Second Armies to retire. It is useless to speculate whether or not this would have decided the war, but subsequent events certainly justified Joffre's use of these two corps. To focus attention almost exclusively on the Allied left and German right, as is the tendency in English-speaking countries, is to see only a part of the campaign. It is quite possible that additional corps could have been taken from the east to reinforce the weak Sixth Army. But that is a different question.

ber 5th, Moltke would order his main effort. The parry thus preceded the thrust.

SEPTEMBER 3

Early reports showed that the Fifth Army had crossed the Marne and probably escaped the threatened envelopment of its left flank. But there was still some danger. Moreover, days of battle and forced marches had left the bulk of this army in sad condition.

Even so, the hour of battle was approaching and Joffre mentally passed his army commanders in review. He was satisfied with all except Lanrezac—once the brilliant professor and far-sighted strategist—now the discouraged, complaining general whose authority over his own staff and troops was weakening.

Joffre felt that he had to have a fighting man at the head of the tired and disheartened Fifth Army. In two battles this army had been struck both in front and in flank. It had made the longest retreat of any French army. Even now it was staggering back over the Marne in a disorganized condition. And yet, when the time came for the French offensive, the Fifth Army could again expect to be on the spot. This army, obviously, needed a strong character in command—strategist or not.

Lanrezac might have done once, but he would not do now. The strain of the campaign had told upon him. He had frequently objected to carrying out orders. On occasion his conduct of operations had been weak and hesitant. His attitude was being reflected in his troops. Coöperation with the British would remain a vain hope so long as Lanrezac commanded the Fifth Army. Joffre decided that Lanrezac must go.

He drove to Lanrezac's headquarters and relieved him. To Franchet d'Esperey he entrusted the Fifth Army, with the warning to "get along with" the British.

Back at GQG Joffre received Foch's answer to an inquiry as to whether or not his command was fit for immediate battle. The answer was no; not for several days.

The first reports that came in on this day had puzzled G-2, for they seemed to indicate that Kluck might head for Paris after all. However, at 7:00 P.M. Maunoury reported that the Germans opposed to the Sixth Army had moved southeast toward the Marne. A French air reconnaissance saw a column ten miles long approaching the Marne. Then Huguet telephoned:

> Reliable reports, coming from the British air force and all confirming each other, indicate that the entire German First Army, except the IV Reserve Corps, is moving southeast with the object of crossing the Marne between Château-Thierry and La-Ferte-sous-Jouarre and attacking the left of the Fifth Army. The heads of columns will doubtless arrive at the river this evening.

Another message stated that the British air force now reported that the Germans were marching southeast and not southward, that there were no more troops in front of the British and that it looked as if the entire German First Army would cross the Marne.

About 10:00 P.M. Huguet again called GQG and stated that it was possible that Sir John French, who had received numerous replacements, might move to the east to attack in the evening of September 4th, "especially if the Sixth Army, which appears to have nothing in front of it, should begin on the same day a similar movement to the left of the British."

Shortly before midnight Joffre dictated letters to Gallièni, Governor of Paris. Gallièni had reported the weakness of the Paris defenses and his fears for the capital. Joffre referred to his previous orders and reiterated that when the offensive was launched, it was his intention *to use the active and reserve troops of Paris to attack toward Meaux.*

In a personal note to Gallièni, Joffre indicated that a portion of the Sixth Army should be pushed forward at once so as to be in position to threaten the German right flank and support the British left. He also directed Gallièni to keep in constant touch with Marshal French.

The Paris garrison had been reinforced by the 45th Division, an excellent regular unit, and the IV Corps was beginning to arrive. These two units brought the total striking force available in Paris to four regular divisions, five reserve divisions and three cavalry divisions.

By their own errors the Germans had thus allowed Joffre to return to his conception of August 25th—to envelop the German right flank. The Allied left was now favorably located with respect to the German right; furthermore, it was steadily growing in strength as Joffre stripped his eastern armies. Meanwhile, the German right was constantly diminishing; troops had been detached to invest Maubeuge and others were being continually dropped off to guard the ever-lengthening line of communications. The situation was definitely on the mend for the Allies.

Whether Joffre should strike at once or wait a while longer was a question. The favorable strategical opportunity might be lost through delay. But, on the other hand, the French center and left would be materially stronger if the blow could be deferred a few days longer.

Joffre thought the time near but not yet at hand. He believed that the Third, Fourth, Ninth,[21] and Fifth Armies were not quite ready for a decisive battle. If the Sixth Army struck now, it would have to strike almost alone. Even when reinforced by the IV Corps, he did not believe that it would be able to reverse the situation on the western front by itself. It might gain a spectacular local success but he would have to call it off, just as he had had to call off the First and Second Armies in Lorraine, the Verdun forces in the midst of their success against the Crown Prince, de Langle's counter-offensive on the Meuse, and Lanrezac at Guise.

Joffre felt that he must play for higher stakes. Therefore, on the evening of September 3d he decided to defer the decisive battle until the Allied forces *as a whole* were ready. Then, and not until then, would he strike.

[21] The Foch detachment had now grown into the Ninth Army.

(To be concluded)

The Dispersion Slide Rule—Modified

Captain N. A. Burnell, C.A.C.

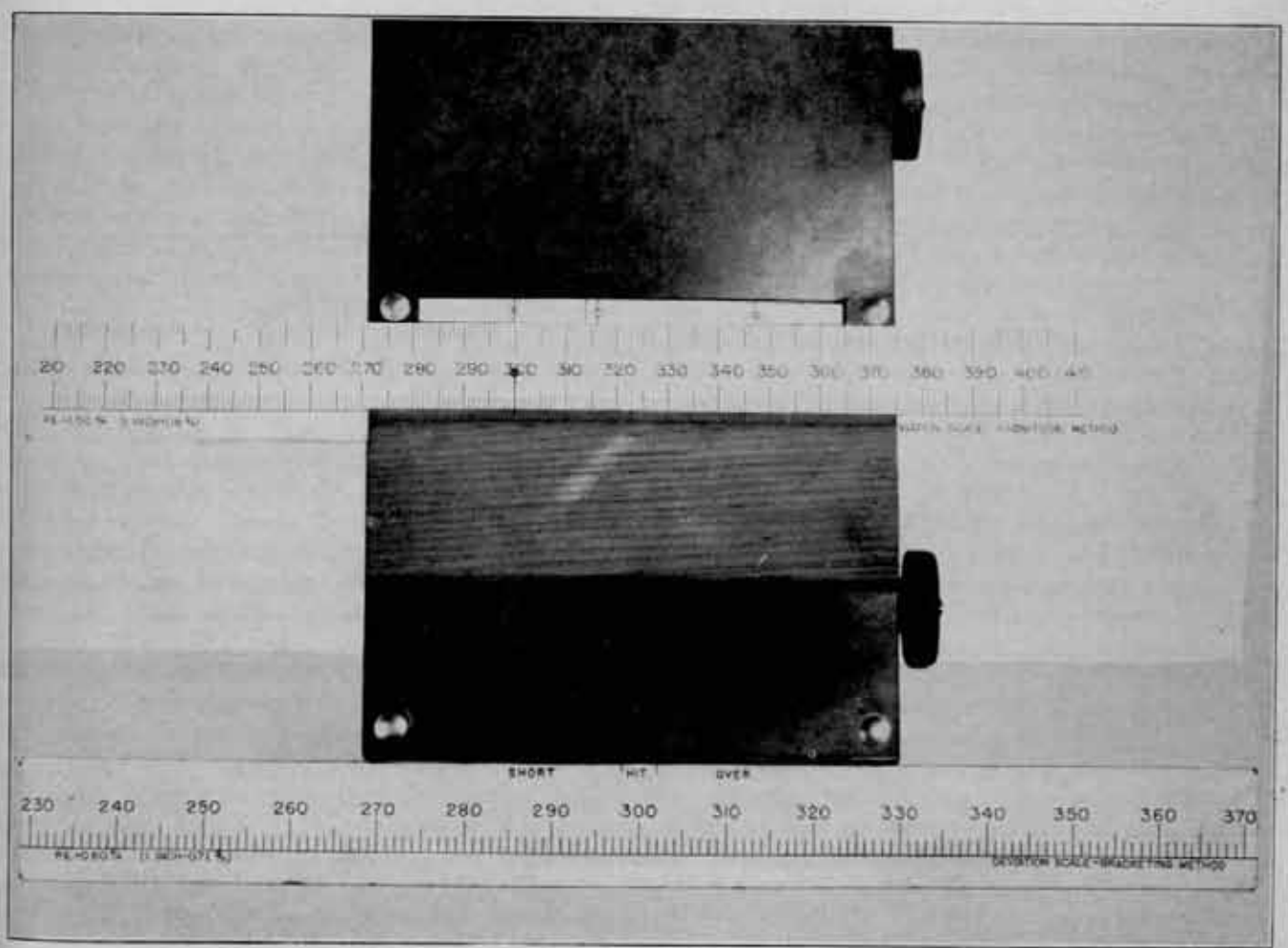
THE dispersion slide rule is, as the name implies, a device by which gun dispersion may be simulated. It is used to furnish deviations during drill so that the person who adjusts fire may be trained in the operation of the fire adjustment board (or the bracketing adjustment chart) and in the application of the rules for fire adjustment.

This device was first described in the 1934 edition of Special Text No. 35, a publication of the Department of Extension Courses, Coast Artillery School. It is based on the usually accepted theory that the fall of shots is distributed according to the law of accidental errors and that such distribution may be simulated by the fall of dice or the drawing of appropriately marked cubes from a bag. When the dispersion slide rule was designed it was intended that a dispersion bag or a set of dice be used with it to determine deviations, but it soon became apparent that its operation would have to be simplified a great deal before many persons could be induced to use it.

The purpose of this article is to describe a modified form of dispersion rule which is well suited to use during daily drills. It has been used extensively at the Coast Artillery School and has proved to be of great value for training in adjustment of fire.

The modification consists of a dispersion tape to be used with a deviation scale—Scale *A* of the original model—on a different type of mount. This eliminates the use of a dispersion bag (or dice) and Scales *B* and *C* of the first model, without affecting any of the functions for which the rule was designed.

The dispersion tape consists of a large series of "canned" deviations or splashes grouped about their center of dispersion according to the fall of two dice of different colors, as described in the original discussion in Special Text No. 35. The center of dispersion is represented by the center of the tape. The splashes are presented in some four hundred and eighty "frames" or sections on each of which are placed four vertical marks. One of these marks bears a cross (*X*), another bears a circle (*O*), a third a double bar (=), and the fourth is left plain. The tape is placed on rollers and is covered so that only one frame appears at a time in a window in the covering.



Modified Dispersion Device.

The deviation scale is made on a separate piece of cardboard and is placed in a guide next to the window. This scale is a duplicate of the one used with the fire adjustment board, except for the spacing of graduations. For the bracketing method of adjustment, the deviation scale may be marked to show "Overs," "Shorts," and "Hits." The spacing of the deviation scale should be proportional to the probable error of the armament manned. The number of graduations per inch may be determined in the following manner: The depth of the dispersion zone represented on the tape is 6.8 inches. Hence, 6.8 inches = 8 P.E. Substitution in this equation of the value of the probable error will give the desired scale of graduations. For example, if the probable error of the armament is 0.60% of the range, the scale of graduations should be 1 inch = 8 x 0.60/6.8 = 0.706%.

The operator of the device determines the deviations by reading from the deviation scale opposite the marks on the tape. He reads as many deviations from a frame as are needed for the salvo and moves the tape a predetermined number of frames to get the next set of deviations. An exceedingly great number of combinations of deviations may be secured by changing the selection of marks to be read or the number of frames to be turned between readings. The tape may be turned in either direction. The only precaution necessary is to insure that the dispersion depends on chance and not on the whim of the operator. The selection of frames and marks should be made according to some *predetermined* rule which should be followed until the end of the problem. For instance, it might be decided to turn two frames between readings and to read opposite the *X* for a single shot, or opposite the *X* and the *O* for a two-gun salvo.

Besides providing a means for simulating gun dispersion the device is intended to permit relative movement between the center of dispersion and the target to represent (1) the result of initial adjustment or preparation of fire, (2) the application of adjustment corrections ordered, and (3), when desired, a shifting center of dispersion. At the same time, it allows the determination of deviations always with reference to the target.

The target is represented by the normal (300-graduation) of the deviation scale. If it is not opposite the center of dispersion when a problem is begun, the effect is the same as though there were a systematic error as a result of preparation of fire. The amount of the error is proportional to the distance between the normal and the center of dispersion. Since preparation of fire is rarely perfect for an actual practice it should not be so represented for drill. As good a way as any to select the amount of the error is to do so by means of the dispersion tape, as though a deviation were being determined. For example, if the range officer has decided to have the tape turned two frames between readings and to have the mark bearing the X represent single splashes, the problem may be started by turning the tape and placing the normal of the deviation scale opposite the *X*. A pin should then be put on the mount to mark that position, and should not ordinarily be moved until the problem is completed. This procedure is equivalent to saying that the probable error of preparation of fire is about the same as the gun probable error—an assumption which is often justified.

If an adjustment correction is ordered during an actual practice, the application of that correction to the firing data will presumably move the center of dispersion and the succeeding splashes a like amount. If the deviation scale is so moved that the graduation corresponding to the adjustment correction with which any shots was fired is opposite the pin marking the initial position of the 300-graduation when the deviation of the splash is reported, the effect of all adjustment corrections ordered will have been correctly reproduced on the dispersion slide rule. Note that the deviation scale does not have to be moved as soon as an adjustment correction is ordered. In fact, it should not be moved until the fall of the first shot fired with that correction.

The only reason for moving the pin that marks the initial position of the target is to simulate a shifting center of dispersion. If such action is desired, shift both the pin and the deviation scale in the desired amount and direction.

Proper simulation of timing is one of the most important, and at the same time difficult, elements of successful drill. Except for such preliminary instruction as may be necessary, all problems should be conducted with the same timing as would be required during the firing of an actual practice. No deviation should be reported before the end of the time of flight plus five to ten seconds allowance for the normal functioning of the spotting section. Corrections should not be applied to the firing data sooner than could be done normally. A divergence from correct timing in either of these operations might make considerable difference in the trend of the problem and in the result.

The operation of the modified dispersion device may be summarized as follows:

1. Place the deviation scale in position under the window, move the normal (300-graduation) to the desired initial position, and mark this position with a pin placed in the mount.

2. Turn the dispersion tape until the selected frame is in the window and, at the proper time, read the deviation from the deviation scale opposite the mark that represents the splash.

3. If an adjustment correction is ordered, move the deviation scale until the correction ordered is opposite the pin, timing the move to synchronize with the fall of the shot on which the new correction is applied.

4. To simulate a shifting center of dispersion, move both pin and deviation scale the desired amount and direction.

Copies of the deviation tape and plans for constructing the mount may be obtained, upon request, from the President of the Coast Artillery Board, Fort Monroe, Virginia.

Flag of Truce

By Lieutenant Sewell T. Tyng, *Military Intelligence Reserve*

IN the opening days of September, 1914, the German armies, victorious in the hard-fought battles of the frontiers, were pushing southward towards the Marne on the heels of the retreating French, and the great cathedral city of Rheims stood squarely in their path. Though in no sense comparable to Verdun and the other bulwarks of France's eastern frontier, Rheims was classified as a fortified city. Although antiquated and demoded, its defenses might nevertheless serve as a center of resistance should the French attempt to make a stand along the heights of the Aisne. The question then, was this: Would Rheims be defended or would Joffre abandon it without a struggle? To be on the safe side, von Moltke made preparations for a siege.

His instructions for August 27th read:

> The siege equipment necessary for the capture of Rheims will be assembled and in due course will be placed at the disposal of the Fourth Army.

At this time it seemed that the reduction of the city would fall to the lot of the army commanded by Duke Albrecht of Württemberg, but in the succeeding days the general direction of the German advance shifted from southwest to south, so that on September 2d when the invaders' advance guards approached the outskirts of Rheims, that city no longer fell within the zone of the Fourth Army. Instead, it lay between the right wing of the Third Army and the left wing of the Second Army, almost in the center of the German battle line.

The ancient capital, where Jeanne d'Arc had placed the crown of France on the head of Charles VII, offered a rich and tempting prize. Both von Bülow, commander of the Second Army, and von Hausen, commander of the Third Army, coveted the honor of announcing its capture. There was no doubt that its fall would be proudly announced and joyfully received in Germany. Here was an opportunity for the successful army commander to cast off the unwelcome cloak of anonymity that shrouded military operations and enjoy a pleasant moment of popular acclaim. Moreover, a natural rivalry animated the two German commanders. Von Bülow was a Prussian of distinguished family, high in favor at the Imperial Court, and an eminent example of the military caste that dominated the German Army. Von Hausen, a Saxon by birth and former Saxon Minister of War, bitterly resented the Prussian assumption of superiority. There was no love lost between the two; jealousy and distrust marked both their personal and official relations.

On the night of September 2d, General von Bülow established his headquarters at Fismes on the Vesle. On the left flank of his army the 2d Division of the Guard held the little town of Jonchéty, which lay south of the river and almost ten kilometers due west of Rheims. To the east of the city von Hausen's Saxons had made corresponding progress, and the 23d Reserve Division, on the Third Army's right flank, occupied Heutrégiville. Beyond a casual statement in a radio message to the Second Army, that "the capture of Rheims is desirable," no definite orders had come from OHL. Von Moltke, as was his custom, apparently intended that Bülow and Hausen decide between them which army should take it and when.

In point of fact the French had no intention of making a serious stand at Rheims. Intent upon a general strategic retreat and a regroupment of forces for a counter-offensive on a grand scale, Joffre had no thought of diverting any part of his strength for a secondary operation. The forts of Rheims, with their out-of-date armament and equipment, were in no condition to offer serious resistance to a well-organized attack unless reinforced by substantial mobile forces. Moreover, the damage that the city would suffer if resistance were offered, outweighed any possible military advantage. Accordingly, during the day of September 3d the last French units[1] marched out of Rheims, leaving it open and undefended.

From the nature of the rear-guard actions fought by the French during the preceding days, von Hausen rightly conjectured that Rheims would not be defended. Then, too, he knew that the Second Army was preparing to take the city, for his headquarters had intercepted a radio message to that effect from von Bülow to OHL in the early hours of September 3d. However, in the absence of any express direction from the High Command, he saw no necessity for giving his Prussian colleague the right of way. Here was an occasion when vigorous action might be richly rewarded.

Accordingly, late in the afternoon of September 3d and without notice either to OHL or the Second Army, von Hausen turned his 23d Reserve Division against the forts of Vitry-le-Reims and Nogent l'Abesse on the eastern outskirts of Rheims. Finding the French gone, Captain von Humbracht with a patrol of Saxon hussars[2] boldly entered the city.

The patrol made its way through the darkened and deserted streets, and at 11:00 P.M. drew rein before the *mairie*. The French mayor, M. Lenglet, who had waited at his office in anticipation of this, received the German troopers and was forthwith arrested and held as a hostage to insure the peaceful behavior of the civilian population. It seems fair to doubt whether the invaders' arrival and the arrest of the mayor reassured the inhabitants of the city to the extent that General von Hausen has suggested in his memoirs; but in any case no resistance was offered and Rheims remained undisputedly in German hands until after the Battle of the Marne.

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[1] Elements of Foch's Army Detachment.

[2] The patrol consisted of three officers, two noncommissioned officers and seven troopers of the Saxon Regiment of Reserve Hussars.

A few minutes after midnight van Hausen sent a jubilant radio to von Moltke: "Rheims is in the hands of the Third Army, almost without combat." The following morning the main body of the 23d Reserve Division entered the city and its suburbs.

Meanwhile, von Bülow had also turned his attention to Rheims, but with somewhat more regard to form and to the military protocol. Early in the afternoon of the 3d, a party under a flag of truce left the headquarters of the Guard Corps to demand the formal surrender of the city. The mission was composed of Captain von Arnim, wearing the red tabs of the Great General Staff, and Captain von Kummer, personal aide to General von Plettenberg, commander of the Guard Corps, Captain Schölvinck of the Motor Transport Corps, a noncommissioned officer and trumpeter. The noncom, who had been a music-hall artist in Berlin, conceived the curious notion of ingratiating himself with his enemies by wearing on his field-grey tunic the violet ribbon of the French civilian order of *Palmes Académiques* which had been awarded him before the war.

Approaching Rheims from the west—the opposite direction from that taken by the Saxons—the staff car carrying the German envoys ran into a French cavalry patrol at La Neuvillette, a suburb some four kilometers outside the city. This patrol, part of the French X Corps, withheld their fire at the unexpected sight of an automobile filled with Germans and proceeding under a white flag. Uncertain how to treat their unlooked-for visitors, the French delayed while the Germans with some difficulty explained their presence. Meanwhile, angry civilians crowded around the car, eager to do violence to the enemies thus delivered into their hands. However, the French troopers succeeded in extricating von Bülow's emissaries from this embarrassing situation and started with them for corps headquarters.

When the party reached corps headquarters the corps commander stated that he had no authority to deal with such a case, declined to receive them, and ordered them taken still further to the rear to the army commander. At last, in the middle of the afternoon, the German envoys, weary and bewildered, stumbled blindfolded into the courtyard of the Château de Rebais, the headquarters of the French Fifth Army.

Warned in advance of their coming, General Lanrezac, the army commander,[3] had prepared a disconcerting welcome. Seated behind a table in an upper room, with the officers of his staff grouped about him, he acknowledged the Germans' salutes with a cold inclination and waited in silence. Captain von Arnim stated his mission haltingly and with evident embarrassment.

Knowing that the French had already evacuated Rheims and suspecting that the German mission concealed some ruse, Lanrezac not only made no reply to the demand for the city surrender, but made no response to any part of von Arnim's speech. When von Arnim completed his statement Lanrezac merely said, "Take them back to the lines." Puzzled and confused, the Germans were again blindfolded, loaded into their car and driven back to the front. It may be that their perplexity influenced their subsequent conduct, for on crossing the lines they lingered—or so it seemed to the French—surveying the French positions and dispositions with an interest unbecoming to their privileged character. Suspicious of their intentions and good faith, a French patrol quickly pushed forward and again took them into custody. Once more they made the journey to Fifth Army Headquarters, not blindfolded this time, but handcuffed and as prisoners. For a while there was talk of summary execution for abuse of a flag of truce; but investigation of the matter indicated that their conduct did not merit such drastic action. Moreover, it was certain that any mistreatment of officers sent under a flag of truce would lead to German reprisals on British as well as French officers. In view of this, the British liaison officer, Lieutenant E. L. Spears,[4] took it upon himself to urge caution and moderation on the French army commander. The lives of the whole party hung in the balance for several hours. Finally the matter was referred to Joffre. With sound good sense, the French commander in chief directed that von Bülow's representatives be detained until any information they might have picked up became valueless. A few days later the crestfallen party was moved to Bordeaux. From there they were placed on board a neutral vessel bound for Germany.

In the meantime, General von Plettenberg had been aroused to a state of high indignation by the disappearance of his mission. Though von Hausen's radio announcing the capture of Rheims had been intercepted by the Second Army, it was not transmitted to von Plettenberg, who was totally unaware of the presence of Saxon troops in the city. Therefore, convinced that his representatives had been detained in violation of the flag of truce, he dispatched another group at dawn to announce the imposition of a fine of 50,000,000 marks, with instructions to state that it would be raised to 100,000,000, if the German envoys had not safely returned within two hours.

The second party met with better success than the first. They entered the city without mishap, and presented themselves at the *mairie*. There they found a detachment of Saxons already in possession. The mayor protested that he had no knowledge of the fate of the earlier envoys, but von Plettenberg's officers remained inexorable; the fine must be paid.

For some reason this second party seemed in no great hurry to get back to their headquarters. Perhaps they stayed to swap stories with their Saxon comrades whom they had not seen since the opening of the campaign. In any event, as time passed and his second group of emissaries did not return, von Plettenberg reached the end of his patience. Without further delay or inquiry he directed General von Winckler, commanding the 2d Division of

[3] Later the same day Lanrezac was relieved of the command of the French Fifth Army and replaced by Franchet d'Esperey.

[4] Now Brigadier General Spears, author of *Liaison, 1914*.

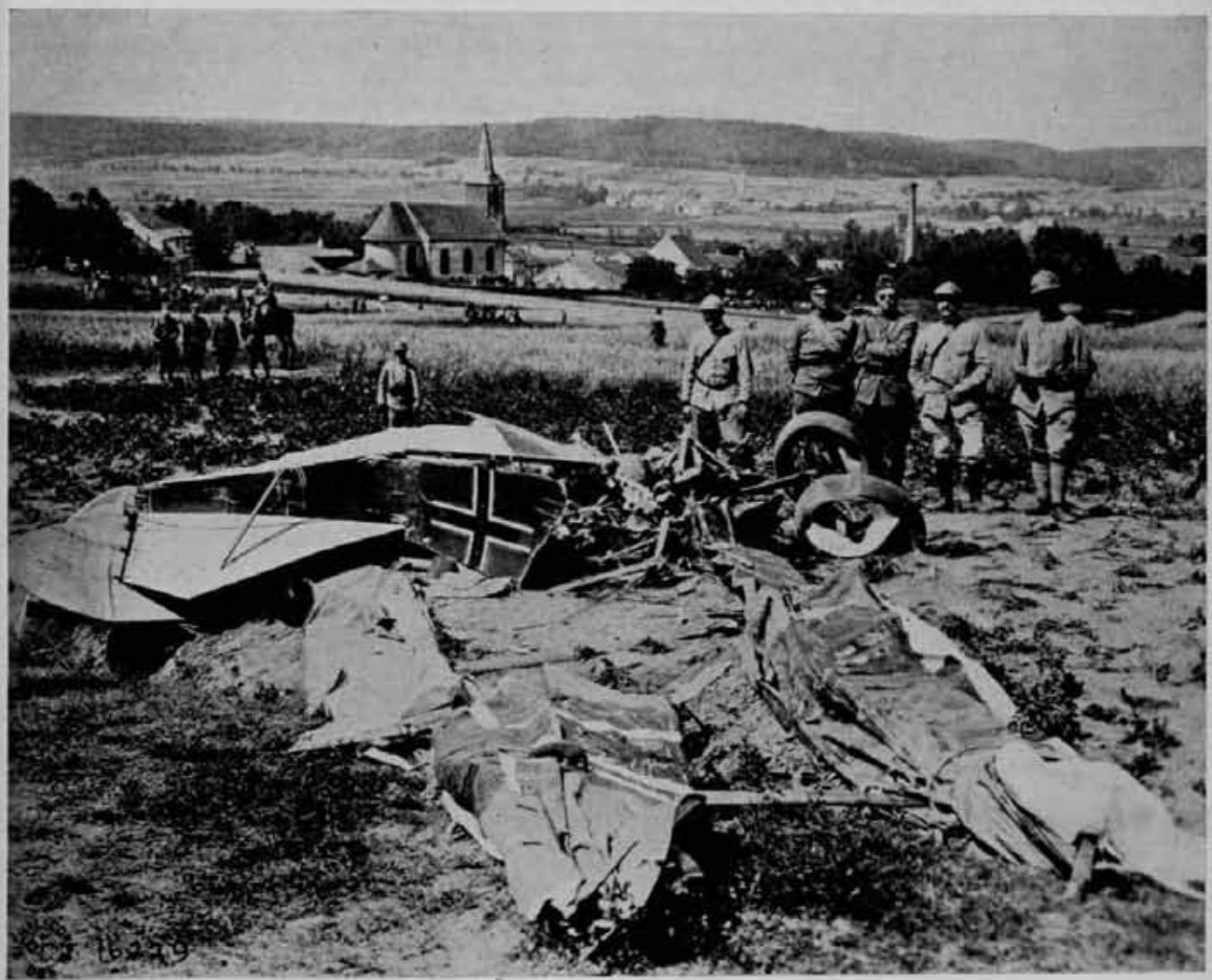
the Guard, to bombard Rheims. For nearly three hours the guns of the Prussian Guard shelled the city. Then General von Sückow, the Saxon division commander, succeeded in getting word through that his troops were holding Rheims.

