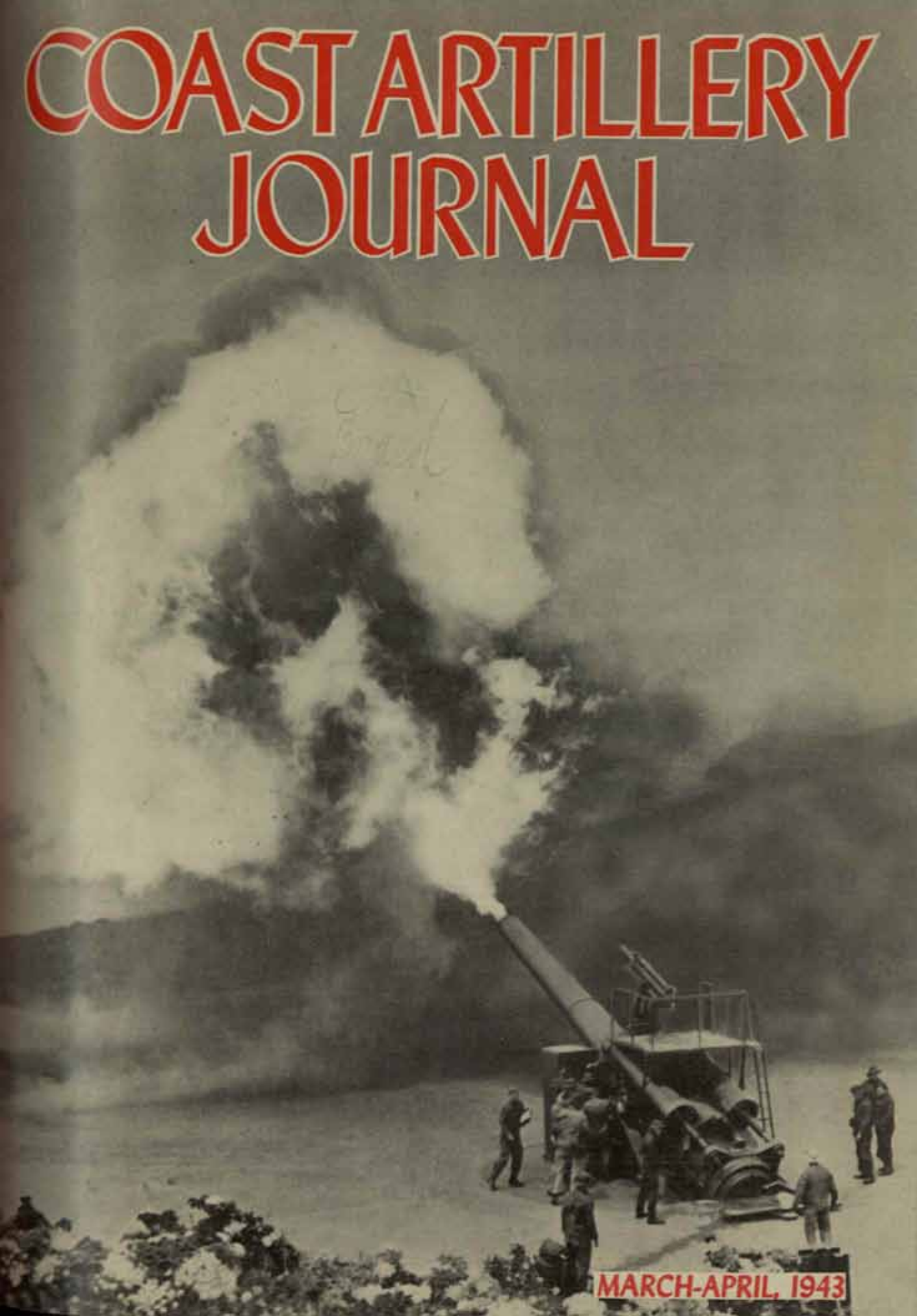
COAST ARTILLERY JOURNAL



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Landing in the Aleutians.

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CONTENTS

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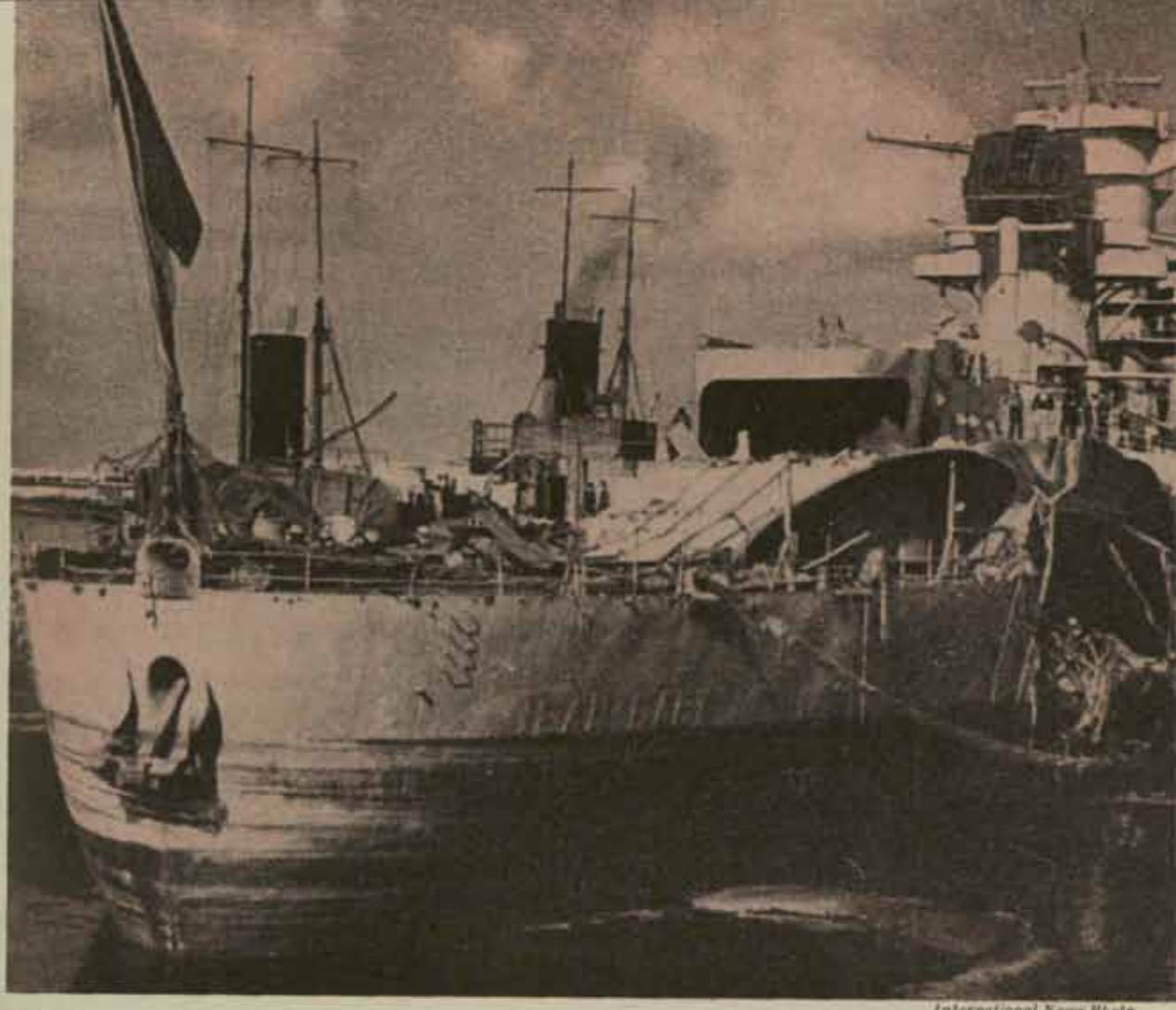
Armor Attack

Acme Photo

Hull damage on the *Jean Bart* blasted by American guns at Casablanca.

By
COLONEL LEON C. DENNIS
and
LIEUTENANT COLONEL CARL W. HOLCOMB



International News Photo

Another view of the *Jean Bart*. Note how the deck was buckled by a hit that perforated.

and fire Effect

Seacoast artillery guns cannot defeat the armor of a ship under all conditions. Explosive projectiles that completely penetrate the armor and detonate in the vitals of a ship are of more destructive value than hits that explode on the outside. It is necessary, therefore, first to investigate *armor attack* to determine under what conditions armor can be defeated.

Armor-piercing projectiles are made from the finest quality of steel. In the process of manufacture the projectile is heat-treated to give hardness throughout. The rear portion is then tempered to make it less brittle. This leaves the head very hard so that it will not deform upon contact with the armor, and the body tough so that, at angles of impact other than normal, it will stand the strains set up as the projectile tends to right itself and penetrate normal to the plate.

An important part of the armor-piercing projectile is the cap. It is made in such a manner that the portion directly in front of the point is very hard while the skirt is tough. Initially, the cap places the armor under great stress, flaking the hardened surface and destroying it. The projectile proper then passes through the cap to the inner layers of the armor while they are still under strain, the point being supported laterally as it penetrates. The cap increases the ability of the projectile to bite into the armor surface at glancing angles.

There are two main types of armor used for the protection of modern fighting ships, namely, face-hardened

armor and nonface-hardened armor. Both types are treated differently to give them different qualities, each designed to resist better the type of attack to which it will be subjected.

Face-hardened armor, called Class A armor, is installed upright to form side wall protection to naval vessels. It is used on the water-line belt, end bulkheads, barbettes, turrets, and conning tower. This armor is particularly designed to resist the penetration of projectiles which strike at small angles from the normal to the plate. It must have a hard surface capable of deforming the projectile at impact and a tough back to absorb the shock of the blow.

A ship's Class B or nonface-hardened armor is applied approximately horizontal for protection of the deck and tops of such important installations as turrets and conning towers. This armor is homogeneous in structure and is treated in such a manner as to give great tensile strength and ductility. Since it is used mainly where the line of impact of a projectile is at a large angle from the normal to the plate, it is designed to resist glancing blows, to spread the effect over a greater area, and absorb the energy more slowly than at normal impact. Class B armor is intended to *dish* or *give* upon impact and deflect the projectile.

Many factors affect the armor-piercing ability of a projectile. It will be accepted, without proof, that when the obliquity of the line of impact deviates from normal, the penetrating power of a projectile will be decreased. Other factors that influence the penetrating power of an armor piercing projectile are: its weight, diameter, velocity at impact, and, of course, the type of the armor.

The obliquity is the angle between the line of impact and the line normal to the face of the plate at the point of impact. This angle is dependent chiefly upon the inclination of the armor as installed on the ship, the roll or list of the ship, the quadrant angle of fall, and, for vertical armor, the target angle. In this discussion, the effects of any inclination of armor and roll or list of the ship are not considered. It is assumed that the Class A armor is exactly vertical at all times and covers the sides and ends and that the Class B armor is horizontal and covers the entire top or deck forming a *rectangular box-like compartment* enclosing the vital parts of the ship. In the determination of the angle of obliquity, practical consideration is given to the quadrant angle of fall and the target angle.

It is easy to visualize that as the quadrant angle of fall increases, the angle of obliquity for Class A armor increases and for Class B armor decreases. Values of the quadrant angle of fall are assumed equal to the angle of fall and are taken directly from firing tables.

The target angle is the acute angle between the vertical plane containing the gun-target line and a vertical plane parallel to the longitudinal axis of the ship. The target angle does not affect the obliquity for horizontal *Class B* armor but directly affects the obliquity for the vertical *Class A* armor. Target angles are taken into account, without undue complications, by grouping them into sectors which for this discussion are: 0°-30°, 30°-60°, and 60°-90°. Computations for each sector are made by using the mid-angle and are considered to represent the whole sector.

The angle of obliquity is obtained from one of the following formulas in which:

Θ = angle of obliquity.
w' = angle of fall as listed in firing tables.
T = target angle or mid-angle of the target angle sector.

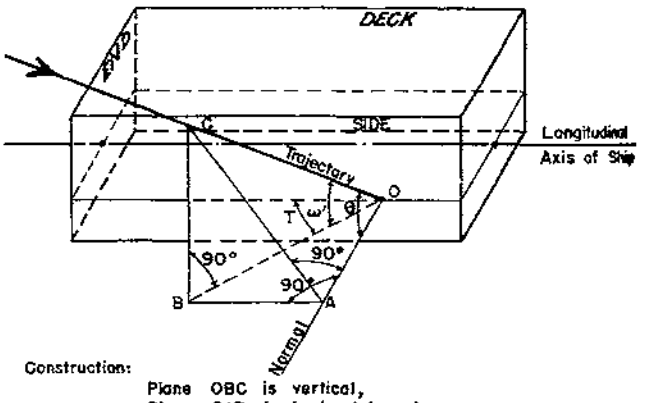
(a) For an end section (Class A armor, see figure 1).
$\cos \Theta = \cos w' \cos T$

(b) For a side section (Class A armor).
$\cos \Theta = \cos w' \sin T$

(c) For the deck (Class B armor).
$\Theta = 90° - w'$

From the foregoing it is evident that the obliquity is the same for the mid-angles of the 0°-30° sector on the Class A end armor and the 60°-90° sector on the Class A side armor.

ANGLE OF OBLIQUITY



Construction:
Plane OBC is vertical,
Plane OAB is horizontal, and
Plane ABC is parallel to the side section.

Proof:
$OA = OB \cos (90° - T) = OB \sin T$

$OC = \frac{OB}{\cos \omega'}$

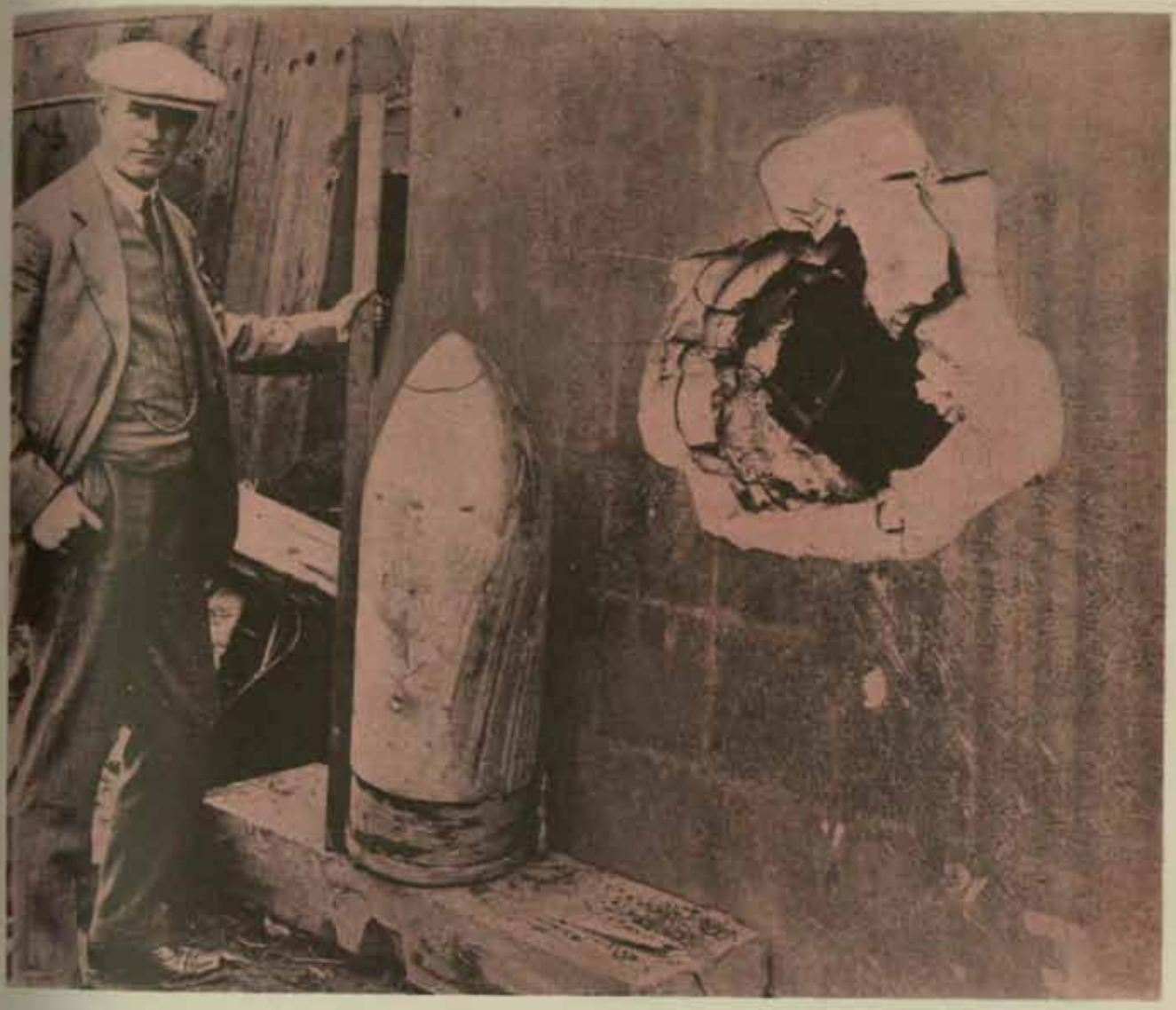
$\frac{OA}{OC} = \cos \Theta = \cos \omega' \sin T$

Figure 1

Penetration is the depth of entry of the projectile into the armor as measured perpendicular to the surface. *Perforation* is complete penetration of the armor plate. There are various formulas for the calculation of penetration. The one used in this discussion, a development of the deMarre formula, is:

$$t = \left[\frac{w^{.5}}{1022} \frac{V}{d^{.75}} \frac{}{KM\Theta} \right]^{\frac{10}{7}}$$

where t = penetration in inches.
w = weight of the projectile in pounds.
V = velocity of the projectile at impact in feet



per second, and is obtained from firing tables.

d = diameter or caliber of the projectile in inches.

$KM\Theta$ = An armor factor K times an angle multiplier $M\Theta$. K serves as a measure of the efficiency of the armor. $M\Theta$ adjusts for the obliquity. Both of these factors are obtained by experiment. The values are shown as a set of curves from which $KM\Theta$ may be found opposite the value of Θ. Curves may be obtained through unit plans and training officers.

Obliquity causes a practical limitation to be imposed upon perforative Class A hits. Numerous experimental firings against face-hardened armor of one-half or more calibers thick (i.e., one-half as thick as the diameter of the projectile) have shown that when the obliquity becomes as great as approximately 30 degrees, most of the projectiles are broken up. Since the obliquity exceeds 30 degrees under the conditions listed below, hits upon Class A armor one-half or more calibers thick will not be considered perforative under any of the following conditions:

(1) For angles of fall greater than 30 degrees for all target angles.
(2) For the side section in the 0°-30° target angle sector.
(3) For both side and end sections in the 30°-60° target angle sector.
(4) For the end section in the 60°-90° target angle sector.

The thickness of Class A armor that a given gun will defeat decreases as the angle of fall increases. On the other hand, for Class B armor, as the angle of fall increases, the thickness of armor that will be defeated increases. It is impractical to install sufficient armor to make a vessel immune to perforation by gun fire under all conditions. However, it is practical, and in most cases desirable, to install enough armor to create a zone in range where guns most likely to be encountered will not produce perforative hits; that is, to create a zone between two ranges, the smaller of which is the maximum range for perforation of Class A armor and the

larger the minimum range for perforation of Class B armor. Between these limits is the *zone of immunity* for the vessel.

For this discussion, the following mean values have been assumed for the thickness of armor on modern naval vessels:

TABLE A – ARMOR THICKNESS IN INCHES

Type of Vessel	Class A armor	Class B armor
Battleship (BB)	14	6
Heavy cruiser (CA)	4	2
Light cruiser (CL)	3	2
Destroyer (DD)	none	none

The penetration formula is used to determine the range at which the armor under investigation will be perforated. The general procedure is to search by 5000-yard increments in range, until two ranges are found, one of which gives less and the other more penetration than the assumed thickness of armor. The nearest 1000 yards range at which the exact thickness of armor will be penetrated is then found by linear interpolation. The following must be determined by calculation:

(1) In the 0°-30° target angle sector, the range at which perforation of the Class A end takes place. The range for the Class A side need not be calculated since the probability of hitting this section is assumed to be zero.

(2) In the 30°-60° target angle sector, the range at which perforation of the Class A end or side takes place. This need not be calculated when the class A armor is one-half or more calibers thick.

(3) In the 60°-90° target angle sector, the desired information has already been determined for the 0°-30° target angle sector, the problem being the same after interchanging the side and end.

(4) The range at which perforation of the Class B deck takes place. This range is the same for all target angle sectors.

Any study of the effect of fire upon modern naval vessels must be based largely on results of engagements between British and German vessels during the years 1914 to 1918. Statements and statistics that follow are taken from records and observations made during or shortly after that period.

In discussing fire effect it is first necessary to assign a destructive value to each type of hit. To form a basis for the construction of the tables of fire effect values of hits, shown below, the value of a Class A perforative hit from a 12-inch gun is assumed to be 1.00 or unity. In general, the amount of damage caused by a hit increases with an increase in caliber. However, on light vessels with little or no armor, the amount of damage resulting from a 6-inch or larger hit is about the same. In this discussion it is assumed that the value of a Class A perforative hit varies generally as the weight of the projectile and bursting charge but since the 6-inch and 155mm projectiles are used chiefly against light vessels, they are given the same value as the 8-inch.

At the battle of Jutland, the Germans used nothing but armor-piercing projectiles while the British had more than fifty per cent high explosive shell. The British ships suffered more damage in proportion to the hits sustained than did the German ships. The greatest damage suffered by capital ships resulted from perforative hits that ignited fuel or powder. Non-perforative hits destroyed weapons and equipment and caused leaks by opening seams and joints. About the same amount of damage resulted from non-perforative hits regardless of whether the impact was on the side or deck. It is therefore assumed that non-perforative hits on Class A or Class B armor are equally destructive and have a value of one-half that of a Class A perforative hit from the same gun.

At Jutland and Dogger Bank, hits that passed through the deck frequently ignited magazines. Most effective against the interior of ships were projectiles that pierced the deck at large angles of fall. This leads to the assumption that for low-angle fire (at angles of elevation of less than 45°), the value of a perforative hit on Class B armor is one-third greater than that of a Class A perforative hit and for high-angle fire, the value of a perforative hit on Class B armor is two-thirds greater than that of a Class A perforative hit.

The following tabulation is based upon the foregoing assumptions:

TABLE B – FIRE EFFECT VALUES OF HITS

Caliber of gun	Typical target	Weight of projectile	Perforative hits			Non-perforative hits
			Class A	Class B		
				Low-angle	High-angle	
16	BB	2340 2100	2.00	2.67	3.33	1.00
14	BB	1660 1560 1400	1.50	2.00		.75
12M	BB	1046 824 700			*1.67	
12	BB CA	1070 975	1.00	1.33		.50
8	CA CL	323 260	.30	.40		.15
6	CL DD	108	.30	.40		.15
155	DD	95	.30	.40		.15

In the comparison of weapons, it is necessary to know the fire effect value of a shot before it is actually fired: that is, it is necessary to know its *potential fire effect*

*Based on the 12-inch gun.

value. Multiplying the fire effect of a *hit* by the probability of hitting, the potential fire effect value of a *shot* is obtained. This latter value is the basis of construction of *damage tables*.