Though the Saxon forces occupying the city suffered no casualties, this bombardment killed or wounded some forty civilians and caused serious damage to the cathedral. Naturally, the French held it up to the world as an act of ruthless and pointless barbarity, but actually it was the tragic result of a series of errors and misunderstandings, of rivalry between two commanders and of defective staff work.

Later General von Hausen wrote:

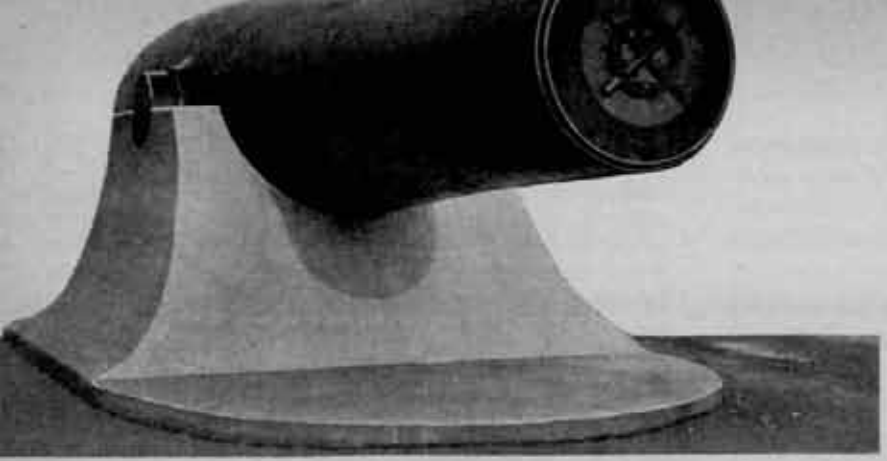
> Never the slightest word of explanation or . . . of apology in connection with this incident came to me from any Prussian military authority . . . I did not attach any special importance to all this episode because it reduced itself to negligence of various sorts, furthermore, it had no notable effect on the operations of the Third Army. Nevertheless, I shall not conceal how strange it seemed to me that I did not receive a word of explanation or excuse after the 2d Division of the Guard had opened fire, despite the danger to which Saxon troops were exposed. What a fine row there would have been if the situation had been reversed and Saxon artillery had fired on Rheims while it was occupied by the Imperial Guard!

The capture and bombardment of Rheims had little influence on the strategic development of the campaign. Indeed, the incident has been all but forgotten in the shadow of the greater events that surrounded it. Nevertheless, it is significant, for it provides a cardinal illustration of the lack of harmony and coöperation between the German armies. This constituted one of their most conspicuous weaknesses during the early weeks of the war. A few days later it would wreak havoc with German arms at the Battle of the Marne.



RESULTS COUNT.

The AA guns brought them down in the past—they can today—they will tomorrow.



RODMAN 20" SMOOTH BORE GUN
Plenty of Historical Background Here.

Fort Hancock Now Has Rival For Old Gun 40 at Fort Monroe

THERE are few among us who do not know of "Gun 40" at Monroe with its ancient and romantic history. There are some, among us, who shiver in our boots in anticipating that the old romantic piece of artillery may talk. We have been told that "daisies never tell." Let's hope our romantic "Gun 40" has the same virtue of continuous silence. Even if only half the legends are true and we could prevail upon our old friend to "speak" what a story we would have.

There is no claim that "Gun 2" at Fort Hancock, which is the subject of this article, has hidden in its cloistered recesses the same romance and parts of the intimate lives of some of us but it does have great historical interests as it represents the maximum development attained with muzzle loading, smooth bore cannon made of cast iron. Simultaneously with the perfection of the development of this gun was the beginning of the development of the breech loading rifled gun, to be followed somewhat later by the introduction of the use of steel as a gun material.

For years this mammoth piece of artillery has been lying in the grass at Fort Hancock. Recently it was mounted at the head of the road leading to "The Old Brick House." The difficult operations of moving and mounting were solved by that splendid old Artilleryman, Master Sergeant Louis Razga, United States Army, retired.

The handsome solid brass ornament to the brass tampion shown in the muzzle was discovered by Captain W. C. McFadden, Headquarters Battery, 7th Coast Artillery (HD). The design as you will notice from the accompanying photograph is a very happy blending of the insignia of two closely allied branches, the Ordnance Department and the Coast Artillery Corps. This gun is one of the creations of Captain Rodman who, without question, was one of the great leaders in the development of modern artillery. He conceived the plan of casting guns by cooling from the interior. This was the conception of true genius. Due to this efficient method of casting guns, the American artillery at the time of the Civil War was in a leading position among the heavy gun systems of the world. The United States at that time was successfully producing the most powerful weapon known, the 15" Rodman gun. Anticipating the needs of the future and in a progressive mood, Captain Rodman in 1861 recommended, to the Chief of Ordnance, that the development of a 20" gun weighing about 100,000 lbs. be undertaken. Due to the outbreak of the Civil War and the need for quantity production of standard models of guns, the 20" smooth bore, cast iron gun recommended by Captain Rodman was not actually cast until 1864. Two of these guns were manufactured, and have the following characteristics:

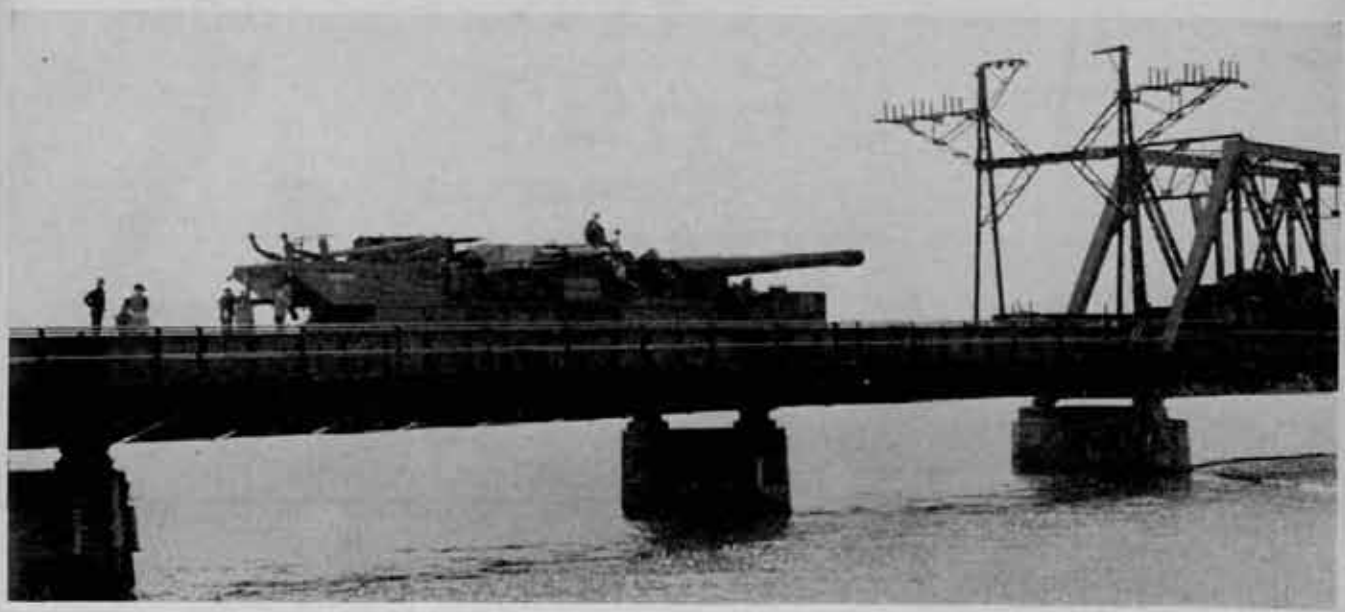
Model of 1861 20" Smooth Bore—Cast Iron
Weight—115,100 lbs.
Length of entire piece—243.5"
Length of bore—210."
Diameter at base line—64"
Diameter at muzzle—34"
Maximum diameter—64"
Diameter of trunnions—18"
Maximum powder charge—200 lbs. of Mammoth Powder
Projectile—Shot 1,080 lbs.
Projectile—Empty shell 725 lbs.
Elevation—25° Range 8,000 yds.

One of these 20" Rodman guns was emplaced at the Narrows in New York harbor at Fort Hamilton, N. Y. The other gun was retained at the Sandy Hook Proving Ground, N. J. which is now Fort Hancock. Although this gun does not contain the same romantic history "Gun 40" has and you and I can look at it with no fears of it telling the stories of our intimate life, it still is a treasure, and the Commanding Officer of the Harbor Defenses of Sandy Hook should be complimented upon putting it in such an attractive setting.

TRANSPORTATION PROGRESS

Civil War: During the Civil War this combination made four miles an hour sometimes, and the oxen suffered.

Several Answers to the Oxen's Dream

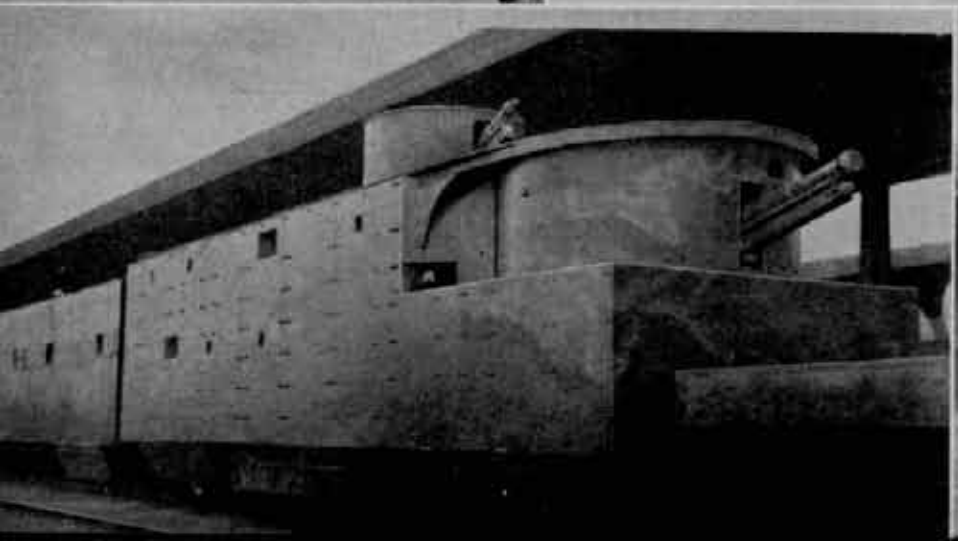


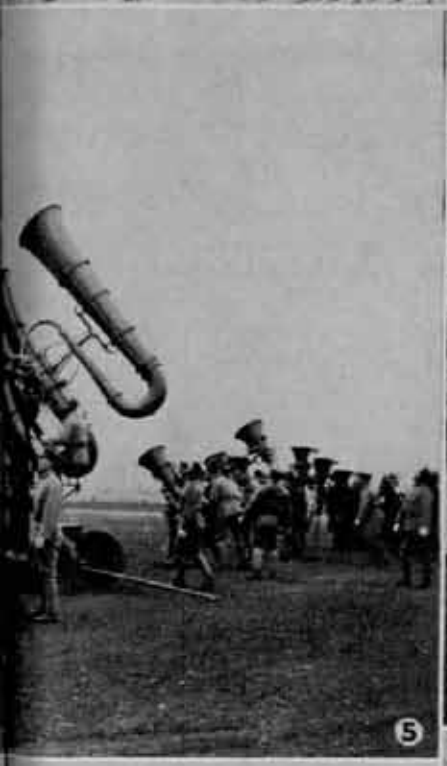
Today: Our most modern railway gun with its engine traveling across the continent from the Pacific to the Atlantic.

Today: Our latest eight-inch howitzer carriage, towed by a prime mover, with 3-inch AA gun mounted on it, can travel at fifty miles per hour. *Perfection.*

FAR EAST

1. China—13.2 Hotchkiss Anti-Aircraft gun.
2. China—Armored car.
3. China—Soldiers following targets with horizontal pointer and range cylinder.
4. Japan—Comparator in use at Yatsu beach.
5. Japan—Audiphones sound locators.
6. Japan—Anti-Aircraft Machine gun squad.
7. Russia—Anti-Aircraft guns.
8. Russia—150 C. M. search light portee.
9. Russia—203 C. M. howitzer mechanized.





A Device for Training Stereoscopic Observers

By Captain Robert W. Crichlow, Jr., C.A.C.

EVER since the introduction of stereoscopic height finders into the antiaircraft fire-control system, there have been efforts to produce a satisfactory device for training stereoscopic observers. Several more or less complex and expensive trainers have been designed and manufactured by commercial concerns, but these have not been issued to all units equipped with stereoscopic height finders.

There is a definite need for a device with which preliminary training can be given before the beginner attempts to operate the height finder. Such a device should enable the candidate observer to appreciate the fusion of reticle symbols, what stereoscopic contact is, and how it is obtained. It should also enable the instructor to determine the candidate's accuracy in making contacts, and provide a means for developing and exercising the stereoscopic sense when the use of the range finder is not practicable.

The contrivance described in this article does not differ greatly in principle from some of the trainers used in the past. However, it has other advantages, for it can be built in a local machine shop at a cost of approximately two dollars.

The trainer is essentially an old-fashioned parlor stereoscope in which the familiar stereoscopic views of Niagara Falls are replaced by a pair of pictures (called a stereogram) representing the reticle of a height finder. Viewed through the stereoscope, the pair of reticles merge into one set of reticle symbols which appear to stand out in relief. Superimposed on each reticle of the stereogram is the figure of an airplane. The left figure is fixed. The right figure is placed on a piece of transparent celluloid which can be moved laterally, thus changing the distance between the two airplane figures. When viewed through the stereoscope, this lateral displacement of the right-hand figure causes the observer to receive an impression of movement in depth, that is, toward or away from the observer.

To demonstrate this same principle in another way, fix the gaze on a point on a wall, fifteen or twenty feet distant. Hold a pencil about fifteen inches in front of each eye. The two pencils should be identical and should be held vertically with the points at the same level. With the gaze still fixed on the wall, at first the observer will be conscious of four pencil images instead of two. Gradually the two inner pencil images will merge into one, which is known as the "fused image." If the pencils are then moved closer together while concentrating on the fused image, it will appear to move toward the observer and as they are moved apart it will appear to recede. This

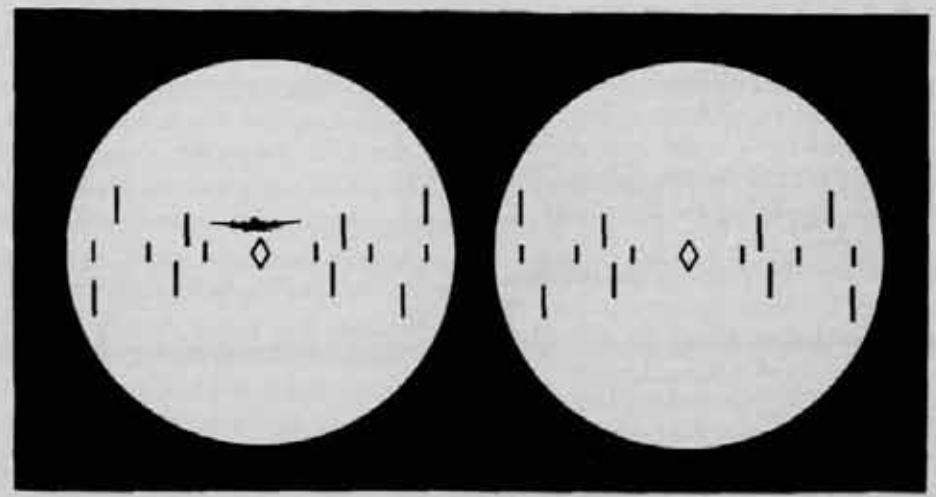


Figure 1.—*Reticle Stereogram.*

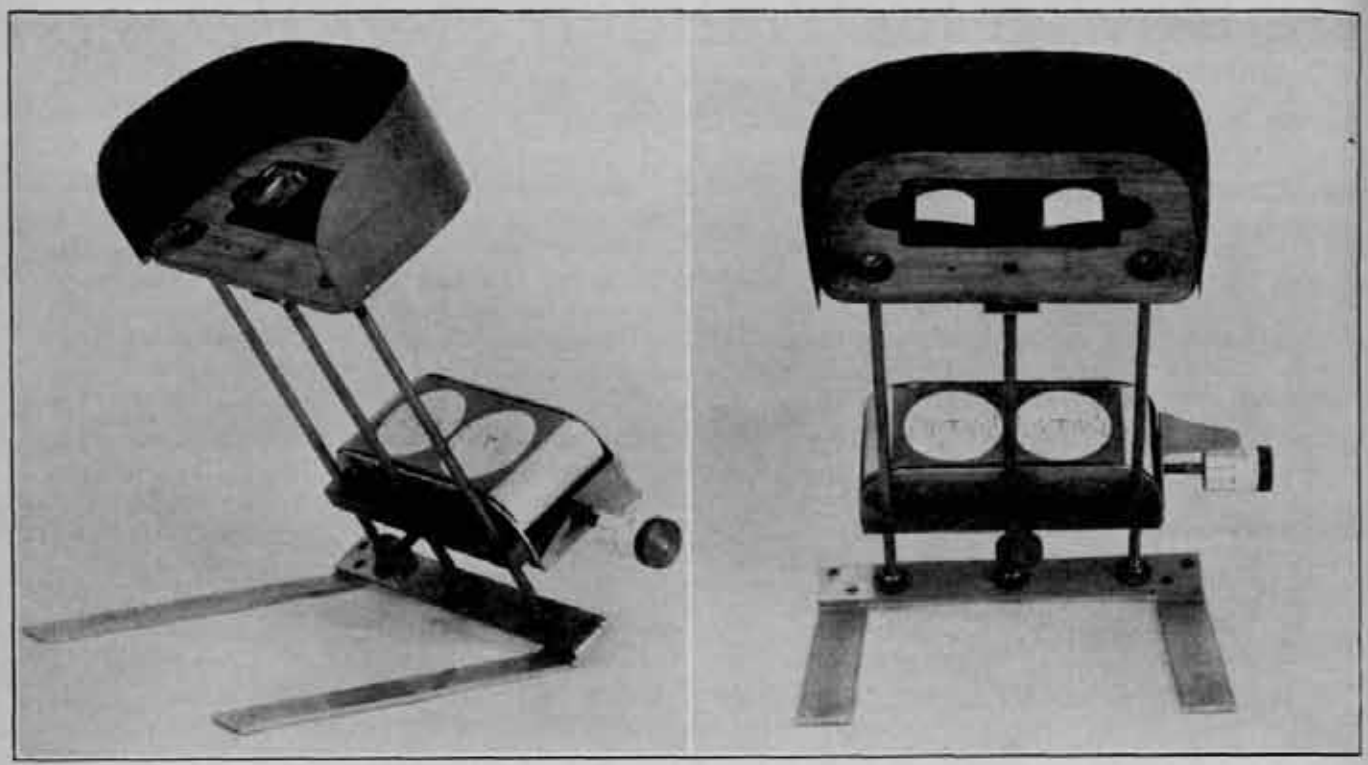


FIGURE 2.

approximates what happens when the airplane figures in the trainer are moved laterally, and also when the target image is moved by the measuring knob in the actual range or height finder. The explanation of this effect is beyond the scope of this article but if the reader is curious he will find his phenomenon discussed in current texts on the subject.

The reticle stereogram mentioned above is shown in Figure 1. Its position in the trainer can be seen in Figure 2. The details of construction are shown in Figure 3. The separate parts are lettered and their location is indicated on the assembly views by corresponding letters.

The reticle stereogram, Figure 1, should be cut out and glued onto the upper face of the block of wood (I) which is mounted in the three-sided metal holder (H). The reticle stereogram is covered by a transparent celluloid slide which carries the right-hand airplane figure. This figure is made on the slide by placing the right-hand side of the slide over the left-hand reticle and copying onto the celluloid the airplane figure appearing above the central diamond. The copy is made by cutting into the celluloid with a needle and then filling in with black India ink. By gluing the ends of a strip of tough paper to the ends of the celluloid strip, an endless belt (J) is formed. This belt should slide freely over the block (I) and the reticle stereogram.

In copying the airplane figure on the celluloid and in forming the endless belt, care should be taken to have the airplane figure on the right, the same distance vertically above its central diamond as the airplane figure on the left. Failure to do this will cause the observer to see two airplanes when the reticle symbols are fused.

A wood block (O) is fastened to the under side of the endless belt. The assembly view of the trainer shows how block (O) is connected to the threaded shaft of knob (K) through the brass strip (N). Turning knob (K) causes a lateral movement of block (O) and the endless belt (J) to which it is attached. Thus a lateral movement is transmitted to the right-hand airplane figure whenever knob (K) is turned. The knob (K) carries a paper scale for checking the consistency of readings when making a series of stereoscopic contacts.

The holder (H) is attached to the stereoscope frame through bar (G) which is fixed to holder (H) and drilled so as to slide on the three supporting rods (C) and (D). With the clamping screw (Q), this arrangement permits adjustment of the distance between the eye pieces and the reticle stereogram to suit the individual observer.

The stereoscope prisms can be procured from an optical supply company for approximately seventy-five cents.

The question may be asked "Why bother with a trainer at all when the height finder is available?"

The answer to this is that, in the early stages of training, many candidates find it difficult, if not impossible, to fuse the reticle symbols and to make stereoscopic contact when using the height finder. Some of these candidates might become good observers if given the proper instruction and training. It is probable that good observer material is sometimes cast aside because the candidates have not experienced the sensation of seeing stereoscopically, through a similar instrument, before attempting the height finder. The trainer should help to overcome this difficulty.

Practice on the trainer is fascinating. One or more of

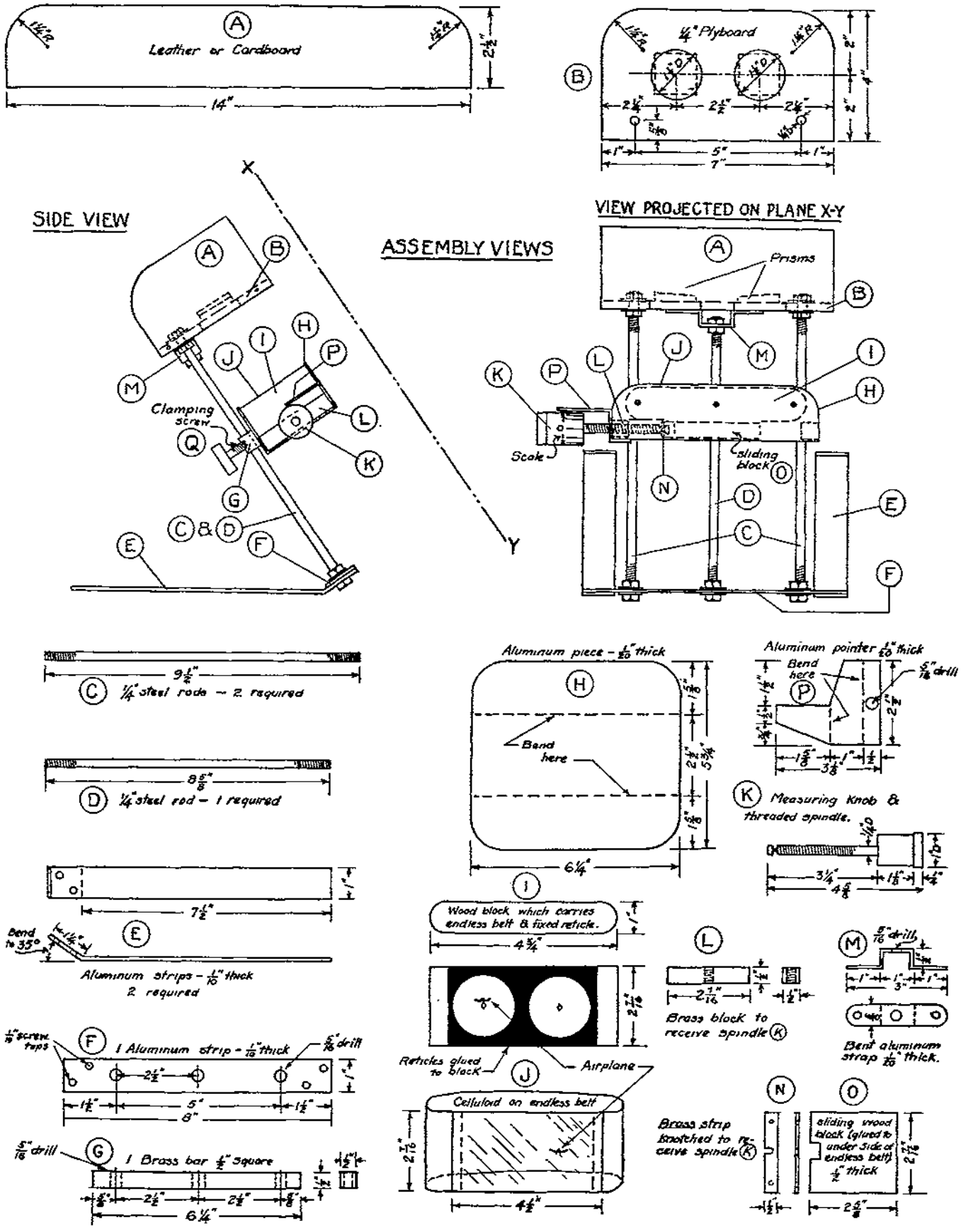


FIGURE 3.—*Details of Construction.*

the instruments placed in the day room of an organization, where all men could have access to them during their leisure, should serve as an aid in developing prospective observer candidates. The fact that they could practice making stereoscopic contact at times when they do not feel that they are being watched and judged by an instructor is important at this stage.

It should be clearly understood that training devices of this nature are not a cure-all for training troubles. The trainer supplements but does not replace the height finder as a training instrument. By far the greater part of the observer's training should be conducted on the height finder after he has reached the point where he can benefit from his training on that instrument.

Performance on the trainer is not necessarily an indication of what the candidate will do on the height finder. There are many adverse conditions encountered in the height finder, such as poor visibility, heat waves, light absorption and vibration of the instrument which are not present in the trainer.

The 62d C. A. (AA) Wins U. S. Coast Artillery Association Trophy

By Colonel F. K. Fergusson, C.A.C.

TARGET practice stands out as the most important feature of artillery training; and, say what you may, the results of a service practice are the real test of the capacity of a unit to deliver effective fire, and hence of its combat efficiency. Fire power is indeed the essential characteristic of antiaircraft artillery and in the training of AA units its attainment, as indicated in the target practice score, is the paramount objective.

High Morale was a Controlling Factor.

The part played by the regimental commander in preparing the 62d for target practice need only to be briefly outlined. To him fell the duty of preparing the scenery and setting the stage. The principal parts had to be played by the personnel doing the firing, acting under the close supervision and direction of the battery commanders, and so to them fell the task of developing exceptional fire power by which they were enabled to outshoot all their competitors.

What the regimental commander actually did is a short story. Yet with the voluminous recital of what he must do, must not do, may do or may not do, contained in the regulations, he was certainly not among the unemployed. It is sufficient to say that he planned and supervised the practices in such manner as to make possible the fine results attained. In accomplishing this, credit should not go to him entirely, for no command ever had a more faithful, competent, and zealous staff, particular credit being due the Executive and S-3, whose knowledge of antiaircraft artillery and skillful, diligent, and continuous application of this knowledge to conditions as they arose, were of inestimable value.

The preparation of a plan of training which was entirely satisfactory, wherein events could be made to follow in logical sequence, was not an easy task owing to numerous other training missions which interfered and which had to be fitted into the plan with the least possible interference with the continuity of the 62d's own training.

Particularly fine coöperation was attained in the tow-target missions. The two planes assigned to the 62d were based at an extemporized flying field at Fulton, about 10 miles south of Oswego. Landings after night missions had to be made at Syracuse, 35 miles distant.

The excellent scores of the 62d CA(AA) were not attained through accident, nor by any innovation or shortcuts, but by persistent, diligent and prolonged endeavor. There is no get-rich-quick course to excellence in antiaircraft artillery firing, nor any painless method through which excellence can be attained in operating the highly technical equipment of present-day antiaircraft artillery. Skill and dependability result from long continued, patient systematic, and persistent instruction, only. The real beginnings of success in the target practice in question took place in the barracks during the winter of 1935-1936. Thoroughness was insisted upon in this training, the individual gunners' instruction, to the end that battery commanders would have amply trained personnel out of which to form their teams.

Experience Gained in the Training of Other Components

After a period of team training, the training of detachments and batteries, came the training missions with other components, viz., 513th, 521st, 530th and 533d CA (AA)-Reserves, the R.O.T.C., the C.M.T.C., and in the training of the 212th CA(AA) National Guard of New York. The firing of the ammunition allowances provided for these organizations gave invaluable experience to the battery officers and the gun crews of the 62d. In fact, it is doubted whether any single feature contributed more to the immediate preparedness of the firing units for their service practice later on than this. Full advantage was taken of these firings, so the 62d was not a regiment of amateurs when it began its own practice on August 18th.

Selection of Firing Point

But even the best trained units may not attain good results unless conditions under which target practices are held are of the best. There are no satisfactory firing points near Fort Totten. The one locality in the Second Corps Area where conditions are propitious is on the South shore of Lake Ontario near Oswego, N. Y. Visibility over Lake Ontario is generally good, and there is but little interference from passing vessels at any time; moreover, the axis of fire is to the north and good camera records are obtainable at all hours. I have never made a better decision —nor one more appreciated by the regiment—than the one to go to Oswego for the 1936 practices. The 380 mile march from Fort Totten gave fine training in convoy work.

Equipment

A factor which can help or mar a target practice, normal for all commands, perhaps, but of concern, always, from the regimental commander's viewpoint, is the matter of equipment and accessories. Close watchfulness was exercised and checks made to insure that the necessary equipment and only the best grade of ammunition procurable were always ready, serviceable, and available to subordinate commanders when and as needed.

Opportunity Given Battery Commanders

Determined effort is made in the 62d CA(AA) to give battery commanders as near 100% of their personnel for training as is possible. The training program of the 62d CA(AA) has for two years contained the following:

> "Every officer and enlisted man must be trained, and attendance at such appropriate training formations as will attain this end is required. No officer nor enlisted man may be excused entirely. The attendance at training formations of officers performing essential staff or administrative duty, and of specialists such as radio operators, electricians, supply sergeants, mess sergeants, cook and the like, will be so arranged as to hours that the primary duties of such personnel shall not be seriously interfered with, but no officer nor enlisted man shall be excused continually."

This regulation was conscientiously enforced; the regimental commander and staff constantly drew personnel from other duties, from special duty, detached service and fatigue duty, to insure that the maximum possible number of men were made available to battery and detachment commanders for training. Persistent and continuous follow-up methods were invoked to insure the desired attendance at essential training, and that this attendance took precedence over all other duty during that phase of training immediately preceding target practice.

The foregoing paragraphs may be summarized in the statement that the regimental commander and staff were ever watchful to see that maximum opportunity was afforded subordinate unit commanders in the way of providing personnel, equipment, and facilities; and that the amount of time for accomplishing their missions thoroughly well was made available to them. The training of the 62d for its service practice and the preparations made for the practice were not abnormal; they were not characterized by departures from well known standard methods. These methods are basically sound and sufficient; failure to apply them zealously is more often the cause of unsatisfactory results, than *all* other factors combined.

The Matter of Training Handicaps

It may not be out of place to mention two handicaps encountered in carrying out the training program. The first is unfortunately prevalent in many if not in all commands. It is the matter of shortage of battery officers. As the target practice season for 1936 approached, the annual walk-out to schools and other duties began. These transfers are necessary, of course. It is only unfortunate that so many of them occur during the busiest part of the summer season. The regiment undertook its target practices with only 16 regular officers present out of an authorized strength of 31.

One captain had trained his gun battery for over a year and in all eagerness "pointed" toward this practice as one that would be a real event in his career; he had full confidence that the practice of his battery would be a record breaking one. It was. Much against his wish, he was detached for duty at the Camp Perry Rifle Matches, leaving his battery just three days before the regiment marched from its home station. Because of the greatly reduced officer personnel, there was no replacement available who had trained with the regiment. The command of the battery devolved upon a lieutenant who had just arrived for duty; he took hold and worked with commendable zeal and a fine grasp of the problems he had to solve, but the best he could do could not overcome the handicap. This battery established a "record"—it was the only one of the regiment which was not rated "excellent."

Morale

The last factor to be mentioned, but really the first in order of importance and without which the target practice could never have been so successful, is MORALE. Enthusiasm and cheerfulness characterized the performance of all tasks connected with the target practices. After all is said, the incontrovertible fact stands out in bold relief—no machine is any better than the mind and hand that control it. In the accuracy and effectiveness of fire direction, the man is everything. The results are due in a very large measure to the fine spirit of the officers and the enlisted men of the batteries, to their pride in themselves and in their organizations, and to their determination to develop a well-rounded, homogeneous team. Each officer and man in the regiment is entitled to generous praise for the part he played in contributing to the winning of this covered trophy.

Battalion and battery commanders functioned with zeal and confidence; therefore it is fitting that they should have opportunity to record their observations so the stage will now be turned over to them.

Guns

By Major L. D. Farnsworth

Progressive training of the batteries was conducted throughout the year. In addition to the usual preparatory training of the gun and range sections, both batteries were fortunate in that numerous opportunities to fire were afforded in conjunction with the training of the civilian components of the Army, during the period preceding target practice. The value of this additional training is reflected in the results obtained.

The practices of "B" Battery were held on August 26, August 28, and the night of August 31, 1936. Excellent results were obtained in all three practices, the scores being 107.65, 95.35, and 101.84, respectively. The average rates of fire for the practices were 21.47, 28.84, and 30.99 shots per gun per minute. That of the first practice was lowered due to malfunctioning of a fuze cutter; and, as a result, on one course, but one gun was in action. Hits were obtained on all courses except two, which were gliding targets. No corrections, except those due to trial shot fire, were made during the target practices.

No special methods of training nor special devices were employed.

Machine Guns

By Major E. H. Taliaferro, Jr.

Throughout the training season, all personnel of the two machine-gun batteries, who were in any manner associated with the determination or application of firing data, were given individual and group instruction in the estimation of target speeds and ranges, and the rapid conversion of leads into "target lengths." All instructional firing had as its ultimate goal, the attainment of individual proficiency in controlling fire by means of tracers. Intensive individual training during the preliminary period was possible, due to the fact that considerable ammunition was available. Throughout the target practice season all practices, both preliminary and record, were thoroughly analyzed with the result that much valuable information was obtained, thereby making possible the application of the proper corrective measures. Both batteries were fortunate in having assigned to them, just prior to target practice, numerous men who had recently returned from foreign service where they had served with AA machine-gun batteries. With the benefit of additional training, these men were fitted into the team and rendered valuable service.

Batteries "E" and "F" obtained excellent results for each of their practices, the average record scores being 228.1, and 285.1, respectively. During all record practices, the firing conditions were ideal. The results obtained may be attributed largely to a high state of morale and training.

Searchlights

By Captain R. E. DeMerritt

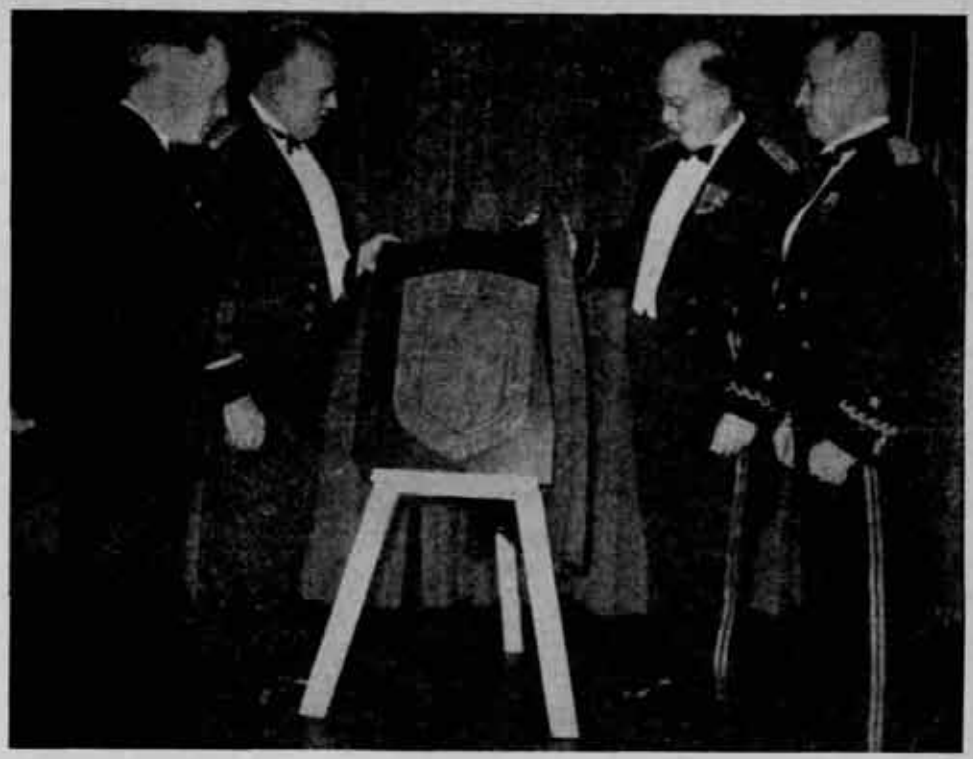
Due to the training requirements of other components of the Army, and the requirements of the gun and machine-gun batteries of the regiment for night training and practices, it was impossible to complete record searchlight practices at Fort Ontario and these practices had to be held later at Camp Upton. However, during the training of other components, advantage was taken of every opportunity to train the personnel in the operation of searchlights, sound locators, control station, and the installation and maintenance of communications.

Sixty-eight men were tested on the Binaural Training Instrument M-1 to determine their qualifications as listeners. Each individual was tested at least ten times both as to his ability to balance the sound, as well as to keep a continuous balance with a simulated moving sound source. Of the sixty-eight tested, twenty-two were found to be consistent. These men were selected for continuous training as listeners and acoustic corrector operators. Records were kept, showing the error of each individual. By this means the personal error for each individual was determined from the average of his daily errors over a considerable period of time.

Improvised Matériel and Methods

In order to facilitate the location of the target plane by other light sections, after one section had reported "Listeners on Target," a defended area plan was laid out on cross-section paper to a scale of 2,000 yards to the inch. The positions of the forward lights, advanced listening posts, and sector boundaries were plotted. Arcs, graduated to the nearest 100 mils, were described about the forward light positions and a small horizontal range conversion chart to the same scale was laid out at the bottom of the plan. This plan was mounted on a sketching board and covered with celluloid. When one searchlight section reported "ON TARGET," the telephone operator also reported the angular height and azimuth (as read from the control station) to the platoon C.P. By using the assumed altitude it was possible to plot instantly, and with nothing but a pencil, the approximate position of the target plane and give to the adjacent searchlight sections a relocation of the target plane from their positions both in azimuth and angular height. This enabled these adjacent searchlight sections to "pick up" the target plane with their sound locators immediately and without an undue amount of searching, and resulted in having an intersection of at least two light sections on the target long before it reached an angular height of 625 mils from the nearest searchlight, at which point "IN ACTION" was given. The course of the target plane was readily plotted from intersections from two light sections and checked from a third light section without difficulty prior to giving the command "IN ACTION."

Due to unfavorable weather conditions, rain, fog and mist, record exercises were not held until the latter part of October. Although the temperature was at or below the freezing point, personnel and matériel functioned perfectly.



LEFT TO RIGHT: *Governor Robert E. Quinn, of Rhode Island, Colonel Earl C. Webster, Brig. Gen. William H. Wilson and Brig. Gen. Herbert R. Dean.*

243d Coast Artillery (HD), Rhode Island National Guard, Wins Coast Artillery Association National Guard Trophy for 1936

THE 243d Coast Artillery (HD), Rhode Island National Guard, commanded by Colonel Earl C. Webster, has been announced as the 1936 winner of the Coast Artillery Association Trophy annually awarded to the most efficient Coast Artillery National Guard regiment for outstanding performance during the training year. In behalf of the Association the Trophy was presented by Brigadier General William H. Wilson, Chief of Staff, First Corps Area, to the officers of the regiment at the Annual Regimental Dinner held at the Squantum Club, East Providence, Rhode Island, Saturday, Febuary 13, 1937. The dinner which was a great success and a most enjoyable affair, was attended by all the officers of the regiment and many guests including—His Excellency Robert E. Quinn, Governor of Rhode Island, Colonel Joseph H. Gohn, Infantry, Officer in Charge of National Guard Affairs, First Corps Area, and Major LeRoy Lutes, CAC, representing the Chief of the National Guard Bureau.

Colonel Earl C. Webster.

The award of the trophy is based on several factors the most important of which are the results attained in target practices. The total score of the regiment is 95.78%. The regiment includes nine firing batteries, seven of which have been designated by the War Department as "Excellent" for the 1936 target practice season. The 243d manned and fired a variety of armament in 1936 to include:

2—12" Seacoast gun batteries DC
3—10" Seacoast gun batteries DC
1—12" Seacoast mortar battery
1—3" Antiaircraft gun battery
2—30 Caliber Antiaircraft machine gun batteries.

The trophy was first awarded in 1932 when it was won by the 243d Coast Artillery, Rhode Island National Guard. In 1933 the trophy was won by the 249th Coast Artillery (HD), Oregon National Guard. In 1934 the trophy was won by the 198th Coast Artillery (AA), Delaware National Guard. In 1935 it was won by the 251st Coast Artillery (AA), California National Guard. Hence the 243d Coast Artillery (HD), Rhode Island National Guard, has the distinction not only of being the first regiment to win the trophy when it was first awarded in 1932, but it is also the first regiment to win the trophy a second time.

The senior federal instructor of the regiment since July 1, 1935, has been Lieutenant Colonel Earl H. Metzger, C.A.C., United States Army.

Command Post Trailer

THE 213th C.A. (AA) Pennsylvania National Guard has developed, under the direction of its commanding officer, Colonel C. J. Smith, the improved command post trailer described below. Readers of the JOURNAL will remember that this progressive regiment also developed one of the original command post trucks, and that it was described in the January-February 1935 number.

In this instance, through careful budgeting of regimental headquarters' funds, they constructed the trailer at a cost of approximately $850.00. It is 22 feet in length, 7 ft. 8 in. high, and weighs 3,150 lbs. It was designed and built in about three months, by regimental personnel, namely, motor mechanic Sergeant Joseph L. Siessmayer, Sergeants E. C. Derr, George Horn, Corporal LaMont Krause, and Private C. Occeletto.

The sub-frame is of steel construction and the upper frame of white oak and ponderosa pine covered with plywood, insulated with felt and covered with aircraft "dope" finish. The exterior is painted "OD" with artillery red trim. The trailer is wired for a dual lighting system, 110 volts or 6-8 volts when there is no commercial line available. A 50-foot extension cord is used for plugging into service lines when possible. A one-cylinder power generator is used for charging the two batteries which provide light in the field. An abundance of service outlets in addition to the permanent lights provide for additional illumination, fans and radio power. Automatic brakes assure safe driving. Windows are screened with fine mesh copper wire screening. Compartments underneath the seats provide space in which to carry buckets, basins, lanterns and other battle impedimenta.

The trailer is designed to be used as a real command post in the field and not as living quarters.

In the forward part a map board occupies the center and it is flanked by two six-foot benches with upholstered seats and backs. Above the table are two compartments for use of the commanding officer and his executive officer. Beneath the benches are the spaces for various equipment such as buckets, etc., described above. The map board is sturdy and folds back into a space 24 x 30 inches. Underneath this space are three deep drawers. Adjacent to the seat is a two-drawer filing cabinet on top of which a small field desk is placed for the use of S-3. At the opposite side is a two-drawer file for use of S-1. In rear of this file there is a shelf provided upon which S-1 and the assistant adjutant may place field desks. Underneath this shelf are three compartments and the wheel housing. In rear is found a typewriter stand and organization field desk designed for use of each organization of the regiment.

Opposite the S-1 section is a map board for use of S-2 and the communications officer. In back of the map board is a box 8" x 12" x 5' in which rolled maps and draughting instruments are kept. Underneath the box

TOP: *Exterior—Sgt. Siessmayer, Designer*

CENTER: *Rear Interior Showing S-1 Section in position.*

BELOW: *Forward interior showing map board and operations map.*

Allentown Morning Call

are three large compartments. In rear of the communications map board is a box upon which a short wave or a standard radio set can be placed. Inside the box which is ventilated through a wire screen to the outside is found the power generator driven by a gasoline motor. Automobile-type batteries are also carried here.

Entrance is gained from the rear. Glass windows are raised and lowered by automobile fixtures. Green and red running lights are placed on rear and on sides of the trailer. The floor is covered with inlaid linoleum.

There has been provided in this trailer all the necessary means to insure that the commanding officer and his staff can operate efficiently in the field and under conditions conducive to the attainment of excellent results.

Wire-Laying Apparatus

By Staff Sgt. Cletus L. Luebbe, C.A.C.

ONE of the most difficult communication problems confronting us today is the rapid laying of wire over great distances. Units operating in the field are not equipped at the present time with proper devices for this purpose. Since the execution of prescribed tactical missions and the employment of units would be seriously interfered with unless some means were devised whereby wire could be laid over great distances in the minimum of time, study and efforts have been made to provide a suitable wire-laying apparatus.

The device described in this article was improvised from salvage material and tested during the First Army maneuvers and many field exercises. It has demonstrated that it offers a satisfactory solution to some of the wire-laying problems before us. Communication officers who are called upon to put in 50 miles or more of wire in a short time will find herein a possible solution to one of their most troublesome problems.

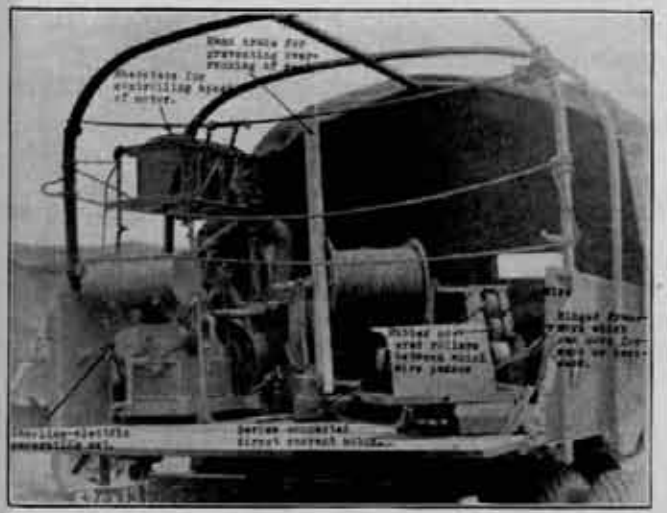
The apparatus consists of a gasoline-electric-driven reel from which the wire is led out through a guide to two rubber-tired rollers, from which it is thrown to the place where it would normally have to be put by hand. The speeds of these rubber-tired rollers, or wire throwers, are varied in such a manner that the wire can be drawn from the reel and thrown through the air to great distances at the desired rate. The rubber-tired rollers are mounted in a framework which permits them to be moved in both a horizontal and vertical plane. In addition to the rubber-tired rollers and their framework, there is installed in the wire-laying truck a direct current, gasoline-electric generating set, rheostats for controlling the speed of a series connected motor and a stand for supporting a reel of wire.

The mechanism operates under the theory that the wire having been put into motion possesses kinetic energy, and this energy throws the wire away from the conveyance in a manner similar to that whereby kinetic energy sustains the motion of a projectile which has been discharged from a gun.

The feasibility of using kinetic energy to throw wire from a truck to a desired distance off the road has been repeatedly tested. The most recent tests were held at Camp Upton, Long Island, New York, and are summarized below:

(a) Terrain covered.
Everything from paved road to forest trails over which the wire-laying truck could barely make progress.

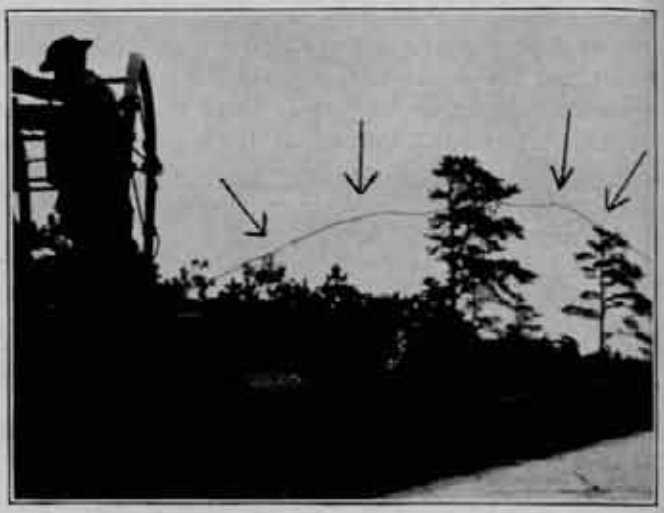
(b) Road Miles 27.50
Wire Miles (Estimated) 30.25
At least 10% more wire passed through machine than road miles covered due to slack put out for emergency.



Apparatus arranged for wire laying.

(A) *Wire guide support.*
(B) *Wire threaded through guide.*

Throwing wire clear of road at 25 m.p.h.



Wire in flight. Range 30 yards.

(c) Time wire layer operated continuously ..... 1 Hr. 11 Min. 50 Sec.
Time wire layer operated intermittently ..... 34 Min.
Time spent changing reels, splicing, testing, repairing defects found in wire and in instructing personnel ..... 4 Hr. 45 Min. 10 Sec.
Total operating time ..... 6 Hr. 31 Min.

(d) Wire-laying speed maintained while operating continuously on the road..... 21.63 M.P.H.

(e) Wire-laying speed maintained while operating intermittently through forest trails ..... 2.82 M.P.H.

(f) Average M.P.H. (Road Miles) for completed communications ..... 4.22 M.P.H.

(g) Average M.P.H. (Wire Miles) for completed communications ..... 4.64 M.P.H.

This test showed that so long as the machine could be supplied with wire its speed would match the speed of the truck on which it was mounted—and that it would pay out slack wire at the desired distance from the truck. For one stretch of eight-tenths of a mile on excellent road an average of 36 M.P.H. was attained. During this part of the test the wire thrower threw the wire about 30 yards off the road while the truck was in motion.

The results of this test were considered most satisfactory by all the officers and other observers present. It should be remembered that the device being tested was purely an experimental one and in no way a finished product. It is believed reasonable to assume that even under adverse conditions a properly constructed apparatus of this type could establish completed communications of at least 15 miles per hour. This device presents the following advantages:

Construction

1. Simplicity of design.
2. Low cost of construction.
3. Light weight, sturdy, and dependable.
4. No clutches, gears or complicated system of shifting used.
5. Flexibility of speed control.

Operation

1. In laying field wire it lays wire at a rate which conforms to the rate of travel of the truck and in addition it will pay out the required amount of slack or spare wire.
2. It will throw wire varying distances away from the truck by varying either or both the rate and angle of discharge.
3. It facilitates laying wire correctly and rapidly and eliminates the necessity for removing any wire from the road manually.
4. The usual snarling, twisting and straining of the wire is eliminated.
5. It requires no great amount of training or special qualified personnel for its operation.

In operation the rollers grip the wire and as the rollers are put in motion the wire reel is caused to revolve. Once the desired speed is attained, the motor merely supplies enough energy to overcome friction and to supply the increased energy stored in the reel. The reel continues to gain increased energy, because, the desired wire speed having been attained, the core of wire on the reel reduces in diameter as the wire is paid out and to keep the speed of wire constant the r.p.m. of the reel must increase. The rollers and motor function to change the direction of motion of the wire from a rotary motion on the spool to a forward or linear motion off the spool.

The direction of discharge of wire from the rollers is controlled by moving the upper roller forward or backward for elevation and moving the rollers and motor as a unit in a horizontal plane controls the horizontal direction of discharge.

COAST ARTILLERY ACTIVITIES

Office of Chief of Coast Artillery

Chief of Coast Artillery
MAJOR GENERAL A. H. SUNDERLAND

Executive
COLONEL HENRY T. BURGIN

Personnel Section
MAJOR CLARE H. ARMSTRONG

Matériel and Finance Section
MAJOR C. W. BUNDY
MAJOR H. B. HOLMES, JR.
MAJOR S. L. MCCROSKEY

Organization and Training Section
LIEUT. COL. C. M. S. SKENE
MAJOR AARON BRADSHAW, JR.
MAJOR W. H. WARREN

Plans and Projects Section
LIEUT. COL. JOHN L. HOMER

Fort Monroe News Letter

BRIGADIER GENERAL JOHN W. GULICK, U.S. Army, *Commanding*

COLONEL HORACE F. SPURGIN
Commanding Harbor Defenses of Chesapeake Bay and 2d C.A.

LIEUTENANT COLONEL EUGENE B. WALKER
Commanding 51st C.A.

LIEUTENANT COLONEL FREDERIC A. PRICE
Commanding 52d C.A.

By Major Oliver B. Bucher and 2d Lieutenant H. Bennett Whipple

GENERAL and Mrs. Gulick and Miss Jean Gulick arrived on the post on January 3d, from the Philippines. General Gulick succeeded General Tracy as Post Commander, Commanding General Third C.A. District and Commandant of the Coast Artillery School.

On January 15, the Commanding General G.H.Q., Air Force, Major General F. M. Andrews, the Chief of the Second Wing, G.H.Q., Air Force, Brigadier General H. G. Pratt and Colonel W. R. Weaver of Langley Field, came to Fort Monroe and paid their respects to General Gulick. They were met by an escort of honor from the 2d Coast Artillery.

On the same day General and Mrs. Sunderland arrived to pay a visit to Major and Mrs. Eustis Poland. General Sunderland declined an official welcome. He did, however, look over the troops who were to participate in the inaugural parade.

The rifle battalion of the Second Coast Artillery represented the Coast Artillery in the inaugural parade. Intensive training for this event started on January 11th under direction of Major E. M. Benitez, 52d C.A., who was selected to command the battalion. The men, in mass formation, carrying rifles and bayonets fixed, marched and marched under Major Benitez' tireless hand. The people of the garrison awoke mornings to the martial notes of the 2d C.A's band which was strutting up Ingalls Road headed by him and followed by the massed battalion. The Second practiced and paraded daily. At first the massed formation appeared like a choppy sea spirited in from the bay but by January 15th the outfit was functioning like a well-oiled machine. The long hours of marching around the post hardened the men for what was to come. On January 16 they were reviewed by General Sunderland, General Gulick and Colonel Spurgin. The troops presented a smart appearance.