For each shot there is the possibility of hitting either the Class A or the Class B armor. When the value of a hit is not the same for both sections, e.g., both are not non-perforative, it is necessary to determine separately the two components of the fire effect value of a shot. Each component is obtained by multiplying the corresponding values of a hit and the probability of hitting. The potential fire effect value of a shot is then the sum of its Class A and Class B components.

In the general case, it would be necessary to determine separately the probability of hitting the deck and the side or end section for each target angle. The determination of the probability of hitting when the target is other than bow-on or broadside is a long and tedious task. Fortunately, accuracy is not unduly sacrificed by computing the probability of hitting the bow-on and broadside targets and making certain assumptions for the various target angle sectors. These assumptions are listed in table C.

TABLE C – PROBABILITIES FOR EACH TARGET ANGLE SECTOR

Section of target	Target angle sectors 0°—30°	30°—60°	60°—90°
End, Class A	Bow-on	Zero	Zero
Side, Class A	Zero	Broadside	Broadside
Deck, Class B	Bow-on	Broadside	Broadside

The target is assumed to be a rectangular parallelepiped of the approximate dimensions of the vulnerable part of the actual vessel. The assumed dimensions of typical targets are as follows:

TABLE D – DIMENSIONS OF TARGETS

Type of Vessel	Deck (yards)	Hull (yards) Above water	Below water
Battleship	32 × 160	10	4
Heavy cruiser and light cruiser	20 × 130	8	4
Destroyer	10 × 80	5	2

In computations, the danger spaces on the surface of the water are used instead of the corresponding sections of the material target. Their dimensions are obtained by projecting the various parts of the profile of the target upon the water line using the slope of fall as listed in firing tables, for the particular gun at the range under consideration, as a direction for the parallel rays.

The position of the danger space with respect to the dispersion zone depends on the location of the center of dispersion, which for this discussion is assumed to be on the surface of the water directly below the geometrical center of the deck.

The width and length of the dispersion zone depend upon the size of the deflection and range probable errors. The deflection probable errors as listed in firing tables are sufficiently accurate to use without correction. However, the information on developed armament range probable errors obtained through target practices have shown that in a number of cases firing table range probable errors are not correct. The formula used to obtain the corrected range probable error (PEc) from the firing table probable error (PE) is:

$$PEc = PE \pm K\,(\text{range}).$$

For a given situation it is necessary to calculate the probability of hitting the danger spaces corresponding to the Class A and Class B armor of the bow-on and broadside targets. The danger spaces are rectangular in shape with their sides parallel and perpendicular to the gun target line. Therefore, by determining the probability factors as explained in FM 4-10 and entering the probability tables in that text, the probability of hitting the required parts of the target may be obtained.

Damage tables are a tabulation of the number of shots necessary to destroy different types of vessels under various circumstances. The entries are obtained by dividing the potential fire effect value of a shot into the total fire effect required to destroy the vessel under the assumed conditions. It is necessary first to determine the total fire effect values that are required to destroy the various types of vessels.

In order that a naval vessel may retain its maximum effectiveness, it must remain afloat on an even keel, and have the use of all of its weapons, equipment, and operating mechanisms. Leaks are localized on modern naval craft by dividing the hull into a number of watertight compartments. Vessels of large displacement allow a more comprehensive system of compartmentation than lighter ones, and require more perforative hits and more flooded compartments to sink them. The table below, showing the life of vessels in hits, is the result of the following statistics and conclusions.

During the period 1914 to 1918 no modern battleships were sunk by gun fire although one such vessel suffered great damage from thirteen major caliber hits. At Jutland, three German battle cruisers of about 28,000 tons displacement were badly damaged by an average of twenty-two heavy hits; of these, two were brought to drydock and one was abandoned and sunk. From the above it is concluded that twenty-five perforative Class A hits from a 12-inch gun are required to sink a battleship of approximately 30,000 tons displacement.

Three British heavy cruisers were sunk by fifteen, fifteen, and seven major caliber hits respectively. From this it is concluded that fifteen perforative Class A hits from a 12-inch gun are required to sink a heavy cruiser of approximately 10,000 tons displacement.

Two German light cruisers were sunk by an average of nine heavy hits. There were two British light cruisers that were placed in a sinking condition al-

though they were able to make port after suffering twenty-five and sixteen minor caliber hits respectively. It is therefore concluded that either nine perforative Class A hits from a 12-inch gun or thirty perforative Class A hits from a 6-inch gun are required to sink a light cruiser of approximately 6,000 tons displacement.

On destroyers, hits in engine rooms and fire rooms were most effective. Three destroyers were sunk by one or two hits. Eight were put out of action, although not sunk, by an average of four hits. It is concluded that six perforative hits from a 6-inch gun are required to sink a destroyer of approximately 1,500 tons displacement.

The following table shows the above conclusions in tabular form together with the approximate tonnage of targets used in the calculation of damage tables.

TABLE E – LIFE OF VESSELS IN HITS

Type of Vessel	Approximate tonnage	Class A perforative hits 12-inch gun	Class A perforative hits 6-in gun
Battleship	30,000	25	
Heavy Cruiser	10,000	15	
Light Cruiser	6,000	9	30
Destroyer	1,500		6

Life of vessels in terms of fire effect.—The total fire effect necessary to destroy different types of vessels are computed from entries in table E and the values of the 12-inch and 6-inch Class A perforative hits in table B.

TABLE F – LIFE OF VESSELS IN FIRE EFFECT

Type of vessel	From tables E and B	Fire effect to destroy
Battleship	$25 \times 1.00 =$	25.00
Heavy Cruiser	$15 \times 1.00 =$	15.00
Light Cruiser	9×1.00 or $30 \times .30 =$	9.00
Destroyer	$6 \times .30 =$	1.80

In the use of damage tables the method of their construction must be borne in mind. They are based upon the probability of hitting a target of a particular size and shape. Obviously the numbers appearing in the tables cannot be taken literally. These numbers can be taken, however, for the purpose of comparison. If one gun is shown to be superior to another gun using the entries in the tables with the assumed target, then, no doubt, the first gun would be superior to the second when used against another similar target.

Persons charged with the location of long range seacoast artillery should investigate the effectiveness with which the mission of the battery can be accomplished from each tentative site. This investigation should generally be conducted for at least four assumed directions of approach of the target; e.g., north-south, northeast-southwest, east-west, and southeast-northwest. Occasionally, due to shoals or channels, fewer directions of approach may be assumed. The tentative sites should be investigated in pairs on a small-scale map with a contour drawn on the map to show the dividing line where both positions are equally effective.

Groupment commanders who direct the fire of long-range seacoast artillery emplaced at widely dispersed points should draw up harbor charts showing for certain angles of approach of the target which battery would have the most destructive effect on the target. Such charts would be an aid in making decisions relative to the assignment of targets.

The table following is a sample damage table extracted from data for a certain type of 16-inch gun. No figures are shown for ranges in excess of 35,000 yards.

Shots of fire for effect to destroy the target.
Use nearest 1000 yards.

BATTLESHIP TARGET

	Target Angle					
	0°—30°		30°—60°		60°—90°	
10000	17		38		20	
11	19		44		24	
12	21		50		28	
13	24		56		32	
14	26		62		36	
15000	28		69		40	
16	32		80		46	
17	35		90		52	
18	38		100		59	
19	42		110		65	
20000	45		120		71	
21	50		130		80	
22	54		140		90	
23	59		160		100	
24	63		170		110	
25000	68		190		120	
26	68		190		120	
27	93		210		210	
28	100		220		220	
29	110		240		240	
30000	120		250		250	
31	140		270		270	
32	150		290		290	
33	170		310		310	
34	74	140	180	230	180	230
35000	83	140	180	250	180	250

ZONE OF IMMUNITY (fictitious)

NOTE: Supplementary columns are for high angle fire.

Limited Area Defense

By Lieutenant Colonel Paul B. Nelson, Coast Artillery Corps

The following tentative detailed principles for the employment of antiaircraft artillery troops in airdrome and small area defense are presented for consideration. They are evolved from observations and reports on current and past military operations abroad. For sake of simplicity in presentation and due to its parallel application to small area defenses, the defense of an airdrome will be used as an example of limited area defense.

Primary Considerations. The primary mission of antiaircraft elements in airdrome defense, is to protect vital airdrome areas from attack by hostile aircraft.

Secondary missions for antiaircraft elements may be defense measures against land, seaborne and airborne elements.

Careful coördination of both air and ground defense means to insure mutual coöperation in both antiaircraft and ground defense missions is essential.

Operational control of antiaircraft elements in close coöperation with locally based air elements is imperative. It should consist essentially of measures to protect friendly aircraft in flight. Close liaison by and between all antiaircraft and air force echelons and the development of mutual confidence is essential to the elimination of friction and to the development of locally adaptable recognition and control procedure.

Airdrome Defense. The antiaircraft defense of an airdrome whether a single landing strip with temporary mobile servicing facilities and dispersal areas or of an elaborate multirunway air base with extensive permanent service, utility, supply and repair facilities differs only in the degree and strength of the means employed. The tactical principles are the same.

The sequence of developments to be considered in the execution of a balanced antiaircraft airdrome defense are:

The commander's estimate of the situation, which involves consideration of:

(1) The relative importance of the airdrome or airdromes to be defended.
(2) The means available.
(3) The proximity of hostile air bases.
(4) Hostile air activity, including tactics and concentrations of hostile aircraft within striking range.
(5) Probability of attacks other than by air.
(6) Reinforcements, if any, which can be expected, and when.
(7) Extent of warning time of an impending attack which will be available.
(8) Local conditions including weather and terrain.

Based on these factors the probable lines of hostile air action are analyzed and balanced against the various antiaircraft counter measures possible.

The great mobility and rapid striking power of amphibious, air, armored, and motorized forces, both friendly and hostile, require that concerned commanders be provided with full information upon existing and probable future weather conditions and their effect on ground, air and water-borne operations. This data should be available from the meteorological section of the local airdrome.

The decision. The estimate of the situation culminates in a decision to adopt a certain line of action. Once the decision is made, it is carried out with vigor and changed only in the face of compelling reason. Estimation of the situation is a continuous process which in view of radically changed conditions may, at any time, call for a new decision.

In arriving at a decision as to what landing strips, dispersal areas or installations are to be given priorities in antiaircraft defense, terrain exercises a decisive influence. Proper evaluation and utilization of the terrain reduce the disadvantages of incomplete information of the enemy. Important features to be considered in evaluating the terrain for antiaircraft defense are not only the natural ground forms and their effect upon the movement of heavy equipment but also the artificial features such as roads, railroads, and towns or villages and the degree to which they will aid or impede the establishment of the defense. While maps are used in preliminary planning stages, they must be checked by air and ground reconnaissance. Pin point or oblique air photographs of the area to be defended are, when available, of inestimable value for reconnaissance planning purposes. There is no substitute for ground reconnaissance in arriving at a final disposition plan. The following factors govern in the final evaluation of the terrain: observations, fields of fire, concealment and cover, obstacles, and routes of communication.

Observation is essential in order to prevent surprise by the enemy. It is obtained from commanding elevations. Suitable detector sites must be located and prepared.

Fields of fire, 360° for antiaircraft weapons with a frontal mask of not to exceed 10°, are required; however, terrain contingencies may necessitate serious limitations. Where compromise measures must be adopted, consideration is given to the fact that the hostile air commanders will usually attack in the sector lacking in good fields of fire for the defender or directly "out of the sun." While the best fields of fire are found on level or gently sloping stretches of cleared ground, ade-

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quate fields of fire can be quickly prepared in even densely wooded areas by judicious employment of pioneer tools and demolitions.

Concealment and cover may occur together. Concealment is protection from observation from the ground and air. Cover is protection against fire. Ideal defensive positions are those having both cover and concealment. Antiaircraft elements by the very nature of their fire missions must take to the open, improvise, dig in, and camouflage to attain these measures. The use of demolitions supplemented by pioneer tools and any power-driven excavating machinery available, will hasten the preparation of cover, gun emplacements, and slit trenches. Concealment comes later in conjunction with deceptive measures. It involves the judicious use of camouflage, employing local available means, camouflage and traffic discipline, plus the construction of alternate and dummy positions.

Obstacles are either natural terrain or artificial features which impede the movement or landing of military forces. Some common terrain obstacles are mountains, rivers, bodies of water, marshes, gullies, steep inclines and woods, while artificial obstacles may consist of entanglements, felled trees, demolished roads and runways. Mined or contaminated areas when covered by ground fire are employed to deny hostile ground elements ready access to defended areas. Portable, readily movable obstacles, to prevent surprise landing by airborne troops on existing runways, are of special importance. These are cleared when friendly aircraft signal for landing or take-off, otherwise remain on landing strips. Trucks, tanks, trailers, readily movable wire and timber hurdles, wire hedgehogs, sections of logs and driftwood, and even filled sand bags and trip wire, are employed for this purpose. Their sole object is to crash aircraft attempting to land without authority. Roadways, which might be employed as crash landing strips by hostile aircraft, may be similarly treated, with the addition of tall poles at the roadside edge to tear off the wings of aircraft attempting sneak landing.

Routes of communication include roads, trails, railroads, waterways and airways and their facilities. In antiaircraft defense, it is of particular importance that all automatic weapon, gun searchlight and detector positions be readily accessible by day or by night and in all types of weather. This condition is due to the necessity of frequent shifts in tactical dispositions, changing tactical missions and to the problems of supply and evacuation. The preparation and maintenance of these routes is a continuous requirement. Where airdrome engineer companies can be made available their equipment will permit speedy excavation and maintenance of roads. Otherwise, the task will be the antiaircraft commander's responsibility. In some swampy or insular installations some guns may have to be ferried into position.

The plan. From a knowledge of the terrain and of the limitations and capabilities of his own troops, the local antiaircraft commander evolves a tentative plan of action.

After consulting with the local air force commander, to whom he presents his general plan of action which is based upon considerations previously discussed, he asks for concurrence, adjustment, suggestions and for such assistance as the local air force commander can make available. He then rejoins his staff and presents the approved general plan.

Orders. At the conclusion of this conference, staff details are outlined and antiaircraft unit representatives present are given their orders, assigned defensive sectors, installation priorities, recognition procedure and directed to move their units out. Fragmentary orders in rapidly moving situations are imperative—when time permits they may be confirmed in writing.

Supervision. Orders may be misunderstood or misquoted, while confusion and friction may delay or prevent their execution. The antiaircraft commander, his staff, and his subordinate commanders must circulate freely, frequently, and continuously to supervise the installation of the antiaircraft defense.

Liaison and Coöperation. Adjacent units of other arms present must be visited and arrangements made for coöperative action and liaison not only by senior commanders but by the most junior officers as well. Friction and misunderstandings disappear with improved knowledge of what adjacent units are doing and what their problems may be. Each unit irrespective of arms of service must know what it can expect in assistance from adjacent units and be prepared in turn to render equivalent mutual support in combat action. Airdrome defense requires the finest type of teamwork between arms.

Classes of attacks. Attacks are of three general types; harassing, in force and invasion. Harassing attacks by individual or small groups of air, amphibious, or ground forces are calculated to wear down local garrisons by requiring repeated alerts, to disrupt local position improvement, and to halt preparations for subsequent offensive operations. Attacks in force by any or all of the above combat elements are calculated to cripple or overrun airdromes for temporary occupation by the enemy or may be designed to neutralize the effectiveness of such airdromes preliminary to a direct invasion. Invasion attacks are usually combined attacks of all hostile air and ground combined arms, designed to neutralize all local defenses and to effect the seizure of the defended airdrome for extensive use by hostile air elements. This latter type of attack usually consists of furious coördinated assaults involving many or all of the following means:

Types of Hostile Attacks.

(1) High level bombardment.
(2) Low-level and dive bombing.
(3) Ground-level strafing.
(4) Mechanized and armored-force attacks.
(5) Airborne operations involving paratroops, glider-borne, and airplane-borne troops.
(6) Amphibious operations including infiltration attacks.
(7) Guerrilla activities.
(8) Sabotage and fifth-column activity.

Defense troops. The necessity for establishing airdrome defenses in depth, and the relative over-all dimensions of each airdrome considered, necessitates the formation of a fairly large highly mobile reserve from ground defense elements, other than antiaircraft troops; while the requirement for auxiliary airdrome defenses as friendly air forces shift their principal operating bases to new or alternate airdromes requires that antiaircraft elements preserve their mobility to the maximum degree. The following troops—either in part or in whole, may be assigned to an airdrome for general airdrome defense against attacks by air, ground, airborne or amphibious forces:

(1) Antiaircraft artillery including part or all of the following:

(*a*) Gun fire units to destroy high-level hostile bombing aircraft, heavy armored vehicles, and naval troop transports with accompanying escort.

(*b*) Automatic weapons including machine guns to deal with low-level and dive-bombing attacks, landing and mechanized operations and for direct fire on personnel.

(c) Searchlights for illumination of targets for guns and friendly fighter aircraft, dazzle effect on hostile bombing raids, and as beacons for specialized operation with friendly aircraft.

(*d*) Detectors. For early warning purposes, coöperation with friendly aircraft in intercept operations and as guiding beacons for homing friendly aircraft in adverse weather.

(2) Infantry to repel all types of attacking troops, guerrillas or saboteur activity.

(3) Armored forces, to overrun enemy concentration, to rush and wreck newly landed hostile aircraft and gliders, and for the support of beach defenses where required.

(4) Field artillery, both light and medium, to repel land and landing attacks, for counterbattery operations, and for the destruction of enemy aircraft landing on runways.

(5) Mobile seacoast artillery—(in insular operations), to deny hostile naval transports and escorts favorable range for conduct of landing operations in proximity to defended airdromes.

(6) Antitank weapons and tank-destroyer elements. For direct operation against hostile armored and mechanized operations and for direct support of other elements in beach defense.

(7) Engineer Troops. To aid in the construction and maintenance of runways and other airfield installations such as dispersal areas, joining taxiways, fuel storage, repair shelters, routes of communication, weapon emplacements, etc.

(8) Chemical troops may lay down obscuring smoke

when the tactical situation requires or may be employed to fire chemical projectiles, for decontamination, or for any other special chemical operation which may be required.

(9) Air Force Troops. Local air force tactical and service units will normally be too occupied with other duties to be made available for airdrome defense. They are usually equipped with small arms only for the strictly local defense of dispersed aircraft, hangars, and control of operation towers. In extreme cases only this military personnel may be employed against invading forces.

Planning and disposition for airdrome defense.

With only a limited number of ground troops available yet with several airdromes or landing strips selected as requiring priority defenses it will be impossible to defend each airdrome against all probable forms of attack. Compromises and adjustments in the composition of these airdrome defenses must not result in the overextending or dangerous thinning of the antiaircraft defenses of critical airdromes. It may be preferable to leave satellite airdromes devoid of any antiaircraft defenses with the preponderance of weapon strength concentrated around the most essential and critical airdrome installation rather than to weaken the critical defense areas by attempting to provide a token defense for all such fields.

In the final disposition of both antiaircraft and other ground force combat elements the following factors govern:

(1) The defenses must be disposed and mutually supporting to permit the delivery of the maximum of accurate sustained fire power against all hostile elements in a major attack.

(2) Each defensive sector and garrison must plan and rehearse plans for, and be capable of launching coordinated counterattacks against, hostile ground forces which may break through the outer limits of the airdrome defenses.

(3) A large mobile reserve, preferably motorized, must be established for the reinforcement or relief of weakened defenses and for the purpose of delivering vigorous counterattack, when required.

(4) The total defense system must be capable of action outward, upward, and inward. The latter case is of special importance in view of airborne operation, infiltration tactics, and possible break-through by a determined enemy.

The entire system of airdrome protection is based upon defense in depth with defended localities, strong points, and antiaircraft installations characterized by field works and communications planned for mutual support and fire coverage of important objectives in the air, on the ground and, in special cases, on seaward approaches to landing beaches.

The use of camouflage and deception, of alternate and dummy positions to mislead the enemy, and of cover and concealment for true installations until such time as they can render deadly effective fire against the enemy, is of supreme importance. The value of the element of surprise gained must then be exploited to the greatest possible degree.

The mission for the fire units of the antiaircraft artillery defenses requires that they deliver accurate fire against hostile aircraft before such airplanes reach effective bombing range. Guns cannot shoot and remain camouflaged at the same time. During hostile aerial reconnaissance, camouflage is effective, while in action the use of gun-flash equipment at dummy positions will divert many strafing, low-level and dive-bombing attacks away from bona fide installations. The importance of preparation of alternate and supplementary positions and rotating fire units into these positions periodically, once the guns have engaged hostile aircraft, cannot be overemphasized.

Staff and Command. At each limited area defended by antiaircraft artillery, the senior antiaircraft officer present is designated as the AA defense officer. It is his duty to advise the local air force commander on all

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matters pertaining to the coördination of all available men in defense against air or airborne attack.

Complexities which must be considered in the defense of airdromes follow:

(1) In considering other elements of the ground defenses, what priority is to be assigned to antiaircraft in the selection and occupation of positions for defense against hostile aircraft?

(2) Who is going to determine the antiaircraft requirements for given areas and make recommendations to local area or base commander as to what can and what cannot be defended with the means available?

(3) What recognition procedure is to be employed to prevent ground weapons from engaging friendly aircraft? Other elements as well as the antiaircraft units must be informed and thoroughly understand the approved procedure.

(4) How are local antiaircraft and other ground force elements in airdrome defense to be trained in the occupied areas, etc.?

(5) What control measures and recommended uses for the weapons of the ground force element other than antiaircraft troops against hostile aircraft is to be made and who will coördinate?

(6) What control measures, priorities, and recommendations are to be made for the employment of antiaircraft units in support of ground elements against ground or water-borne attack? Who will direct and who will command?

(7) Means available. (*a*) Average conditions in a mobile situation will require heavy AA guns (90mm) and automatic weapons including machine guns and AA searchlights. In all cases supplementary weapons, .30 caliber, .50 caliber, or 20mm machine guns where available from local and captured or commandeered stock, are used to thicken the automatic weapons defense.

(*b*) Heavy AA gun and searchlight defenses are installed in the manner prescribed in FM 4-105 for the gun defense of limited areas.

(*c*) In the early phases of highly mobile operations which may involve the seizure and defense of airdromes by both airborne or amphibious forces the immediate establishment of a machine gun antiaircraft defense at the landing field and at beach heads is mandatory pending the landing of light AA guns and heavier equipment.

Tactical Disposition. (Guns). When available, antiaircraft guns of caliber three-inch or larger, preferably mobile, should be emplaced about the selected critical defended area at intervals of not to exceed 6,000 yards between adjacent gun positions where terrain conditions permit. They are positioned at a distance from the objective which will enable gun batteries, on the side of an incoming attack, to engage hostile aircraft flying at an altitude of 20,000 feet and at a speed of 300 miles per hour, for a period of forty-five (45) seconds prior to the time that such aircraft can reach effective bombing range (Initial Bomb Release Line).

The fields of fire of all heavy gun batteries should overlap and be mutually supporting with preferably fifty per cent of the gun batteries having their fields of fire overlapping the most critical area of the defended airdrome. Wherever possible some of these guns should be able to deliver fire directly on the landing surface of defended airdromes.