On January 19 the convoy with Capt. H. H. Newman as convoy officer, proceeded to Fort Belvoir, Va., just outside of Washington. An advance party under command of Capt. H. A. Brusher had gone ahead on January 17th. The trip to Fort Belvoir, Va., where our troops were to be quartered, was made in excellent order and was uneventful except for the difficulties encountered due to rain and mud.

No place was available at Fort Belvoir to clean up our newly painted and polished antiaircraft unit. The unit was finally driven to Washington, D. C. and was quartered in the Post Office Building garage through the courtesy of Capt. F. F. Bernsdorff of the District of Columbia National Guard. The garage was so tremendous that it was actually difficult to find our motor convoy. The vehicles were cleaned and polished and made ready for the parade.

The movement to the parade formation was made under trying conditions. All the men were well soaked by the rain that persisted throughout the trip. To add to our discomforts we arrived in position and stood in pouring rain for well over an hour without raincoats. Horstmann overcoats and boots by Peal had a real test on that day! Finally the President completed his delayed luncheon and the parade proper commenced. The Second Coast Artillery Band under the iron hand of Warrant Officer M. A. Quinto played without ceasing and helped us to forget our troubles with "Over There" and other World War tunes. Just as the Coast Artillery troops passed the President, the rain, which had been tumbling down for ten solid days, ceased. It had succeeded in ruining a potential record parade. The entire command returned to Fort Monroe the next day, having had a tough trip and very little fun, and with some half-dozen men left behind with influenza. Thanks and praise were showered on the Second Coast Artillery, the sole representative of the Coast Artillery in the parade. The President, Chief of Staff, and the Chief of Coast Artillery all extended their appreciation. The following letter was received from General A. H. Sunderland:

THE 2D COAST ARTILLERY AT THE 1937 INAUGURAL PARADE
UPPER RIGHT: *Colonel H. F. Spurgin, Regimental Commander.*
UPPER LEFT: *Major E. M. Benitez, Rifle Battalion Commander.*
LOWER RIGHT: *2d Lieut. H. B. Whipple, Regimental Adjutant.*

January 21, 1937.

Subject: Troops—Inaugural Parade.

To: Commanding General, Fort Monroe, Va.

1. I wish you would express to each member of your command, who may have participated in the Inaugural Parade in Washington on January 20th, my appreciation of the fine appearance presented by the Coast Artillery unit.

2. I feel that the work and discomfort involved were all for a good purpose, namely perpetuating the high record of the Coast Artillery Corps for soldierly attainments and smart appearance.

A. H. SUNDERLAND,
Major General,
Chief of Coast Artillery.

Orders were received on January 28 to prepare four mine yawls for the flood areas in the middle west. Engines were tuned up, crews were picked, four flat cars were made ready for the trip—but the flood subsided!

A northeaster hit Fort Monroe on the 29th and all prepared for a repetition of our minor hurricanes. The post was flooded, cellars had four or five feet of water therein, and the post was a general mess. After the change of the tide the storm died without doing much actual damage; 4.08 inches of rain had fallen in twenty-four hours.

A few interesting miscellaneous notes of the post include, the plowing and seeding of the parade ground which means no parades for several months; complete painting job of the Tuilleries and even the old 100 building; a new cable from Fort Monroe to Fort Wool put in by the Cable Ship *Joseph Henry*, under the command of Captain Burgo D. Gill.

On February 13th the Dutch Submarine O-16 ducked in to Norfolk, Va. to touch up a bit before putting in an official call at Washington, D. C.

Since Christmas, Fort Monroe has lost many officers and gained very few. At present conditions are such that a Reserve officer on one year active duty must command a battery. A recent study shows that a Fort Monroe Battery has an average of four commanders a year. Capt. J. H. Rousseau and Capt. A. D. Miller, have been placed on CCC duty. The death of Capt. A. P. Bruner, a Harbor Defense officer on detached service, brought sorrow to the entire garrison. Captains A. M. Wilson and F. R. Chamberlain have spent considerable time in Walter Reed General Hospital. Lieutenant J. J. Lane arrived on the

post on February 22d. His family followed on March 1.

Recent visitors at the Coast Artillery School include Colonel Avery J. Cooper G.S.C. (C.A.C.); Majors Aaron Bradshaw, Jr., Clare H. Armstrong and S. L. McCroskey from the Office of the Chief of Coast Artillery.

Eleven students were graduated on January 29th with the Special Clerical Course, Department of Enlisted Specialists, and a new course opened on February 1st with a full complement of twenty students.

Recent lecturers at the Coast Artillery School have included Dr. Douglas S. Freeman; Commander F. D. Wagner, U.S.N.; and Lieutenant Commander J. L. Holloway, Jr., U.S.N.

The fall athletic season at Fort Monroe wound up with a football smoker on January 14th, held at the Noncommissioned Staff Officers' Club, for the purpose of presenting athletic awards to members of the post team. Major Oliver B. Bucher, acting as master of ceremonies, expressed the appreciation of the garrison for the work done not only by the team and the officers connected with it but also by the men behind it, particularly Tech. Sergeant James Beattie, Tech. Sergeant J. C. Todd, and Sergeant E. J. Bartsch. Lieut. E. W. Thompson, an outstanding player, Lieut. George W. McCoy, the medical officer for the team, and Major J. L. Hartman, the coach, delivered short speeches. Awards were then presented by Colonel H. F. Spurgin.

The post basketball team, after a slow start in which it lost to the Norfolk "Blue Devils," and the Norfolk "Cops," and the Naval Training Station got away to a fine season. The team was entered in what amounted to three leagues. The Hampton-Roads All-Service League, formed after the season was already under way, included the Naval Training Station, the Norfolk Marines, Langley Field, and Fort Monroe. Monroe won all but two of the games in this series, both losses being to the Training Station. Consequently the "gobs" copped first place with Monroe second. The battle between these two teams however was not over. There still remained the "army-navy" tilt for possession of the Allen-Reeder trophy on which the training Section already had two legs. After a fast, hard game on the Langley Field court, on February 13th, before a crowd of some 600 rooters, Monroe stalked off with the trophy; score, 37-32.

The last series in which the Monroe cagers took part was the Third Corps Area Championship Series. Possession of this title was to be decided by a play-off between the winners of the northern and southern districts, the latter being subdivided into the Washington and Monroe circuits. Fort Monroe took the first four games for the best four out of seven from Langley Field, thus cleaning up the Monroe circuit. Warrant Officer A. W. Christensen then took his team to Washington to meet Fort Belvoir, the winner of the Washington circuit. There, in two hard-fought games on the Haurick Court, Monroe lost, 32-45 and 42-46.

In preparation for the seventh annual Third Corps Area Boxing Tournament several boxing shows were staged. To date, two benefit shows have been held in the central garage at Fort Monroe. Both cards, made up with a few outside fighters were received with enthusiasm. Staff Sergeant George E. (Speedy) Lawrence, well known in boxing circles, handled the match-making and Corporal Manuel Orthys trained the squad. Roland Potter of Btry. "A," 51st C.A.; C. N. Tomalunas of the Quartermaster Detachment, and Alfred Forbes of Btry. "A," 51st C.A. are the outstanding fighters with promising futures in army boxing. It is intended to hold two or three more boxing smokers after which several of the best men will be sent to Baltimore to compete in the championship bouts.

On February 23d at the Fort Monroe Y.M.C.A. medals were presented to the winning inter-battery teams in swimming, bowling, volley ball, and cross country. After a short introduction by Lieut. Cordes, the recreation officer, Colonel E. B. Walker congratulated the various men and presented the medals. First and second place in volley ball were taken by Btry. "A," 51st C.A. and Headquarters Battery 51st C.A. respectively. Bowling was won by the C.A. School Det. with Btry. "D," 52d C. A. second. Pvt. Bowen of Btry. "D," 52d C.A. second and third.

In the swimming competition the honors were rather evenly divided between Headquarters Battery, 2d C.A. and Battery "A," 51st C.A., Btry. "F," 52d C.A. and the C.A. School Detachment. Following the presentation of the awards coffee and doughnuts supplied by the Y.M.C.A. were served, and everyone proceeded to a boxing tournament held as part of the entertainment.

The garrison is now looking forward to the arrival of the new C.A. School students and is preparing for the strenuous spring training at Fort Story, Virginia.

Major General F. M. Andrews, Brigadier General H. C. Pratt, Brigadier General J. W. Gulick, Colonel W. R. Weaver, 1st Lieutenant A. L. Fuller on Coast Artillery School steps at Escort of Honor for visiting officers, January, 1937.

Hawaiian Separate Coast Artillery Brigade News Letter

BRIGADE COMMANDER, BRIGADIER GENERAL JAMES A. WOODRUFF

CHIEF OF STAFF, COLONEL BENJAMIN H. L. WILLIAMS, C.A.C.

S-1, LIEUTENANT COLONEL E. C. DESOBRY, A.G.D.
S-2, MAJOR JOHN T. LEWIS, C.A.C.
S-3, LIEUTENANT COLONEL RALPH E. HAINES, C.A.C.
S-4, LIEUTENANT COLONEL J. P. SMITH, C.A.C.

LIEUTENANT COLONEL HENRY C. DAVIS, JR., C.A.C.
Com. and Engineer Officer

Sixty-fourth Coast Artillery (AA)
COLONEL RALPH M. MITCHELL
64th C.A. (AA)

Harbor Defenses of Pearl Harbor
COLONEL EARL BISCOE
15th C.A.

Harbor Defenses of Honolulu
COLONEL G. A. WILDRICK
16th C.A

By Lieutenant John J. Stark, ADC

CHANGING THE GUARD

THE arrival of Brigadier General James A. Woodruff and the departure of Brigadier General Robert S Abernethy were fittingly observed in a brigade review held on January 15th. Troops from Fort Shafter, Fort Kamehameha and Fort Ruger all joined in honoring the former and present Commanding Generals of the Hawaiian Separate Coast Artillery Brigade.

General Woodruff comes to the brigade from the San Francisco Port of Embarkation, to which post General Abernethy succeeds. With the new Commanding General came Mrs. Woodruff, to whom the Coast Artillery Corps is nothing new. Mrs. Woodruff has a military heritage of her own, as her father, the late Brigadier General Henry W. Hubbell, was with several coast artillery units before he retired in 1905.

To greet the many officers and ladies of the command, General and Mrs. Woodruff held an "At Home" on February fourteenth. The officers and ladies called between the hours of five and seven, and enjoyed the excellent music of the 15th Coast Artillery Band of the Harbor

REVIEW HSCAB FOR GENERALS ABERNETHY AND WOODRUFF. *Colonel Mitchell, General Abernethy and General Woodruff leading.*

LEFT TO RIGHT: *Lieut. Col. Haines, Col. Williams, Brig. General Abernethy, Brig. General Woodruff, Lieut. Vestal, Lieut. Watkins.*

Defenses of Pearl Harbor under the direction of Warrant Officer Frank Frank.

Target Practice and Maneuvers

At the various posts efforts are bent toward early target practices and joint maneuvers. The maneuvers have been moved up nearly two months this year to coincide with the arrival of the United States Fleet.

The 64th Coast Artillery (AA) is due to start its annual antiaircraft target practice very soon. This year, indications are that the site will be Nana-kuli instead of the familiar Waimanalo Beach. It is contemplated, too, to send the gun batteries out by battalions rather than to send the entire regiment out at once.

These target practice arrangements will fit in with the small "resurrection" program in which they are engaged to fix up the barracks. New construction there still seems to be a little way off. Meanwhile, the old buildings must be kept up and that is the reason for the small "resurrection" program.

Lieutenant Gordon H. Holterman is the only new arrival at Fort Shafter.

At Fort Kamehameha efforts are being directed toward an early target practice season, with the 1st Battalion 55th, the 41st and the 15th all planning activities. However, all target practice seasons are subject to revision because of the Army-Navy Maneuvers, which will come between April 15th and May 15th, this year. The officer personnel has recently been augmented by Lieutenant Colonel Herbert H. Acheson, Captains George M. Badger and Joseph F. Simmons, and Lieutenants Robert F. Tomlin, Robert Morris and Calvin L. Partin—quite a sizable increase.

Captain Lester D. Flory has been assigned to Fort Ruger. At this post the 2d Battalion 55th is engaged in antiaircraft gun practice at Sand Island. Just as soon as the heavy, and rather unusual rainy season is over, the guns should go into action.

Social Activities

The Diamond Head post continues to lead in the number of bachelors to lose their status. Since January 1st, both Lieutenant Harrison F. Turner and Lieutenant Theodore F. Hoffman have gone up the aisle—the former with Miss Tyler and the latter with Miss Linnemann. Congratulations.

Athletic Forecast

Fort Kamehameha continues to lead in the basketball league now at the height of its season. They have just turned in their twenty-fifth straight win and if this keeps up they will be going on tour soon. Lieutenant Moorman has been very helpful toward his team's success. He is fourth high scorer in the Sector-Navy league so far this year.

Boxing is at the height of the season with the 64th (AA) leading and Fort Kamehameha and Honolulu following in order. The season is proving a most interesting one, with many of last year's champions taking a licking once in a while from the new boxers who are not a bit backward in displacing last year's winners.

The race for boxing honors is too close to even attempt to select the probable team winner for 1937.

Already inter-battery baseball is under way and indications are that there will be plenty of new material to fill the ranks of the depleted Sector baseball teams. Track and field athletes can be seen every day on the different fields, practicing for their events in the coming competitions. With spring rapidly advancing, it will only be a short time until we can give you the results of the spring sports.

There are some very good rumors in the air about building up the DeRussy pavilion into something approaching an Army-Navy Club. This popular part of Waikiki has been flourishing ever since the paddle tennis courts, handball courts, and the new roadways were put in. Not a favorable afternoon passes that many officers and their families do not take advantage of the fine beach that fronts the pavilion. Now it looks as if it will become an even more popular social gathering place. Aloha.

Fort Totten News Letter

Colonel Frank K. Fergusson, *Commanding*

By Lieutenant Colonel E. E. Bennett, C.A.C.

PERHAPS it is unbecoming for an organization to indulge in self-aggrandizement, but there are occasions when it is appropriate to let others know what is happening at places beyond their immediate horizon. Therefore it is hoped that we will be forgiven if we use the JOURNAL to inform our hosts of friends of the doings at Fort Totten, and at the same time furnish a little food for the development of our personal ego; not that we need any additional publicity for truly enough honors have been garnered by the "archies" to satisfy the desires of the most grasping. The 62d C.A. (AA) will never be content to rest on honors won and notice is hereby served that the antiaircrafters are making plans to add additional stars to the crown.

So many things of importance have happened since the appearance of the previous Fort Totten news letter that it is difficult to single out only those deserving of mention, but an attempt will be made to cover the most noteworthy. Naturally, the winning of the U. S. Coast Artillery Association Trophy is of the greatest importance to the regiment and of paramount interest to the Corps. This coveted symbol of excellence is awarded annually by the Association to the regiment that, during the previous year, established the best record in target practice. The

62d came through with all sails set and colors flying. Two of the four batteries, viz., Battery "F," commanded by Capt. John W. Dwyer and Battery "E," commanded by Capt. James L. Hogan, stood at the top of the list of machine-gun batteries with average scores of 285.1 and 228.1 respectively. These scores we put up as targets for other organizations to "shoot at"; time alone will tell whether they can be equalled or exceeded. Battery "B," commanded by Capt. Leon A. White, turned in an average score of 101.6 which placed it well up on the list of AA gun batteries. Battery "A," commanded by Capt. Robert E. DeMerritt, is also found in the "excellent" class with an average score of 151.2. These records have passed into history but they have not been forgotten and the memory of the outstanding performance is kept fresh by the unusual number of "red E's" appearing on the right sleeve of nearly all wearers of the 62d insignia. Plans are now being considered for the presentation ceremonies, and it is planned to make this an occasion long to be remembered by the regiment and its legion of friends.

Upon completion of the target practice season, the regiment assembled at its home station to indulge in other less spectacular but equally important duties. The first of these was small arms target practice, held at the beginning of the indoor season. In this more than 60 per cent of the regiment qualified as marksman or better. Next in order was intensive concentration on gunners' instruction. This period is not yet at an end but to date more than 600 members of the regiment have qualified as expert gunner and many others are waiting to take the examination.

The work of rehabilitating and renovating the post of Fort Totten has been under way for many months. This is progressing according to schedule and upon its completion all barracks and quarters will be in excellent condition. The WPA furnished all labor and material but the work is performed under the supervision of the Post Quartermaster, Major Norman Minus. Practically all quarters have been thoroughly overhauled and modernized. In the noncommissioned officers' quarters new electric ranges have replaced the old coal-burning stoves. An obsolete fire command station has been converted into an apartment house accommodating four families and at a later date other buildings will be converted into living quarters. The old brick stables have been modified into a barrack for the Quartermaster and Medical Detachments. Improvements have not been limited to barracks and quarters but include many post utilities. The unsightly fuel storage sheds, near the main entrance, have been replaced by a new concrete coat pit while several of the buildings formerly used for the storage of submarine mine property have been converted into maintenance and paint shops to facilitate the upkeep of the motor transportation. The renovation of the Officers' Club has been completed, and Fort Totten now possesses one of the finest clubs to be found in the Army. Other improvements under way or projected include the erection of new garages and service station for the motor equipment; the modernization of the electric systems by placing the circuits underground; a complete overhaul of the post telephone system; construction of a new sewage disposal system; construction of new roads and the resurfacing of existing roads; the erection of a boundary fence and the filling of the marshy land on the southwestern part of the reservation. This latter is being done with the assistance of the New York City Department of Sanitation. This department has cooperated by hauling ashes to the reservation. This project eventually will prove a boon and materially increase the usable area of the reservation by providing additional ground for tactical and recreational purposes.

The Y.M.C.A., under the direction of Mr. Arthur G. Beck, not to be outdone by other activities, has launched an expansion project. The plans contemplate the erection of a new gymnasium with seating capacity for approximately 1,000 spectators; courts for basketball, indoor tennis, handball, and squash. Also, an indoor swimming pool with the most modern equipment for heating and sterilizing water so that the pool can be used throughout the year. To this will be added modern locker rooms and showers, bowling alleys and other greatly needed facilities for the recreation and entertainment of the garrison. Two new concrete tennis courts recently have been completed. Provision was made so that these courts could be flooded to provide ice skating, but the mildest winter in the history of New York outsmarted us and the garrison will have to wait for another winter before "going on a skate."

With the coöperation of the WPA authorities, the Y.M.C.A. has put on an educational and recreational program without equal in the Army.

The Executive Council of the American Legion, representing thirty-eight Legion Posts located within a radius of fifteen miles of Fort Totten have officially approved the action of the President, Borough of Queens, in adopting the 62d Coast Artillery (AA) as "Queens Own." The resolution received the unanimous approval of the duly elected representatives of more than 10,000 World War veterans comprising the membership of the American Legion in Queens County. So far as is known the 62d is the only regiment to be officially adopted by a civic group, thus further cementing the cordial relations that exist between the garrison and the civilian community in which it lives.

On February 8th, the 212th C.A. (AA), NYNG, tendered a review followed by a reception to Colonel Fergusson, in his capacity as District Commander, 2d Coast Artillery District. The armory was filled to capacity. After the review, Colonel Fergusson addressed the regiment, complimenting the entire command on their fine appearance, soldierly bearing, and the precision with which all movements were executed.

During the following week, the 244th C.A. NYNG, under the command of Colonel Mills Miller, also honored Colonel Fergusson with a review and reception. The appearance and performance of the troops was fully up to the high standard set by the 212th.

During the closing days of 1936 Fort Totten under-

went the annual scrutiny of a Corps Area Inspector. In keeping with its history and high standard of performance, the 62d again came through with all colors flying. The Inspector, notwithstanding the most minute examination into all of the administrative affairs of the regiment, found little upon which to comment adversely, and reliable information indicates that a strong commendation is forthcoming; this is in keeping with the high standard of performance demanded in this regiment.'

Under the supervision of Capt. O. A. Nelson, motor transportation officer, the 62d is bringing its 150 or so motor vehicles and trailers out of winter storage, and putting them in the superb condition expected and demanded of the regiment.

The popularity of the 62d with the residents of Long Island is so great that two months ago, Mr. Ernest Levy, the publisher of *Times* newspapers, with headquarters in Bayside, L. I., requested permission from Colonel Fergusson to include as a feature section of the two local newspapers published under his management a "Fort Totten Section" devoted exclusively to news of "Queens Own."

In the first issue of the Bayside *Times*, containing the "Fort Totten Section," there was included a full-page editorial, written by Mr. Levy. Following are a few extracts from this editorial:

"In this manner the *Times* newspapers make their contribution to further cement the fine, neighborly relationship that exists between what we shall technically call the military and civilian sections of Bayside and district. In reality, there is no separation. Through the years, friendships and associations have been created on both sides of the Fort's gates that long ago made Fort Totten an integral part of our own community.

"Of course, official records may show where the territorial boundaries of the City of New York end and the military reservation begins, but human understanding and friendship seem not to heed these boundaries too much. There are more than a thousand officers and men stationed at Fort Totten, an outstanding unit of the United States Army. The families of the married members of Queens Own 62d Regiment also live on the post. Their children attend the schools of Bayside and district. There is a pleasant intermingling of the residents of Fort Totten and us people of civilian life. The 'Men of Totten' are our next-door neighbors. We think nothing of running over there to borrow a couple of eggs or a couple of batteries of the soldier boys to give that smart military touch to our local parades. In either case, or in similar cases, the soldiers never say 'No.'

"Little wonder then, that we of Bayside and district lay claim to Fort Totten and the 62d Coast Artillery, as may we say, 'local talent.' It is with pardonable pride that we take our visiting 'country cousins' to visit the Fort. It is easily understood why, when we watch the big Manhattan parades, we feel a quicker heartbeat as the 62d rolls smoothly past on its sleek military motor vehicles.

"Now is the time when, however small, one is apt to count one's blessings. When counting our blessings this time, it might be well to remember that of all the gifts we may receive, or of all the blessings we may count as ours, none surpasses in value the practical gift that our Uncle Sam has given to us in the form of Queens Own 62d Artillery . . . which, in the conduct of its duty, holds secure for you, and you, and you—and me—our life, liberty, and the pursuit of happiness!"

Panama Canal Department News Letter

Department Artillery Officer
COLONEL LEWIS TURTLE, C.A.C.

Fort Amador
COLONEL EARLE D'A. PEARCE
4th C.A. (AA)

Fort Sherman
COLONEL WILLIAM T. CARPENTER
1st C.A.

Fort Randolph
COLONEL CHARLES B. MEYER
1st C.A.

By Major Harry R. Pierce, C.A.C.

THE War Department has announced the official classification of Batteries A, B and D of the 4th as excellent for the year 1936. This classification was the result of the fine work done by them during the 1936 target practice year. Battery D also won the Amador Cup which is presented each year to the battery making the highest record in target practice. This beautiful silver loving cup was given to the regiment by La Señora Amador, wife of the late first president of Panama, whom Fort Amador was named after.

The time for the department maneuvers has been announced and it is not surprising to learn that they will take place in March, and commence with a phase in which each sector will be called upon to defend its own boundaries followed by a combined exercise on the Atlantic side. During the past two years the exercises have been held on the Pacific side, so the change will be of interest to all concerned.

Late in 1936 the regiment received its first shipment of tactical trucks consisting of three Dodge 1½-ton vehicles. Those who have served in Panama will appreciate this good news as well as the promise that the remainder of

our transportation will be provided before the end of the fiscal year. Eight "tactical" mules were also received about the middle of February and the call for experienced "skinners" were issued. The Service Battery has been assigned the trucks and mules and all the grief that goes with them in addition to its other multitudinous duties. The old scooter shed is being converted into barracks to house the animal and truck drivers. It is being provided with a twelve-foot lean-to on the south side, all complete with cement foundations, floor, toilet facilities, tile roof, and a porch so that the shed will be livable for the additional twenty-five men. When completed, this structure will be turned over to the Service Battery.

A little informal recreation on the Fort Amador parade ground.

ATHLETICS

On January 23, 1937, the Fourth Coast Artillery was reviewed by the Commanding Officer, Colonel E. D'A. Pearce who awarded to Battery F the trophy they won in the last quarter of 1936 in the Amador baseball league. Battery C was also presented with the runner-up trophy at the same time.

The ceremony was very impressive. The four battalions of the Fourth, with the Pacific Sector Headquarters attached, stretched across the parade ground in massed formation, bayonets fixed, while one platoon of each of the honored batteries was marched to the front to receive the prizes. After the presentation these platoons, which were commanded by their battery commanders, Capt. Reierson and Capt. Smith, took position in rear of the reviewing stand and remained there while the rest of the regiment passed in review.

The Fort Amador baseball team has been awarded a franchise in the Isthmian baseball league, and through hard work and practice have made a creditable showing in the league. Although the army team under the name of Fort Amador did not win the first half of the series of games, they have played very good baseball, and had they had the breaks of the game, they no doubt, would have been on top. The army team is working out daily and hopes to make a far better showing during the second half of the Isthmian baseball series. Major James L. Craig, the athletic officer at Fort Amador, C.Z. is in charge of the army team, and is stressing every effort in the hopes of developing a winning team.

The track season started the first of February with a series of local track and field meets in preparation for the Department track meet later in the year. Battery G won with 28 points after the closest struggle we have had during the past two years. It was nip-and-tuck until the end. Batteries B and C both followed closely with 21½ points each. The Regimental Fund contributed Post Exchange coupon books and movie books to the winners.

One of the best volley ball teams that has appeared on the Isthmus was turned out by Battery "C," 4th C.A. (AA), Fort Amador, C.Z., this season. Early in the fall of 1936 Battery "C" clinched the Post championship without the loss of a single set of three games. This Battery represented Fort Amador in the Pacific Sector tournament. Very little trouble was encountered by the team in this tournament, and looking for new fields, the team promptly entered the Y.M.C.A. league for the department. Both civilian and service teams are members of this league. After a hard struggle with Battery "I" of the 4th C.A. (AA), Battery "C" won two sets out of three to become Pacific Sector representatives in the final department tournament. Battery "C" met the Atlantic Sector M.P. detachment in a three-set series, each set consisting of three games. The Pacific "champs" had no trouble in taking the first two sets to become department champions for 1936. The team was ably managed by Sergeant Freemire; captained by Corporal Hyland. Sergeant Edwards starred consistently throughout the season, while Corporal Williams, Private First Class Piacente and Private Szuleski furnished flawless support at all times.

A permanent home for the Girl Scouts has been made in one end of the open play shed with lumber salvaged from the old Fort Amador golf club which was recently torn down. The growing Amador troop well deserves such a club house. Early in January the new home was dedicated at a special ceremony and Colonel Pearce presented it. Mrs. Shumate, the Amador Troop leader accepted it on behalf of the troop. Following the presentation ceremony the scouts presented an appropriate impromptu playette for the amusement of a large number of guests.

There may be some who read this screed who will wonder, with all the various forms of athletics and games we indulge in, when we find time for soldiering. Rest as-

THE TUG OF WAR
Final Event Fort Amador Track Meet.

sured, however, that we do find a little in our spare time.

After several years of debate the Coast Artillery in Panama finally received authority to fire its annual anti-aircraft target practices in January and February, "the season when the sky is clear." There must be a jinx somewhere for the weather wouldn't run true to form and all during January and the first half of February it was cloudy and rained nearly every day.

It was past the middle of February before the first organization, Battery A, Captain Chaplin commanding, completed its annual practices. Battery B, Captain Niethamer commanding, follows Battery A on Battery 24 and, in order to make it easier for the transportation officer, will go into camp at Battery 24 on February 22nd.

SMALL ARMS TRAINING

The Department small arms competition took place on schedule at Fort Clayton commencing January 11th. There were nine officers and twenty-six enlisted men in the pistol matches and five officers and fifty-two enlisted men in the rifle matches. There was a man entered for every place and, in addition, Captain Toftoy was entered to represent the staff.

At the end of the first day's pistol shooting Major Pierce was in the lead with Captain Toftoy trailing one point behind. The next five high were within ten points. The second day Major Pierce bettered his first day's score and won the match and a gold medal with a total of 494. Captain Toftoy placed fifth with 472 and won a bronze medal and Private First Class George E. Brown of the Pacific Sector Headquarters Company placed sixth in the whole match and third among the enlisted men, also winning a bronze medal. Three out of a total of eight medals available went to Fort Amador contestants. As a result of this fine work Major Pierce becomes a distinguished pistol shot. Captain Toftoy has acquired two legs toward the winning of this coveted honor. This was Private Brown's first match and much will be expected of him next year. Both Captain Toftoy and Captain Reierson have joined the Balboa Gun Club and much keen competition is expected next year between them. Our local Annie Oakley, Mrs. Belle Thompson, provided one of the high lights of the match by placing fourth in the whole list. She handles a .45 like a veteran and in 1933 won the Department match against all comers. She is not eligible for awards of prizes and shoots just for the fun of it.

In the rifle competitions the only member of the Fourth who played around the top was Sergeant Joseph B. Royal of Battery I who managed to keep up in the money the whole time. On the final day he came through with a 44 at 600 and 45 at 1,000 and won the match and gold medal with a score of 450. This makes the third leg for Sergeant Royal and makes him a distinguished marksman as soon as he applies for that designation. The Fourth will continue its quarterly small bore matches started nine months ago with the hope of training other medal winners for next year.

FORT SHERMAN

By Lieutenant Colonel Ralph W. Wilson

Fort Sherman has been the scene of varied activities for the past two months. To enumerate even the smaller part would take more space than is allotted. Training has been the paramount objective, however, athletics, recreational features, new construction and reconstruction have been stressed.

During the early part of December, Major Henry F. Grimm, Jr., commanding the 2d Battalion, and Captain Charles W. McGeehan, commanding Battery "C," 1st Coast Artillery (AA), conducted a series of 75 mm. firings at fast moving towed targets in conjunction with the 14th Infantry employing .30 caliber machine guns. Towed targets represented landing boats, and the results

4TH C.A. (AA) MEDAL WINNERS, DEPARTMENT SMALL ARMS COMPETITION
LEFT TO RIGHT: *Major H. R. Pierce, Sgt. J. B. Royal, Capt. H. N. Toftoy.*

showed that beach landings at Fort Sherman are practically out of the question.

The Department boxing bouts were held at Fort Davis on December 19, 1936, and the Atlantic Sector won five out of eight bouts. Private Walerstein, Battery "H," 1st Coast Artillery (AA), Fort Sherman, repeated in the featherweight class by winning a hard fought fight.

Battery "H," 1st Coast Artillery (AA), has been thwarted by freak December and January weather from completing its searchlight practices. January, 1937, has, so far, been the wettest January since 1904. The grass and other vegetation should now be dead and dry but it is causing everyone considerable trouble to keep it under control.

The post is pushing energetically the project to reconstruct and clear old Fort San Lorenzo. The results accomplished are beginning to show that the labor expended has been for a well worth while purpose. It seldom befalls a post commander to have thrust upon him such an interesting and well worth while task. Fort San Lorenzo was built by the early Spaniards and was destroyed by Sir Henry Morgan, the English Admiral, in 1671. The jungles have slowly and relentlessly crept over its acres of ruins in the past 266 years. It has now developed that the Spaniards built better, and the destruction by the English was less, than has been generally accepted. Long galleries filled to a depth of several feet by the dust of centuries, crumbling walls, hidden sentry boxes, partly buried cannon and scattered cannon balls have come to light. Lieutenant Merle R. Thompson, 1st Coast Artillery (AA), has been in direct charge of this work. Among other things, 14,000 cannon balls have been salvaged from the sea at the foot of the sheer cliff below the massive walls. Cannons that have been buried under the sands and water for centuries are now being dredged and dug for. One of the objects that has caused great speculation is the well in the courtyard of the fort, which is 50 feet higher than any land in its vicinity. All attempts to drain it in the past have been fruitless. It must be fed by some unknown spring. Rumor has it that a secret underground passage will be found in the side of this well, if it can ever be emptied. Where the water comes from and why it always stands at an exact height are questions as yet unanswered. The peaceful Chagres River, as it now flows past Fort San Lorenzo, gives little evidence that on January 8, 1671, only 30 Spaniards were left out of 350 defenders, when Morgan's English soldiers took this fort by storm.

A new fire house has recently been built, and it will have the regulation pole for the firemen to slide down for speedy work. The fire hazards at Fort Sherman are great and efforts to reduce these hazards are appreciated by all.

Fort Sherman is making up for its island isolation by providing recreation at home. The Playshed is being overhauled and having an annex built to it, which will provide the most modern offices, dressing rooms and other conveniences; the new non-commissioned Officers' Club is rapidly taking form; the Post Exchange is being remodeled; a fifteen thousand dollar theater is assured; a bowling alley is in the offing; and the best bathing beach in Panama will soon be the mecca of all swimmers. Coal and oil have been banished from the post, electric stoves and ranges having been recently installed in all the barracks.

Maneuvers will start in March, and until then every effort is being made to complete all target practices.

Fort Randolph

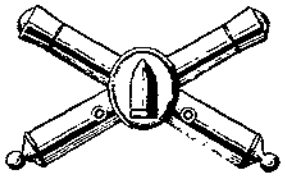
By First Lieutenant O. H. Gilbert

Relatives of General Randolph, Mr. and Mrs. Trimble of New York, N. Y., visited Fort Randolph on February 6, 1937. After an inspection of the Post, they were entertained informally at the quarters of the Commanding Officer, Lieutenant Colonel Charles B. Meyer. Mr. Trimble is the grand nephew of General Randolph for whom Fort Randolph is named.

Battery "E" completed a 3" AA practice in January and at present is preparing to fire a practice with 105 mm. guns. Very few officers or men in this regiment have seen firing by guns of this type and an unusual amount of interest has resulted. The entire battery has moved to the gun position and officers and men are living under field conditions similar to those encountered during the firing of the 3" AA practices last October. Battery "E" has had plenty of "field soldiering" in the past six months.

Battery "A" has completed all but the night practice with 3" AA guns and Battery "B" is waiting for the firing of the 105 mm. guns before starting on their 3" practice.

Fort Randolph got off to a bad start in the Atlantic Side intrapost baseball league winning only one game in the first quarter. The Randolph team has not hit its stride.



Corregidor News Letter

BRIGADIER GENERAL P. P. BISHOP, *Commanding*

COLONEL T. A. TERRY, C.A.C., *Executive*

59th Coast Artillery
COLONEL PAUL D. BUNKER

60th Coast Artillery
COLONEL ALLEN KIMBERLY

91st Coast Artillery (PS)
LIEUTENANT COLONEL J. H. CUNNINGHAM

92d Coast Artillery (PS)
LIEUTENANT COLONEL REINOLD MELBERG

By Lieutenant Colonel Oscar C. Warner, C.A.C.

DECEMBER and January, the best months of the year were busy ones. Intensive training for target practices by all regiments continued during January. The *Pope* reported and began high-speed towing missions on February 1st. Both high-speed and low-speed seacoast practices and AA gun practices will be finished by April 2d. The period March 15th to 27th is reserved for field training coöperating with the Navy, Army Air Corps, and mobile army forces. Eight destroyers of the Asiatic Fleet have been detailed to assist in making our defense problems more realistic.

The swimming beach has a new shark net, two new floats, a barbecue fireplace, beer on ice, and a life guard. The Corregidor Club is building a new open-air dance floor adjoining the south side of the club house. Royal palms will continue to lend a tropical atmosphere growing in the midst of the new dance floor.

Captains Nicholson, Krueger and Lieut. Wilson with thirty enlisted men (PS) have been tentatively selected to go to Fort Stotsenburg in March, 1937, to help train the New Philippine Army.

The Eucharistic Congress, February 3d to 7th in Manila was an important event to the Philippine people. The harbor boats were crowded to the limit to accommodate the command and civilians living at Corregidor during the period of the Congress. Over 400,000 people crowded into Luneta Park to view the parades and ceremonies.

ARRIVALS AND DEPARTURES

Due to arrive May 1, 1937: Majors Francis S. Sweet, James T. Campbell, Benjamin Bowering, Robert M. Carswell, John H. Harrington; Captains John M. England, Burgo D. Gill, Harold A. Brusher; 1st Lieut. Allison R. Hartman; 2d Lieuts. Alvin D. Robbins, Robert E. Frith, Jr., George R. Wilkins.

Due to depart May 8, 1937: Colonel Paul D. Bunker, Lieut. Colonel Reinold Melberg, Majors Philip F. Biehl, Lloyd W. Goeppert; Captains Chauncey A. Gillette, William E. Griffin, James F. Howell, Jr.; 1st Lieuts. Arthur Roth, Sam C. Russell, Irving D. Roth, Robert A. Turner, Charles G. Dunn, Arthur A. McCrary, Frank J. Zeller; 2d Lieuts. Charles L. Andrews, Seymour I. Gilman.

ATHLETICS

By Lieutenant E. W. Moore, Ass't Recreation Officer

Athletic interest during the past two months has been centered around boxing and track. Intra-regimental baseball is just beginning with the promise of a good season ahead. Boxing in the new athletic arena proved a great success, and large cowds turned out for all the smokers. In the American division the 59th CA finally won over the 60th CA, 5½ to 3½, in the second championship try—the first having ended in a thrilling 3½ to 3½ tie. The Scout troops also put on an exciting show with the 91st CA coming from behind to win the last three scheduled bouts and the championship from the 92d, 5 to 4. With the great demand for boxing now being shown, two or three professional shows will be given in the near future with promise of much success.

The Post Track and Field Championships were won by the 60th CA, 71 to 50, in the American division, and by the 91st CA, 89 to 42, in the Scout division. Although no records were broken, the times and distances compared favorably with the records of previous years. Another track meet will be held in April with both the 59th and 92d hoping to turn the tables on their rivals.

Basketball had a sudden and short revival during the last of

60th Coast Artillery AA machine gun sight improvised by Capt. T. B. White.

December when the 59th and 60th furnished seven players and a coach for the U. S. Army All-American team which finished third in the Philippine National Championships. The team was built around the 59th CA Department Champions and made an excellent showing losing only one game by one point and winning four games.

The officers have been concentrating on golf during the past few weeks with great enthusiasm. The Corregidor Club Championships brought out a new champion, Lieut. F. B. Reybold, who decisively defeated Lieut. S. F. Giffin during the play-off. At the present time handicap sweepstakes tournaments every Saturday are keeping all of the golfers scrambling for the prizes when they are not discussing this and that method of handicapping.

Tennis interest has been rather lax recently due chiefly to the absence from the post of a great number of officers and men. But now with everybody back on the "Rock," tennis will soon swing into full stride with an inter-regimental post tournament scheduled for February and April.

Fifty-Ninth Coast Artillery

By Major E. R. Barrows, Adjutant

During December, Batteries A, B, D, F, and G concentrated training on .30 caliber antiaircraft machine guns, their secondary assignment. Each battery fired two platoons at a towed sleeve target. Excellent results were obtained, due in a large measure to a sight which was developed by Major Morgan. Briefly, our average slant range was 1,024 yards varying from 857 to 1,285 yards; the average air speed, 90 m.p.h. with a maximum of 110 m.p.h., and scores averaged 104.5. Captain Fred J. Woods' top score of 144.4 sets an all-time record on the "Rock." Batteries C and E spent the time in training on 3-inch antiaircraft guns. They are now firing and other batteries are now back on the concrete getting ready for service practice with primary assignment armament. High speed practices will be fired by most batteries, with the Navy furnishing destroyers for towing purposes. Our depleted personnel, both commissioned and enlisted, is making training a serious problem.

The regiment celebrated Organization Day, December 19th after postponement from the usual day, September 12th, because of the death of the Secretary of War. A field meet in the morning, which started the celebration, was won by Battery D by a generous margin. In the afternoon the regiment, and ladies, assembled at the Cine for exercises which included remarks by General Bishop and Colonel Bunker and the presentation of athletic awards. Massed behind the speakers on the stage were the scores of athletic trophies won by the regiment in the past. All batteries served special meals and other refreshments. In the evening the officers held one of their famous 59th family parties, a dinner and dance at the Officers' Club whereat native costumes were *de rigeur*, and unprejudiced observers reported that if Tilly Losch had been among *our* galaxy of youth and beauty she would have had to look to her laurels.

The regimental baseball series is now in full swing. The Headquarters Battery is in the lead with six games won and none lost.

Colonel and Mrs. Bunker enjoyed a trip to Southern Islands and brought back many interesting souvenirs including a live mouse deer and fawn. Several officers and enlisted men took advantage of the holidays for short trips to points of interest in the Islands. Captain Myers and family left January 13th for leave in China and Japan and to return to the States.

Sixtieth Coast Artillery

By Captain William L. Richardson, Adjutant

The 3" gun batteries of the 60th went into their target practice positions on the cliff on the southwestern shore of Corredigor in mid-January in preparation for annual target practices scheduled for February, and all concerned are now scratching heads wondering how to beat the score

Philippine Department Basketball Champions — 1935 and 1936
Fifty-Ninth Coast Artillery, Fort Mills, P. I.
Standing: *Lt. Peca, Sgt. Wilson, Corp. Vancio, Corp. Jackson, Pfc. Hines, Pfc. Short.*
Seated: *Corp. Raflowski, Sgt. Dunlap, Pfc. Featherstone.*
(Not in picture: *Corp. Fackler, Pvt. Davis, Pvt. Lieb, Pvt. Wolfe.*)

MANILA BOWLING LEAGUE CHAMPIONS, 1936, FIFTY-NINTH COAST ARTILLERY, FORT MILLS, P. I.
STANDING: *Sgt. Gutschmidt, Sgt. Larrimer.*
SEATED: *Corp. Hermann, Corp. Malone, Sgt. Kulas.*
(NOT IN PICTURE: *Sgt. Schill, Sgt. Kakaznk.*)

when the best target available can't go higher than 2,800 or faster than 80. The answer apparently being no other than hits and lots of them, the avid artillerymen are rapidly transferring their faith from C.A.F.M., Vol. II and Special Text 26 to the rabbit's foot. There is one thing, however, that the serving formula cannot take away from us out here—a good field of fire. Anyone who has known the agony of trying to shoot a target practice in the crowded water areas around most of our Harbor Defenses cannot fail to appreciate the wide and relatively open spaces of water around Corregidor.

Colonel Kimberly remains on the sick list with the rather severely broken arm he suffered when his horse fell with him in early December. However, recent reports indicate a complete recovery in the near future. Lieut. R. A. Turner has rejoined after a sojourn in Sternberg and recuperation at Baguio. Lieut. Colonel Kemble, Captain T. B. White and Lieut. C. G. Dunn and families also enjoyed visits to Baguio during the recent holidays.

NINETY-FIRST COAST ARTILLERY (PS)

By Major L. W. Goeppert, Adjutant

The 91st has just wound up another successful athletic season, having won post championships (Scout Troops) in boxing and track and field. The 92d won the deciding game of the three-game championship basketball series, but the 91st during the course of the Philippine Department Tournament (Scouts), defeated its old rival, the 92d, and emerged in second place, having lost but one game to the 14th Engineers (PS), who thereby became the department champions.

The boxing finals were all that any fan could ask for—knockouts and hair-line decisions galore. With an equal number of wins to the credit of both the 91st and 92d, the championship depended on the outcome of the seventh or final bout, which was won by the 91st entry after one of the finest fights seen on the post.

The active artillery season is well under way. Batteries A, B, and G have fired record service practices—that of G being an advanced practice, under smoke. In this practice, the target changed course approximately seventy degrees, necessitating an immediate change from Case II to Case III with the least possible interruption to the continuance of fire.

In March, the regiment will lose the services, for six months, of two captains and twenty enlisted men who are to be detailed as instructors to Philippine Army trainees on 155 GPF's at Fort Stotsenburg. This detail is in addition to one made on November 1st at which time thirty-eight selected NCO's were sent to the various training camps of the Philippine Army and who will remain on that duty for at least another five months.

The following officers will leave the regiment on the March transport or on terminal leave in China and Japan prior to their return to the States: Major Goeppert, Capt. D. H. Smith, 1st Lieuts. Arthur Roth, D. B. Johnson, and 2d Lieut. Franklin Kemble, Jr.

NINETY-SECOND COAST ARTILLERY (PS)

By Lieutenant William F. McKee, Adjutant

During the month of December, 1st Lieut. Sam C. Russell and 2d Lieut. George J. Weitzel were granted five days and four days detached service respectively for the purpose of visiting points of probable military interest on the Island of Luzon. Some of the points visited by these officers were Calamba, Balite, Batangas, Lake Taal, Lucena, and the rapids of Pagsanjan. "Shooting the rapids at Pagsanjan," says Lieutenant Weitzel, "is one of the most exciting experiences I have ever had."

1st Lieutenant Daniel M. Wilson has been designated to proceed to Fort Stotsenburg, P. I., early in March for the purpose of acting as instructor to a 155-mm. gun battery of the Philippine Army.

The Regimental Commander, Lieutenant Colonel Reinold Melberg and 1st Lieutenant Sam C. Russell expect to leave the Philippines in March for the United States. Lieutenant Colonel Melberg will visit China and France en route. Lieutenant Russell expects to visit China. Effective February 1st, Captain Russell E. Bates was transferred from Battery F to the U.S.A.M.P. *Harrison*, vice Captain Samuel Rubin relieved.

Under the direction of the Commanding Officer, 3d Guard Battalion, the civil prisoners of the Corregidor prison stockade, during the holidays, put on their annual Christmas program much to the enjoyment of the mem-

bers of the post who attended the various events. The program extended from Christmas Eve to New Year's Day, and included dramas, vaudeville, athletic events, special drills and competitions. A large stage was erected in the corner of the Stockade, where each evening were held the plays and native dances. The parades by the prisoners battalion with wooden guns, the acrobatic and athletic events were held on the stockade parade ground under supervision of the Guard Battalion. Considerable talent was discovered among the 700 convicts now in the stockade.

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Harbor Defenses of San Francisco Notes

COLONEL H. E. CLOKE, *Commanding*

By Captain W. W. Scott

IN honor of the recently arrived District Commander and Mrs. Joseph P. Tracy, the officers and ladies of Fort Scott gave a tea and reception January 21st at the Officers' Club. The many guests from the Presidio, Fort Mason and San Francisco included the Corps Area Commander and Mrs. Simonds. General Tracy comes from Fort Monroe where for four years he has been Commandant at the Coast Artillery School and Commanding General, Third Coast Artillery District.

Lieutenant Colonel A. G. Campbell, Assistant Executive, Ninth C.A. District, has been ordered to Fort Sheridan to command the 61st C. A. Lieutenant Colonel L. LaR. Stuart leaves for Washington in June where he will attend the Army War College.

Major C. D. Y. Ostrom was detailed on the General Staff February 1st and is now Assistant Chief of Staff, G-1, Ninth Corps Area. Major E. B. McCarthy who has commanded Fort Baker and Fort Barry for more than a year leaves this month for Denver, Colorado, on Organized Reserve duty. Captain G. M. O'Connell, Plans and Training Officer has been ordered to temporary duty at Headquarters Ninth Corps Area on the staff formed for the Army Maneuvers which will be held in August at Fort Lewis, Wash. Captain and Mrs. R. B. Pape have arrived from Japan where for four years Captain Pape was a language student. Lieutenant and Mrs. Miner left this month for the Philippines. Captain and Mrs. C. C. Carter arrived recently from Fort Monroe. Captain Carter is aide to General Tracy. First Lieutenant and Mrs. W. M. Vestal are now living at Fort Scott. Lieutenant Vestal is aide to General Abernathy, Commanding Port of Embarkation, Fort Mason.

Training activities for March and April center around the tactical and garrison inspections of the District and Corps Area Commanders and the target practices to be fired by Battery A, Captain R. R. Hendrix, commanding, and Battery K, Captain Dean Luce, commanding.

A battalion and the band of the 6th C.A., under command of Major E. B. McCarthy, C.A.C., took part in the Washington Birthday Parade in San Francisco. The regiment will parade again on Army Day and will take

Children's Playground, Fort Scott, Cal.

Officers' Club, Fort Scott, Cal.

part May 27 in the exercises celebrating the opening of the $38,000,000 Golden Gate Bridge, longest single span suspension bridge in the world, which connects the parade grounds of Fort Scott and Fort Baker.

As the result of winning several important bridge tournaments, Captain H. J. Vandersluis has been made a Full Master.

The Officers' Club at Fort Scott is the center of many post activities, bridge, teas and dances. Under the presidency of Colonel H. E. Cloke the Club has been greatly enlarged during the past two years.

The West Point Preparatory School has Colonel Cloke as Commandant, Captain W. S. Lawton as Assistant Commandant and Lieutenant E. A. Chapman and 2nd Lieutenants W. H. Kinard and H. P. Persons as instructors. There are 42 students in this school of whom seventeen have already received Congressional appointments to the Military Academy.

Coast Artillery Reserve Officers' Meeting Washington, D. C.

BRIGADIER General John W. Gulick came up from Fort Monroe and addressed about sixty Reserve officers in the Reserve Officers' assembly hall, in the Munitions Building, on February 9, 1937. He gave a most interesting talk on the political and military situation in the Philippines. General Gulick has just returned from the Philippines, and he presented this timely subject in both an interesting and instructive manner.

The meeting was presided over by Major Milo H. Brinkley, 622d C.A. (HD), who is President of the Coast Artillery Club. Prior to the meeting General Gulick and his aide were the guests of the Field Officers of the Coast Artillery Reserves at dinner at the Army and Navy Club. Some of those present at this meeting were:

Colonel James B. Bentley, Colonel Harry P. Newton, Colonel Earl W. Thomson, Lt. Col. Roy Atwood, Lt. Col. Robert R. Hendon, Lt. Col. Robert M. Zacharias, Lt. Col. Clarence L. Nelson, Major John Caswell, Jr., Major Norman W. Whited, Major William J. Darmody, Major Arthur Adair, Major Edward L. Potter, Major Leonard J. Rose.

Fort Barrancas Notes

LIEUTENANT COLONEL G. F. HUMBERT, *Commanding*

By Captain M. A. Hatch

ON March 1st at a regimental review Colonel Arthur formally turned over command to Lieutenant Colonel G. F. Humbert. Later the officers and ladies of the post gathered near post headquarters to wish Colonel and Mrs. Arthur bon voyage to their new station in Honolulu. The 13th Coast Artillery band played as Colonel and Mrs. Arthur drove off the post along the street lined on either side with troops. Prior to their departure, a post farewell dinner for eighty was given at the Air Station Officers' Club in their honor. It was followed by a dance at Gorgas Hall.

The visit of the cruiser HMS *Dragon* to Pensacola from February 12th to 23d was the occasion for many social affairs.

The post basketball team having won 17 out of 20 games has been entered in the Gold Medal tournament in Mobile, Ala., on March 12th and 13th. Intramural competition in baseball, softball, volley ball and bowling is in full swing under the direction of Lieutenant Yost, athletic officer. If the new bowling alleys continue to be as popular throughout the year as in the first two months they will pay for themselves in two years.

A few months ago tennis players spent most of their time watching others. The two new concrete courts, located on the edge of the parade ground near the bachelor building, have restored tennis as a sport instead of a purely social gathering. The sections inside the lines are tinted green while the side and back court areas are of the usual greyish concrete. Incidentally even Tilden would be satisfied with the generous use of concrete to insure ample side and back court room.

Exterior painting of buildings with a new color combination of white with green trim has given the post a fresh appearance. Everyone watches with great interest the progress of the theatre. While waiting for the promised motion picture service funds, WPA labor has put up a tool house and staked out the theatre on the ground. Gas for cooking and heating was introduced into the Naval Air Station recently. Extension to include Fort Barrancas is practically assured because of the availability of WPA labor.

NEWS AND COMMENT

The United States Coast Artillery Association

"The purpose of the Association shall be to promote the efficiency of the Coast Artillery Corps by maintaining its standards and traditions, by disseminating professional knowledge, by inspiring greater effort towards the improvement of matériel and methods of training, and by fostering mutual understanding, respect and coöperation among all arms, branches and components of the Regular Army, National Guard, Organized Reserves and Reserve Officers' Training Corps."

Pay Increase

THE earnest efforts of Senator McCarran to obtain adequate pay for federal employees have been given wide publicity and may bear fruit. Some of the leaders in Congress are aware of the inadequacy and insufficiency of service pay but there is a strong inclination that wrongs inflicted upon the military profession in the matter of inadequate pay will not be corrected at this session of the Congress. The pressure which our brothers in the civil service exert through their votes cannot be exerted in a similar manner by us. This is an unfortunate handicap. It is believed this is the reason for the continuance of the one-sided proposition existing in the past. Our case is a meritorious one and should arrest the earnest consideration of every member of the Congress. It is hoped the Congress will seize the immediate opportunity to right this injustice especially as it concerns the pay of the junior officers. It would be a simple matter to arrange an equitable solution of this problem. We entertain a hope that Congress will meet the situation and right the long standing wrongs. Inequalities and insufficiency of pay for the members of the military profession should not be allowed to continue any longer.

* * *

Sound Preparedness—Seacoast Defenses

THE daily press and popular magazines of late have carried numerous articles to the effect that extensive preparedness is not necessary against foreign invasion in view of our favorable geographical location affording natural protection. These thoughts are in keeping with our national policy. It is realized that we cannot go in a hole and pull the hole in after us. We do not wish to be unwise and protect ourself as does the ostrich when it hides its head and leaves its body exposed. However, there is a great deal of wisdom in the contentions that we should concentrate our preparedness efforts in strongly defending our vital areas. The most radical pacifists will certainly lend support to strong fortifications of the vital areas at home and making the nation safe from enemy attacks. Self-preservation is the first law of nature. Money spent in accordance with our national policy to protect ourselves against invasion is wisely spent.

Colonel Charles J. Mund

IT is with great sorrow and the profoundest regret that we announce the death of Colonel Charles J. Mund, a most active and loyal member of our Executive Committee. At the time of his death Colonel Mund was the Commanding Officer of the 627th C.A. (HD), R.A.I. He died at his home in Oakland, California, February 28, 1937, of heart failure. His long and honorable service started in Company "F," 3d Infantry, National Guard of California, March 6, 1893. During the Spanish-American War he served in the Philippine Islands with Company "K," 1st Regiment Infantry, California Volunteers. On August 12, 1905 he was commissioned First Lieutenant National Guard of California, June 24, 1907, a Captain, and May 14, 1911 Major of C.A.C., National Guard, and promoted to Lieutenant Colonel August 3, 1917 in the Federal Service, which rank he retained until September 3, 1919. He was appointed a Lieutenant Colonel in the Reserve Corps March 6, 1920, and promoted to Colonel on January 23, 1928.