Gun battery installations, where practicable, should be capable of delivery of fire on both land or water-borne targets when the tactical necessity develops.

Automatic Weapons. The preponderance of defended airdromes may well be furnished with antiaircraft automatic weapons and troops only. In both the initial and continuing phases of combat, relentless efforts will be made by determined hostile forces to seize or neutralize airdromes within striking range, and to destroy our aircraft in the air and while on the ground.

Automatic weapon fire units should be disposed in accordance with the following principles:

(1) Defense in depth.
(2) Mutual support.
(3) High fire density.
(4) Capable of engaging hostile targets in the air, and on the ground or water.
(5) All around defense, all avenues of approach covered by fire.
(6) Coöperation with other arms.

It is believed that 37mm and 40mm fire units should be placed in two or more irregularly concentric rings about defended runways and airplane dispersal areas with the guns approximately 600 yards apart, the nearest guns being from 400 to 800 yards from the runway or dispersal area boundary with 500 to 800 yards between successive automatic weapon rings. Where dive bombing upon extremely critical installations such as shops, repair and storage facilities, utilities, and operation or command headquarters are anticipated, fire units ought to be placed within 200 yards with the distance between adjacent fire units reduced to 400 yards.

The emplacement of all automatic weapons including the machine guns of all antiaircraft elements should follow a highly irregular pattern in which never more than one gun or machine gun can be engaged or put out of action by a single attack or bomb.

Antiaircraft Searchlights. Searchlights are disposed as terrain and local conditions will allow. In general, airdromes do not present a sufficiently profitable target for hostile forces to attack with high-level bombing at night. Some searchlights can therefore be located much closer to airdromes than in the conventional searchlight disposition. The following are types of missions for antiaircraft searchlights and accessories in airdrome defense:

(1) Illumination of hostile targets at night for gun fire and for fighter aircraft interception.

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A new portable landing strip.

(2) Special coöperative missions with local air forces.

(3) Illumination of runways for landing and take off.

(4) Illumination of land, air, and sea spaces, in event of attack through any of these mediums.

(5) Deception.

(6) As beacons and director beams for homing aircraft.

Detectors and Early Warning Service. (1) Detectors, visual, sound locator, and other listening outposts are located to provide surveillance of the entire area about an airdrome plus the surrounding air space to the limits of detection devices available.

(2) The information from these devices where installed by antiaircraft elements constitutes the Antiaircraft Artillery Intelligence Service (AAAIS) and may be the only warning system available to the defended airdrome. Immediate information from this service in the latter case is of utmost importance to the local air force commander for control of his combat aircraft.

(3) The capabilities of certain detector devices in the location of sea-borne operations, particularly the direction and range of naval transports and landing barges, well in advance of unaided eyes and ears is of utmost importance to insular airdromes in close proximity to landing beaches furnishing immediate alert information of approaching amphibious operations to all local ground and air force elements.

Friend or Foe?—Recognition.

The successful defense of an airdrome or of an area is to a large degree dependent upon early warning of hostile aircraft approach, plus prompt recognition. In the absence of an extensive warning system, the problem evolves into a policy of "shoot first and ask questions later," especially where approaching aircraft are unidentified or their activities are of a suspicious nature.

A reasonable degree of independent action is advocated for battery and fire unit commanders. The following example is typical of the fire unit commander's difficult position:

Example:

(1) The simultaneous presence of both friendly and hostile aircraft in the air in the vicinity is confusing.

(2) He is in a degree dependent upon the behavior of aircraft approaching the airdrome for recognition.

(3) The individual soldier and antiaircraft fire unit commander must decide to fire or to withhold fire. In either case he is in a dilemma when an unidentified aircraft approaches.

General fire orders to all fire units should direct that aircraft in the following classes be engaged by fire.

(1) All aircraft not identified as friendly.

(2) Aircraft flying outside of prescribed lateral and altitude zone.

(3) Aircraft not giving proper recognition signal.
(4) Aircraft about which no prior warning has been received.
(5) Any aircraft committing hostile act.
(General Exception)

Suspend fire when recognized as friendly or when friendly planes in the area are endangered.

SUMMARY:

There will seldom be sufficient guns available to counter every form of attack, furthermore, a compromise must be made between—

(1) All Round Protection.
(2) Defense in Depth.
(3) Mutual support.

Automatic weapons and gun defense installation must be flexible and capable of variation when guns are lost or transferred, without undue reduction of efficiency.

The ability to reorganize as a result of losses in personnel or equipment will many times dictate the effectiveness of tactical units in subsequent operations. Commanders of antiaircraft units must consider this matter and be prepared to effect reorganization promptly when losses are sustained.

Commanders must avoid being involved in minutia of detail which should be handled by appropriate staff officers.

Troop commanders and their staff must secure adequate rest in order to conduct tactical operations effectively over protracted periods of time. Faith in the common sense and good judgment of staff officers is a characteristic of efficient troop leadership. Clear, logical planning and decisive action are dependent upon skill, alertness, and physical energy, hence both mental and physical strength must be conserved.

Experiences during the present war have repeatedly emphasized the absolute necessity for speed in all tactical maneuvers. The development of an SOP whereby all tactical movements may be carried out with promptness and dispatch until proper procedure becomes a habit is a combat necessity. This conception of a necessity for speed does not envision carelessness or slip-shod performance of duty. Battles and engagements are won by technical thoroughness and just plain "guts." There is no room for half measures.

AAA's Dual Role

By Major Klochko, Red Army

Experience has shown that antiaircraft artillery supported by fighter aircraft can by the sheer weight of their massed bursts inflict substantial damage on enemy bombers both before a tank attack and while the artillery is supporting a tank attack.

Antiaircraft crews often have to solve two complicated problems: to protect troops from enemy bombers and at the same time to combat enemy tanks. In the fighting before Voronezh, Soviet antiaircraft gunners had to deal not only with enemy planes but also with tanks, infantry and artillery.

Having crossed the river, German infantry, covered by tanks, artillery and machine gunners, launched an offensive. One enemy formation forced its way to a position defended by Political Instructor Skvortzov's AA crews. Firing point-blank, the gunners began to put enemy tanks out of action. After several shots the leading tank was set ablaze. One more shot, and a second one was disabled.

The others turned back. Presently, however, Nazi tanks and infantry made further efforts to break through, and once more met heavy fire from antiaircraft guns. Having lost seven machines, the enemy retreated to his initial positions.

A few hours later forty German dive bombers attacked the battery. Skvortzov's men tackled them effectively, and two of the raiders crashed to the earth in flames. Several others were disabled and headed west. This operation cost us one gun crew.

The Germans, however, were under the impression that the battery had been demolished and sent a couple of dozen tanks into action. The AA gunners demolished six and forced the rest to withdraw.

Recently Captain Kudelko's AA battalion was defending an important sector from air attack. Fifteen German heavy tanks, three armored cars, about fifty motorcyclists and some 350 infantrymen, supported by four guns and six trench mortars, had broken through into the sector immediately adjoining the firing positions of one of our batteries.

The crew of that battery fought desperately for eight hours without a break. Shooting point-blank at the

Alert at a Red prepared position.

Sovfoto

***Panzers* in sight? Zero elevation for fire against tanks.**

enemy tanks and infantry that were crowding down on them the gunners repelled one attack after another. The enemy lost eight tanks, three guns, four trench mortars and some 150 infantry. The battery also suffered considerably.

The AA crews have to be extremely flexible in adapting themselves to the changing circumstances of the front. It is their function to support the general antitank defenses, merging themselves in the defense system as one of its integral parts.

After a march of 120 miles a Soviet AA battalion commanded by Major Ostroglazov prepared an antitank defense at the approaches of a certain inhabited point. On the following day the Germans launched an offensive. Having concentrated considerable forces of infantry and tanks in this area, they made a desperate effort to seize the railway station and to cut the highway connecting two important points.

The fire launched by Ostroglazov's men forced the tanks to turn back. Regrouping their units, the Germans then attacked the opposite side of the inhabited point. The AA crews regrouped and again gave the tanks a hot reception.

At the cost of tremendous losses, the enemy succeeded in pushing back the Soviet units. In the ensuing street fighting one of our batteries, shifting from place to place, kept up a tenacious struggle against superior enemy forces. Enemy automatic weapons directed streams of lead at them from house tops and windows, while enemy artillery and tanks bore down on the guns.

Of the crew of one battery only two men survived—Gunners Ivanov and Alexeyev. Enemy tanks made a series of onslaughts, but the two men maintained point-blank fire at the machines and the infantry that followed in their wake. Alexeyev, though wounded, continued loading the gun until he fell dead.

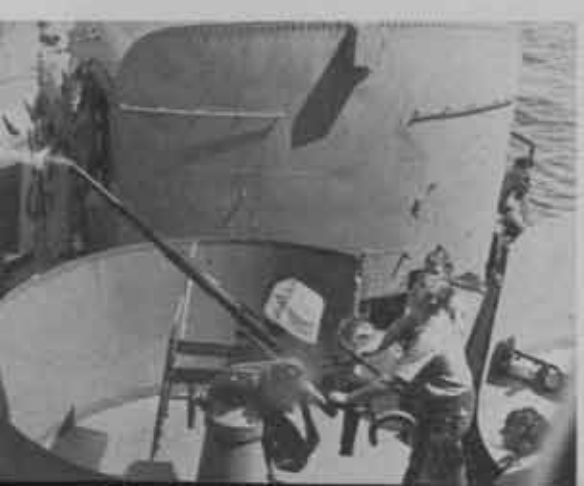
Ostroglazov's AA battalion held out for two days in conditions of extreme hardship, continually repelling tank and infantry attacks and inflicting heavy damage on the enemy.

Such examples could be multiplied wholesale. And in intervals between the fighting Soviet antiaircraft crews incessantly study the tactics of enemy aircraft and armored tank troops. They constantly improve the organization of their antitank defense and evolve new methods against enemy planes.

The War Department will help develop a method of reversing the action of Selective Service. Through that, they were brought to this job. When peace comes, it should bring a job to them. The Army should look after its own while the transition swings into action.—
HON. ROBERT P. PATTERSON.

KEEP 'EM FALLING
—Navy Style

▲ .50's aboard a Caribbean convoy.



← The 20mm Oerlikon is very unpopular among dive-bomber pilots. But these destroyer gunners seem to like it.

→ Drum-feed 30's provide part of a minesweeper's sting.

Navy antiaircraft guns have been producing results in far-flung reaches of the seven seas. The guns and the men of our sister service have blasted many an Axis plane.

This is the Navy version of a twin-mount Bofors 40mm installation.

The old reliable three-inch AA gun has several points of difference in Navy hands.

The four-inch gun reaches 'way up for level bombers.

The Navy calls this a five-inch AA battery, but it is a safe bet that Axis destroyers and smaller craft will also steer clear of these dual-purpose guns.

Military Government*

By Major General Allen W. Gullion

Military government is that form of government which a belligerent establishes and maintains by force of arms over occupied territory of the enemy and over all the inhabitants of that territory. The military occupation of enemy territory suspends the operation of all enemy government therein, both civil and military. It then becomes necessary for the occupying army to exercise the functions of civil government, both for the protection of its military interests and for the maintenance of public order. This it does by military government.

Military government has two objectives: First, to help bring the war to a successful termination; second, and entirely subordinate to the first consideration, to further the welfare of the people of the occupied territory.

At all times, winning the war or, having apparently won it, keeping it won is the prime objective. The question must be asked with reference to every intended act of the military government, whether it will further or hinder that objective. The administration of military government is subordinate to military necessities involving operations, security, supply, transportation, and housing of our troops. If hostilities are suspended by an armistice or otherwise, all military government plans and dispositions must be made so that the troops may resume hostilities under conditions most conducive to a successful termination of the war. Military government must be firm, for softness in its administration will encourage the hostile population to disobey the ordinances and other measures provided for the safety of our troops.

Subject to the primary objective—winning the war and keeping it won—the welfare of the governed must be always kept in mind. Military government should be just, humane, and as mild as practicable. It is incumbent upon those who administer it to be strictly guided by the principles of justice, honor, and humanity—virtues that adorn the soldier more than any other man, for he has the power of his arms over those who are unarmed. A military occupation marked by harshness, injustice, or oppression leaves lasting resentment against the occupying power in the hearts of the people in occupied territory and sows the seeds of future war, whereas just, considerate, and mild treatment will convert enemies into friends.

The exercise of military government is a command responsibility, and full legislative, executive, and judicial authority is vested in the commanding general of the theater of operations. The commanding general of the theater is, *ipso facto*, the military governor of the occupied territory. His authority is supreme, limited only by the laws and customs of war, and by such instructions as he may receive from higher authority. It is elementary that command and civil governmental powers be combined in one person—the commanding general of the theater. Otherwise, instances may arise where military operations may be turned into disasters because of the division of authority in the battle zone between the military leader and the governor of civil affairs. Whatever may be the merits of coöperation in other fields, there is no place for coöperation in the theater of active military operations. The job is a military one. Those who help administer the government as well as the people governed must be quickly responsive to the will of the commanding general.

If we can keep steadily before us the principles that victory comes first, that we must bend all our plans and all our operations to achieve victory, it necessarily follows that the government of an occupied area must be administered by the leader on the spot.

The commanding general of the theater is aided in the discharge of his functions as military governor by the section of his staff known as the "Civil Affairs Section," headed by an officer whose title is "Officer in Charge of Civil Affairs." Presently I shall tell you how we are training officers for service on the civil affairs sections of staffs.

The question is not merely one of military versus civil government. Forgive me if I reiterate this to the point of boredom. What matters most is that the commanding general in any field of operations be given as complete control as possible over all the elements that must enter into his calculations. The administration of civil affairs is a vital element. Civil disorder or disobedience, hunger riots, passive resistance, inter-racial strife among the civilian population, profiteering, sabotage or false rumors may at any moment disrupt military movements of men and supplies or disturb the military timetable. This is the reason why all modern armies, including our own, have come to appreciate the importance of their civil affairs staffs and to regard them as an integral and essential branch of the service. A well-trained civil affairs staff and trained occupational police relieve the combat staff and the combat troops from civil affairs duties and permit them to confine their attention entirely to combat duties.

Military government is not novel—neither is it peculiarly a Nazi or Fascist device as some seem to think.

*Adapted from an address delivered by General Gullion, Provost Marshal General, before the Kentucky Press Association, January 28, 1943.

For thousands of years, every victorious army in conquered territory has employed it. We Americans are no exception. We set up a military government in Florida during the Seminole War and in Louisiana before the Purchase. We had such governments in Mexico, Cuba, Puerto Rico, Panama, China, and the Philippines. Our latest adventure was in the Rhineland after the armistice of the World War. Despite our many and extended experiences in this field, every military government set up by an American Army has been attacked, by the unknowing or by those who would not see, as imperialistic and contrary to the genius of America. When General Winfield Scott erected his firm and just military government in Mexico, the usually able Democratic Secretary of War, William L. Marcy, was shocked, and the Whigs made a campaign issue of it. Yet Justin Smith and other authorities on the period have only praise for General Scott's action.

Military government is divided into two phases. There is the phase in which the Army is temporarily in control. This would be usually followed by a period in which an American or allied civil government replaces government by the Army, after which the occupied area is ordinarily returned to the defeated nation under the terms of a treaty of peace. When the enemy has been driven back and his territory overrun by the victorious army, the scene is usually one of chaos. Frequently the area has changed hands several times. Towns have been coventried, homes have been destroyed, industry and commerce have been paralyzed, utilities have been ruined, food supplies are nonexistent, famine and pestilence are imminent. The local government has either fled or become powerless. Should such conditions prevail even in our own country, either in time of peace due to earthquake or other natural disaster, or in time of war following the ejectment of an enemy, martial law, which is military government at home, would have to be set up. Under these circumstances, the Army must assume control and restore stability and order. This must be done, partly because the civilian population of the occupied territory would otherwise lapse into anarchy. If, however, economic dislocation and civilian distress were the sole considerations, a civil government might possibly serve. But, above everything else, the Army's lines of communication must be kept open and the military situation preserved. Yet the forces of the defeated army may be in the next province or even just over the next mountain range, preparing to resume the struggle. The civilian population may be contemplating all sorts of sabotage or attempting to give aid to their own defeated forces. Military necessity, therefore, demands that the conquering army be in complete control. The control that it thus assumes is what we know as "military government." It is one of those inescapable incidents of warfare, completely sanctioned by international law, that no victorious army can avoid even if it would. Summarizing, its purposes are first, to safeguard the Army and to maintain a favorable military situation, and second, to preserve law and order among the civilian population. It must lay the groundwork for the eventual restoration of the area and, in the meanwhile, render assistance to its people in such emergency matters as food, medical supplies, and sanitation.

How long should it continue? Unless we invite disaster, it must continue so long as military necessity exists. No rule of thumb can fix its termination.

In the past, outstandingly in the Philippines after the Spanish-American War, we, ourselves, paid a heavy price for concluding prematurely that military necessity had ended. As Ambassador Grew lately has said, the treacherous nature of our present enemies will make a correct determination of this question very important. The President, as Commander-in-Chief, will have to determine it, and he will certainly resolve it upon the basis of the peculiar facts that exist at the time in any particular theater.

But when military necessity no longer exists, the Army must lay aside the reins of government, handing them over to an American or allied civil government which, in turn, will govern until a treaty of peace is made. For example, in the occupation of our part of the Rhineland after the last war, American military government lasted from December, 1918, until January, 1920, when the Army turned the government over to the Inter-Allied High Commission, a civilian agency, which continued in authority until the area was returned to German control.

But when the Army gives up its temporary control, the duties then to be assumed by the succeeding civilian agency will be on a much greater scale and probably of much longer duration. For it is then that civil authority must take on the burden of helping the crushed and dispirited peoples re-create their world or, we hope, a better one.

The preparation for occupation, however, whether it be the temporary control by the Army or the more permanent régime of the succeeding civilian agency, must be substantially the same.

It is the duty of the occupying authority, whether military or civilian, to preserve, so far as possible, the local institutions, laws, and customs of the occupied region. Military government and the succeeding civilian authority are, therefore, in a sense, superimposed upon the existing local structure and seek to shape the latter to the military and political exigencies of the occupation. Hence, if the job is to be well done, those charged with its execution must have a knowledge of the institutions, customs, economy, and psychology of the occupied area and must also be prepared to supervise or to function throughout the field of public administration. This is a most complicated undertaking, calling for a large number of professional skills.

Engineers of all types must assist in reëstablishing public works and utilities. Sanitationists must restore and protect the public health. Emergency relief work-

ers must assist in feeding, clothing, and housing the destitute. The tangled fiscal affairs and the disrupted economy of the occupied country must be readjusted. The experts, to perform these missions, must also be indoctrinated in the backgrounds of the special areas in which they may operate.

The time is almost here when our armed forces will occupy important and extensive territories in widely scatttered regions. When that time comes, we should be fully prepared to carry on those initial tasks of government that will fall to our victorious armies. At the same time we should shape our program so as to make the transition from the temporary control of military government to the more permanent civilian control as easy as possible.

Last May the Army established at the University of Virginia a School of Military Government where the top administrative personnel for military governments is being trained—not to be governors but to be administrative assistants to governors. The school has a present authorized student body of 150 officers. Ninety-nine per cent of the students have primarily a civilian background. They are for the most part former National Guard and Reserve officers. Only three have been members of the Regular Army. Nearly all have had extended administrative experience.

Little time is devoted to ideology and pure theory. While a background on international law and of the general principles of public administration is, of course, presented, seventy per cent of the students' time is spent on practical problems dealing with the areas of potential occupation.

These problems include not only studies of the laws, customs, economy, and psychology of definite areas now in hostile hands but involve especially the preparation of definite plans for the taking over of those areas. For example, if we should occupy Hamburg, the commanding general of the theater, who will, of course, be the military governor, will have available a plan for its government, and will have officer graduates of the school who have prepared the plan. Moreover, not only will the top administrators have been especially trained and made available for the commanding general in his government of Hamburg, but the subordinate and technical personnel will also be on hand.

There need be no fear lest the Army interpret military necessity too widely or liberally, and thus oppose the timely transition from military to civilian control of occupied areas. The danger, if any, lies in the opposite direction. The Army is a civilian army. There will be a strong and natural desire on the part of the armed forces to escape from the unaccustomed duties of government and to get back home. The Army will have to guard itself against undue optimism regarding conditions in enemy territory and against undue haste in relinquishing its responsibilities. But it is the people's army and the people can trust it. If our democratic army is not worthy of trust then democracy is a failure, for a democracy as well as an autocracy must depend on the army for protection in this world of recurring wars.

ANTIAIRCRAFT MARCHING SONG *Contest!*

In response to numerous requests from Antiaircraft units and individuals in the field, the United States Coast Artillery Association offers a cash prize of $100 for the best Antiaircraft Artillery marching song submitted by July 1, 1943. The need has been felt for a distinctive song for the Antiaircraft, and your Association has acted in the belief that the talent to produce an excellent musical effort will be found in the greatly expanded Antiaircraft service.

The new song will not change the status of *Crash On! Artillery,* which remains the official song of the United States Coast Artillery Association, for *all* the Coast Artillery. What is now desired is a distinctive *antiaircraft* song.

Eleven requirements have been adopted for the contest:

1. The music should be an inspiring military march that will quicken the pulse when heard or sung. It must be original with the composer.

2. The lyrics must be distinctive in their application to Antiaircraft Artillery. They must be original with the composer.

(Note: Requirements 1 and 2 do *not* bar collaboration.)

3. Manuscripts must be submitted without any name of author or unit on the manuscripts themselves. The outside wrappings and letter of transmittal should, of course, identify the sender.

4. The letter of transmittal must state the name of the song submitted. All manuscripts (except the winner) will be returned at the close of the contest.

5. Payment of the prize will be made to the person signing the letter of transmittal of the winning song.

6. The President of the United States Coast Artillery Association will appoint a committee of five judges to choose the winning song. The decision of the judges will be final.

7. The winning song will be published in the JOURNAL.

8. The winning song becomes the property of the United States Coast Artillery Association, which reserves all rights of publication and sale.

9. Any person or persons, in or out of the service, may enter the contest.

10. The United States Coast Artillery Association will pay the sum of $100 to the winner of the contest.

11. All manuscripts must be mailed to the Editor, COAST ARTILLERY JOURNAL, 631 Pennsylvania Avenue N.W., Washington, D. C., and postmarked before midnight, June 30, 1943.

The requirement concerning persons eligible to enter the contest was left all-inclusive in order to get a good song. The Association and the judges are not interested in *who* writes the song, but in how good the song is. The Antiaircraft Artillery deserves a swingy, tuneful song with lyrics that men will like to sing, and to which everybody will like to listen. Among the millions of men in the army, and the other millions who are taking an interest in the army that they never took before, it should be possible to find one or two who can write something that we all will be whistling and singing by the end of the year.