Unnecessary Secrecy

WE have been taught that "it pays to advertise." We have also been taught that there is much to be gained from intelligent publicity, and it seems rather extraordinary that when so much can be gained from this type of publicity that silence is still advocated by many. Ignorance is without question a prime cause of a great deal of misunderstanding and is a deterrent to progress. When the civilian population is kept in ignorance we fail to make the most of their coöperative powers. It is believed that the bulk of the civilian population will willingly cooperate and aid us in our advancement. A policy where the needs of the services are kept secret is somewhat an unwise one.

The deplorable lack of suitable equipment especially in our antiaircraft arm should be broadcast and the public should be made conscious of our weakness. Only when the public has become conscious of this critical weakness and imbued with the ever pressing need for this important service will sufficient funds be made available to provide the necessary equipment for the accomplishment of our mission.

Spanish War—Bombardment Aviation—AA Artillery

THERE are many unofficial reports, some contained in the press, to the effect that aerial bombardments in Spain are not producing the results that most everyone had anticipated. It is reported that the difficulty of coordination between the attacking forces and their own planes has been a deciding factor and that attacks by the ground forces have not been properly timed with those of the bombardment and attack planes. The bombardment attacks are believed to be too transitory in their effects. They have forced the opposing ground forces to take cover but have not been sufficiently effective to drive these forces from positions held, and once the aerial attacks were completed the defenders have been able to meet the opposing forces almost as if there had been no aerial attack. Some have come to believe that the volume of bombardment fire necessary to have any really appreciable effect is so great that it is impracticable.

There are also many reports from apparently reliable sources that the antiaircraft artillery has more than lived up to the expectations of its most enthusiastic advocates. Some of the AA equipment with General Franco's army is the most modern in existence, and according to our sources of information it has achieved real results. It has been asserted that 80% of all planes brought down in this present war have been brought down by the antiaircraft artillery and that only 20% have been brought down by fighting airplanes. The efficiency of the medium caliber antiaircraft artillery has been most impressive. These results are in keeping with the thoughts of the well informed and predict a bright future for antiaircraft artillery.

One Hundred Per Cent Subscribers

THE 243d C.A., Rhode Island National Guard lived up to our expectation as expressed in the January-February number and is now one of our hundred per cent organizations in all respects. Each unit, each Coast Artillery officer, the medical officer, the chaplain, and the warrant officer has subscribed. Colonel Earl C. Webster and Lt. Col. Earl H. Metzger deserve our highest appreciation—what we need is more Earls. The 243d is not alone in joining the list of hundred per cent subscribers. Through the efforts of Major Elvin L. Barr, the Redding District, Civilian Conservation Corps, has also taken its place among the 100% group.

The Coast Artillery contingent at the U. S. Military Academy came through in fine style and only failed to make the perfect score by *two* non-subscribers. We predict that the 6th C.A., Fort Winfield Scott, will take its place among the hundred percenters at no far distant date. Major Willard W. Irvine of the 6th C.A. is on the job and his efforts have proven fruitful. The following organizations and groups of the Regular Army, as listed in the "Officers' Station List," lack the distinction of being listed among the hundred per cent subscribers in each case by only *one* non-subscriber:

Coast Artillery Districts and Brigades
3d Coast Artillery
8th Coast Artillery
9th Coast Artillery
11th Coast Artillery
13th Coast Artillery
14th Coast Artillery
15th Coast Artillery
16th Coast Artillery
Coast Artillery School
Command and General Staff School
R.O.T.C. Instructors
General Staff
General Staff with Troops.

We certainly hope that the non-subscribing officer in each of the above groups will give us the benefit of the doubt and send in his subscription so we can publish these groups in the list of the hundred per cent subscribers. That accomplished, I believe the record established before the Johnstown Flood (or whenever it was) will have been broken. Let's all get together in this activity which is essential to the Corps as a whole. At this time we again wish to repeat that all subscriptions are *voluntary*. We shall make an earnest effort to give a proper return to every loyal supporter. Criticisms and suggestions are welcomed.

Winston Churchill—Mastering the Air Peril

MR. CHURCHILL'S much discussed concern at the rapid strides made by Germany in its air strength, has changed to an expression of confidence in the effectiveness of ground defenses, according to the United Ser-

vices Review of February 18, 1937. It is reported that Churchill has stated emphatically, as his matured judgment, that within a few years the ground defenses will have mastered decisively the air and that airplanes will be clawed down from the skies in flaming ruins.

Mr. Churchill apparently has been studying the other side of the question. He now is convinced a balance will be struck between air attack and defensive measures against it. The race between aircraft developments and counter-defensive measures is not a one-sided affair. The great lead claimed by air corps enthusiasts can be successfully challenged. Experience shows conclusively that in all such races, such as guns against armament and this one at hand, that balances can and will result. Confidence in the ability of antiaircraft defenses to ward off attacks is having its effect in Great Britain as antiaircraft defense activities of large magnitude are being initiated.

Long Range Fire Control

IT has been felt for a considerable time that the autogiro may have a possible field of usefulness in seacoast artillery and other long range artillery fire control. This means of observation is believed especially adapted to our latest types of long range matériel and localities where the heights of observation stations are limited. The N.A.C.A. and the Air Corps in coöperation with the Infantry, Field and Coast Artillery have been conducting exhaustive tests to determine the practical usefulness of the autogiro, especially for artillery fire control. These tests have shown sufficient results to justify the purchase of six autogiros with a view to their use for reconnaissances, observation of fire and command missions. The autogiros have a top speed of approximately 130 miles per hour and a cruising speed of 105 miles per hour. Space is provided for a pilot and an observer in each autogiro. It has been proposed that the autogiro may be used also for towing antiaircraft targets of minimum air resistance especially weighted vertical panels for machine guns. It has also been proposed that these machines be made an organic part of fixed and mobile heavy artillery regiments. Progress in the solving of some of our long range fire control and observation problems should result from this initial purchase.

Bombardment Aviation

THE January, 1937 issue of the "Royal Air Force Quarterly" has as its feature article "Views on Air Defense." This article is one that might be well read by all Coast Artillerymen. It discusses in detail the book "L'Aviation de Bombardement" by the celebrated French expert C. Rousgeron. It is maintained that Rousgeron in summarizing the progress of present-day antiaircraft ground defense has greatly demonstrated the defects of post-war heavy bombers. It is stated that indeed he shows that medium-altitude bombing, i.e. from 10,000 to 12,000 feet will become an impossibility even in clear or moderately cloudy weather. A straightforward and logical discussion of the difficulties in bombing and the necessity for great improvement in destructive efficiency, range and accuracy are brought forth. This discussion is somewhat at variance with the exaggerated claims made by our over enthusiastic air corps advocates and tend to disprove many of their claims for perfection. It is apparently the opinion of both the authors of "Air Strategy" and Mr. Rousgeron that positive steps must be taken to counterbalance the progress in AA gunnery in order that the task of raiding air units may be facilitated. The necessity for an appreciable increase in the velocity and travel of the bomb is emphasized. Medium-height, horizontal-course and low altitude dive-bombing are rejected on account of the improved accuracy of AA guns and of small-bore automatic weapons. The value of high performance, fighter planes employed in coöperation with AA artillery, is discussed in an especially fine manner.

Transportation for Antiaircraft Searchlights

SOME months ago three antiaircraft portable searchlight units were sent to Fort Totten for test purpose and for comparison with the duplex units there. Initially these units were received with a great deal of consternation as self-contained units were thought to be the only practical solution of our mobile searchlight problem. There are many in our service who still believe that portable or portee units lack tactical mobility which is not in keeping with the facts in the case. The portable units that have been assigned to mobile organizations, such as the 62d, have given great promise and lead to the belief that they are the true answer to the mobile searchlight problem. The difficulties encountered with the self-contained units were, in a large part, concentrated in the carrying trucks. There appears no reason why commercial trucks with low centers of gravity cannot be used to transport searchlight units and their power plants. If the present mobile searchlight unit is modified so that the duplex element is replaced by a commercial truck and a portable power plant, maintenance problems will unquestionably be considerably simplified. All the essential elements in time of emergency should be much easier and certain of procurement. Commercial vehicles should be used wherever possible provided they meet all technical requirements as they apparently do in this case.

Transportation of Antiaircraft Fire Control Equipment

THERE have been many questions raised recently with respect to transporting the new universal fire control equipment since the instrument trailer M1 provided for the old equipment is not interchangeable for transporting

this new equipment, and not adaptable without major modifications.

We are informed by the Office, Chief of Coast Artillery that the instrument trailer, M1, is intended to be used with the M2 directors only. Directors of later types, T8, M3 and M4, as well as the earlier type M1A1 are to be carried in standard service vehicles. Also that there is now under construction by the Ordnance Department, an experimental shock-absorbing platform, for protection of the later type directors during transportation. Pending test and standardization of such a device, the use of temporary expedients is directed in accordance with the provisions of W.D. Circular No. 4, dated January 12, 1937.

Trucks with bodies, 15 ft. 3 in. long are expected to be furnished for transportation of height finders. Pending availability of funds for the procurement of these trucks, such temporary methods as can be devised will have to suffice.

Officers' Station List

WE have been in receipt of many compliments on the Officers' Station List which was published with the January-February issue but we are reluctant to accept these compliments until we have at least apologized for and corrected the errors appearing in that list.

Captain A. S. Baron, 52d C.A. and 2d Lieutenant H. J. Harrison, 51st C.A. were shown as being at Fort Monroe, Va. They are both at Fort Story, Va. Captain E. B. Thompson's name was omitted under the heading of "Extension Courses, Coast Artillery School." Lieutenant Colonel W. E. Duvall's name was misspelled and he was shown as on duty with the Organized Reserves, 8th Corps Area. He is on duty with the California National Guard, San Diego. The name "Ord" was left off under the heading "Mine Planters, etc." It appears as "General O. C.," it should appear as "General O. C. Ord." Lieutenant Colonel W. W. Hicks is shown as on duty with the Historical Section, Army War College. He is on temporary duty in the Office of the Inspector General, Washington, D. C. Brigadier General Rodney H. Smith (Colonel, C.A.C.), and Major William D. Hohenthal (Captain, C.A.C.), are on duty with the U. S. Military Mission, c/o American Embassy, Rio de Janeiro, Brazil.

It was planned to publish another station list, which we hoped would contain the minimum of errors, with the May-June issue but the personnel section in the Office Chief of Coast Artillery advises against this in view of the fact that there will be many changes just following the data of publication and therefore such a list would be practically out of date almost as soon as issued. An up to date station list will be published with either the July-August or September-October issue and in the future it is planned to publish such lists at least twice a year.

A Public Benefactor—A Sense of Humor or Both

ON January 25, 1937, Representative Hamilton Fish of New York presented the following Resolution in the House of Representatives:

RESOLUTION

WHEREAS the present social etiquette of Washington requires the wives of public officials and of Army and Navy officers to personally call on those of superior rank or with seniority; and

WHEREAS this practice and custom as carried out creates a vicious circle of leaving and returning cards to the detriment of the health, nerves, and disposition of the wives, and to the discomfiture of the husbands; and

WHEREAS the tired husbands wonder and inquire why this perpetual merry-go-round is necessary, and the only answer given is that it is an essential social function as part of the accepted diplomatic and social customs of the Capital of the United States; and

WHEREAS the husbands of these tired wives must suffer in silence while exhausted and irritable wives try to maintain a social etiquette that is antiquated and an abomination of desolation; and

WHEREAS these unfortunate wives start at 3:30 in the afternoon, returning as many calls as humanly possible until 6:30, but find on their return home just as many cards have been left on them, thereby never reducing the number of calls; and

WHEREAS this continually expanding system serves no useful purpose except to provide business profits for printers and taxicabs and other forms of transport; and

WHEREAS this extraordinary custom has grown and expanded into a social frankenstein which in its very essence is undemocratic, un-American, and utterly stupid and not acknowledged or practiced in any civilized country in the world: Therefore be it

Resolved, That a Committee on Social Etiquette be, and is hereby, created, to be composed of all the gentlewomen who are Members of the House, whose duties shall be to prescribe rules and regulations in order to curtail, limit, or otherwise govern the gentle art of calling in the Capital City: Provided, however, That such rules and regulations shall be within the confines of the Constitution and our American system of government.

Scholarships—Rensselaer Polytechnic Institute

AMONG the scholarships to be awarded by Rensselaer Polytechnic Institute at Troy, N. Y., will be one to a son of an officer of the U. S. Army and one to a son of an officer of the U. S. Navy or Marine Corps.

These special scholarships now made available for the first time, provide full tuition for four years, or the equivalent of $1,600.

Sons of officers either on the active, retired or deceased lists are eligible for consideration.

According to President William Otis Hotchkiss, these scholarships are distinctly honor scholarships. Only exceptional students will be considered and the successful applicants will be required to maintain an average of 85 per cent in their work at the Institute.

Winners of the scholarships will be made to choose from

the following courses which are given at Rensselaer: civil engineering, mechanical engineering, electrical engineering, chemical engineering, aeronautical engineering, metallurgical engineering, industrial engineering, business administration, chemistry, physics, biology, architecture.

Searchlight Battery
Battery A, 251st C.A. (AA) Cal. N.G.

THE 1936 searchlight practice of Battery A, 251st Coast Artillery (AA), California National Guard, was sufficiently outstanding to win the commendation of the Chief of the National Guard Bureau. General Blanding, Bureau Chief, commented strongly on the fine spirit, initiative, energy and resourcefulness of the outfit. He also expressed his appreciation of the generous aid rendered the battery by the 63d Coast Artillery (AA), the 514th Observation Squadron, Air Corps Reserve and the 40th Division Air Service, California National Guard.

Battery A began its preparation for the camp period in the early spring. The listeners and lamp operators trained during the armory drill periods under the street lights of San Diego, the home station. They were very resourceful and utilized even Sunday mornings for training in tracking commercial ships entering and leaving Lindbergh Field. They trained so continuously that at the time they left for camp an adequate number of experienced listeners were available. The difficulties encountered during the two weeks encampment at Ventura, Calif., which are too numerous to elaborate upon here, were readily overcome. Such things as overcoming the objections of the local utility company to the stringing of wire on the company's poles were of no moment. Progress during the camp period was hampered greatly due to the fact that only one night in five was suitable for drill on account of fog. Much of the night training was limited to traversing and elevating drill only. As a result of these interferences, the battery could not conduct its record practice during the encampment period; however, shortly after returning to its home station they completed arrangements to conduct the record practice at March Field, California, a hundred miles from San Diego, their home station.

At March Field the 63d Coast Artillery was in training —defending a sector. Their installations, already set up, were loaned to Battery A. The battery made the trip by motor convoy, and had the sections in their stations and the lights in action, an hour after arrival and conducted an excellent practice.

This battery conducted its record target practice at a time other than during its camp period. The practice was conducted one hundred miles from the homes of the members of the battery and during time that normally would be allotted to their personal pursuits. In keeping with their fine spirit they achieved excellent results. The battery commander modestly maintained in his narrative report that the results attained would not have been possible without the wholehearted coöperation of the 63d C.A., the 514th Observation Squadron, Air Corps Reserve and the 40th Division Air Service, California National Guard.

It has been wisely said that anything can be accomplished if you have the determination to do it. Battery A apparently was not only determined to hold its practice but also was determined to attain excellent results. It did both and did them in an exemplary manner and it merits the commendation received.

Headquarters Battery, 7th Coast Artillery Wins Trophy

THE Headquarters Battery, 7th Coast Artillery, has been awarded the trophy to be presented by the New York Society, Military and Naval Officers of the World War, for general efficiency during the period November 1, 1935 to October 31, 1936. The battery was commanded by Captain W. C. McFadden, 7th C.A. The record of this organization is most outstanding especially so because it was being transformed during the period of the award from a nucleus of a small caretaking detachment to an active training battery. Apparently the inexperience of the men was more than compensated for by their intelligence and genuine enthusiasm for the vast assortment of duties that they were called upon to perform. The organization proved itself to be most versatile for during the period in question it successfully conducted a mine practice classified as excellent; a test of the T11 Data Transmission System; a test mobilization for Battery A, 7th C. A. (inactive) and a record practice with AA machine guns with a score of 107.83, in addition to its daily routine duties.

Although this organization is called a Headquarters Battery it is essentially an active training battery. The men accomplish their training missions, do full guard duty and perform their maintenance work in addition thereto.

Notwithstanding the intensive training and amount of maintenance work required of the battery, it has produced winning athletic teams showing that it is a well-balanced organization. During the 1935 baseball season, the Headquarters Battery team took second place. It took first place in the soccer contest and first place in the basketball league, which has just closed.

On February 26 General Sunderland was pleased to forward a letter of commendation to the commanding officer of the Harbor Defenses of Sandy Hook, in which he states that he has studied the record of the battery for the year ending last fall and that it appears that the battery is fully entitled to receive the award in question. He also stated "I congratulate you and, through you, the commanding officer, officers and enlisted men of the Headquarters Battery, 7th Coast Artillery, on their fine performance in their wide variety of duties undertaken."

Battery H, 241st Coast Artillery (H.D.) Mass. N.G. Awarded Knox Trophy

THE Sons of the Revolution in the Commonwealth of Massachusetts awards annually a trophy to the most outstanding Coast Artillery battery of the Massachusetts National Guard.

The subjects of competition for this trophy are artillery target practice, gunners' qualifications, indoor and outdoor rifle competition; attendance at armory drills, at federal and state inspections, at annual camp and at officers' and noncommissioned officers' school; ratings at armory inspections; guard duty and efficiency ratings at camp; extension courses and finally commendations—a very comprehensive list of subjects which includes nearly every phase of training.

The Adjutant General of Massachusetts states that the award of this trophy has been the means of greatly increasing the interest and efficiency of the Coast Artillery and that the competition for it has been keen each year. It is a very much sought after prize.

Sixteen batteries competed this year and all made excellent records. The three outstanding batteries are listed below with the score attained by each listed opposite their names.

Battery H, 241st C.A.(HD)—724.43
Battery M, 241st C.A.(HD)—716.25
Battery D, 241st C.A.(HD)—709.24

Battery H, 241st C.A.(HD) was declared the winner and has been presented the trophy. It is commanded by Captain Fred E. Pereira and has as its lieutenants, 1st Lieutenant Wesley M. Bacheller and 2d Lieutenant Fred S. Grant, Jr.

This excellent battery is to be congratulated on the results attained especially so because this is the third time that it has won the trophy in succession and it now becomes their permanent possession.

Toulmin Trophy to 535th C. A.

THE 535th C.A. (AA) Org. Res., Colonel Bowman Elder commanding, was awarded the Toulmin trophy for supetiority for artillery in the 5th Corps Area. This trophy was presented by Major General William E. Cole, commanding the 5th Corps Area. Colonel Elder and his regiment are congratulated on their splendid work especially in view of the fact that this is the first time that a Coast Artillery unit has ever won this coveted trophy.

212th Coast Artillery New York National Guard Wins Hines Trophy

THE Colonel Frank H. Hines Attendance Trophy for annual award to the organization of the New York National Guard obtaining the highest per cent of attendance during the training year has been won by the 212th C.A.(AA) commanded by Colonel E. E. Gauche. The period of competition was from October 1, 1935 to September 30, 1936. The achievement of the 212th C.A. is especially noteworthy for it not only competed against all organizations of the Coast Artillery Corps but every organization of the New York National Guard. The competition was very active. The scores of the four leading contestants are listed below.

212th C.A.(AA)	97.27	71st Inf.	96.25
106th F. A.	96.58	121st Cav.	95.95

The scores listed above are an average of those attained by the various regiments for excellence in armory drill, field training and inspection. Colonel Gauche and his superior regiment have earned well deserved commendation and the congratulations of all.

Overhead Cover for Fixed Armament

THE importance of overhead cover must be realized. From time immemorial it has been recognized as an established fact that the best protection from an attack on the ground is some form of a substantial wall, breastwork or trench and that a strong roof is the best protection from the elements and attack from the air. The lively discussion which is taking place relative to the needs for overhead cover and its advantages have been given impetus due to the action of foreign governments in providing suitable overhead cover in their rearmament programs for seacoast armament.

Does it not seem reasonable that we also fall in line with air service progress and provide adequate protection against air attack?

Gunners Instruction Pamphlet Submarine Mining No. XII.

DUE to a misunderstanding, information has been circulated that there are no Gunners' Instruction Pamphlet No. XII available. There are plenty available and the JOURNAL will be very pleased to receive orders for them. They can be supplied promptly.

OPEN FORUM

MAY VIGOROUS THOUGHT BE STIMULATED AND CRYSTALLIZE INTO ACTION

Open Forum Enthusiast

Sir:

I like the JOURNAL. The supplement was a superb idea. I also like the idea of a column on contributors. The open forum is swell stuff. There is a crying need throughout the army for a real organ of self-expression where officers can "let the chips fall where they may." Too many good minds grow stagnant because of the limitations on the expression of personal opinions. It is the Army's worst necessary evil. It discourages growth and advancement. If this column can arouse some of the minds that have long lain dormant, the JOURNAL will have achieved a really constructive mission for the entire Army.

C. C.

Agnosticus

Sir:

Agnosticus had an idea but he didn't develop it. We are quite sure that some one will say that the criticism was not constructive. It is a natural gift to some of us to see weak spots without knowing how to correct them. Nevertheless, we are condemned for petty fault finding if we call attention to what we see without suggesting a remedy. There appears to be no place in the military scheme for a man who can diagnose a trouble unless he also knows the cure.

We who are members of the Legion of the Lost have difficulty in grasping the idea that a division cannot attack in the afternoon but must wait until next morning because it takes all of five hours to get out a formal field order. We keep reverting to the idea that the attack is more important than the field order.

Of course, we should realize that field exercises and maneuvers are for the benefit of the high command and staff. Not all of us, however, have been through an extended maneuver; and some who have were not sufficiently close to headquarters to observe that about the only equipment which was not simulated was the mimeograph machine.

OBSERVER.

Lack of Essential Fire Control Equipment

Sir:

There is ever present in the minds of antiaircraft artillerymen the many limitations existing relative to our present directors. The number of directors of this type or similar modern types that are available is certainly most limited. The time required for manufacturing them in times of emergency will unquestionably be great. There is a strong possibility that in event of a major emergency that we will be caught unprepared and unable to meet even the minimum requirements for AA fire control equipment. It is suggested that it is reasonable that we take advantage of every bit of substitute equipment and put it in condition so that it could be used without delay. The R.A. corrector can be used within its limitations to very good advantage and those on hand should be modernized so that they can be so used. Greater study should be made with a view to utilizing the R.A. correctors to their maximum limits.

CAPTAIN, C.A.C.

Coast Artillery Rifle and Pistol Teams

Sir:

We should be concerned over the failure of the Coast Artillery to enter teams in the National Rifle and Pistol matches. Teams should be entered, and it would surely be good morale medicine if they were.

The principal argument against entering teams seems to be that we are artilletymen and are not supposed to know anything about small arms. We may be artillerymen, but at the same time, we are armed with rifles and pistols and have definite missions necessitating their use. We may even be called upon to serve as infantry. Also machine guns are assigned to us as primary armament. While they may be different, in many respects, from the rifle, nevertheless, those who know the rifle trajectory, as graduates from Camp Perry know it, cannot help but be considerably better equipped than those who can qualify only as marksmen. There is no reason why advanced marksmanship training for the Coast Artilleryman is not just as important as for the Infantryman.

There are many officers and enlisted men who are anxious to have their chance. In addition to those who have formerly taken an interest in shooting there are many more who would take active part in this sport if such advantages were offered.

I sincerely feel that we are making a great mistake in this matter and that we are not making the most of all of our opportunities to prepare for field service.

MAJOR, C. A. C.

Reserve Officers' Promotion

Sir:

I often wonder if the W.D.G.S. wants or expects Reserve Officers, R.O.T.C. graduates with no actual experience in an emergency, and who by virtue of their

civilian occupations find it impossible to attend the service schools provided, to advance beyond the grade of captain.

Every regular army officer in the junior grades, whose profession is arms and who has at his disposal all the texts and talents of his profession will admit that the A.E.C.—40 Series is no course that can be run thru hurriedly. Now, take the case of the civilian officer. Most of us who adopted military science as an avocation and have been reasonably successful or exceptionally fortunate in our vocations during the past ten or twelve years since leaving college, have arrived at a critical point in our careers—there will be no retirement with pay for us after thirty years service, unless we ourselves have made it; and, there is no assurance that salaries will rise in years of service, unless our own personal efforts and achievements make it possible. Therefore of necessity we must make our civilian occupation primary, and with the necessary business and social functions, recreation, etc., the amount of time available is indeed small.

A lot of us are very ambitious to become field officers in the O.R.C. but three months is a long time these days to ask for a "leave of absence" from business to attend a service school. And, to sit down at night after a busy day in the realms of commerce and transport one's mind into the military science requires a lot of time and concentration. A 40 series A.E.C. can't be picked up and thrown aside like "Readers Digest" and most of the lessons take the average officers five hours to do—from start to finish.

I'm not bellyakin'—or maybe I am. But it's damn little a Reserve officer gets for what he puts into the Corps, if he's at all active—two weeks' training one summer in three—maybe; so, if promotion above the grade of captain is impractical why not say so and let us get it over with. And if it's the less fortunate group of Reserve officers who have been unable to tie into a steady job during the depression and have taken advantage of the C.C.C., and there under conditions more favorable to study completed A.E.C. courses and attended service schools for the pay involved, that the Army wants for its field officers in future emergencies, then the rest of us better turn our attention to more relaxing and lucrative diversions.

A Captain, Coast Artillery Reserve.

Why Not Enlist ROTC's?

Sir:

Colonel George U. Harvey's idea of military for CCC's is not new. In fact, General Glassford, who was the superintendent of the Washington, D. C. police, was the first one to prescribe camps as an antidote for unemployment and he contemplated military training and MILITARY DISCIPLINE.

However, as actually run, with the exception of veterans, mere unemployment did not qualify a young man for CCC duty. His family had to be on relief which meant in most cases that his father was also unemployed. This resulted in the selection of candidates from a class, a peculiarly disgruntled class.

Marx said: "The arming of the whole proletariat with muskets, rifles, cannon, and munitions must be carried on immediately."

Trotsky, in the History of The Russian Revolution, boasts of his success in arming the proletariat in the coup d'état of March 25, 1917.

Colonel Harvey complains that discipline was foreign to world war conscripts; proposes six months in the army for CCC's, supposedly to subject them to discipline. But if it will be anything like the CMTC, it will be very lovely but not discipline. Where the idea of compulsion is lacking, it is not discipline. It is make believe. It will not give Reserve officers "actual experience in the command of enlisted men" unless the idea of compulsion is fully present. Elsewhere in the same issue Major Charles I. Clark extols the virtues of drilling CMTC's but they are not under military discipline.

At Blacksburg, Va., where I went to school, there were some students who enlisted in the local unit of the National Guard in order to meet school expenses. This was in addition to living in barracks, marching to mess, standing guard, and enjoying Saturday inspection of quarters and review, etc.

If they had been given the opportunity to draw enlisted men's pay while attending classes, the whole school would have unanimously enlisted. Two-thirds would have helped to provide an enlisted reserve since only one-third that entered ever graduated.

Such a plan would help those loyal enough to believe in military training to receive an education, it would provide adequate means for punishing agitators, it would provide that element of compulsion needed to insure full attendance at Officer's Reserve meetings and would keep active those Reserve officers who, having attended a school where compulsion was much in evidence, are forever more disgusted with the "do it if you want to" spirit which is prevalent in the Reserve Corps.

Of course there is the National Youth Administration to help out college students, there is one of 'em lectures in my home town of Youngstown; she holds forth at the central auditorium which is where the local communists do their fist waving, international singing, and advocation of mutiny.