Notes On Antiaircraft Gunnery

By Lieutenant Colonel E. E. Farnsworth, Coast Artillery Corps

I

Horizontal Fire

The usefulness of AA guns against land and water targets has been demonstrated again and again during the present conflict. In many situations AA Artillery is most useful in a supporting rôle to Seacoast and Field Artillery.

a. Firing Data: The gun battery may, of course, be fired as a battery or by individual guns employing Case II methods. In either case the range officer must not overlook the value of the director as a computing instrument regardless of the visibility of the target. If a range and azimuth is read from a map and time permits, this data should be run through the director, particularly when a vertical parallax correction is needed. The range officer who burdens himself with scales and charts as a substitute for the director is not being practical. One interesting problem arose in a battery firing mechanical-fuzed ammunition with a powder-train cam in the director. A map range entered in the director would give a quadrant elevation for the powder-train trajectory. The M43 ammunition fired on this data would overshoot the target as a result of the "flatter" trajectory of the M43 ammunition. To solve this problem it was necessary to determine the quadrant elevation corresponding to all ranges for both powder-train and mechanical-fuzed ammunition. This data was not available in firing tables so three directors equipped with powder-train cams and three with mechanical-fuzed cams were set on horizontal fire and the quadrant elevation for each 200 yards of range was read. The average for each type ammunition was taken and plotted against range. The result is roughly shown in Figure 1. Note that the quadrant elevation required for powder-train ammunition is much greater than for mechanical-fuzed ammunition firing at the same range.

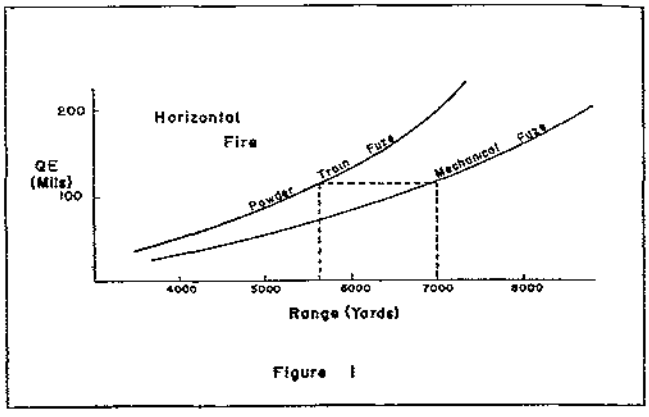


Figure 1

Referring to Figure 1, if it is desired to fire M43 ammunition at a target whose range is 7,000 yards, the following procedure is necessary: Select a point on the mechanical-fuze curve corresponding to 7,000 yards range. Draw a horizontal line to the powder-train fuze curve. We find the line intersects this curve at a range of 5,650 yards. Set this range in the director and the proper quadrant elevation including corrections will be computed for the M43 ammunition. This range-range relation can be represented in the form of a chart which requires only a straight edge for quick reading. Such a chart is shown in Figure 2.

It is realized that the problem illustrated above does not arise very often with the present policy on ammunition. However, similar problems will occur whenever

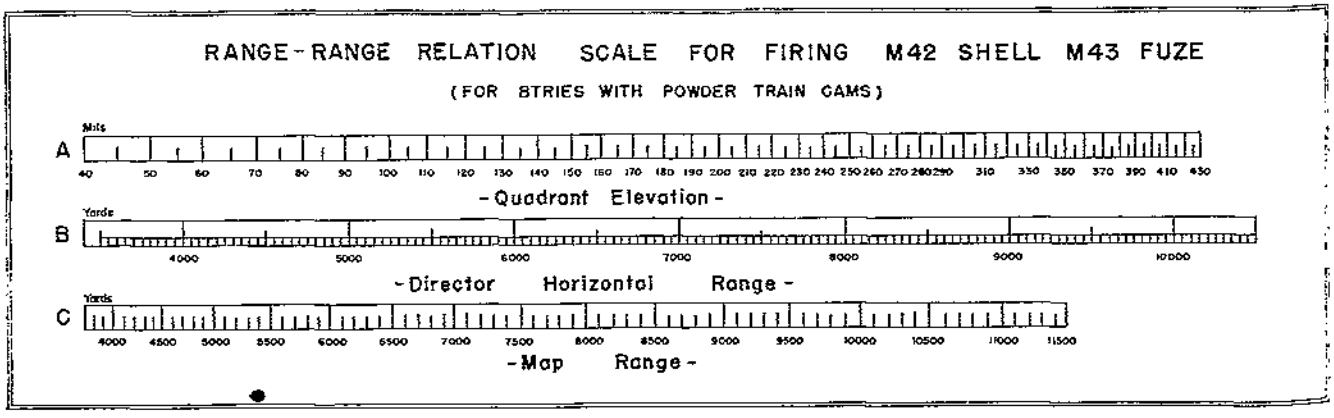


Figure 2

the guns are firing ammunition of which the ballistic characteristics differ from those of the ammunition for which the cam in the director is cut.

b. Adjustment of Bursts: The adjustment of fire offers no serious problem when impact ammunition is being used. When time-fuzed shell is fired some difficulty has been experienced in adjusting both range and height of burst simultaneously. To simplify and expedite the adjustment, the range officer must make corrections for the developed muzzle velocity error prior to opening fire. This error has an effect on both range and *height of burst*. Using firing tables for the ammunition on hand a chart should be drawn giving the corrections for each 200 yards of range. It must also be remembered that the use of shell is most effective against personnel and a height of burst of thirty (30) yards is desired. For example, a battery sited at sea level is firing against personnel in landing boats at a range of 9,000 yards. The quadrant elevation for this range is approximately 200 mils. If the ammunition is developing a plus 100 ft/sec m.v. variation, this will cause an increase in range of 213 yards and an increase in altitude of height of burst of 56 yards. (FT 3AA-O-1). Thus, before firing, the range officer should decrease his horizontal range by 213 yards and decrease his quadrant elevation by a spot of 56-30/9 or 3 mils. If the range officer fails to consider the vertical effect of muzzle velocity variations (which are usually plus) and enters an initial Q.E. spot of up three or four mils to obtain an air burst, it is easily understood why some initial bursts are excessively high. After fire has been opened range deviations are corrected by increasing or decreasing horizontal range. In this connection, it was discovered that some range officers were entering range corrections by offsetting the bugs on the dials. This is impractical and difficult. The proper way to make a range correction is by means of the height finder spotting knob. This spot is incorporated in range sent to the director and enables the range setter to match dials. Lateral deviations and vertical deviations from the desired height of burst of 30 yards are made in mils. It is merely necessary to divide the yards deviations by the range in thousands of yards and enter the resultant mil correction in the spotting dials. *Numerous practices have proven that the use of fuze spots is disastrous.* The resultant effect on both range and height of burst causes an excessive delay in adjustment and quite often an adjustment is never obtained by use of fuze spots.

c. Spotting: Standard seacoast spotting methods are too slow for antiaircraft application. Stereoscopic spotting against land or water targets is extremely difficult. The Kane Spotting Instrument (M1) and Rule may be employed with slight modification to give magnitude sensings as accurately as they give AA range deviations. In Figure 3

G is the gun position
T is the target
F is the burst

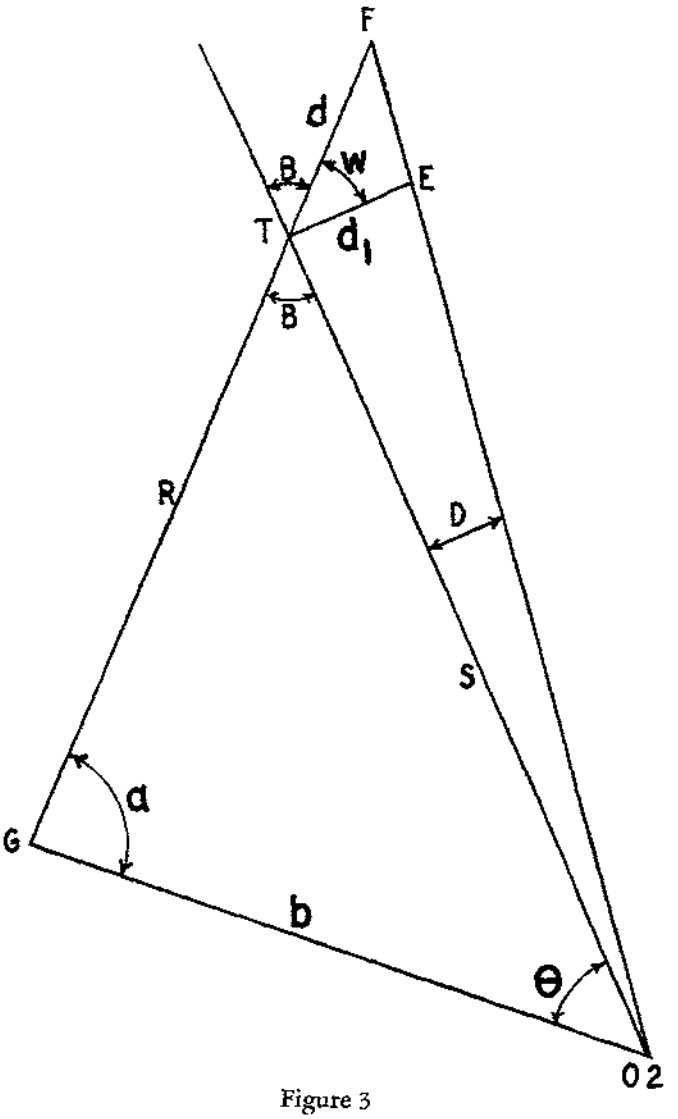


Figure 3

O_2 is the flank station
D is the mil deviations from O_2.

Draw TE $\perp$ TO_2. Triangle TEF may be considered right triangle.

$d_1/d = \cos w$ or $d = d_1/\cos w$

but $\cos W = \sin B$ (complementary angles)

or $d = d_1/\sin B$ (1)

but $d_1 = S/1000 \times D$ (2)

and since $\sin B/b = \sin a/S$, $\sin B = \sin a x b/S$ (3)

substituting (2) and (3) in (1)

$d = S^2D/1000 \sin a \times b$ (4)

but $S/\sin a = R/\sin \theta$ or $S^2 = R^2 \frac{\sin^2 a}{\sin^2 \theta}$

substituting this value in (4)

$d = R^2 \sin a \times D/1000 \times b \times \sin^2 \theta$

expressed logarithmically

$\log d = 2 \log R + \log \sin a + \log D + \text{colog } 1000 + \text{colog } b + 2 \text{ colog } \sin \theta$

The logarithmic equation on which the Kane Rule is based is:

$\log h = 2 \log H + \text{colog } \sin E_m + \log D + \text{colog } 1000 + \text{colog } b + 2 \text{ colog } \sin \theta$.

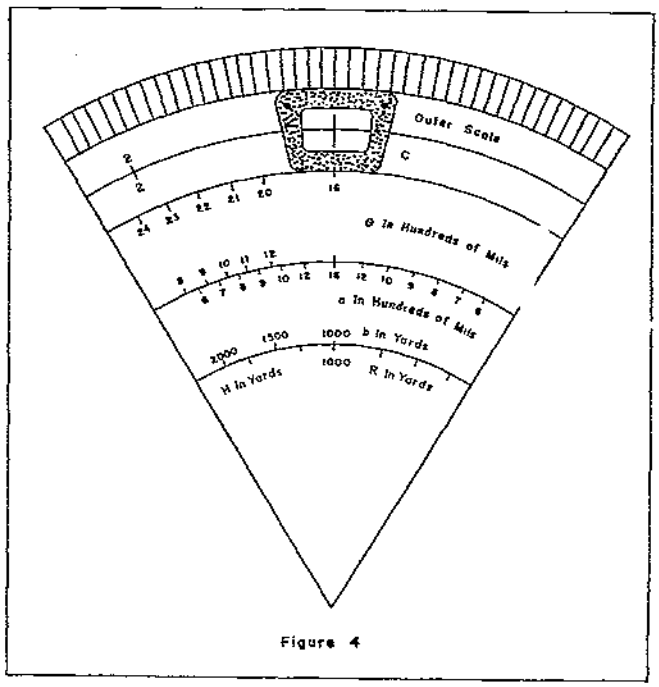


Figure 4

Although some numerical equations and trigonometric functions represent different elements of the problem, the two logarithmic equations are identical except that a log sin appears in the first equation where a colog sin is found in the second. This similarity in the two equations permits of easy adaptation of the Kane Spotting Rule to horizontal use. To accomplish this, three changes are necessary. On the spotting rule two of the elements must be redesignated and the E scale must be graduated to the right instead of to the left of the index (16) to add the log sin function mentioned above instead of subtracting it. (See Figure 4). The E_m scale to the left of the index is disregarded. The elements changed are:

H becomes R (range of target from guns)

E_m becomes a (interior angle at guns)

To determine the magnitude of the range deviations, it is merely necessary to follow the directions as printed on the rule with the indicated changes. The E_m angle used in AA adjusting is not read or used in horizontal spotting. The angle *a* may be read from a Kane Spotting Rule or rough azimuth instrument set up at the battery.

II

Fuze Errors and Prediction

The present standard method of applying corrections with which to enter fire for effect may cause serious errors in our antiaircraft directors. If the fuze error has been accurately determined, the director will accurately predict. But every time a fuze error, determined or not, *is corrected by percentage altitude and* $d\Phi$, a serious error in prediction results. The only way to correct a fuze error is by a fuze spot. To do this the range officer must know what the fuze error is. An undetermined muzzle velocity will not affect prediction. To be more specific let us consider three situations:

a. Situation One: The battery commander from previous firings has entered trial fire with corrections based on his previous determination of fuze error which is not accurate. *The prediction error is directly proportional to the error in fuze determination.*

b. Situation Two: The battery commander has no data on fuze error from previous firings and "shoots it out" with trial fire. This is seriously in error as corrections for trial fire are made in altitude, quadrant elevation, and azimuth.

c. Situation Three: The battery commander has no previous firing data except an accurate record of fuze error. No prediction error results and all other errors are correctly eliminated by trial fire.

Cause of Prediction Error

If the altitude of the target is accurately determined by the height finder observer, overs in range may result from several causes: unknown ballistic conditions, muzzle velocity variations, and fuze errors. These may be reduced to two classes: muzzle velocity variations (ballistic corrections are computed as variations in muzzle velocity) and fuze errors.

Consider first the problem solved in the director when no fuze error exists. Muzzle velocity variations are corrected by a per cent correction in altitude and a corresponding $d\Phi$. This causes a fictitious value of the target altitude and the present position slides in the director set up the target position, speed, and travel based on this new altitude. An erroneous altitude reading by the height finder observer produces the same effect. However, no prediction error results as can be seen by referring to Figure 5.

The present position of the target in the horizontal plane is determined by the values of A_o (lateral tracker)

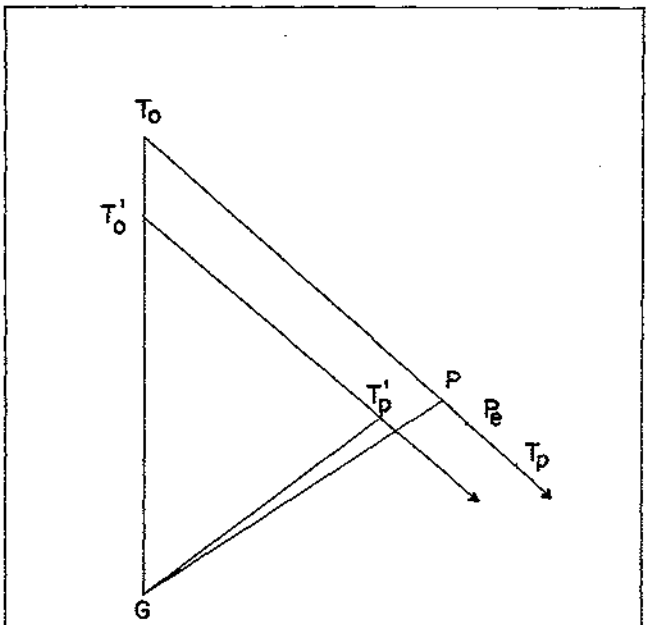


Figure 5

and R_o (a function of E_o and H_o). The movement of the present position pin is measured in the N-S and E-W components and, if the correct altitude is used, the true actual speed of the target is indicated. If the present altitude is in error, the present horizontal range and speed of the target will also be in error an amount proportional to the altitude error. For example if an altitude 90% of the true altitude is used, it will result in a horizontal range 90% of the true horizontal range and, therefore, a speed 90% of the true speed.

In Figure 5 let T_o and T_p be the true present and future positions of the target, T'_o and T'_p represent the present and future positions of the target indicated when an altitude is used that is less than the true altitude. Let t_p t'_p S_g and S'_g represent the respective times of flight and ground speeds. The point in question is "Where will the true target be along the line $T_o - T_p$ at the expiration of t'_p seconds?" Assume it will be at a point called P and draw the line GP. Let H and H′ represent the actual altitude and the observed altitude respectively.

Then $T_oP = t'_pS_g$

But $T'_oT'_p = t'_pS'_g$

Hence $= \frac{T_oP}{T'_oT'_p} = \frac{S_g}{S'_g}$ (1)

Now $\frac{S_g}{S'_g} = \frac{H}{H'}$ and $\frac{T_oG}{T'_oG} = \frac{H}{H'}$

(Both ground speed and horizontal range are proportional to altitude of the target)

Therefore $\frac{S_g}{S'_g} = \frac{T_oG}{T'_oG}$

Substituting in (1) $\frac{T_oP}{T'_oT'_p} = \frac{T_oG}{T'_oG}$

But angle GT_oP = angle $GT'_oT'_p$

Therefore, triangles GT_oP and $GT'_pT'_p$ are similar and the point T'_p must lie on the line GP. In other words, when there is no fuze error and the altitude determination is in error, or muzzle velocity corrections are improperly computed or determined, the burst will occur on the gun target line laterally and there will be no lateral deviation. Thus, the prediction is not affected. If, for example, this was not an altitude error but a per cent altitude correction for a plus muzzle velocity variation, the shell will be propelled to point P in t'_p seconds and will reach point P the same instant as the plane.

Consider the problem in which the muzzle velocity variation is zero but a fuze error exists and is shot out by trial fire. In other words, it is eliminated by an altitude and quadrant elevation correction. The director again sets up a fictitious range, speed, and travel. This time, however, there *is a lateral error which is due to the inability of the director to properly predict the position of the target at the time of burst.* Refer to Figure 5 again.

If the altitude is decreased to correct for an "over" in fuze range, we will have the same problem as above, except that this time the burst will not occur on the target. The director will again predict the point T'_p and the target will be at P at the predicted moment. This time, however, *the projectile will be at* T'_p *at the expiration of* t'_p *seconds* since there is no muzzle velocity error. However, the over in fuze range will cause the projectile to remain in flight longer and by the time the projectile has reached P the plane *will have traveled to* P_e. *The shell will burst behind the plane an angular distance which is equal to the prediction error.*

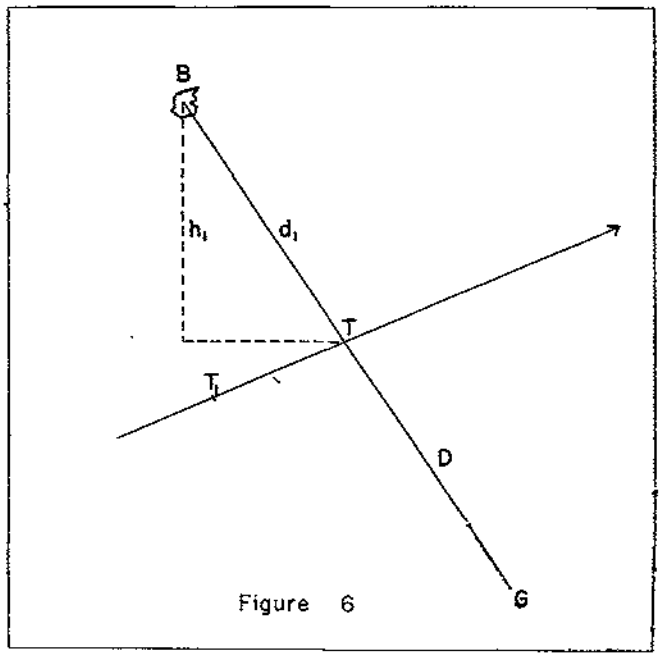


Figure 6

It is, therefore, evident that it is extremely important to know the fuze error of the ammunition so that a proper correction may be made by means of a fuze spot. Improper determination of the fuze error will cause the center of impact of the bursts to continually lag or lead the target, depending on the sense of the error. Cameras should be used to determine fuze errors wherever possible. Otherwise, at least five trial shot problems should be fired with the best ballistic message available and with a subsequent careful analysis of the problems.

III

Effect of Range Deviations

It is universally recognized that once fire has been opened the opportunity to adjust may never arise. There is, however, a possibility of adjusting in battle and particularly during target practices. A short discussion of the effect of range deviations on lateral deviations might be of some value from a gunnery viewpoint.

In Figure 6:

G represents the battery

T is the target at the moment of burst

T_1 is the target at the moment the trajectory crosses the target track

B is the burst of the shell
D is slant range in thousands of yards.

Let us assume that all corrections, including those for muzzle velocity and fuze errors, have been properly computed and applied. As the target comes on course the height finder observer reads too high, causing the shell to burst beyond the target d_1 yards. The question is: "What effect will this over in range have on the lateral deviation?" If S represents the ground speed of the target and V the terminal velocity of the projectile at this range then *the plane will travel* $\frac{d_1S}{VD}$ *mils while the projectile is travelling from the actual track of the target to its bursting point.*

But where is the target when the projectile crosses its track? The observer's altitude error (h_1) has caused the director to locate the target at a proportionally longer horizontal range and h_1 yards higher in altitude. The ground speed of the target represented in the director by its component rates is also computed to be greater in the same proportion. Now, since prediction is equal to ground speed times time of flight (computed by components), it is obvious that prediction is greater as a result of the altitude error. The projectile will consequently pass the track of the target in front of the target. The lateral error *along the track of the target* (amount projectile passes in front of target) is equal to $\frac{t'_pS - t_pS}{D}$ mils where

t'_p is time of flight based on erroneous altitude
t_p is time of flight based on actual altitude
S is ground speed of target
D is slant range in thousands of yards.

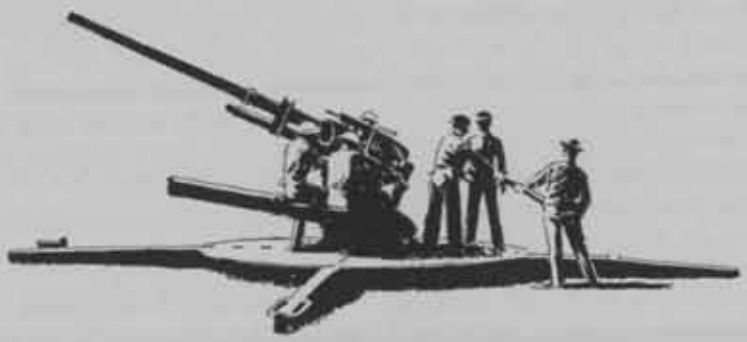
The expression may be written $\frac{S(t'_p - t_p)}{D}$

But $t'_p - t_p = \frac{d_1}{V}$

Then error along target track is $\frac{d_1S}{VD}$ mils.

It will be seen from the first part of this discussion that this is also the angular distance the target travels while the projectile is travelling from the target track to the bursting point. In other words, the projectile passes in front of the target an angular distance of $\frac{d_1S}{VD}$ mils, and as it continues on to the bursting point the target travels $\frac{d_1S}{VD}$ along its track.