For many years our statesmen have told us that Americans are opposed to things military and will not stand for a large army. But experience shows that the free American will frantically rush to join and pay money to any organization which offers titles and uniforms. And if they have ever held a temporary military office or title, their title and uniform has to be practically scalded off of them. Maybe our statesmen have been wrong about our not wanting a large army. Why not enlist ROTC's at any rate?

First Lieutenant, C.A.-Res.

COAST ARTILLERY BOARD NOTES

Any individual, whether or not he is a member of the service, is invited to submit constructive suggestions relating to problems under study by the Coast Artillery Board, or to present any new problems that properly may be considered by the Board. Communications should be addressed to the President, Coast Artillery Board, Fort Monroe, Virginia.

SECTION I

Projects Completed Since Last Issue of the Journal

PROJECT NO. 1069—HELMETS (STRAW AND FABRIC).—The Coast Artillery Board forwarded the report on the test of the helmets with the recommendation that the fabric helmet be standardized for wear with the cotton khaki uniform in lieu of the service (campaign) hat. The comfort to the wearer and the smart appearance of the helmet as an article of military uniform were both strongly emphasized by both officers and men during the period of the test.

PROJECT NO. 1081—MODIFIED KITCHEN TENTS.—As described briefly in the last issue of the JOURNAL, the modified kitchen tent is shaped like a pyramidal tent except that the floor area is smaller and any one or all of the side walls, which are about six and one-half feet high, can be raised to form awnings. Except that it is hardly large enough to accommodate properly the wood burning field range, when all the walls are down, and except for several minor defects, the modified kitchen tent was found to be generally satisfactory for its intended purpose. As a part of this investigation, consideration was given to the suggestion submitted by the Quartermaster General that the floor dimensions of the modified kitchen tent be increased from eleven feet by eleven feet to sixteen feet by sixteen feet, but that the present height of eleven feet and the present wall height of six feet six inches be retained. The floor dimensions of sixteen feet by sixteen feet equal those of the pyramidal tent. This proposal raised questions believed properly answerable only by an extended test of the matériel by the using troops. It was recommended, therefore, that the proposed tent be constructed and sent, along with a modified kitchen tent, to an antiaircraft artillery regiment for a comparative test. For use as a battery orderly tent, or as a headquarters tent, the M1934 pyramidal tent was considered to be more suitable than the modified kitchen tent because the former tent has greater floor space and a better doorway.

PROJECT NO. 1085—COVERS BG-68 AND BG-69 FOR REEL UNIT RL-26.—Two canvas covers for the large, gas engine-driven Reel Unit, RL-26, were given a service test. One cover, the BG-68, was designed to cover the reel unit completely; the other, the BG-69, was designed to protect only the gas engine of that unit. There was some question as to whether any cover was needed for the RL-26 since that unit is intended to be used in a truck. Furthermore, the RL-26 is to be replaced in the Coast Artillery by the Reel Unit, RL-31. The other side of the argument is that there will be times when the RL-26 will not be afforded the shelter of a truck and on those occasions a canvas cover, or some sort of protection from the weather, will be necessary. There are already a number of RL-26 reel units in service and, being of durable construction, they will probably remain in service for some time to come. These considerations led to the opinion that a cover should be provided for the Reel Unit, RL-26, and the cover BG-68 (the overall cover) was chosen as the better type. Subject to the correction of certain faults, the Cover, BG-68, has been recommended for adoption as standard and for inclusion in the Parts List of the Reel Unit, RL-26.

SECTION II

Projects Under Consideration

PROJECT NO. 953—RADIO CONTROLLED HIGH-SPEED TARGET.—The major overhaul of the engine has been completed and the engine has been installed in the boat. A breadboard set up of the new radio control unit has been completed and tested, and this unit is now ready for installation. This installation will be completed in time to renew the tests of this target as soon as weather conditions permit.

PROJECT NO. 1038—STORAGE OF RUBBER-JACKETED SUBMARINE MINE CABLE.—This is a service test being conducted in several harbor defenses. The test in each harbor defense involves the storage of four reels of jute-covered cable and two reels of rubber-jacketed cable under water and two reels of rubber-jacketed cable, dry. At the

end of each six months certain electrical tests are made and the cable on a certain number of reels re-reeled. The electrical tests are then repeated and the reels are put back in storage. Sufficient data has not been received to warrant any conclusions. The test will extend over a period of five years for the purpose of determining which is better, dry storage or wet storage, and whether periodic re-reeling is advisable.

PROJECT NO. 1039—DATA TRANSMISSION SYSTEM, T-11.—The service test of this system for transmitting firing data to seacoast gun carriages included one set of the equipment which was installed in the Harbor Defenses of Sandy Hook. A comprehensive report of the test of this installation has been received and is under study by the Board. The report is, in general, favorable. Some difficulty was experienced in securing the expected precision in the transmission and setting of elevation, but the errors noted were not serious either in size or frequency of occurrence. In fact, the report states that the mechanical indications of the T-11 Data Transmission System were more accurate than the range discs and azimuth circles originally provided with the guns. Also it was found that, with the T-11 Data Transmission System, the gun could be pointed more quickly and the data was more reliable than when telephones were used.

PROJECT NO. 1076—SWITCHBOARDS BD-71-T4 AND BD-72-T4.—The Coast Artillery Board tested these switchboards during 1935 and recommended certain changes. The switchboards are six-line and twelve-line, respectively, embodying as component parts the operator's set, and ringing and listening keys. The switchboards are now in production and this test is to be made to check any change necessary for future procurement. This test is awaiting receipt of matériel.

PROJECT NO. 1079—MODIFIED FIELD JACKETS—Ten field jackets of improved designs over those tested last year are now undergoing a test to determine their suitability for wear in the field in lieu of the service coat. Two types of field jacket have been submitted, differing chiefly in the following respects: One has slash pockets (similar to a pea-jacket), whereas, the other has "bellows" pockets; the latter jacket is slightly longer. Otherwise, the two jackets are essentially alike; each is open at the throat, is fastened by a zipper, and has two pleats at the back. The early indications are that the jacket will be found generally satisfactory.

PROJECT NO. 1083—ELBOW TELESCOPES, T9 AND T10.—Comparative tests of these telescopes and the present standard elbow telescope, M2, were conducted by tracking an outgoing target illuminated by a platoon of searchlights. The five lights were emplaced so that continuous illumination of the target was provided from directly above the telescopes out to a distance of approximately 15,000 yards. Tests were conducted under various conditions of visibility. With the T10 telescope (8-power), it was easily possible to track the target until it was lost by the outer ring of searchlights. The observers, when using the T9 telescope (6-power), usually experienced more difficulty than when using the T10, but, nevertheless, were able to track nearly as far as with the higher powered instrument. The results obtained with the M2 telescope varied with the visibility. On clear nights, the observers could follow the target until it was lost by the searchlights. On hazy nights, this telescope permitted tracking to ranges of 10,000 yards and over, though the target was lost much sooner than with the newer types of telescopes. It is believed that the performance of the M2 telescopes could be made nearly equal to that of the newer types of telescopes if a more satisfactory means of reticle illumination were provided for the former.

PROJECT NO. 1086—POSITION FINDING BY AERIAL OBSERVATION.—Investigation by the Board is being made to develop a method of locating long range targets by aerial observation without utilizing radio direction finders or angle depression indicators or altazimuth instruments. The method should be applicable to those situations where the observer in the airplane cannot see any landmark after he has passed over shore out to sea. One method, involving the use of a Pelorus, is being investigated. Actual tests have not started but it is planned to conduct the test as soon as weather and troop requirements permit.

PROJECT NO. 1088—ANTI-CORROSIVE PAINT FOR SUBMARINE MINE CASES.—The standard method of painting mine cases consists in the application of a priming coat of red lead followed by one or two coats of standard gray paint. Experience has shown that the gray paint tends to scour off leaving the conspicuous orange color of the red lead primer. To a certain degree the camouflage of the mine is thus defeated, because red lead does not lend itself readily to pigmentation by neutral colors without lessening of the protective qualities. Improved priming and finishing paints such as used on ship bottoms are being investigated. These paints have better color characteristics, and possibly better wearing qualities. Modern anti-fouling paint is also being tested to determine the need for, and effectiveness of, this development in preventing the accumulation of excessive marine growth on mine cases. The test is being conducted at a tropical station and also at Fort Monroe and will continue for a period of six months.

SECTION III

Miscellaneous

ANTIAIRCRAFT SEARCHLIGHT TRANSPORTATION.—Three members of the Coast Artillery Board witnessed the recent tests of various vehicles proposed for use in transporting the antiaircraft searchlight and portable type power plant. The tests were conducted at Fort Belvoir, Virginia, by the Engineer Board. One vehicle of particular interest was a White cab-over-engine truck onto the chassis

of which was bolted the body taken from a GMC mobile power plant. This vehicle then had all the advantages of a specially designed searchlight truck. Another vehicle of interest was a 1½-ton truck with stake body. The stakes were removed and the searchlight and its auxiliary equipment were carried over rough roads with improvised holding-down devices and at no time was any material shift noted in the load. It was definitely established that, in an emergency, the searchlight can be carried safely in any 1½-ton or larger truck with cargo body.

The vehicles for transporting the searchlight equipment, recommended by the Coast Artillery Board, were two 2½-ton trucks with twelve by seven-foot cargo bodies having floors not more than forty inches above the ground. The necessary loading and holding-down accessories are to be furnished with the searchlights. These accessories are to be designed so that they can be shifted from one truck to another without tools other than those available in the searchlight battery. One truck carries the searchlight, the other carries the portable power plant and tows the sound locator. It is expected that, by thus adopting general service types of truck, the procurement problem, both for initial equipment and replacements, will be simplified. Another advantage is that, if a searchlight or power plant carrier is disabled, any cargo truck from which the load can be dumped can serve as a substitute.

SERVICE TEST OF MOTOR TRICYCLE.—A motor tricycle, modified to correct certain difficulties found in previous test, is soon to be issued to an antiaircraft regiment for extended service test. This vehicle is intended as a replacement for the motorcycles with sidecars now issued. Comments on the results of previous tests by the Board were given in the September-October and November-December issues of the JOURNAL for 1936. A questionnaire for the service test of the motor tricycle has been prepated by the Coast Artillery Board.

TABLES OF BASIC ALLOWANCES.—The Coast Artillery Board has recently completed a check of the proposed revision of tables of basic allowances for the Coast Artillery Corps. The new tables will contain motor vehicle allowances in the Quartermaster section. Formerly, these allowances were shown only on tables of organization. The majority of the changes made in revision were made for the purpose of eliminating obsolete articles and substituting modern equivalents.

TRAINER FOR SOUND LOCATOR LISTENERS. — While stationed at Fort Crockett, Texas, and later while in command of Battery D, 1st Coast Artillery, at Fort Randolph, Canal Zone, Captain E. G. Cowen, Coast Artillery Corps, designed and built a portable loud speaker attachment for the phonograph of the binaural trainer. This loud speaker can be moved along an overhead wire in simulation of a passing airplane and can be tracked in angular height and azimuth by the listeners on the sound locators. Thus, either outdoor or indoor training can be carried on independent of weather and availability of an actual airplane. The Coast Artillery Board has recommended that one of these devices be built and subjected to service test. It is hoped that such a device will accelerate the training of listeners so that the maximum benefit may be derived from the limited number of hours of tracking on actual targets. The device should be particularly valuable for armory training.

TELEPHOTOGRAPHIC MEASUREMENT OF SPLASH DEVIATIONS.—Master Sergeant J. C. Palmer, Coast Artillery Corps, has conducted a number of experiments in an effort to evolve an improved method of determining range and direction deviations in seacoast artillery target practices, and has submitted his results to the Board. He has installed a miniature camera behind the eye lens of an azimuth instrument on which is also mounted an auxiliary telescope. It is proposed that two such instruments, one at either end of a long base line, be used for tracking the target. The tracker at the station nearest the battery signals electrically to the distant station at the instant of splash and at the same time works the camera shutter. An assistant turns the film for the next exposure, an operation requiring only the movement of a lever. By experiment it has been found that the resulting negatives show distant objects silhouetted above the reticle of the telescope so that deviations in angular measure can be determined.

FORTRESSES ARE EQUALLY USEFUL *in offensive and defensive warfare. It is true they will not in themselves arrest an army, but they are an excellent means of retarding, embarrassing, weakening, and annoying a victorious army.*—NAPOLEON.

COAST ARTILLERY ORDERS

(Covering the Period January 1 to February 28, 1937)

Colonel Robert Arthur, from 13th, Fort Barrancas, to Hawaii, sailing New York, April 29.

Colonel P. D. Bunker, from the Philippines, to Org. Res., 9th Corps Area, Los Angeles.

Colonel Richard Donovan, from 69th, Fort Crockett, to General Staff with troops, Fort Sam Houston.

Colonel Albert Gilmor, from 61st, Fort Sheridan, to Org. Res., 2d Corps Area, New York.

Colonel Franc Lecocq, from Panama, to Third Corps Area, Baltimore.

Colonel F. H. Lincoln, from War Department General Staff, Washington, D. C., to 9th C.A. District, Presidio of San Francisco.

Colonel E. D'A. Pearce, from Panama, to recruiting duty, 9th Corps Area, San Francisco.

Colonel George Ruhlen, to the Philippines, sailing San Francisco, June 11. Previous orders amended.

Colonel S. C. Vestal, retired, April 30.

Colonel B. H. L. Williams, from Hawaii, to 13th, Fort Barrancas.

Colonel E. N. Woodbury, promoted Colonel January 1, retired upon own application, January 31.

Lieutenant Colonel R. D. Brown, from 62d, Fort Totten, to student, Army War College, August 21.

Lieutenant Colonel A. G. Campbell, from 9th, C.A., District, Presidio of San Francisco, to 61st, Fort Sheridan.

Lieutenant Colonel J. H. Cunningham, promoted Colonel January 1.

Lieutenant Colonel W. K. Dunn, from 13th, Fort Moultrie, to student, Army War College, August 21.

Lieutenant Colonel W. E. Durvall, from Org. Res., El Paso, Texas, to instructor, California N.G., San Diego.

Lieutenant Colonel Franklin Kemble, from the Philippines, to University of New Hampshire, Durham.

Lieutenant Colonel C. B. Lindner, from finance officer, Boston, to Hawaii, sailing New York, June 9, for assignment to Finance Department.

Lieutenant Colonel Reinold Melberg, from the Philippines, to instructor Pennsylvania N.G., Allentown.

Lieutenant Colonel H. E. Small, from instructor, Connecticut N.G., Bridgeport, to Panama, sailing New York, July 8.

Lieutenant Colonel E. A. Stockton, Jr., promoted Colonel, January 1.

Lieutenant Colonel L. L. Stuart, from 6th, Fort Winfield Scott, to student, Army War College, August 21.

Lieutenant Colonel E. H. Thompson, from Org. Res., Second Corps Area, New York, to 3d, Fort Stevens.

Lieutenant Colonel R. L. Tilton, from 9th, Fort Banks, to student, Army War College, August 21.

Lieutenant Colonel R. H. VanVolkenburgh, from War Department General Staff, Washington, D. C., to student, Naval War College, Newport.

Lieutenant Colonel Eugene Villaret, from The Citadel, Charleston, to Belgrade, as military attaché and military attaché for air, Yugoslavia, Greece, and Roumania.

Lieutenant Colonel O. C. Warner, from the Philippines, to Org. Res., 8th Corps Area, San Antonio.

Major T. J. Betts, from Hq. 9th Corps Area, Presidio of San Francisco, to student, C.&G.S. School, Fort Leavenworth, August 25.

Major P. F. Biehl, from the Philippines, to instructor, California N.G., San Francisco. Previous orders revoked.

Major Benjamin Bowering, to the Philippines, sailing New York, May 19. Previous orders amended.

Major O. B. Bucher, from 51st, Fort Monroe, to student, C.&G.S. School, Fort Leavenworth, August 18.

Major J. T. Campbell, to the Philippines, sailing New York, May 19. Previous orders amended.

Major H. W. Cochran, from C.&G.S. School, Fort Leavenworth, to student, Army Industrial College, August 21.

Major M. E. Conable, from instructor, Washington, N.G., Fort Lewis, to the Philippines, sailing San Francisco, April 9.

Major E. T. Conway, from C.A. Board, Fort Monroe, to student, C.&G.S. School, Fort Leavenworth, August 18.

Major C. E. Cotter, from C.A. Board, Fort Monroe, to student, Army War College, August 21.

Major J. L. Craig, from Panama, to instructor, New York N.G.

Major L. C. Dennis, from Panama, to student, C.&G.S. School, Fort Leavenworth, August 25.

Major D. L. Dutton, from University of Delaware, Newark, to student, C.&G.S. School, Fort Leavenworth, August 25.

Major W. H. Donaldson, Jr., from Hawaii, to instructor, C.A. School, Fort Monroe.

Major F. E. Edgecomb, from instructor, C.A. School, Fort Monroe, to C.A. Board, Fort Monroe.

Major D. M. Griggs, from 63d, Fort MacArthur, to student, C.&G.S. School, Fort Leavenworth, August 18.

Major M. C. Handwerk, from student, C.&G.S. School, Fort Leavenworth, to instructor, C.A. School, Fort Monroe.

Major I. H. Harrington, to the Philippines, sailing San Francisco, April 9. Previous orders amended.

Major C. S. Harris, from Hawaii, to 69th, Fort Crockett.

Major H. N. Herrick, from student, Air Corps Tactical School, Maxwell Field, Alabama, to C.A. Board, Fort Monroe.

Major C. J. Herzer, from the Philippines, to instructor, Pennsylvania N.G., Allentown.

Major D. W. Hickey, Jr., from instructor, C.A. School, Fort Monroe, to student, C.&G.S. School, Fort Leavenworth, August 18.

Major P. W. Lewis, from student, C.&G.S. School, Fort Leavenworth, to instructor, C.A. School, Fort Monroe.

Major E. B. McCarthy, from 6th, Fort Winfield Scott, to Org. Res., 8th Corps Area, Denver.

Major H. A. McMorrow, from instructor, Ark. N.G., Hot Springs, to the Philippines, sailing New York, May 27.

Major O. D. McNeely, from instructor, Pennsylvania N.G., Allentown, to student, C.&G.S. School, Fort Leavenworth, August 25.

Major S. R. Mickelsen, from C.A. Board, Fort Monroe, to student, Army War College, August 21.

Major D. E. Morrison, from Georgia School of Technology, Atlanta, to student, C.&G.S. School, Fort Leavenworth, August 25.

Major R. E. Phillips, from Org. Res., 8th Corps Area, to the Philippines, sailing San Francisco, April 9.

Major H. R. Pierce, from Panama, to University of Washington, Seattle.

Major J. D. Powers, from Hawaii, to instructor, Arkansas N.G., Hot Springs.

Major W. W. Rhein, from instructor, California N.G., San Francisco, to Panama, sailing San Francisco, February 2.

Major G. B. Robison, from Hawaii, to instructor, C.A. School, Fort Monroe.

Major E. C. Seaman, to Panama, sailing New York, June 9. Previous orders amended.

Major J. C. Stephens, from 7th, Fort Hancock, to 11th Fort H. G. Wright.

Major W. H. Steward, from the Philippines, to University of Cincinnati, Cincinnati, Ohio.

Major F. S. Swett, to the Philippines, sailing San Francisco, April 9. Previous orders revoked.

Major E. W. Timberlake, from 61st, Fort Sheridan, to Havana, Cuba, as military attaché.

Captain W. I. Allen, from U.S.M.A., West Point, to student, C.&G.S. School, Fort Leavenworth, August 21.

Captain H. T. Benz, from Hawaii, to 69th, Fort Crockett.

Captain H. A. Brusher, to the Philippines, sailing New York, May 19. Previous orders amended.

Captain J. F. Cassidy, from 6th, Fort Winfield Scott, to University of California, Berkeley.

Captain G. A. Chester, from student, C.A. School, Fort Monroe, to 11th, Fort H. G. Wright.

Captain J. M. England, to the Philippines, sailing San Francisco, April 9. Previous orders amended.

Captain A. G. Franklin, Jr., from 9th, Fort Banks, to Hawaii, sailing New York, April 29.

Captain J. F. Gamber, from student, C.A. School, Fort Monroe, to 63d, Fort MacArthur.

Captain B. D. Gill, to the Philippines, sailing San Francisco, April 9. Previous orders amended.

Captain C. A. Gillette, from the Philippines, to 9th, Fort Banks.

Captain R. I. Glasgow, from U.S.M.A., West Point to student, C.&G.S. School, Fort Leavenworth, August 21.

Captain S. J. Goodman, from University of California, Berkeley, to student, C.&G.S. School, Fort Leavenworth, August 25.

Captain W. E. Griffin, from the Philippines, to 61st, Fort Sheridan.

Captain E. R. Guild, from Boise High School, Boise, Idaho, to student, C. A. School, Fort Monroe.

Captain N. E. Hartman, from 6th, Fort

Winfield Scott, to instructor, C.A. School, Fort Monroe.

Captain W. B. Hawthorne, from 63d, Fort MacArthur, to U.S.A.M.P. *Joseph Henry*, Fort Hancock.

Captain C. W. Holcomb, from Hawaii, to student, C.A. School, Fort Monroe.

Captain J. F. Howell, Jr., from the Philippines, to 62d, Fort Totten.

Captain L. W. Jefferson, from Hawaii, to student, C.&G.S. School, Fort Leavenworth, August 25.

Captain J. J. Johnson, from 10th, Fort Rodman, to Hawaii, sailing New York, March 18, revoked.

Captain W. H. Kendall, to Hawaii, sailing San Francisco, June 12. Previous orders amended.

Captain D. B. Latimer, from Fort Monroe, to Finance Department, Chicago.

Captain A. L. Lavery, from instructor, Massachusetts N.G., Boston, to the Philippines, sailing New York, May 27.

Captain W. L. McPherson, from instructor, C.A. School, Fort Monroe, to student, C.&G.S. School, Fort Leavenworth, August 18.

Captain D. D. Martin, from Michigan State College, East Lansing, to student, C.&G.S. School, Fort Leavenworth, August 25.

Captain H. F. Meyers, from student, C.&G.S. School, Fort Leavenworth, to 69th, Fort Crockett.

Captain P. B. Nelson, from Panama, to 61st, Fort Sheridan.

Captain R. B. Pape, from 6th, Fort Winfield Scott, to student, C.&G.S. School, Fort Leavenworth, August 18.

Captain M. M. Read, to 62d, Fort Totten, upon completion of foreign service. Previous orders amended.

Captain C. E. Rothgeb, from 13th, Fort Barrancas, to Hawaii, sailing New York, April 29.

Captain C. V. R. Schuyler, from student, C.&G.S. School, Fort Leavenworth, to C.A. Board, Fort Monroe.

Captain C. Q. Shelton, from 6th, Fort Winfield Scott, to student, C.&G.S. School, Fort Leavenworth, August 18.

Captain C. E. Shepherd, from student, C.A. School, Fort Monroe, to C.A. Board, Fort Monroe.

Captain P. W. Shunk, from Panama, to student, C.A. School, Fort Monroe.

Captain L. O. Shutt, from 62d, Fort Totten, to student, C.&G.S. School, Fort Leavenworth, August 18.

Captain D. H. Smith, from the Philippines, to Michigan State College, East Lansing.

Captain V. C. Snell, from 14th, Fort Worden, to Hawaii, sailing San Francisco, June 12.

Captain H. J. Vandersluis, from 6th, Fort Winfield Scott, to student, C.&G.S. School, Fort Leavenworth, August 18.

Captain W. L. Weible, from instructor, C.&G.S. School, Fort Leavenworth, to student, Army War College, August 21.

Captain W. A Weddell, from Hawaii, to 11th, Fort H. G. Wright.

Captain T. B. White, from the Philippines, to student, C.&G.S. School, Fort Leavenworth, August 25.

Captain L. A. Whittaker, promoted Major, February 1.

Captain S. E. Willard, from 11th, Fort H. G. Wright, to Hawaii, sailing New York, April 29.

Captain A. M. Wilson, Jr., from 51st Fort Monroe, to student, C.&G.S. School, Fort Leavenworth, August 18.

Captain W. L. Wright, from 2d, Fort Monroe, to student, C.A. School, Fort Monroe.

First Lieutenant G. N. Adams, from 3d, Fort Stevens, to student, C.A. School, Fort Monroe.

First Lieutenant D. S. Alexander, from 63d, Fort MacArthur, to student, C.A. School, Fort Monroe.

First Lieutenant K. M. Briggs, from Panama, to 61st, Fort Sheridan.

First Lieutenant A. F. Cassevant, from student, C.A. School, Fort Monroe, to 62d, Fort Totten.

First Lieutenant E. W. Chamberlain, from student, C.A. School, Fort Monroe, to C.A. Board, Fort Monroe.

First Lieutenant E. A. Chapman, from 6th, Fort Winfield Scott, to student, C.A. School, Fort Monroe.

First Lieutenant C. C. Cloud, Jr., from student, C.A. School, Fort Monroe, to 61st, Fort Sheridan.

First Lieutenant W. S. Coit, from 6th, Fort Winfield Scott, to student, C.A. School, Fort Monroe.

First Lieutenant N. A. Congdon, from Panama, to student, C.A. School, Fort Monroe.

First Lieutenant H. B. Cooper, Jr., from 11th, Fort H. G. Wright, to student, C.A. School, Fort Monroe.

First Lieutenant I. W. Cory, from Panama, to student, C.A. School, Fort Monroe.

First Lieutenant F. E. Day, from USMA, West Point, to student, C.A. School, Fort Monroe.

First Lieutenant M. K. Deichelmann, from the Philippines, to 52d, Fort Monroe.

First Lieutenant P. V. Doyle, from 69th, Fort Crockett, to student, C.A. School, Fort Monroe.

First Lieutenant C. G. Dunn, from the Philippines, to student, C.A. School, Fort Monroe.

First Lieutenant P. W. Edwards, from Hawaii, to 63d, Fort MacArthur.

First Lieutenant F. H. Fairchild, from 2d, Fort Monroe, to student, C.A. School, Fort Monroe.

First Lieutenant F. T. Folk, from 11th, Fort H. G. Wright, to student, C.A. School, Fort Monroe.

First Lieutenant R. T. Frederick, from 1st C.A. District, Boston, to student, C.A. School, Fort Monroe.

First Lieutenant A. L. Fuller, Jr., from 3d C.A. District, Fort Monroe, to student, C.A. School, Fort Monroe.

First Lieutenant T. A. Glass, from 2d, Fort Monroe, to student, C.A. School, Fort Monroe.

First Lieutenant C. E. Green, from 69th Fort Crockett, to student, C.A. School, Fort Monroe.

First Lieutenant P. W. Guiney, Jr., from 52d, Fort Hancock, to student, C.A. School, Fort Monroe.

First Lieutenant W. H. Harris, from student, C.A. School, Fort Monroe, to 11th, Fort H. G. Wright.

First Lieutenant A. R. Hartman, to the Philippines, sailing San Francisco, April 9. Previous orders amended.

First Lieutenant T. H. Harvey, from 52d, Fort Hancock, to student, C.A. School, Fort Monroe.

First Lieutenant W. H. Hennig, from U.S.M.A., West Point, to student, C.A. School, Fort Monroe.

First Lieutenant H. W. Hunter, from 13th, Fort Barrancas, to student, C.A. School, Fort Monroe.

First Lieutenant D. B. Johnson, from 2d, Fort Monroe, to student, C.A. School, Fort Monroe.

First Lieutenant Harry Julian, from 13th, Fort Barrancas, to student, C.A. School, Fort Monroe.

First Lieutenant R. K. Kaufmann, from student, C.A. School, Fort Monroe, to 63d, Fort MacArthur.