Thus, *the burst occurs along the line of position and the range deviation has no effect on the lateral deviation.* This may also be seen from the discussion on "Fuze Errors and Prediction." An altitude error and a per cent altitude correction affect the computation of firing data similarly. It was shown that an altitude correction to compensate for a muzzle velocity error will not cause the burst to deviate from the line of position.



Improved Seacoast Target

By Brigadier General David P. Hardy

EDITOR'S NOTE: *Reports from organizations using this target state that it is particularly valuable in cases of low-sited batteries. It is very light, therefore easy to handle and easy to tow. It can be built by an average mechanic provided clear-grain spruce is available. The target has proved very satisfactory in clear weather and light seas.*

With the increase in the range of even medium-caliber seacoast guns has come a demand for an artillery target which is larger and higher than the standard ordnance equipment provided for this purpose. The tremendous force of ocean waves striking large towed targets has made it necessary either to build the targets very strong with consequent increase in weight or to make them light enough to ride over the tops of approaching swells and so avoid the full force of the water.

An interesting target of the latter type is one recently developed by the author.

Basically this target rides on two longitudinal pontoons twenty feet long and one square foot in cross-section placed sixteen feet apart and connected by a series of "A" frames which form the superstructure. The seventeen-foot ridge of these connecting trusses is twenty feet above the water.

Resistance to towing stress is reduced to a minimum by raising all cross members of the target several feet above the top of the pontoons so as to clear the waves and by making the entire target weigh less than eleven hundred pounds. Planning has been directed toward keeping this target on top of the waves instead of allowing it to fight the water by plunging through it.

A float is fastened securely to the towline at the forward end of the bridle to prevent the latter from twisting, to assist the target in turning, and to help prevent the towline from pulling the front end of the target down.

Port pontoon, showing the method of attachment of the "A" frames and the wire bindings.

The target. Eight men raise it easily.

The most difficult problem is to fasten the very large superstructure to the relatively fragile pontoons and then to attach the tow line to the latter so that they will not break up. The solution lies in fastening the towing shackles securely to keelsons composed of one-inch by twelve-inch boards and two-inch by six-inch keels bolted together. Five bulkheads, each two inches thick and made up of two boards with the grains crossed, furnish the anchorage of the "A" frames to the pontoons.

Buoyancy is provided by sixteen water-tight galvanized iron floats, each twelve inches by twelve inches by two feet long. After the floats are inserted, the sides and top members of the pontoons are nailed in position and bands of galvanized wire are wrapped around them at the bulkheads. The wires are tightened and secured by staples.

Clear-, straight-grained spruce strips three inches wide by one inch thick are used for the superstructure. Points of crossing are securely fastened by riveting or binding so that stresses are distributed to all members equally.

The tendency to overturn is quite negligible with this new target, particularly if the float described is towed just ahead of the target.

The red bunting is place at the extreme top of the target and is made full width at all points so that the cross wires of the sights do not cover it completely as in the case of the triangular target. The cloth is carried down the sides only ten feet to keep wind pressure to a minimum and still provide sufficient area for good visibility. The triangular ends are partially filled to give visibility when the target is changing range.

While no direct hits have been registered, it is believed that the superstructure can be hit a number of times with sand-loaded projectiles without completely wrecking the target, the spruce strips acting like the basket mast construction formerly used by the Navy.

Coast Artillery Training Bulletins

By Lieutenant Colonel D. C. Tredennick and
Captain A. J. Stewart, Coast Artillery Corps

With the recent distribution of Vol. I, No. 16, the first volume of Coast Artillery Training Bulletins was completed. This new series of bulletins is a product of Army Ground Forces' directive of May 16, 1942, which declared: "The special service schools of the various Arms and Commands are hereby designated as the normal preparing agencies for training literature and visual aids pertaining to their Arms."

In nature, the School's bulletins are for information only. They conform strictly to War Department demands but do not purport to announce War Department doctrine, tactics, technique, or procedure. Their primary mission is to carry military instruction from the School to Coast Artillerymen swiftly. Complementing the bulletins is The Coast Artillery School Information Service, which is geared to answer the inquiries of troops in the field. The School trusts that Coast Artillerymen will not hesitate to submit their individual tactical and technical problems to this Service.

In deciding upon the contents of its Training Bulletins, the School concluded that Coast Artillerymen would benefit most by publications pertaining to matériel they must use. Consequently a majority of the new bulletins are of a technical nature. Nevertheless, information of a tactical nature has not been overlooked and will not be overlooked during the present year. In some instances, the bulletins introduce the content of official field and technical manuals in the process of preparation.

These bulletins, as has been said, are not official War Department publications. Likewise, they are not hastily compiled stop-gaps. Writers, editors, artists, and printers have collaborated to make them helpful, durable, and attractive. The School approves of all bulletins before they are distributed. In addition, if the bulletins are highly technical they are submitted to the War Department and the Coast Artillery Board for review and approval for release.

The initial general distribution of Coast Artillery Training Bulletins is of course the School's responsibility, but when they reach their destination the responsibility for their prompt and appropriate distribution rests squarely upon the receiving unit. Comments from the field lead the School to believe that distribution, as a rule, is performed conscientiously; there are indications, however, that in a few instances bulletins have gathered dust altogether too long in receiving headquarters. The Coast Artillery Corps, like every other Arm and Service, is filled with new officers and men in need of sound and rapid training. School bulletins are one means of providing this training. Officers responsible for distributing Coast Artillery Training Bulletins should make it their business to see that they are distributed wisely and without delay.

Below is a summary of Volume I of Coast Artillery Training Bulletins.

Vol. I No. 1 *General Information.* This bulletin, the first in the new series, has mainly an introductory purpose. The first section, *New Training Bulletins,* states that the new series is to serve as the "seacoast artilleryman's technical newspaper," urges officers of field units to keep the School advised of new instruments and techniques, and calls attention to the Information Service maintained by the School for the answering of questions on seacoast artillery. The second section, *FM 21-6,* stresses the value of that manual as a training aid. The third section, *Visual Aids,* lists the training films and film strips which have been approved for release or are in the process of production for Coast Artillerymen. It points out that instruction guides for the use of training films will be published by The Coast Artillery School, and that notes prepared by the School will accompany every film strip.

Vol. I No. 2 *Lateral Adjustment of Fire.* A concise discussion of lateral danger spaces, general rules for lateral adjustment, and methods of adjustment.

Vol. I No. 3 *Radio Set SCR-582—Choice of Site and Installation.* (Confidential). An easily understood bulletin on the purpose of the equipment, the problems that arise when choosing a site, and the installation of the equipment in view of its physical and operational features. Illustrations aid in the rapid grasp of the bulletin's contents.

Vol. I No. 4 *Intelligence Summary No. 1* (Restricted). This is the first of a series of Coast Artillery Intelligence Summaries which will be issued from time to time. The institution of this series marks an effort on the part of The Coast Artillery School to make available to field forces pertinent items of intelligence information. With some items the School has included discussions of a general nature. The contents of *Intelligence Summary No. 1* include: (1) German "E" Boats, (2) Seaborne Attack on a Harbor, (3) Location of Barbed Wire in Beach Defense, (4) Tracer Ammunition, (5) Mobile Observation Posts, (6) Employment of Coast Artillery during the Attack on Hong Kong, December, 1941, (7) Demolition of Fixed Seacoast Batteries at Penang, (8) Use of Slit Trenches, (9) Damage to Observation Stations by Falling Rock, (10) Camouflage of a Command Installation, (11) Protection of Searchlights, (12) Essentials for Successful Combat Operations, (13) Fire Commander's Standing Orders, (14) Models of Installations, (15) Miniature Ranges.

Vol. I No. 5 *155mm Gun (G.P.F.) Handbook.* A

detailed presentation of every feature of this famous gun. The following are discussed: the gun, carriage, accessory, and firing characteristics; the breech and firing mechanisms; steps to place gun in battery; wheels; brakes; elastic suspension mechanism; top carriage; recuperator; replenisher; telescope mount M6A1; panoramic telescope M8; quadrant sight; panoramic telescope M3A1; gunner's quadrant; limbers; subcaliber tube; tools; ammunition. The 197 halftone illustrations provide a strong visual appeal.

Vol. 1 No. 6 *The M1 Deflection Board.* A definitive study of the present standard direction correction device for guns in seacoast artillery. The following section headings indicate the treatment of the subject: description of board, checking assembly of board, corrective measures, mounting the charts, the lateral adjustment scale, operation, conversion to operation in mils. The three appendixes consider the theory of the M1 Deflection Board, construction of charts, and calculation of Case II check data. The bulletin concludes with a section containing twenty-one full-page illustrations.

Vol. 1 No. 7 *"Notes on Training."* This bulletin contains *Notes on Training* issued by a general with a Coast Artillery command in an overseas theatre. It is a mature and moving presentation of an officer's responsibilities, and literature and history as well. Even before their incorporation in a Coast Artillery Training Bulletin, the *Notes* had appeared in the COAST ARTILLERY JOURNAL and the *Infantry Journal*. The editor of the latter magazine wrote in his foreword to *Notes on Training*: "This is the finest piece of official writing we have seen in this war. There have been forceful directives produced by every army fighting our enemies, and those The Journal has been able to find have appeared in its pages. But this is the best of all. We'd like to bet big odds that here was ONE issue from the mimeograph that every officer in the outfit read—and took to heart." No conscientious officer should miss reading *Notes on Training*.

Vol. 1 No. 8 *The Identification of Merchant Vessels.* Herein the Coast Artilleryman is familiarized with the Navy Department's system of identifying merchant vessels by type and characteristics. Each identification process is explained clearly and in detail. Numerous line drawings are employed to silhouette the specific type or characteristics under discussion. The bulletin contains a glossary of terms, self-testing exercises, and a suggested outline for teaching the identification of merchant vessels.

Vol. 1 No. 9 *Identification and Uses of Enemy Small Craft* (Restricted). This bulletin is the result of a search for the most recent information on enemy small craft. M.T.B's; German stormboats, tank-landing craft, and inflated boats; and the five types of Japanese landing boats are among the craft discussed. Coast Artillerymen should be acquainted with its contents. Halftones and line drawings contribute to the value of the bulletin.

Vol. 1 No. 10 *The Use of Film Strips.* This bulletin covers selection, ordering, and showing of film strips. Particular emphasis is put on preparation for the film strip showing. A section on the proper use and care of the film strip projector is included.

Vol. 1 No. 11 *Lubrication of Coast Artillery Matériel.* This bibliography on the important subject of lubrication assembles in compact form the most complete list of references available. Additions or corrections will be appreciated by the School.

Vol. 1 No. 12 *Courses for Enlisted Men at The Coast Artillery School.* Prepared in response to inquiries concerning courses for enlisted men available at The Coast Artillery School, this bulletin discusses entrance requirements, application procedure, courses offered, used, and general rules and regulations. The School trusts that officers will be aided in their guidance of enlisted men through the possession of this bulletin.

Vol. 1 No. 13 *Armor Attack and Fire Effect.* Following a discussion of armor-piercing projectiles, armor, armor attack, and zone of immunity, this bulletin continues with a consideration of fire effect values and concludes with a study of damage tables.

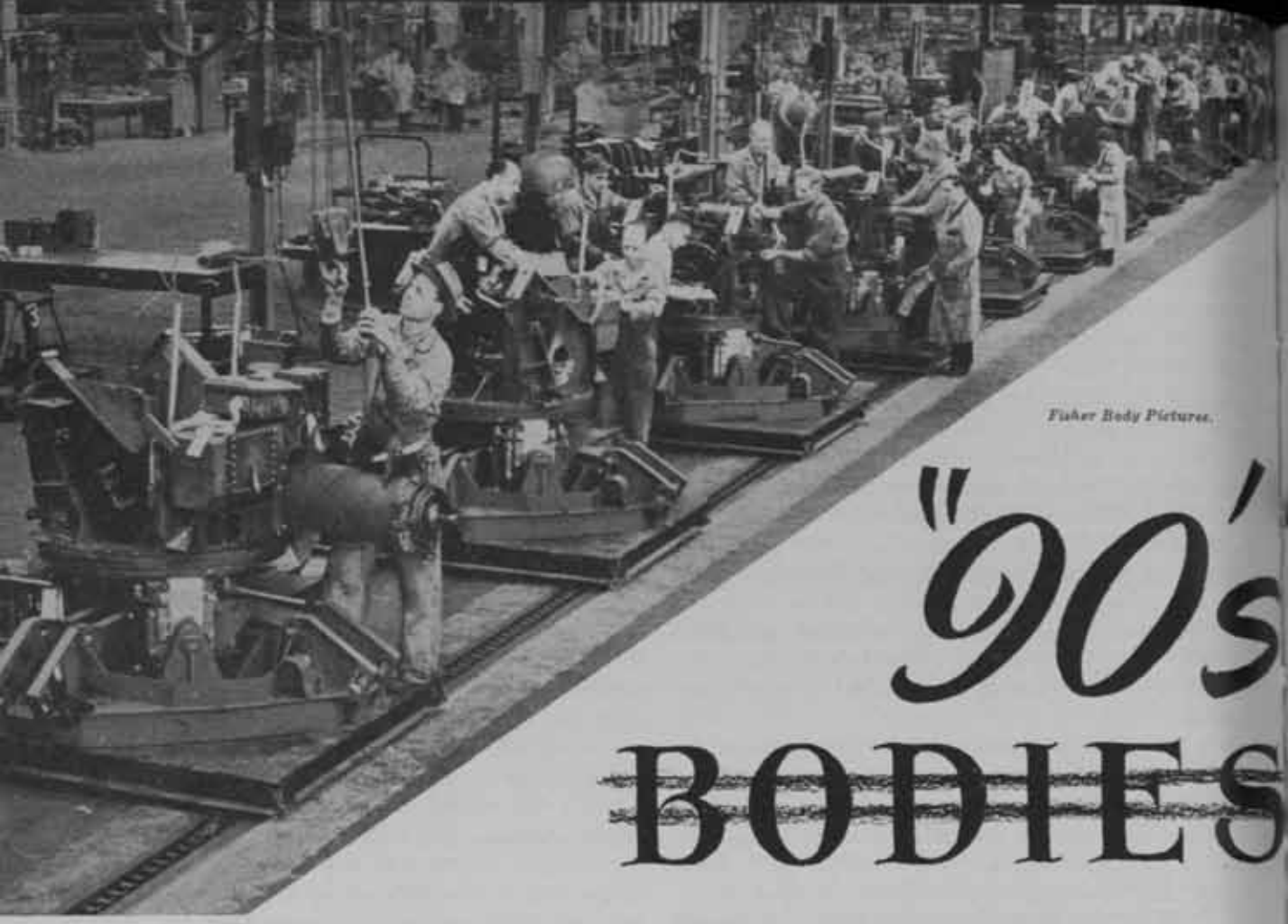
Vol. 1 No. 14 *Audio Reception System, M1* (Confidential and distributed to mine installations only). Herein is examined a warning device for detecting vessels approaching a certain area.

Vol. 1 No. 15 *Gun Data Computer, M1* (Restricted). A general discussion of the new *mechanical* computer which computes firing data for a two-gun battery. The contents include: historical background, physical characteristics, description, training of personnel, stand-by equipment, operation, electrical data transmission systems, auxiliary matériel, and time interval system.

Vol. 1 No. 16 *General Information.* Summary of Volume 1 and other pertinent data.

TO BE RELEASED SHORTLY

Theory and Use of Logarithms.
Introduction to Trigonometry.
Logarithmic and Function Tables.
Identification of Aircraft.
Antiaircraft Defense of Minor Craft.
90mm Fixed Mount.
Pointing 155mm Guns with F.A. Sights.
Four pamphlets on use of radio in position finding.

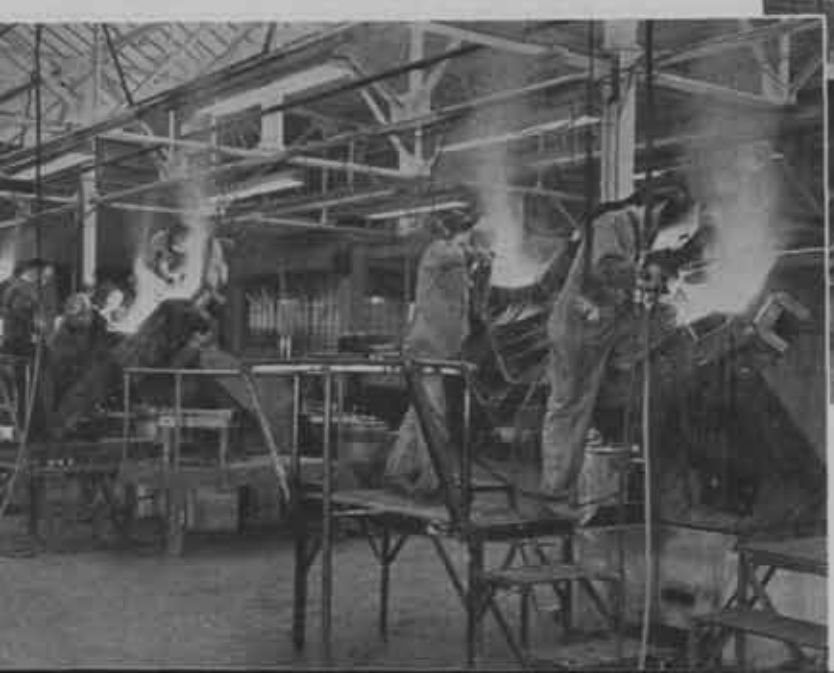


Fisher Body Pictures.

"90's BODIES

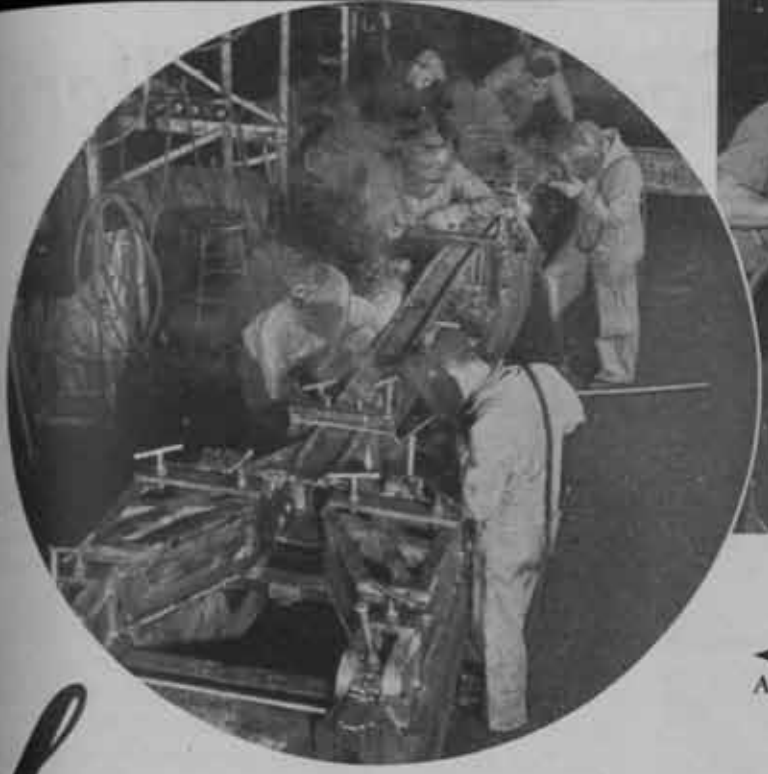
↑ Part of the 25,000 lineal inches of welding that goes into each "90." These are pedestals under construction.

"The Nazis and Fascists have asked for it--and they are going to get it."
Franklin D. Roosevelt



↑ No standing on their heads for these welders, working on trails. The fixture moves the trail to the proper position for the welding at hand.

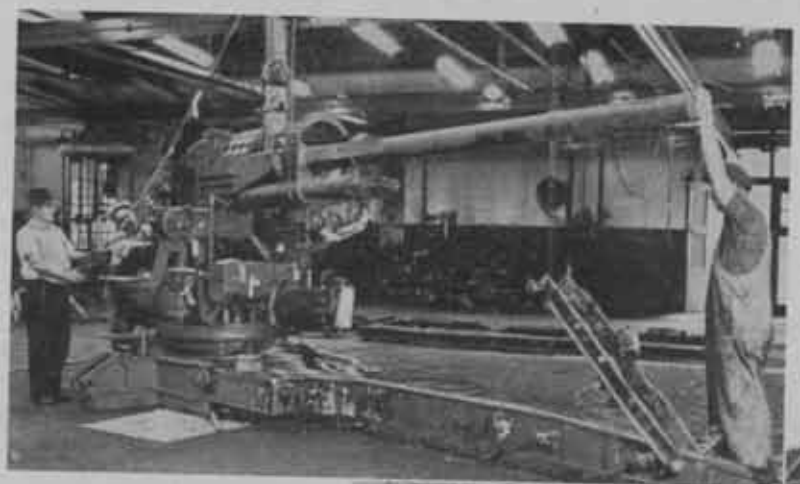
← Normally your 1943 car would be on this moving conveyor line, but right now we would rather have these mounts for 90mm. AA guns.



Super-accuracy is necessary on the jacks. From the appearance of these capable workmen, the guns will level.

Another view of the trail-welding job. Solid-looking trail?

by FISHER



With the barrel lowered to the pedestal, it begins to look like flowers for Axis fliers.

Bogies + guns = M
Order! Yes, they are
ing to get it.

"Axis papers please copy."

Casemating Seacoast Artillery*

By Lieutenant Colonel Luis Sanchez Tembleque, Spanish Army

The military art develops slowly during peace, but its evolution is revolutionary during war. Intervention en masse by aerial arms has begun a new revolution which is now in progress.

In the traditional battle between gun and armored plate, the latter's advance has been by leaps, discontinuous, in contrast with that of offensive arms, which seem to be the only kind which are interesting in time of peace. This is because offense is action, and defense seems to be inaction, although it ought to be reaction—that is, double action.

In the battle between movement and suspension, coastal fortification achieved such a supremacy over the Fleet, insofar as combat between the two is concerned, that it remained asleep on its laurels until it was brusquely awakened in late years. The humming of airplanes at the present time compels harbor defense artillery to get up and follow their progressive march.

Emplacements concealed only from the sea, or elevated so that naval guns could not register hits, with auxiliary constructions in the open, as visible ways of communication, can no longer exist. They are easy marks for the air force, which in a few minutes is capable of reducing the costliest installations since they are fixed to the ground and may not even defend themselves, like ships, by zigzagging in their course.

Today, all the auxiliary elements—the power and light systems, the munition dumps, the garrison shelters, neighboring roads — are camouflaged, and perhaps armored. But the characteristic inertia of the fixed fortification still includes the batteries of barbette guns, and presents them on a platter to the fire of enemy planes.

The mobility of maneuverable coastal batteries of large caliber (by railroad, naturally, in view of their weight) is a prime factor in their defense; but this is not enough; other existing means of defense must be added.

On a smooth coast like that of northern Europe from Belgium to Danzig, the railroad is relatively easy to locate and locations for services essential to the battery, including range-finding bases, are easy to discover; but on rough and steep coasts, like the greater part of the Spanish coast, there is no facility for spreading out railways because its grades are too heavy and its curves are too sharp for the rapid transport of railway artillery. Frequent tunnels may be used as natural casemates (if their orientation is good) but the many bridges present a multitude of weak points, vulnerable to fire from the sea, from the air, and even to small landing parties.

For that reason, on the Iberian coasts, and especially in Spain, where the construction of a railroad is, usually, a matter of years, it is not easy to think of coast artillery transported on rails.

It is certain that the best defense is attack, and for an active defense, aviation itself is necessary; but the domination of the air cannot be continuous. Antiaircraft batteries remain as the defense against planes, but in spite of their great volume of fire, their critical area may be run through and the land goal beyond reached and bombed. Camouflage is a good passive means of defense; but camouflage of barbette batteries is extremely difficult. Consequently, separation of the guns, reduction of the size of the works, and protection or cover are indispensable for passive elements of a seacoast battery.

It is also necessary to find protection for the active elements, such as observing stations, range-finding stations, and the gun emplacements themselves. There are three solutions: the cave, the casemate, and the rotating metallic cupola. We might add another, the reinforced concrete cupola, but the great energy necessary to move it, however well-balanced it may be, will make its use almost impossible. It would be a substitute for the metallic type in countries poor in steel.

This reason, the lack of a steel industry, is what prevents Spain from using revolving metallic casemates, which are but slightly vulnerable because of their minimum surface and their intrinsic resistance, as ironclad turrets anchored in the land along the coast. Their advantages are undeniable: a firing sector of 360 degrees; rapidity of maneuver; safety of the gun crew; services completely buried, protected, camouflaged; broad as well as accurate horizontal range-finding bases, which ships cannot discover; an unobstructed and known field of fire; protected against the sea and against the air. They can even be camouflaged in part with vegetation around and above, which does not blind them, but on the other hand, does conceal them from the plane and ship.

It is the best solution, for primary as well as secondary artillery, and perhaps it may also be possible to apply it to antiaircraft artillery.

Artillery placed in defense against landing parties, sited to flank the beaches of bays and ports, finds its best installation in caves. Their field of fire, in general, is parallel with the general direction of the coast and it is often possible to defilade them lengthwise by the buttresses of the capes or promontories which narrow the beach to be defended. In such positions they may be protected from planes by overhead natural ground in whatever thickness is desired —fourteen, fifteen, twenty meters. In such cases caves are practically invulnerable; for their capture will necessitate landing parties assaulting them from their rear as well as from their front in

*From *Ejercito*, Spain.

conjunction with attacks from the air. If their flanks are naturally protected and their immediate vicinity well protected by wire entanglements and automatic weapons, they should remain strong islands of resistance, constituting an impregnable barrier for a long time to the beach or port defended.

Batteries with metallic cupolas should be so emplaced as to provide the core to such unit area defenses.

But if we do not have metallic cupolas, nor can find caves with their mouths toward the sea, what will become of our primary and secondary artillery? Air attack can put it out of combat in a short time, and in the absence of supporting fires ships could then approach and complete the destruction of open defensive batteries even though landings were not attempted.

Therefore, we must protect the primary and secondary batteries, even though we have no cupolas. Even if they are placed on barbette mounts, we can scatter them so that the guns will not be placed in a line, near to one another in exact formation as if set up in a showcase to be shattered by the guns of planes and ships. The least that can be done is to separate them with traverses, and better still, with traverses of firm earth. Scatter the guns; it matters little that they are not at the same position. When they are scattered, the target area of each one grows smaller, while the whole area to be covered by enemy guns (to include all the separate emplacements) grows larger; a disadvantage for the attack which necessitates the use of many more projectiles.

We should also give them the protection of camouflage. Many people believe that those coastal batteries, which have been fixed for many years in the same place are known; their coördinates perfectly fixed, and that the opening of enemy fire can be made directly with fire for effect. But the coördinates are not marked on the ground. Further, it is always necessary to observe in order to correct the fire, for ballistic and meteorological conditions change by the minute.

So, if the target cannot be seen because it is adequately camouflaged, we shall still not know if we have hit it or not. If only we could succeed in making a coastal battery invisible, even though its emplacement were perfectly marked on the most detailed of enemy maps!

Natural camouflage, the forest for example, is ideal. And if the natural terrain were a cave? Much better; but if the natural cave does not exist, we make an artificial one. We thus come to the casemate.

One objection brought against the casemate is relative to its raised surfaces. What does that matter? In a wild coast, where the buttresses of the mountains overlook the sea, the artificial hill formed by the casemate, smoothly blended into the terrain, becomes just another irregularity in that terrain; that is the art of concealment. Naturally much work is required, but a coastal battery is almost everlasting although its armament must someday be renewed.

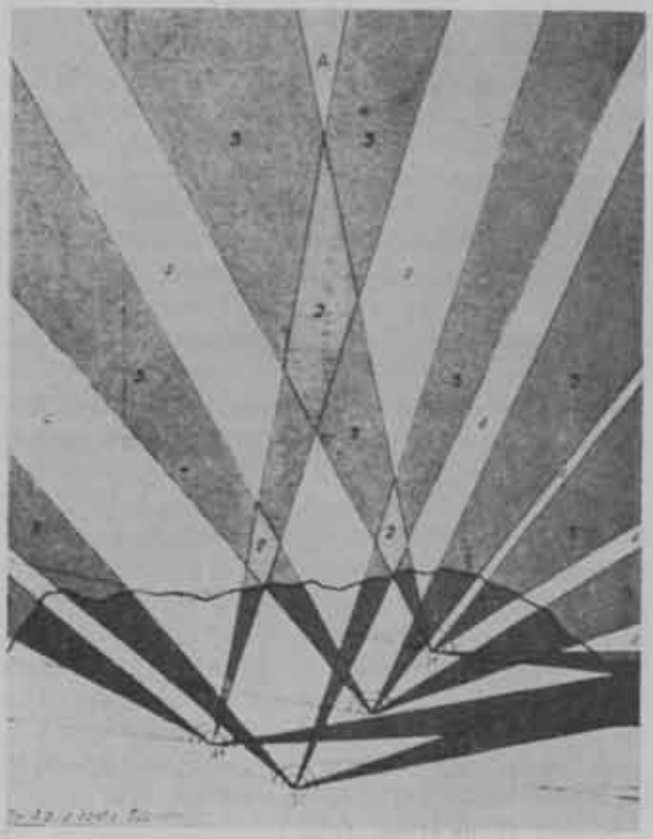


Figure 1

Another objection: How will you keep it covered? With large projections it is admittedly not practicable; first, because you would no longer have 360 degrees in the sector of fire. But in 90 out of 100 cases is not the desired sector of fire a great deal less than 360 degrees?

Should coastal batteries be so emplaced as to be able to fire towards the land front as well as the sea front? We should find ourselves in a bad position if we had to use them this way. Cupolas permit it, of course, but the cupola is the queen of armors, and above all, if there are no cupolas, do we cease to fortify? A projection of much surface and much weight (a concrete screen) must be deeply imbedded, and if direct hits are made (with accompanying penetration and explosion) will it not separate and fall over the gun, crushing it? It is very probable. But if we give the cover more supporting points, its resistance will increase; the supports would form a block with the cover and platform and the embrasures would be like holes carved in a single resistant mass. Thus we have the solution for us.

Those who oppose the casemating of batteries will probably state four other disadvantages, and they are:

First. The field of fire is no longer of 360 nor of 180 degrees: it diminishes rapidly because the equation which links power with resistance is such, that if one increases, the other decreases. We have it in ships: more armor, less speed; more guns, less range of action. But we should have neither the barbette with maximum action, but with minimum capacity of resistance, nor the

passive shelter, with maximum resistance, and no fire power.

If we manage to make three of the four guns of the battery reach all the points within the sector of fire, that seems to be a good solution; it will be said that we lose one-fourth of our effectiveness in offensive action; but, on the other hand, we have assured almost the maximum cover, and with it, camouflage, which combined with the scattering and the diminishment of the target by enlarging the area to be covered by enemy guns, offers the enemy only a small percentage of useful impacts.

Figure 1 represents a hypothetical battery, and in it we see that, except for the small quadrilaterals marked with a 2, in which only two of the four guns can fire, the remainder of the surface of the sea included in the total field of fire is covered by three or four guns of the battery, and yet we have proportioned two or three supports to the cover of each casemate; it is simply a problem of placing the supports which limit the embrasures. Done carelessly, it would make the action of the battery useless, as would be easily proved by tracing at whim the active sectors. The quadrilaterals marked with a 2, given their proper proximity to the coast, will be within the desired field of fire of the primary batteries.

Second. If the chase of the gun projects outside the embrasure, apart from the fact that the value of camouflage is lost, since the tube betrays the emplacement, in the case of a moving target it may become necessary to withdraw the gun and lose the time that it takes to advance it again by another embrasure. That is true. In the cupolas, the chases project outside; the gun does not usually revolve completely around the opening, and yet natural or artificial means of camouflage can be used. With respect to the second part of the objection, there is no disadvantage, for the time lost corresponds to the time which the ship takes to pass through the dead angle, and at that time this gun will not fire. There is something else that can be done so that the gun with its supports need not move backward nor even the chase recede, and the aim thereby be lost. The casemate can be made in such a manner that it also covers the chase. To be sure this will increase the surface of cover; but, on the other hand, for the same sectors of fire the supporting pillars can be thicker on their internal surface and consequently offer greater resistance. (Fig. 2, a and b.)

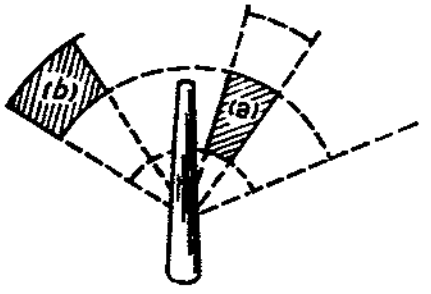


Figure 2

However, we run the danger of firing into the support. If the operation of aiming and firing is electric, a simple automatic interruptor can prevent this last as the muzzle of the gun passes in front of the pillar; if the maneuver is mechanical or by hand, a bolt (which can be drawn at will) will immobilize the gun when it arrives near the sides of the embrasure.

The added expense of covering a larger surface is relatively unimportant since in works as costly as these, a few more tons of steel and cement do not make a great deal of difference in the cost.

Three. The angles of elevation for fire are sufficiently large to necessitate the pillars being quite high; their strength diminishes with their height and the shock of discharges tends to shatter the roof. We then have to construct the pillars strong enough to withstand all

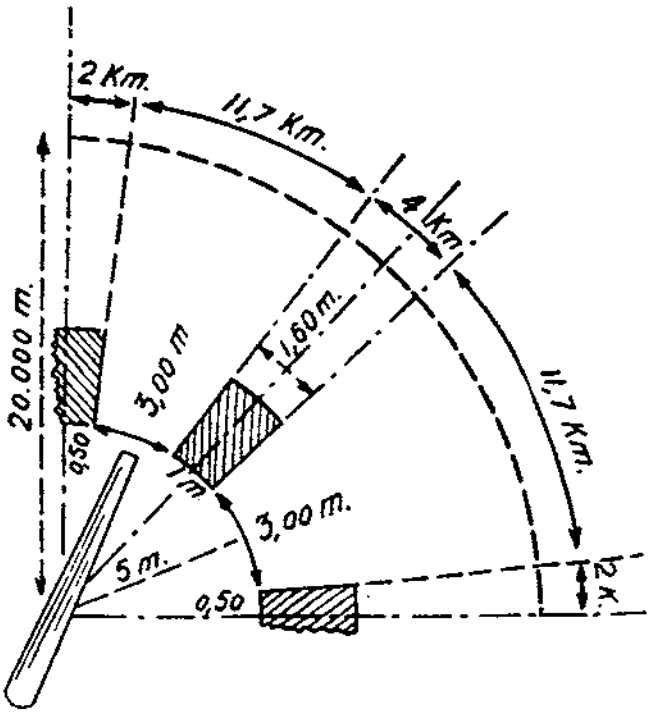


Figure 3

shock. In Figure 3 we see that the width of the pillar should have a minimum dimension of one meter for very wide embrasures. This reduces the sector of firing very little since at twenty kilometers distance there are only eight kilometers of the front of 31.5 kilometers of the quadrant out of the field of fire. In figure 4 we can see that the height of the embrasure is some four meters; consequently, the relation of the height to the minimum transverse dimension is 4 to 1; lateral movement of the pillars is not to be feared, since proper reinforcement makes them a unit with both foundation and overhead cover. But, if necessary the pillars can be made still wider, in fact almost double. We could reduce the available field of fire eight more kilometers, a total of sixteen would then be excluded from our field, leaving sixteen kilometers at a range of thirty kilometers still within our field of fire. This extreme proportion of two

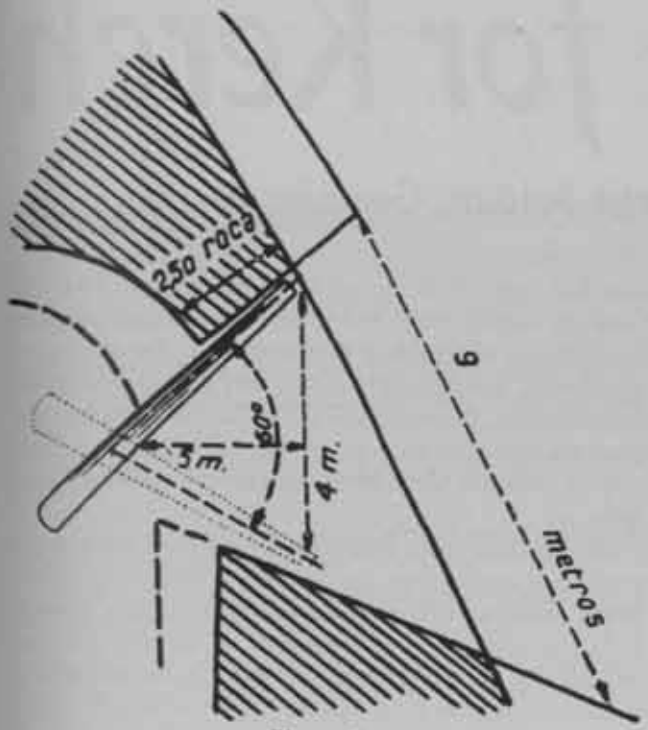


Figure 4

to one between the height and the lesser transversal dimension is not impractical.

Four. The resulting embrasures with such large openings would be camouflaged with difficulty, and hence would betray the position of the battery.

Let us examine this further. With the barbette gun the embrasure is all the space which surrounds it horizontally and vertically. For the whole construction the best cover is a natural camouflage—growing trees or shrubs. However, spreadnets with artificial foliage is possible. The embrasures themselves can be camouflaged with interior or exterior canvas.

Furthermore they are not really very large; even if we use a maximum of thirty-five degrees elevation and fifteen degrees depression and guns of five meters chase from the axis of the trunnions, and considering the exterior height of the window as four meters, a tree situated somewhat below would cover it with its top.

A projectile could enter through such embrasures from the sea, but hardly from the air. The chance of a direct hit from the sea is negligible. It must be considered that the natural dispersion of a shot at twelve or fifteen kilometers, as a minimum distance, is much greater than five meters in one dimension and three in the other.

We see, then, the possibility of casemating primary and secondary batteries; a problem which, at first view seems insolvable without revolving metallic cupolas.

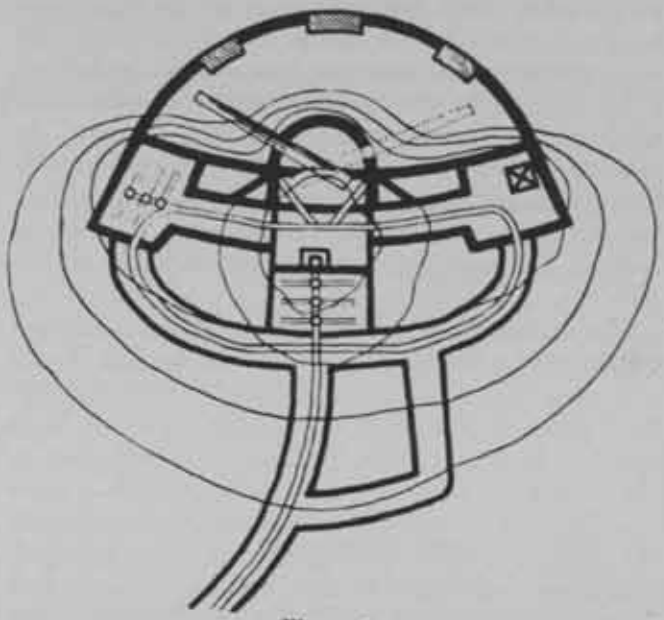


Figure 5

Figure 5 indicates, in sketch, the plan of an esplanade (platform) (half-covered because it deals with a projection and because we represent only half of it) and its connections with the gun stores and shelters for the gun crew.

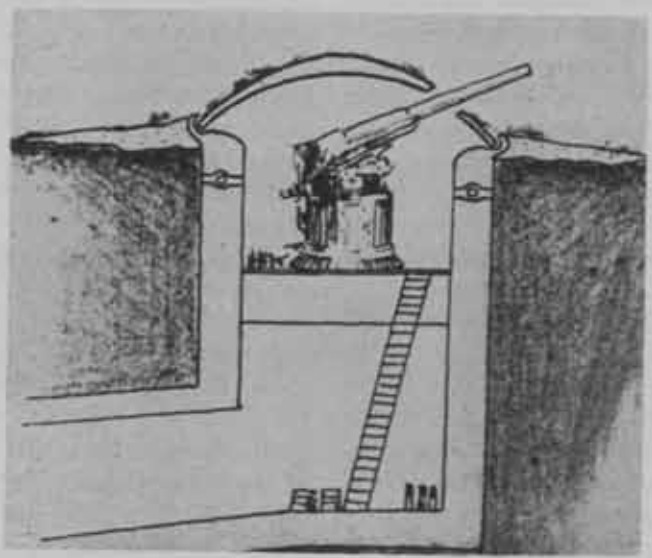


Figure 6

The Battle for Kerch*

By Lieutenant Colonel George Soldan, German Army

I. The Background of the Battle

In the Crimea, May, 1942.

The distinctive Crimean Peninsula, washed by the Black Sea and the Sea of Azov, with its thin and in part broken land bridges seems to maintain connection on one side with Europe and on the other with Asia, almost as if it was torn between the continents. It has come again into the foreground of attention as a result of the just concluded German offensive. Its position between two continents, in conjunction with the peculiar advantages and beauties with which nature has obviously and impressively endowed it in many respects, has been the cause of a remarkably restless past.

The history of the last century alone, inscribed with certain clarity between the castles of the last Tartar princes in Bakhtshissarai and those of the last Czars of the House of Romanoff in the land that has been snatched back and forth, bequeathed a heavy fate to the population. However, if one today watches women and girls—the men have for the most part been taken by the Red Soldateska—loading five or more hundredweight on their miserable carts, built for the most part of improvised materials, and pulling and pushing them through the passes that lead in endless windings from the southern coast at Alushta to Simferopol, then it immediately becomes evident that, as always in human life, necessity and struggle have inspired a robust sex.

"Victory in the Crimea is the key to general victory over the enemy"—these are the words of a captured order of the Russians. "If the Germans succeed in taking Kerch, they might succeed in taking Timoshenko's rear," said the English. On the other hand, a glance at the map shows that a Crimea in the hands of the Russians could entail a risk to the southern flank of the German army fighting on the eastern front. The subject is obviously studded with many "ifs" and "buts." But in the final analysis it is their recognition, their foreseeing, exclusion or utilization regardless, that is the basis of a great part of all military science.

About December 20, 1941 the Russians were still occupying the western tip of the peninsula around Sevastopol. With small forces—as compared with the combat power of the Russians and the breadth of the area—the army of Lieut. General von Manstein had driven the enemy from the mainland. This was regarded as an especially great achievement since a strong Russian fleet controlled the sea in that region, and for the German supply route only the narrow land bridge in the vicinity of Perekop was available, the forcing of which had finally opened the way into the Crimea. Nevertheless, the weather had given the Russians time to consolidate themselves in the old historic fortress and to organize themselves quickly by utilizing their fleet.

At the same time, however, it was clear what a preponderant significance the loss of the peninsula had for them. Efforts to reconquer it began almost immediately. It was, however, possible to tighten the ring around the fortress constantly. Among the accomplishments achieved in hard fighting and within a few days, the conquering of the various forts on the left and the forcing of the Kacha crossing on the right wing between the 21st and 23d of December are outstanding. Both sides persisted in the attack in these last days of the past year.

It was possible for the Russians to make use of their control of the Black Sea and again to make landings by surprise at any point. Like everywhere on the eastern front, calculations must also be made here on a great scale. On the coastal front of almost 1000 km in length there was no suitable place where forces could be landed in the rear of our troops. From December 25 on, such landing attempts, especially on the long neck which stretches out to the Kerch Peninsula, were attempted, without any effect on the German attack against Sevastopol.

It was already believed that the throwing back of the Russians who had landed up to that time had considerably cleared up the situation, when on December 29, during an overcast day that excluded the use of aviation, an enemy fleet consisting of several cruisers and torpedo boats slipped into the harbor of Feodosiya. Troop debarkation followed in enormous numbers. Simultaneously, landings were made at other places. An undoubtedly serious situation developed, for Feodosiya not only controlled access to the Kerch Peninsula, but had to be viewed as an important position for the control of the entire Crimea.