First Lieutenant V. M. Kimm, from 2d, Fort Monroe, to student, C.A. School, Fort Monroe.

First Lieutenant J. H. Kochevar, from 14th, Van Nuys, California, to Panama, sailing San Francisco, May 8.

First Lieutenant A. A. Koscielniak, from student, C.A. School, Fort Monroe, to 69th, Fort Crockett.

First Lieutenant J. J. Lane, from 2d, Fort Monroe, to student, C.A. School, Fort Monroe.

First Lieutenant R. C. Leslie, from 13th, Fort Crockett, to student, C.A. School, Fort Monroe.

First Lieutenant Lafar Lipscomb, Jr., from 51st, Fort Monroe, to student, C.A. School, Fort Monroe.

First Lieutenant F. A. Liwski, from 62d, Fort Totten, to student, C.A. School, Fort Monroe.

First Lieutenant W. B. Logan, from 51st, Fort Monroe, to student, C.A. School, Fort Monroe.

First Lieutenant H. G. McFeely, from 63d, Fort MacArthur, to student, C.A. School, Fort Monroe.

First Lieutenant F. J. McMorrow, from 62d, Fort Totten, to Ordnance Department, Watertown Arsenal.

First Lieutenant T. K. MacNair, from 7th, Fort Hancock, to student, C.A. School, Fort Monroe.

First Lieutenant R. F. Moore, from 3d, Fort Rosecrans, to student, C.A. School, Fort Monroe.

First Lieutenant R. W. Moore, from 61st, Fort Sheridan, to student, C.A. School, Fort Monroe.

First Lieutenant C. G. Patterson, from 51st, Fort Monroe, to student, C.A. School, Fort Monroe.

First Lieutenant Arthur Roth, from the Philippines, to 61st, Fort Sheridan.

First Lieutenant I. D. Roth, from the Philippines, to student, C.A. School, Fort Monroe.

First Lieutenant W. A. Rude, from 52d, Fort Monroe, to student, C.A. School, Fort Monroe.

First Lieutenant S. C. Russell, from 52d, Fort Monroe, to student, C.A. School, Fort Monroe.

First Lieutenant J. A. Sawyer, from Hawaii, to 14th, Fort Worden.

First Lieutenant W. F. Spurgin, from student, C.A. School, Fort Monroe, to U.S.A.M.P. *Schofield*, Fort Monroe.

First Lieutenant T. V. Stayton, from 11th, Fort H. G. Wright, to student, C.A. School, Fort Monroe.

First Lieutenant Preston Steele, from the Philippines, to student, C.A. School, Fort Monroe.

First Lieutenant R. A. Turner, from 51st, Fort Monroe, to student, C.A. School, Fort Monroe.

First Lieutenant J. T. Wrean, from 61st, Fort Sheridan, to the Philippines, sailing New York, May 27.

First Lieutenant F. J. Zeller, from 52d, Fort Monroe, to student, C.A. School, Fort Monroe.

Second Lieutenant C. L. Andrews, from 2d, Fort Monroe, to student, C.A. School, Fort Monroe.

Second Lieutenant L. K. Beazley, from 52d, Fort Monroe, to student, C.A. School, Fort Monroe.

Second Lieutenant R. C. Boys, from 11th, Fort H. G. Wright, to Hawaii, sailing New York, April 29.

Second Lieutenant C. F. Cordes, Jr., from 52d, Fort Monroe, to the Philippines, sailing New York, May 27.

Second Lieutenant S. I. Gilman, from 51st, Fort Monroe, to student, C.A. School, Fort Monroe.

Second Lieutenant H. J. Harrison, from 51st, Fort Monroe, to the Philippines, sailing New York, May 27.

Second Lieutenant C. W. Hildebrandt, to the Philippines, sailing New York, May 19. Previous orders amended.

Second Lieutenant J. N. Howell, from 63d, Fort MacArthur, to Hawaii, sailing San Francisco, May 22.

Second Lieutenant M. M. Kallman, from Randolph Field, to Hawaii, sailing San Francisco, March 12.

Second Lieutenant Franklin Kemble, Jr., from 51st, Fort Monroe, to student, C.A. School, Fort Monroe.

Second Lieutenant R. H. Kessler, from 52d, Fort Monroe, to U.S.A.M.P. *General John M. Schofield*, Fort Monroe.

Second Lieutenant J. C. Moore, from 51st, Fort Monroe, to the Philippines, sailing New York, May 27.

Second Lieutenant J. B. Morgan, from 52d, Fort Monroe, to the Philippines, sailing New York, May 27.

Second Lieutenant W. R. Murrin, from 7th, Fort Hancock, to Hawaii, sailing New York, April 29.

Second Lieutenant A. D. Robbins, to the Philippines, sailing San Francisco, April 9. Previous orders amended.

Second Lieutenant W. G. Root, from 61st, Fort Sheridan, to Hawaii, sailing New York, April 29.

Second Lieutenant C. E. Spann, Jr., from 52d, Fort Monroe, to the Philippines, sailing New York, May 27.

Second Lieutenant E. H. Walter, from 52d, Fort Monroe, to Hawaii, sailing New York, April 29.

Second Lieutenant S. L. Weld, Jr., from 62d, Fort Totten, to Hawaii, sailing New York, April 29.

Second Lieutenant G. R. Wilkins, to the Philippines, sailing San Francisco, April 9. Previous orders amended.

Second Lieutenant P. H. Wollaston, to the Philippines, sailing San Francisco, April 9. Previous orders amended.

Regular Army Batteries Classified as Excellent by the War Department for 1936

Corps Area or Dept.	*Regiment*	*Battery*	*Caliber*
I	11th	A	12" SC M
II	7th	Hq.	Mines
	52d	C	12" Ry. M
		E	8" Ry. G
	62d	A	S.L.
		B	3" AA G
		E	M.G.
		F	M.G.
III	52d	D	12" Ry. M.
VI	61st	B	3" AA G
VIII	69th	B	3" AA G
		E	M.G.
IX	63d	A	S.L.
		E	M.G.
Panama	4th	A	S.L.
		B	3" AA G
		D	155 mm. & Mines
Hawaii	15th	B	12" BC G
		C	16" BC G
	16th	A	155 mm.
Hawaii	55th	B	155 mm. (Adv.)
		C	155 mm.
		F	155 mm.
	64th	F	3" AA G
		K	3" AA G
Philippines	59th	A	12" BC G
		B	12" DC G
		E	14" G (Adv.)
		F	12" BC G
	60th	B	3" AA G
		D	3" AA G
		F	M. G.
	91st	B	155 mm. & 6" DC G
		D	14" DC G
		G	Mines & 6" DC G
	92d	A	3" SC G
		B	155 mm.
		D	155 mm.

National Guard Batteries Classified as Excellent by the War Department for 1936

Battery C,	197th C.A. (AA), New Hampshire National Guard
Batteries B, C, D, E, G, H,	198th C.A. (AA), Delaware National Guard
Battery G,	203rd C.A. (AA), Missouri National Guard
" B,	206th C.A. (AA), Arkansas National Guard
" C,	212th C.A. (AA), New York National Guard
Batteries A, C, E, F, G, H,	213th C.A. (AA), Pennsylvania National Guard
" B, C, E, G, H,	240th C.A. (HD), Maine National Guard
" G, M,	241st C.A. (HD), Massachusetts National Guard
" A, B, C, E, G, H, I,	243rd C.A. (HD), Rhode Island National Guard
" D, F,	244th C.A. (TD), New York National Guard
" D, K,	245th C.A. (HD), New York National Guard
Battery A,	248th C.A. (HD), Washington National Guard
Batteries B, D,	249th C.A. (HD), Oregon National Guard
" A, E, F,	251st C.A. (AA), California National Guard
Battery A,	261st C.A. (HD), Delaware National Guard
" C,	265th C.A. (HD), Florida National Guard

THE CONTRIBUTORS

Major CHARLES BUNDY, C.A.C. was born in Massachusetts, April 20, 1890. Graduate of the 1912 class at Middlebury College, Vermont, of the Army War College, a distinguished graduate of the Command and General Staff School, and a graduate of the Coast Artillery School, advanced class. Now on duty in the Office, Chief of Coast Artillery as officer in charge of the matériel and finance section. Well known to many in the Coast Artillery Corps because of his fine work at Fort Monroe where he served as Secretary of the Coast Artillery School. Is somewhat bashful about the fine article appearing under his name. In fact refused to have his name appear with the article claiming that someone might think that it had official sanction. We thought otherwise. Major Bundy is a very loyal supporter of the JOURNAL, and has aided the editorial staff greatly with his suggestions and other active help.

Captain NATHANIEL A. BURNELL, C.A.C., now on duty as an instructor in the Coast Artillery School, was born in Maine, September 13, 1897. Entered the Army from the Military Academy on November 1, 1918. Graduated from the Coast Artillery School, Basic Course, 1920, Battery Officers' Course, 1932, and Advanced Gunnery Course, 1933. Has been particularly active in support of the JOURNAL and Coast Artillery Association, especially in the services that he has given towards the preparation and revising of Gunners' Instruction Pamphlets.

Captain R. W. CRICHLOW, JR., C.A.C. was born in Tennessee, October 6, 1897. Graduated from the Military Academy, June 14, 1917, and is a graduate of the Coast Artillery School, Basic Course, Battery Officers' Course and Advanced Gunnery Course. Was on duty as an instructor at the Coast Artillery School during the period 1932 to 1936. Has had great experience with stereoscopic work. He conducted the training of a group of observers at Fort Story in the spring of 1935 and collected all the data possible for study in future analysis. The resulting report submitted by him has influenced to some degree the present instruction for training stereoscopic observers. Also spent a period with the United States Navy studying their methods of training observers. Author of the official text on the subject of "Stereoscopy and Stereoscopic Rangefinding" which is now in use in the school and has been distributed to the AA regiments. Now on duty as student, Command and General Staff School. Well known to many readers of the JOURNAL for his contributions.

Colonel FRANK K. FERGUSSON, C.A.C., born in Tennessee, February 18, 1874, has spent his whole service in the Artillery, has been with the Coast Artillery Corps since it was created. He has held many important and distinguished assignments, was placed on the initial General Staff Eligible List and served on the General Staff from 1920 to 1924. Is a graduate of the U. S. Military Academy. Twice graduated from the Army War College. Graduated from the School of Submarine Defense, 1906. He was awarded a distinguished service medal for war services. Was a brigadier general during the period of the war and following it. He is so well known because of his fine achievements that there is very little that can be added to his well-known record. A leader, a man of pleasing personality and a true friend.

Captain JOSEPH I. GREENE, Infantry, concludes his traffic study in this issue. These two articles are not meant for light reading but for professional study, and military men should approach them from that point of view. So far as we know, the professional values stressed in "Highway Traffic and Modern War" have scarcely been touched before.

Staff Sergeant CLETUS L. LUEBBE, Coast Artillery Corps, enlisted in the Regular Army, January 13, 1926. After a brief hitch at the recruit barracks at Fort Thomas, Kentucky, he was assigned to the Coast Artillery at Fort Adams, R. I. From there he was sent to Fort Monroe in 1927 to take the course at the Enlisted Specialists' School from which he was graduated in 1928. After graduation he was retained at the school as an assistant instructor for three years. Sergeant Luebbe then had a tour of foreign service with Headquarters Battery, 59th Coast Artillery at Fort Mills, P. I., returning to the States in May of 1935. Since that time he has been on duty at Fort Totten, N. Y., with Headquarters Battery, 62d Coast Artillery (AA).

Shortly before he entered the service, Sergeant Luebbe graduated from Elder High School, Cincinnati, Ohio. His main interest in life has been the solution of practical electrical and mechanical problems. His article in the current number shows that he brings to his work a keen mind and much technical ability.

Major KENNETH McCATTY, C.A.C., was born on July 3, 1892, in Jamaica, British West Indies. Came to the United States in July, 1893, and became a naturalized American citizen in 1914. Graduate of the Manual Training High School in Brooklyn. Entered the Army in 1916. Claims to have mastered Spanish in three months and to have forgotten it almost as soon. Joined the Cavalry and went overseas with the 4th Division where he served as

battalion and brigade adjutant and battalion commander. After the war he found out that horses had no more appeal in peace time than they had in war so he transferred to the Coast Artillery Corps where he has had various types of service. Graduated from the Air Corps Tactical School in 1936. At present is on duty as a student in the Command and General Staff School and boasts that he has not yet abandoned hopes of graduating. He has three children and proudly maintains that he has had the same wife since 1922.

Captain PASCHAL N. STRONG, JR. sent us his article "And the Floods Came" at such a late date that we had no time to secure any biographical data. Therefore we have been constrained to turn to the *Army Register* for inspiration. There we find that our author entered the Military Academy in 1918 and graduated in 1922. He started out in June of that year with the Air Corps but something went wrong somewhere, for the *Register* records his transfer to the Engineers three months later. Captain Strong is a graduate of the Basic Course at The Engineer School (1923) and of the Civil Engineering Course at Cornell University (1925). At the present time he is on duty in the office of the Division Engineer at Cincinnati, Ohio.

To these bare facts we add one mild piece of hearsay. A fellow Editor states that Captain Strong played a wicked game of chess at West Point. Since the chess habit is as hard to break as an addiction to drugs, it is safe to predict that Engineer Strong still wages bitter battles on the chessboard when Old Man River gives him a chance.

We duly celebrated Major RICHARD G. TINDALL in this department in our January-February issue. There is nothing new to add to that account save the plaint of the postman that his burden has increased since The JOURNAL began publishing the Tindall series on "The Will of the Leader." Our subscribers are really taken with that *magnum opus* and we are delighted that they take the trouble to write in and tell us so.

SEWELL T. TYNG was born in New York City on April 30th, 1895. After graduating from Groton School in 1914, he attended Williams College where the war interrupted his studies as he was completing his junior year. Rejected both by the Army and the Navy—three times each—on account of defective eyesight, he entered the American Ambulance Service and arrived in France in the latter part of May, 1917. Thereafter until the armistice he served at the front, principally with units of the French Army, in the Ambulance Service, in the American Red Cross and finally as second lieutenant in the Corps of Interpreters. In February, 1919, during the Peace Conference at Paris, he was attached to the staff of Mr. Herbert Hoover, then Director General of Relief, He returned with Mr. Hoover to the United States, as his secretary, in September, 1919.

On resuming a civilian status, Mr. Tyng entered the Harvard Law School from which he graduated in 1923. Since that time he has practiced law in New York City. His principal avocation is the study of military history. He is the author of several articles on military subjects and one book, *The Campaign of the Marne, 1914* (Longmans, Green) which was published in 1935.

First Lieutenant WILLIAM J. VERBECK has had continuous military service of some sort since 1911, when he entered Manlius School, of which his father, then Adjutant General of New York State, was president. He graduated from the U. S. Military Academy (five-year course) in 1927. He has served at Madison Barracks, Manila, Zamboanga, Fort Benning, Camp Dix, and Fort Jay. Having acquired a diploma from The Infantry School in 1934, he became involved in CCC activities for a spell. This was followed by a hitch as assistant to the Officer in Charge of WPA, Governors Island. Released from his alphabet associations, he took over Company D, 16th Infantry. While on this duty the Manlius School rediscovered him and he is now with the ROTC unit of his prep school unit.

He confesses to such weakness as a fondness for hunting, weapons collecting, and military history.

BOOK REVIEWS

WARFARE. By Spaulding, Nickerson, and Wright. Washington, D. C.: The Infantry Journal, Inc., 1937. 601 Pages, charts and maps. $3.00.

Warfare is not a new book. It was originally brought out in 1925 by Harcourt Brace and Company at $5.00 a copy. Like many another standard military work, a number of years had to pass before it found its proper place in the military world. Today that place seems assured; so assured, in fact, that The INFANTRY JOURNAL has purchased the copyright from Harcourt Brace and Company and is bringing out a new edition.

As a contribution to the military art, *Warfare* is unique. It is not an outline; it is not a résumé; it is not strategy and tactics made clear in three easy lessons. It is none of these things. Therefore, if your inclinations run toward a get-rich-quick course in the art of war, this book is not for you. It is a serious study of the evolution of warfare and it is designed for serious reading. In this, as in all other worthwhile things, the reader will get out of it exactly what he is willing to put into it; no more and no less. But what he does get out of it will be enduring bone and sinew for the body of his military education.

The study begins with warfare under the early Oriental monarchies and traces its developments through the epic battles of the Great Frederick. The authors point out that the book closes with Frederick because Frederick closed an era; after him began the epoch of our modern tactical systems. What, then, is the value of a study that begins in antiquity and ends just when warfare is about to evolve into our modern and still existing systems? Perhaps the best answer is epitomized in the first chapter of the book itself. . . . "Strip any military operation of external identifying details and one will find it hard to put a place and date on the story." In point of fact those "external identifying details" are about all that has changed and that will change in the art of war. The broad underlying fundamentals were as real in warfare under the ancient Oriental monarchies as they are today in the fratricidal battles of modern Spain.

This searching volume presents those fundamentals of warfare as well as its superficial changes. But to understand these things it is not enough to know the little unimportant and uninstructive facts that can be set forth so glibly on a schematic sketch; more must be shown. And this the authors do. They detail the various military hierarchies, their titles, their commands, their line and staff functions. They tell how armies marched, camped, crossed rivers, crossed mountains, guarded themselves, fought. They explain the systems of supply and tell how those systems worked. They picture the weapons used, their characteristics, their purposes, and their efficacy. Of such stuff are their battle pictures compounded.

But even here they maintain a nice balance for they do not allow the science of war to swallow the art of war. Both are interwoven in this book as they must be in battle. Nor do they lose sight of the intimate and deciding relationships that exist between a nation and its armed forces. They are at some pains, and rightly so, to warn the reader that these relationships must be constantly considered in studying the great operations of the past. The student who sees only weapons, formations, and maneuver, sees no farther than the end of his nose.

To the military novice this book is both cultural and instructional. He will have occasion to refer to it often. He will find the road we have come well charted and he will encounter more than one indication of the road that lies ahead. But paramount, perhaps, in both interest and value is the inevitable evolution of tactics wrought by the evolution of weapons. Here, will the young man-at-arms find rich fields for speculation on the tactics of tomorrow, for our weapons are also changing and surely our tactics must change too.

The older officers will find in *Warfare* a splendid means of rounding out their own cultural background along military lines. In particular will they profit from the consistent emphasis placed on the relations between the military and the state, and in the shrewd treatment accorded the higher aspects of both the art and science of war.

In brief, this extensive, scientific investigation is recommended for anyone who would acquire with a minimum of effort the historical background which is so essential to an intelligent grasp of modern military problems. F.G.B.

MESOPOTAMIA: THE LAST PHASE. By Lieutenant Colonel A. H. Burne, D.S.O. Aldershot: Gale & Polden, Ltd., 1937. 111 Pages; 12 Maps; Illustrated; Index. $2.00.

Here is a volume of tactical studies that should gladden the heart of any man even faintly interested in the profession of arms. The action is fast, the situations varied and dramatic, the units small enough to be comprehensible, the style simple and direct, the fold-out maps clear and convenient, and the discussions swift, precise and convincing. In a word—all right, twelve words then—it is everything a military book should be and so rarely is.

Colonel Burne wisely devotes his slender volume to the last phase of the Mesopotamian Campaign; that is, from the fall of Baghdad in March, 1917, to the Turkish armistice on October 30, 1918. But hear the author himself:

> The Mesopotamian campaign . . . may be compared to a flower—a tulip for choice, of which the stalk represents the line of our advance up the Tigris past Qurna, Amara and Kut, to Baghdad. At Baghdad the stalk blossoms and bursts into flower. . . . It is the flower portion of the campaign

that will be dealt with . . . the last phase of the war, when our troops were no longer glued to the line of the River Tigris, when not only the area of operations but the range of possibilities blossomed and broadened out. . . . Problems of interior and exterior lines, and problems of time and space, which . . . were foreign to the early part of the campaign, now abound. . . . I have set myself two chief aims. The first is to present within a small compass, an accurate account of the main events of this little known campaign. The second aim is to bring out some of the main lessons that the campaign teaches us.

In pursuit of these two aims, Colonel Burne has produced a book that should be of interest and value to military men the world over. In this country it should be particularly welcomed by instructors on duty with the civilian components and by those harassed souls who are in charge of garrison schools. For these gentlemen, this little book will solve their chronic problem of digging out interesting and vital instructional material for many a day. Indeed, the battle studies crammed into its 111 pages literally cry out for group presentation and group study. All the essential data are present; the facts of each action are set forth logically and concisely; the maps are so simple and so clear that they can be sketched in on a blackboard in a matter of minutes; and finally, Colonel Burne's critiques are keen and penetrating. Here, then, is an answer to the collective prayer of these instructors and that answer is O.D., G.I., complete with handles.

But the value of this modest volume is not restricted to those of us whose present chore happens to be of an instructional nature. Indeed, in the humble and widely ignored opinion of this reviewer, the Regular, the Guardsman, and the Reservist may all ponder with profit these open-warfare battles that their Cousin Tommy fought in Mesopotamia and the lessons that he learned from them.

C. T. L.

MARSHAL NEY: A DUAL LIFE. By LeGette Blythe. Harrisburg, Pennsylvania: Stackpole Sons, 1937. $3.50.

In 1819, to a small South Carolina settlement called Cheraw there came one Peter Stuart Ney, a teacher. The natives were interested. Was there not a great French soldier named Ney? Oh, yes, Marshal Ney, executed a few years back. The newspapers had a good deal to say about that execution. But there were other stories. The Marshal had not been shot; the Duke of Wellington, being a Mason, had arranged to have the rifles loaded with blank ammunition. Another account stated that ball ammunition was used, but the firing squad was instructed to fire over the Marshal's head; that Ney carried inside his coat a bladder filled with red fluid which spurted out at the crack of the rifles. Later, so the story went, a man strangely resembling Ney had left the prison secretly, and galloped off into the night.

Peter Ney admitted that he had served in the French Army and that he had left France for political reasons. Everything in the teacher's life centered upon news in the foreign section of the daily papers; his pupils often saw him stare and grow pale after reading half a column. Also, there were letters from France that were read only behind locked doors. One day he was so startled by something he read that he fell in a faint. That night he attempted suicide by stabbing himself in the throat. In a delirium he talked of battles, of Napoleon, of Josephine, of freezing nights, of Cossacks and of dead men. During his convalescence he spoke freely of Napoleon and the battles of the Empire, but of himself guardedly. In his later years, however, he openly admitted to close friends, when in his cups, that he was Marshal Ney. When he died, his last words were: "I will not die with a lie on my lips. I am Marshal Ney of France."

Michel Ney, the son of a soldier who retired to become a barrel-cooper, was born in Saarlouis in 1769. At twenty he enlisted in the Royal Hussars. Within five years he had become a captain, and in three more a general of brigade. For the capture of Mannhein in 1799 he was made a general of division. Five years later Napoleon created him a Marshal of France.

Ney's baptism of fire came at Valmy, and it was Captain Ney who led the advance guard in the great rush across the Low Countries. When Bernadotte led Jourdan's

vanguard in the sweep through Brabant to the Meuse, it was Colonel Ney who rode in front.

Later, Cavalryman Ney became Infantryman Ney. At Montreuil he studied infantry tactics under Jomini. He even wrote training regulations for his infantry command. Two precepts he insisted on: fast marching and straight shooting. His Sixth Corps did march fast, but it is doubtful if any French soldier of those days shot very straight.

In the disastrous Russian Campaign, it was Marshal Ney who commanded the rear guard during the epic part of the terrible retreat. On December 14, 1812, after forty-two consecutive days of fighting, the last French soldier of the Grand Army left the soil of Holy Russia, and that last soldier was Michel Ney, Duke of Elchingen, Prince of the Moskowa, Marshal of France. The Russian winter had defeated an emperor, two kings, a prince, eight marshals and 600,000 men—but not the Saarois barrel-cooper's son. When Napoleon heard that Ney had joined the main army he exclaimed: "I would have given three hundred millions from my treasury rather than have lost him."

It was Marshal Ney who informed Napoleon that the Army would obey its generals but not their emperor. It was he, accompanied by Macdonald and Marmont, who delivered the Act of Abdication to the Tsar. After Napoleon's exile Ney joined the Council of War under the returned Bourbons, and commanded the Royal Grenadiers. When he learned of Napoleon's return, he swore to Louis that he would bring the monster back to Paris in an iron cage. But the old loyalties would not down and at Waterloo we find him battling for the Emperor.

After Napoleon's second fall Ney was arrested and charged with treason. He was tried by the Chamber of Peers and convicted. Next day he was shot in the Luxembourg Gardens.

Marshal Ney: A Dual Life makes a graceful bow to those who refuse to believe that its hero died by a firing squad. But it is best in its depiction of the military exploits of the cooper's son whose sole purpose in life was the acquisition of military glory. It is a most entertaining biography of a dashing, gallant soldier. It may fairly be described as a piece of popular but sound historical writing —a book of human as well as military interest. N. J. A.

COMBAT INTELLIGENCE. By Major Edwin E. Schwien, Cavalry. The Infantry Journal, Inc., Washington, 1936. 125 pages, 17 sketches. $2.00.

"A servant is worthy of his hire." An author should be worthy of his subject. Major Schwien, graduate of the Command and General Staff School, graduate of the École Supérieure de Guerre, and instructor in Combat Intelligence at the Command and General Staff School for four years, is probably the best qualified officer in our Army to write on his subject.

The subject matter is presented as follows: Part One, "The Intelligence Factor in its Relation to the Commander"; Part Two, "Collection, Interpretation, and Dissemi-

nation of Enemy Information"; and Part Three, "Application of Intelligence to Small Units."

Part one explodes completely and finally, it is to be hoped, the old school of thought that one can "divine" the "enemy's probable intentions." It illustrates by historical examples how futile such a practice is and submits a reasonable, logical procedure whereby the future capabilities of the enemy that can interfere with the accomplishment of your mission are considered and a decision arrived at that will accomplish the mission in "spite of anything the enemy can do to interfere."

Part two might well be called a manual for division intelligence officers. It covers clearly and in detail the classification and characteristics of collecting agencies, the collection of enemy information, the handling of prisoners and captured documents, and the evaluation and interpretation of information and its dissemination.

Part three is a complete exposition of the duties of the intelligence officer of the infantry battalion.

The principles propounded in the book are convincingly supported by historical examples taken from the World War. These examples appear sufficiently convincing to disarm even the most determined opponent.

The sketches that so completely illustrate the subject matter are a joy. Instead of being in a separate folder, which so often is inaccessible or misplaced, they are bound in the book so that they can be opened and referred to as the subject matter is read.

This reviewer believes that every officer in our Army will materially profit by reading this book, and that it should be an indispensable part of the library of every commander and every intelligence officer.

ORDER OF BATTLE OF THE U. S. LAND FORCES IN THE WORLD WAR. (General Headquarters, Armies, Army Corps, Services of Supply and Separate Forces.) Washington, D. C.: Government Printing Office, 1937. 412 Pages. $1.25.

The War Department has just published another of its volumes of the *Order of Battle* series which deals with the activities of the units of the A.E.F. during the World War.

In 1931 the first of this series appeared. This new book, written like its predecessor in staccato, almost telegraphic language, gives an outline of the main events in the histories of higher and special organizations—GHQ, the SOS, the First Army, the Second Army, the Third Army, the nine army corps, the three French corps which served under General Pershing, our forces in Siberia, North Russia, and, finally, in Germany and elsewhere after the Armistice. Rosters of commanding officers and staffs, together with an enumeration of their respective units during important periods of activity, are also given. The book, of course, rests squarely upon official war-time documents.

Team-Work