It was not difficult to realize that the Russians now were planning not only a relief of Sevastopol, but that they had set for themselves no smaller an objective—captured orders show this clearly—than the recapturing of the entire Crimea and beyond that, in conjunction with their now fully developed attacks on the entire eastern front, to drive ahead against the rear of the Germans in order to cripple their supply lines and thus to

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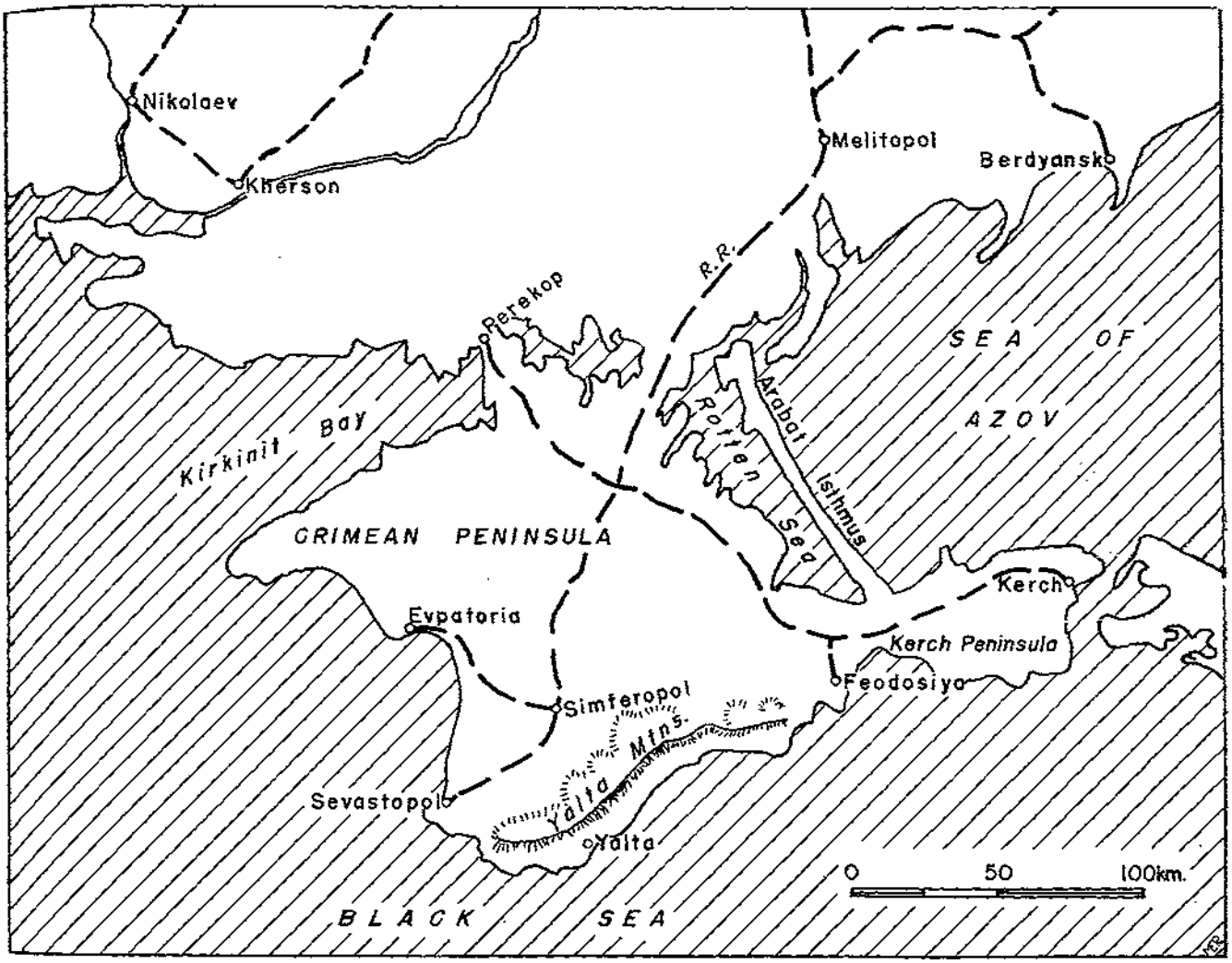
*"Die Schlacht um Kertsch" from *Volkischer Beobachter*, June 2, 3, 4, 1942.



Map 1

serve the combined objects of the Russian winter offensive in the most effective way.

The shrewd calculation did not materialize in either place. It did not once get beyond the original bridgehead problem, although here on the Crimea all advantages were on the Russian side. Their position was even more favorable since the Strait of Kerch was frozen and could now also be used as a direct land connection. The ratio shifted further in favor of the enemy when he threw fresh troops into the battle. The army of Lieut. General von Manstein had, on the other hand, withstood uninterrupted attacks since the beginning of the campaign, and the missions accomplished by it had far exceeded the scope of normal performance.

While the situation that developed as a result of the enemy landings was stabilized by the energetic efforts of all subordinate leaders, Lieut. General von Manstein understood clearly that only a powerful counterblow could create a stabilized condition in which to pass the winter. It was obvious that this blow must be against Feodosiya. Preparations were finished in fourteen days. On January 15 the three days' battle for the city started. It ended wtih a decisive German victory. More than 10,600 prisoners, at least 6,000 dead, 180 guns, 85 tanks and quantities of other matériel were lost by the Russians. They took shelter in a position prepared in advance in the vicinity of Akmanai and Parpach. This position lies where the sea loops around the Kerch Peninsula somewhat from both sides. It is this position primarily which was now stormed by German troops.

But this was still not the entire picture. In the Crimea cold and warm periods alternate in winter, often without stabilization of the weather. Thaw and rain overnight often create bottomless mud on the roads in the Kerch Peninsula. For the continuance of the German offensive it was necessary here as everywhere on the eastern front to await the dry season. For the Russians, however, the compulsory situation had now provided the opportunity of aiming a crushing blow, which in the spring, would be much more difficult to achieve. This is a clue explaining to some extent the stubborn efforts of the Russians to defeat the German Army in the winter.

Thus, they sent very strong forces and large quantities of matériel, by ships and over the ice, both to Kerch

and to Sevastopol. They especially reinforced the aerial arm. This fact was easy to appreciate in the following weeks.

On February 26 they began their offensive. With the exception of a very few days, it continued uninterruptedly until April 12. Sometimes they made simultaneous attacks on both fronts, sometimes on one day against the Kerch front and on the following day at Sevastopol. Impressive large-scale attacks alternated with partial thrusts. Many tanks were always brought into action. If it is realized, for example, that on February 27 at Sevastopol 75 tanks were annihilated, and on April 9 at Kerch 72 tanks were annihilated and 29 immobilized, a small estimate of the situation can be made. Bitter hand-to-hand fighting frequently developed. A single division had to repulse 35 attacks in 4 days in front of Sevastopol. Another in the same place and during the same time repulsed 38 attacks. Our troops underwent a regular drum fire, in which on individual sectors frequently more than 10,000 artillery shells hailed down. Massed attacks were organized in 3 and 4 waves. The enemy air service covered the land battle in thundering coöperation. When daytime attacks did not lead to the objective, a transition was made to night attacks. The Russians threw every man and gun they had into the action, and this density in combat developed at Kerch on a front of scarcely 30 km and at Sevastopol on a front of scarcely 50 km in width. This meant a tremendous concentration of forces and fire on comparatively narrow fronts.

The Russian effort finally subsided and starting on April 13 they began to dismantle their emplacements.

But it was also known that a difficult struggle still remained. To force a position 25 km wide occupied by an enemy of great experience, obvious skill and deeply echeloned in depth, defended with the strongest forces and having the most modern combat media, supported left and right by the sea—this is conceivably the most difficult task which an attacker could set for himself. Its solution was calculated as the first offensive thrust of this year.

II. The Course of the Battle

Today it can be stated that, measured on the basis of the number of prisoners and the matériel destroyed, the magnitude of the success of the battle on the Kerch Peninsula far exceeds—by nearly one-third—the extreme that had been expected and hoped for by the staffs in whose hands the conduct of the battle lay. One should once more realize that the entire peninsula from the enemy position to the Strait of Kerch has an average length of scarcely 80 km, with an average width of only 40 km. If on this narrow space, washed on all sides by seas, the accumulation of troops and matériel, which the concluding report of the army high command has now revealed, took place, an accumulation which far exceeds any normal measure, then the observation on the significance of the Kerch Peninsula made in the first part of this article is clearly strengthened and, beyond that, the significance of the entire Crimea.

In the first World War, an attack against such a position would have been regarded as practically without prospect of success. Only after long and extremely heavy artillery action, which had moved forward constantly in systematic stages, would a forcing of the peninsula have been attempted. By that time, the matter would have been a purely frontal preparation, a purely tactical conduct of battle within the scope of the possibilities. Today the German Army has been able, in spite of the narrowing due to the sea, in spite of enemy support on both sides, in spite of confinement to the narrowest sort of operating space, to carry the battle through as a strategic operation in the clearest sense of the word.

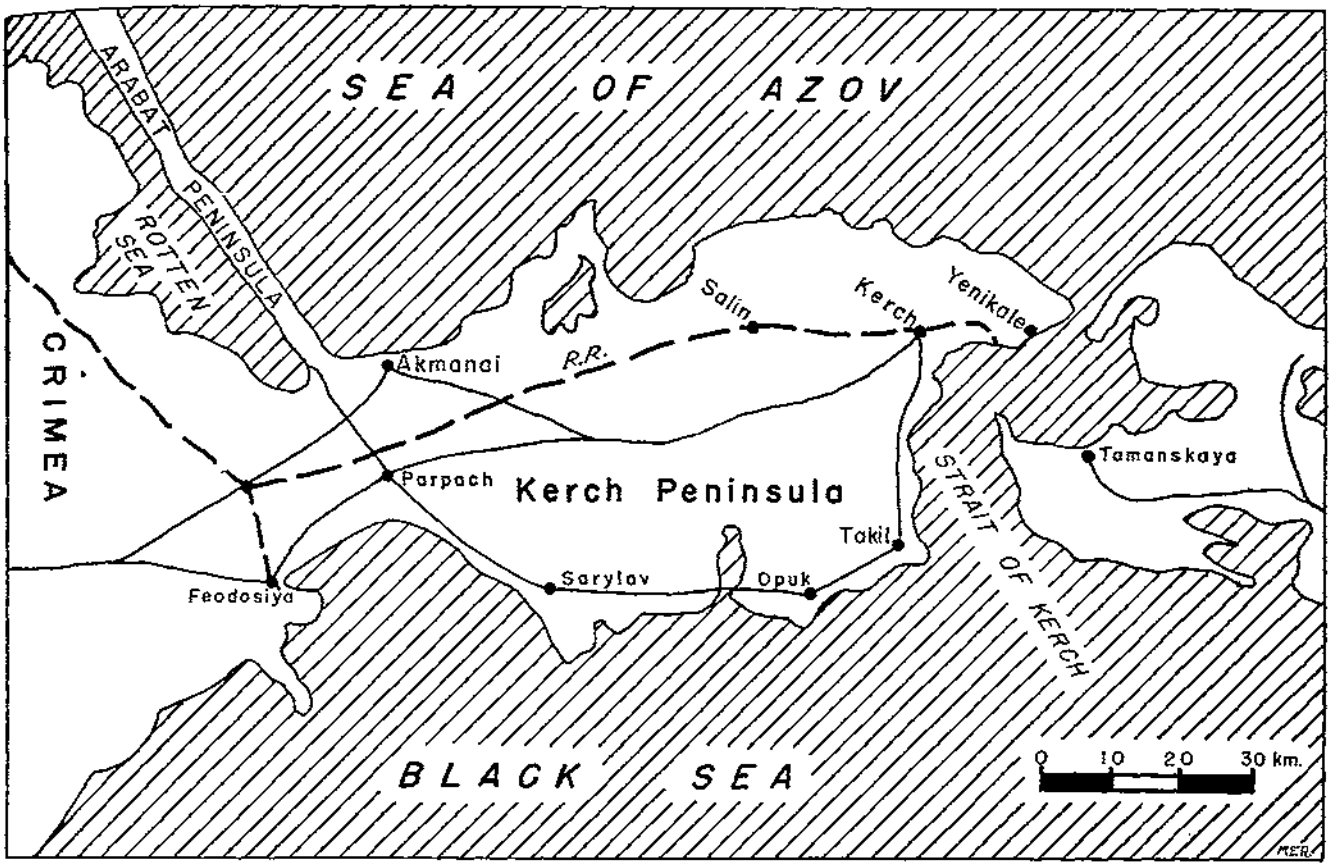
A captured Russian officer from the staff of one of the divisions immediately struck by the principal German thrust on May 8 reported how on the 7th, therefore on the day before the German attack, a loud sound of battle had rung out from the northern sector. He inquired of the neighboring division, "What's happening there?" No one knew definitely. "It's something in the neighboring army up on the Sea of Azov."

It was really a preview of the German offensive, a premature appearance of an attack, for the purpose of diverting the enemy right wing on the Black Sea from our own attack front. How remarkably this succeeded is documented by the command issued on the evening of the 7th by the division of the captured officer, ordering the troops to prepare for a German attack on the 10th! Thus, this captured officer and his division were thoroughly surprised on the 8th.

The German surprise was completely successful. In illustrative reports it has already been described how in the midst of the fighting there appeared that remarkably improved tank trap which the Russians had projected across the land as the major obstacle between both seas. Numerous field emplacements, wire entanglements and mine fields, to an extent not heretofore experienced, had to be fought through stubbornly. Bunkers of concrete and steel had to be captured: Heavy interdiction fire from strong enemy artillery repeatedly forced us to take cover until Stukas silenced them. Vast numbers of grenade throwers, machine guns, antitank guns and tanks had to be overcome.

The rays of the setting sun finally bathed the land in a peculiar red glow. Again and again fliers roared across the cloudless sky, often in strong formations toward the front, from which the noise of battle came hollowly. Heavy detonations still made the houses shake, here at the rear. Everyone believed that this 8th day of May, 1942 was a date to go down as a memorable date in the history of the campaign in the East.

There were still some worries: would the Russian divisions that had not been attacked stay in their emplacements until the German encirclement moving up



Map 2

from the south could block their withdrawal to the east? The success of the encirclement by which at least 8 and possibly even more enemy divisions with all their matériel might be cut off at one stroke, would secure the final accomplishment more rapidly and with less bloodshed.

In the course of the 9th, confidence increased. Heavy motorized forces with many tanks hurried through the breach that had been broken, out across the tank traps that had been filled in again by prisoners, and into positions of readiness for the advance to the northeast. A motorized combination unit of all arms, thrown out immediately in the direction of Kerch, quickly gained forward terrain.

On the evening of the 9th strong German forces stood, faced to the north and northeast with advancing motorized units on their right wing already in attack. It was then certain that the encirclement could be completed on the 10th. Other German forces, now joined also by Rumanians, were operating on the right wing, following the beaten Russians rapidly to the east. The German left wing, here also in collaboration with Rumanians, stood ready to seal the inclosure from the west.

Then it began to rain! We knew that it meant the very prompt slackening of all movement, and finally, if it persisted in this way, the complete stoppage of motorized vehicles of all sorts, on which mobility in this stage of the battle was primarily dependent. Anyone who does not know the soil of the peninsula, over which only a single solid road runs, cannot understand this condition in the least.

We had the feeling of walking through soft soap. The earth clung to our feet like a heavy load. Puddles soon broadened into little ponds.

It was the crisis of the battle. At noon on the 12th, heavy clouds were still hanging in the sky. Was the rain, which had let up only in the morning hours, going to start again? Supply columns stood in endless rows on the road.

Where the solid road left off, the caterpillar vehicles rolled on through pulpy mud. Everywhere automobiles were stalled. On all uniforms was a thick yellow layer of earth. The rate of advance had undoubtedly been slackened, large parts of the motorized troops were stuck fast, but things still went forward. And then suddenly the layer of clouds parted. Over the Black Sea was a piece of blue sky, rapidly growing larger. A short time later the rays of the sun forced their way down to earth.

III. Conclusion

On the afternoon of the 11th it was conclusively determined that large forces of the Russians were surrounded in the area between Parpach and the northern coast. Desperate breakout attempts to the east and northeast by those surrounded were repulsed. The narrowing of the inclosure by pressure toward the east made rapid progress. Relief thrusts by the enemy from the outside were unsuccessful. Portions of the enemy

did in fact succeed in getting away toward the east along the railroad and on the upper coastal road. In war, it is well known that the pursued is always swifter than the pursuer. In his great necessity he copes more readily with all hindrances which softened ground and dark night involve. But only small units had succeeded in slipping through the last gap still open. Their troop and supply columns, crowded on the few roads, were heavily attacked by German fliers.

The pursuit along the south of the inclosure which had already begun was soon overtaking the enemy. A heated battle soon raged over the contraction of the ring. East of the inclosure another advance detachment was already pushing forward. The first one, which has already been mentioned, was approaching Kerch and was soon to attract the attention of strong Russian units. Up to the 11th it had captured 3,000 prisoners and knocked out 58 aeroplanes. On the evening of the 12th German troops had marched and fought more than 50 km eastward from their starting positions. When the army communique of the 13th reported that the break-through battle on the isthmus of Kerch had been decided, the problem in the inclosure was now merely one of mopping-up. This was 5 days after the beginning of the offensive. Without the rain intermission, the break-through battle should only have lasted 3 days.

The day of rain also exerted a hampering influence on the tempo of subsequent accomplishments. The land dried only slowly, and in some places difficult soil conditions persisted to the end. The attempt of the enemy on the 13th to create a new continuous line of resistance in the "Tartar position"—a rampart against which the Tartars had once thrown back a Russian invasion—and on the 14th on the heights around Kerch, were blocked by our swiftly attacking penetrating troops. However, a different situation developed in the hard battles for the dominating high points, where the resistance of the Russians was increasing daily.

The breach through the inner defense belt of Kerch had to be forced against a desperate enemy, defending himself with numerous tanks. Only on the morning of the 15th was it possible to break the resistance, extremely bitter in spots, and to occupy the city and harbor. During this battle before Kerch, another battle had developed 20 km northwest of the city in the area around Salin. The Russians fighting here were repulsed by skillful operations against their extended rear lines to the embarkation harbors to the east.

The only harbor still offering them escape was Yenikale, 5 km east of Kerch. Here and along the coast in the vicinity of Mayak Baksy as far as Cape Khroni at the northern entrance to the Strait of Kerch, there were several forts and fortified installations remaining from some earlier time. In general, this terrain, which now became the theater of the final stage of the encirclement of Kerch, was well suited to defense. The objective of the enemy was to cover the embarkation at Yenikale from these strong positions.

On the 15th this strongly garrisoned line of resistance was broken through in a battle of several hours. The total number of prisoners taken up to that point and that date was fixed at 93,000. In the Russian units, crowded into the narrowest sort of space, the bombs of the German air service struck with terrible effect, and at the same time ships and vessels of all sorts in the harbor or already underway were attacked. Nevertheless, resistance was still being given on the 16th. Under the leadership of many officers and commissars, desperate counterattacks were made everywhere. It became constantly clearer that such massed attacks could be possible only if the numbers of the enemy encircled were considerably greater than had been previously assumed. Finally our troops witnessed a performance in which the enemy entered into the attack in several lines, the foremost one storming forward with the men arm in arm. It was a frightful road of death. Repeatedly, attempts to land at the rear of German troops also had to be beaten off. Indicative of the stubbornness of the resistance is the fact that at one place in the extremely narrow region, 1,100 prisoners were taken and nearly as many dead were counted. It was literally necessary to contest each meter of soil. Only when, after heavy artillery had been brought in against a system of forts and after the numerous bunkers built into the rock walls had been systematically overcome by the use of flamethrowers, could it be said that the Russian resistance had been finally broken.

The full significance of the battle can only be completely evaluated later. How highly the Russians had estimated it is shown by the mass of troops brought into action. The battle was high-lighted by the nature of the Russian resistance, carried to annihilation.

Antiaircraft Artillery

*With the Field Forces**

By Lieutenant Colonel D. S. Ellerthorpe, Coast Artillery Corps

The Coast Artillery Corps has been charged with the development of army antiaircraft artillery since its inception as a component of our armed forces. Tributes to this task of development are the already legendary exploits of our antiaircraft artillerymen and their matériel during the operations of recent months. This is the beginning. Past accomplishment is but a stepping stone to future achievement. Rapid development of aircraft including greater speeds, higher altitudes, increased operating ranges and new methods of operation have imposed tremendous tasks in the effort to effectively combat the air threat with ground weapons.

The proper employment of antiaircraft artillery in any type of operation is predicated on a knowledge and understanding of aerial tactics. Aerial operations consist of reconnaissance and attack. Aerial attacks may be generally classified as follows:

High altitude bombing.
Low altitude bombing.
Dive bombing.
Low flying strafing attacks.

Each sizeable attack is preceded by aerial reconnaissance.

High altitude bombing is generally conducted by massed bomber formations at altitudes in excess of 15,000 feet. In the majority of instances the presence of antiaircraft artillery and fighters in the vicinity of the objective renders precision bombing so costly to the attacker that he releases his bombs without the preliminary straight sighting run necessary for precision. The result is area bombing, where each bomb dropped falls within the boundaries of the objective area and is not effective unless vital point installations are closely grouped. High altitude bombing in the forward part of the combat zone is exceptional as it is only in rare instances that remunerative targets are found here.

Low altitude bombing attacks are usually executed by flights of planes in "V," staggered line or trail formation at altitudes just above the effective range of automatic weapons, that is, from 5,000 to 7,000 feet. Parachute or delayed action bombs are employed in order to minimize the danger to attacking aircraft. Precision bombing is comparatively easy at these altitudes. General Doolittle's Tokyo visit is an example of a cleverly conceived and executed low altitude attack, within range of automatic weapons. The surprise was so complete in this case that his flights operated without effective antiaircraft artillery or fighter opposition. A particular advantage to be gained by low elevation approach is the relative inability of detection devices to pick up targets near the horizon, thus permitting an attacker to gain surprise. Variations of the low altitude attack may include ground strafing following the bombing run. Low altitude bombing attacks may be expected against marching columns, troop concentrations, bridges and other profitable targets in the combat zone.

Our navy originated dive bombing, but it remained for the Germans to develop the technique of this operation to the point of its present effectiveness. This attack is launched by single planes or large formations of planes, each plane directing its flight at some particular surface objective. Such attacks are extremely accurate when unopposed. The usual method of attack generally adheres to the following pattern:

Dive bombardment aircraft move in at high altitude to the vicinity of the objective area, lose altitude to elevations varying from 10,000 to 20,000 feet, then begin their diving run, out of the sun or clouds, if possible, at angles between 50 and 80 degrees from the horizontal. Each pilot dives his ship at a particular point target within the objective area and releases his bombs when at a distance of about 1,000 yards from the target. It is reported that in some instances Japanese pilots held their bombs until within 300 feet of their targets at Pearl Harbor. American pilots pushed home like attacks in the Coral Sea and Midway engagements. Dive bombing is a form of precision attack that may be expected against any vital objective within the combat zone. The Germans have repeatedly employed dive bombing tactics against antiaircraft artillery and field artillery emplacements, stubborn points of resistance in the path of their attacking ground troops, and against marching columns.

Strafing attacks are generally executed at tree top elevations. These attacks combine the fires of machine guns and aircraft cannon firing incendiary bullets and high explosive shells. This operation may be supplemented by delayed action fragmentation bombs against personnel. Our forces were on the receiving end of strafing attacks in Hawaii and the Philippines. Personnel, aircraft on the ground and inflammable ground installations were destroyed with such rapidity and completeness as to conclusively prove the effectiveness

*From Command and General Staff School *Military Review*, with permission of the editors.

of this type of attack. The attack arrives with little or no warning at altitudes from 25 to 100 feet, speeds 200 to 400 miles an hour and is the most difficult form of attack to combat. When warning is lacking, ground weapons are useless during the initial stage of the strafing attack. This attack may be expected at any time and against any target in the combat zone.

The foregoing classification does not include the many variations of attack which have proved highly successful. Combinations of any of the above methods are to be expected. The more unorthodox and varied the method, the greater are the chances of success. Ground forces must be prepared to meet any eventuality of aerial attack.

Obviously, the best defense against all types of attacking aircraft is defensive aircraft operating offensively to intercept hostile planes before they can launch their attacks. Both fight in the same medium where combat is most effective through contact at short range. Friendly fighters will not always be available for the desired interception; consequently the need for protection of vital ground elements must be met by the operation of suitable ground weapons especially designed to limit or deny the effectiveness of aerial attacks. Antiaircraft artillery not only functions in the absence of fighter protection but also augments the defensive efforts of fighter aircraft when present.

It is to be expected that an enemy will be in possession of complete information concerning important peacetime installations. The temporary installations of war are not generally known and must be discovered before they can become the targets for attack. It follows, then, that the first protective measure is to deny or limit the effectiveness of hostile aerial reconnaissance, as this method of gaining information is rapidly becoming more important and comprehensive due to developments in aerial photography.

Effective defense against aerial observation is a task involving both active and passive measures. Full knowledge of the benefits to be gained through the intelligent application of passive defense measures must be possessed by the personnel of all echelons. Commanders must impress passive defense discipline on their units because such discipline is requisite to survival. Active and passive defense measures are closely linked. Operating with restricted amounts of antiaircraft artillery will not permit active protection for all ground elements participating in an operation. Only those elements vital to the scheme of maneuver may be so favored. Less important elements will have to rely solely on passive defense measures, and the failure of any element to properly and diligently employ them may spell defeat for the force as a whole.

Principal passive defense measures consist of camouflage, concealment, dispersion, cover, slit trenches, warning, deception and numerous others. Principal active defense measures comprise antiaircraft artillery, fighter aviation, organic weapons in the hands of troops, and barrage balloons. Barrage balloons constitute the only active means not yet employed in the forward part of the combat zone.

The antiaircraft artillery protection of combat units from hostile aerial reconnaissance and observation is accomplished by the employment of antiaircraft guns (three inches and greater in caliber) supplemented by antiaircraft automatic weapons (less than three inches in caliber). Automatic weapons are required to cover the air space between the ground and the minimum effective range of the guns in order to provide coverage from the ground up. Guns with their heavy mass of metal cannot be traversed, elevated and depressed with enough speed to track aircraft flying near the gun position at high speed and low elevation. Automatic weapons should always supplement guns in order that all altitudes may be adequately covered.

It will not generally be possible to mass antiaircraft guns in such a manner as to provide dense coverage for aerial observation protection of the battle area. While this arrangement is desirable, the limitation of available weapons will seldom permit more than a general coverage with batteries disposed near the center of important localities. Whenever possible the fires of adjacent gun batteries should overlap. This method can scarcely be expected to do more than keep reconnaissance aircraft so far away from the vital areas as to deny accurate information. In siting batteries, alternate positions should be carefully camouflaged and frequently occupied. Dummy positions should be established in such a manner as to draw hostile attack. Numerous combat examples bear evidence to the effectiveness of dummy positions in drawing repeated attacks, while near-by batteries, carefully camouflaged, remained unmolested.

Caution must be exercised in employing antiaircraft fires. For example, let us assume that a unit has been well concealed in bivouac or assembly area through the adoption of passive measures, and that friendly aircraft has checked the effectiveness of the concealment and pronounced it satisfactory. It is apparent that prompt fires, executed by protective antiaircraft artillery in an attempt to drive away or knock down inquiring aircraft, will result in divulging the location of the concealed unit and thus invite further reconnaissance. When it becomes evident that hostile aerial reconnaissance has discovered the troops, fire should be commenced. Active antiaircraft defense measures must be so taken as to maintain secrecy concerning the disposition and scheme of maneuver of the ground forces. Air defense fires which divulge important information must be avoided.

Because of the fluidity of modern combat involving rapid changes in the positions of ground elements, all antiaircraft artillery with the field forces should be highly mobile. This is in marked contrast to the defense of rear areas. In rear area defense frequent changes of position over long distances are exceptional and less mobile antiaircraft artillery is able to fill the need. Therefore, semimobile or static units lacking full com-

plements of transportation are employed in rear areas.

In operations with the field forces in the combat zone, antiaircraft artillery protects troop concentrations, entrucking and detrucking areas, bivouacs, assemblies and routes of march. Because targets suitable to high altitude bombing attacks are rarely present in the forward part of the combat zone, protection against aerial attack is afforded by automatic weapons.

Lack of sufficient antiaircraft artillery will preclude protection for all ground elements. It is therefore advisable to classify the various elements of a force in priority of their importance to the particular operation at hand. Elements requiring priority classification are: front line troops, i.e., troops in contact; reserves which are invariably held for later decisive employment; supporting field artillery; command posts; supply installations. All of these elements should receive protection from aerial attack. The importance of each element to the scheme of maneuver of the entire force will change in accordance with its mission in different operations. Some of the elements possess organic weapons capable of furnishing effective protection and that fact must be considered in planning a defense in order to free antiaircraft artillery for the protection of units lacking organic means. Limitations in the aerial firing capabilities of weapons in the hands of troops often make it necessary to augment their fires with those of antiaircraft artillery. This is true of field artillery, which is always a primary target for unremitting aerial attack.

In offensive situations it is recognized that troops executing the main effort of the attack should receive priority for antiaircraft protection. This is sound practice as it permits advancing troops to concentrate on ground opposition and minimizes delay and disruption which might be occasioned were the troops attacked by unopposed hostile aircraft. Troops in contact, reserves, and field artillery supporting the main effort should receive highest priority in the offense.

In defensive operations it is a primary function of antiaircraft artillery to protect first the organization of the ground, then later the occupation of the battle position. The defender employs a general covering force well in advance of the selected battle position in order to deepen the defense. All defensive covering force action is designed to prevent early hostile development of the battle position in order to gain time for the defender. Lack of adequate air defense against aerial reconnaissance will neutralize a large portion of the effectiveness of covering force action. In the absence of such protection the enemy may obtain early aerial information as to the location and extent of the main battle position, thus enabling him to launch a coördinated attack earlier than if denied information by antiaircraft artillery. Antiaircraft guns and automatic weapons must therefore be sited well forward in order to provide maximum opposition to attempted aerial reconnaissance during the organization of the ground. It is to be expected that the enemy will eventually determine the true location and extent of the battle position, and prepare his forces for a coördinated attack in the event he cannot accomplish his mission by avoiding the position. Guns may then be displaced rearward near the center of areas containing important defense elements and installations in order to better provide protection for the conduct of the defense. This includes protection for reserves, their expected routes forward, and field artillery located in depth within the position. Automatic weapons must be sited well forward within protected localities to defend troops in contact from aerial softening tactics directed at points of stubborn resistance. Reserves constitute the defender's primary means for influencing the conduct of the defense. In consequence it is to be expected that the enemy will concentrate every effort to locate the reserves, and that when found he will hit them with smashing air attacks, either in assembly areas or enroute to counterattack positions, thus neutralizing the effectiveness of that vital element of the defense, the counterattack. This makes it at once apparent that reserves must receive high priority for protection.

The air defense of marching columns presents a difficult problem. Protection is best attained by an umbrella of fighters. However, the probability that fighters will always be available when needed is so remote that the air defense of troop movement in the combat zone definitely requires antiaircraft artillery.

When protecting foot troops on the march antiaircraft units can leap frog along the axis of advance by means of rapid transport. Motor and mechanized columns move with such rapidity that "leap-frogging" is out of the question. The exceptional presence of close-in parallel routes does not completely furnish a solution to the problem due to the rapidity of movement. Motor and mechanized columns must therefore provide a large measure of their own protection through the application of passive defense measures. These measures include night movement, speed of movement, extended distances between vehicles, and multiple columns. However, marches cannot be confined solely to hours of darkness and seldom will road nets permitting desired dispersion be encountered. A wholly protected route of march is the answer, but means to supply protection for entire routes are generally lacking. Defiles such as bridges, mountain passes and causeways along routes of march must therefore receive first priority for antiaircraft artillery protection, as it is here that the movement of columns is restricted and the force is most vulnerable to air attack.

The need for antiaircraft artillery will most often exceed the available means. An applicable method of procedure is to provide protection for elements of highest priority, that is, those elements whose operations are most vital to the successful completion of the assigned mission of the force as a whole. In the offense this will most generally be the force making the main effort. In the defense, reserves and field artillery are first considered. It is poor practice to spread antiaircraft artillery

thin in an attempt to furnish some protection for all elements of a command. The resulting arrangement will not provide adequate protection for any of the elements. Antiaircraft artillery should be concentrated in its employment, not dispersed beyond effectiveness.

The foregoing principles apply most generally to infantry and motorized divisions. In what respect then do principles of antiaircraft artillery employment differ in application to armored force operations? The chief difference lies in the fact that the protection of armored unit supply installations must be emphasized. Until battle experience proves that tanks, which are equipped with light antiaircraft weapons, are so vulnerable to air attack as to require reinforcing antiaircraft artillery, the supply and service echelons of those divisions should receive priority. This does not mean that the protection of defiles along the routes of advance of armored units will be neglected. Such localities must be strongly protected. In combat, there are two supply and service echelons within each armored division. The rear echelon, consisting of the division field trains with attached elements of unit trains not immediately essential to combat, is located at some distance in rear of the fight. The forward echelon train consists of a portion of the unit trains and a few reinforcing division train elements necessary to sustain operations of the combat vehicles. The forward echelon trains operate in very close support during combat. Both echelons carry reserve supplies of gasoline, lubricants and ammunition, life blood of the armored division. Aerial attacks which succeed in destroying these vital supplies succeed in immobilizing the armored division. Armored units immobilized on the battlefield do not survive to fight again. It is therefore obvious that in addition to dispersion and organic weapons, antiaircraft artillery must be counted upon to protect vehicles of the supply echelons of armored divisions.

It is evident that concentrations of antiaircraft artillery for the protection of the most vital elements of a force will leave less important elements without desired protection. The less important ones will therefore have to rely solely on their organic weapons and passive measures. No hard and fast rule can be followed in apportioning antiaircraft artillery. Each situation presents a different problem requiring an individual solution.

We no longer need imagine the destructive potentialities of a surprise aerial attack. We have been on the receiving end of such attacks, and numerous other examples have recorded the devastating effects of these surprise operations. To be effective, antiaircraft artillery must be forewarned of impending attack. Each antiaircraft artillery regiment or corresponding unit is provided with personnel and equipment for the purpose of supplying essential warning for its own use and that of neighboring units. Radio detectors and sound locators comprise the primary observation facilities of a warning system, chief reliance being placed on the former. The system set up constitutes a close-in warning service not to be confused with the more extensive Aircraft Warning Service covering large areas. All ground units employ twenty-four hour air guards whose functions supplement the local warning services. When two or more antiaircraft regiments operate in proximity, their warning service should be closely coördinated to provide more complete and continuous coverage. Antiaircraft regiments will not usually be attached to divisions, but the information obtained from the intelligence facilities of those regiments will be available to divisions.

Antiaircraft searchlights have no place in the forward part of the combat zone. Inability to place effective illumination on low flying targets coupled with the danger of illuminating friendly objectives and installations within the battle area offset any doubtful advantage to be gained by such employment. Searchlights are properly employed farther to the rear to illuminate hostile aircraft for antiaircraft gun fire. They are also employed on coöperative missions with fighters for the sole purpose of illuminating enemy planes for interception.

The Germans were the first to use antiaircraft artillery for antimechanized defense. Later they employed units of this arm with their assault echelons to reduce concrete fortifications and other strongly defended emplacements. Finally they initiated its use as direct support artillery. It is obvious that their antiaircraft artillery weapons could not have been diverted from the normal mission of air defense had they been confronted with a real air threat. German control of the air has made this employment possible in the past. The effectiveness of their antiaircraft weapons against ground targets has been achieved through special design for dual operation of the weapons so employed. Antiaircraft guns and automatic weapons designed solely for air defense possess inherent limitations which greatly restrict dual employment. Guns and automatic weapons have high muzzle velocities, flat trajectories, high rates of fire and 360° traverse, all of which are highly desirable antitank characteristics. Characteristics limiting dual employment are high silhouettes, lack of sufficient mobility to permit rapid change of position, and lack of stability during low angle fire which may disturb gun orientation requisite for antiaircraft fire. Force commanders must understand and appreciate these limitations when assigning primary ground missions to antiaircraft weapons.

The primary mission of all antiaircraft weapons whether single or dual purpose is normally air defense. During weather conditions which restrict flight, the absence of aerial threat, or the predominance of the mechanized threat, the force commander may be justified in assigning a primary mission of antimechanized defense to antiaircraft artillery. In other situations involving the primary assignment of ground missions, the commander should carefully consider the disadvantages

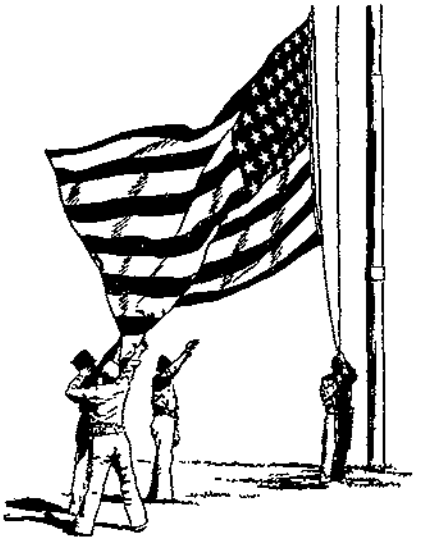
of such employment. When both aerial and mechanized attacks are hostile capabilities, antiaircraft artillery should retain its primary mission of air defense with the understanding that regardless of the priority of missions fire is always placed on the most immediate threat. All antiaircraft units are trained in antimechanized as well as air defense and habitually search for localities from which both missions can be executed. A percentage of armor-piercing projectiles is supplied to antiaircraft artillery units for antitank purposes.

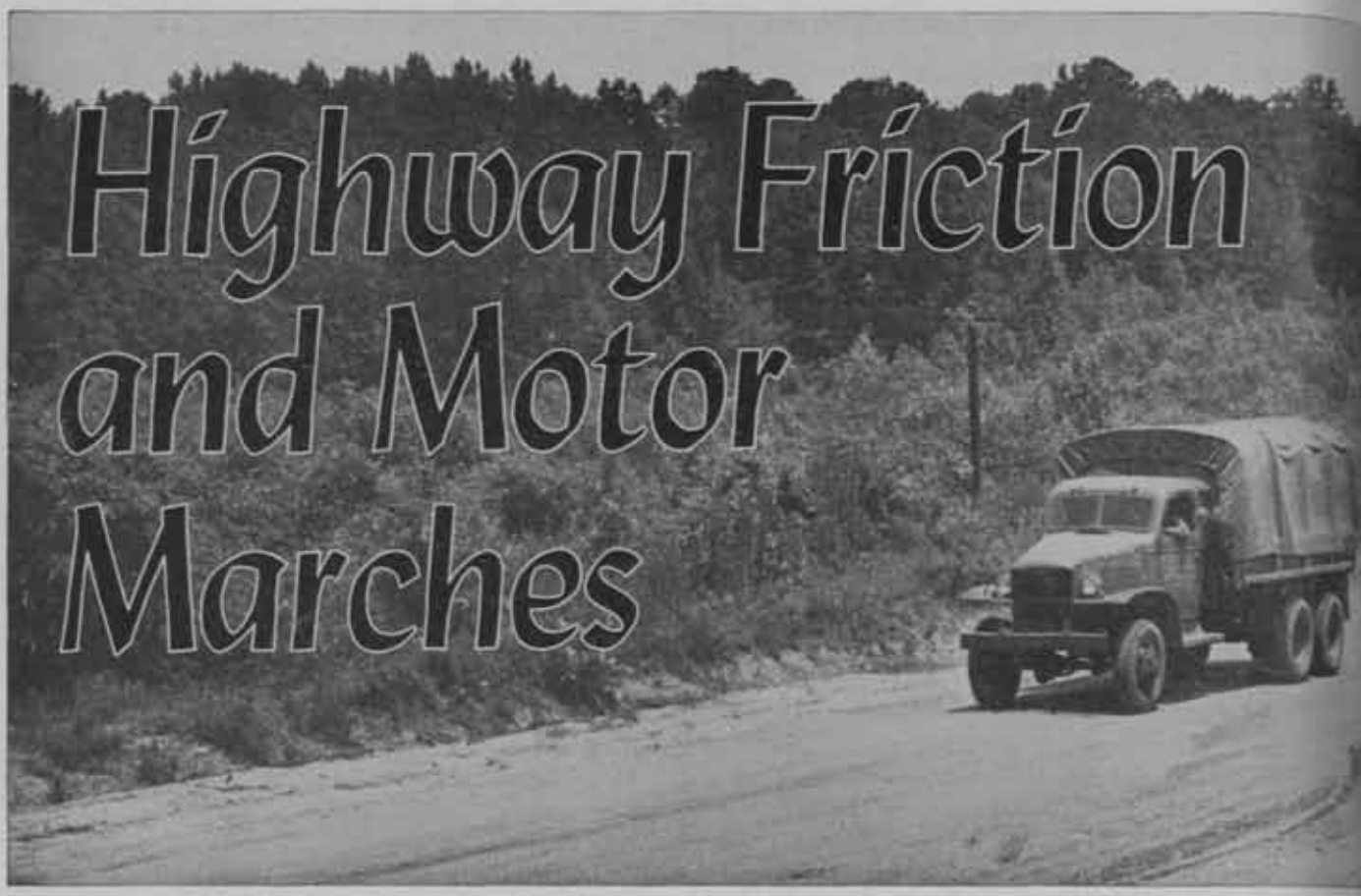
The need for antiaircraft artillery by all field force echelons has been clearly established. This need is met by providing antiaircraft artillery with automatic weapons battalions either by assignment or attachment to divisions with larger AA units operating as an organic part of Army Corps and Armies. In addition, air borne and air transport divisions must be supplied with special antiaircraft units designed particularly for air transport and the protection of landing fields.

In all situations involving employment of antiaircraft artillery and fighters in the air defense of identical objectives, a high degree of control is necessary to prevent friendly fighter casualties. Because of the ability of fighters to operate at a distance from the defended locality, the Fighter Command is charged with establishing this control. Antiaircraft artillery functions under operational control of the Fighter Command, and provides assisting personnel to that agency. Operational control consists essentially of orders from the Fighter Command to withhold fire. Emergency air ground signals must supplement established control to minimize hazard to friendly aircraft. Control measures must be simple, direct, and capable of immediate application.

Modern warfare with attendant demands for ingenuity and imagination on the part of leaders, portends failure for those commanders who neglect full consideration of the potentialities and limitations of all weapons provided for their use.

The establishment of antiaircraft priorities and missions is a function of the force commander. An understanding of the capabilities and limitations of antiaircraft artillery and a knowledge of doctrine and principles involved in its employment will enable him to employ properly his antiaircraft artillery in all types of operation. The commanders of assigned or attached antiaircraft units, and the antiaircraft artillery officers of the higher echelons, advise and assist the force commander in this task.





Highway Friction and Motor Marches

By Richard Gordon McCloskey

You don't have to wait until traffic piles up around that one-lane bridge on the two-lane highway to know that you're going to have a jam. It's not the vehicles and the dumb drivers that produce traffic jams. The potential jams are on the roads before the vehicles get there. All the vehicles do is prove the map no liar when it warns "Traffic jam coming up here!"

A knowledge of a few rudiments of highway friction and of map reading will tell you all you need to know about traffic jams and where to expect them. Highway condition naturally has some effect on traffic jams, and if the roads you plan to use haven't been under fire, maps will also show you their condition. But in the combat zone you have to learn to take the roads as they come, not as the map indicates them. Reconnaissance is the only thing that gives you any definite idea in advance of what to expect on road condition. Since you can't do any long-range forecasting on highway condition we'll leave it out of this discussion and confine it to what you can forecast with reasonable accuracy.

Speed in a motorized movement depends on a great many factors beside the condition of the highway. Reduced visibility, rain or dust storms, varying time-lengths, discipline, enemy action—and the highway. It's the last—the highway—with its practically stable capacity and its predictable limitations which is the most constant and the most dependable of any factor affecting motor marches. Poor discipline, for example, can be offset by good weather. Poor visibility can be offset by excellent discipline. Time-length can be varied to meet operating conditions, but there's not a thing you can do about the highway—except know what highway friction is, study maps for potential sources of highway friction, and plan to avoid them by realizing that with highway friction you're dealing with physical characteristics that for all practical purposes remain the same regardless of the type or quantity of vehicles you are using.

When wagon trains were moving leisurely along at two or three miles an hour, a traffic jam here and there didn't make much difference. But when fifteen minutes' delay can clip ten miles off your possible distance in a motor march and land you that far short of your destination when you're supposed to be pulling in, a traffic jam looms as a major threat to successful motorized transportation.

Modern motor transport movements are driving mile-a-minute vehicles over thirty-mile-an-hour roads, and military traffic control hasn't been able to iron out the differences because in peace the Army has little opportunity to practice mass motor movements, and—say it softly—because it is inclined to disregard considerations of this type until the last moment.

Because civilian traffic cannot be as tightly controlled

as military traffic, civilian highway engineers were forced to consider factors that the Army could, in peacetime, ignore. In their efforts to increase road capacities and decreases the death rate, civilian engineers dug down deep to find out what causes traffic jams. In planning their foolproof highways many weird and wonderful schemes were tried before the highway authorities decided that the whole matter of traffic jams could almost be boiled down to one physical characteristic: Friction.

It's quite appropriate that this characteristic, which ties whole convoys into knots, is the same one that plagues the individual motor vehicle within the convoy from front-wheel-drive to pintle.

Too much highway friction and not enough highway lubrication is responsible for practically every convoy, not delayed by accidents, that rolls in late. Too well do motor-transport personnel know that any two things rubbing together without lubrication gradually become hot, then seize and come to a full stop, just as highway friction makes the drivers hot under the collar while the convoy commander is seized with fury as the convoy comes to a full stop. . . .

It doesn't require actual vehicle-to-vehicle contact, such as you get in accidents, to create highway friction. It is the nearness of one vehicle to another, or to some roadside hazard, that creates the highway friction responsible for intolerable traffic conditions.

Highway friction has been divided by highway engineers into four types: marginal, intersectional, medial, and internal. By knowing exactly what they mean and by knowing where they will be met on a highway, you can prepare your traffic-control lubricant and have it ready to apply where needed—not after the jam has occurred, but as a preventive maintenance measure before the jam develops.

The first two types of highway friction—marginal and intersectional—are largely responsible for creating the last two—medial and internal—so let's have a look at them first.

Marginal friction is caused by any obstruction on the right-hand side of the road (the left-hand, naturally, in England and other countries with left-hand drive). The friction can be caused by a mental hazard, like a soft shoulder, that makes individual drivers edge over toward the middle of the road and interfere with traffic in the other lane. It can be caused by a physical hazard, like a truck parked with its tail-end half on the road. This hazard can drive a whole column off the straight and narrow into the middle of the road where it is apt to seriously interfere with an oncoming column that has been driven from its side of the road by marginal friction. The fear of collision, or an actual collision, slows down both columns.

Troops marching on the side of the road too close to the road itself create marginal friction, as do maintenance gangs working on stalled vehicles. Parked columns from which troops dodge in and out on the left-hand side, and any other hazards, physical or mental, that force drivers into the middle of the road, cause marginal friction. The hazard presented by the possibility of accidents has usually been the reason for keeping parked and disabled vehicles, or troops, well off the highway, but the more important, if less visible, danger of materially slowing motor movements is frequently overlooked.

The only cure, then, for the primary hazard of marginal friction and the secondary hazard of accidents is to keep marching or halted troops well off the actual highway; make maintenance gangs push or tow disabled or abandoned vehicles into the fields alongside the road; pull halted motor columns off on a side road whenever possible, or drive them into the fields if the shoulder is not wide enough to leave plenty of clearance between them and the highway.

You can always count on marginal friction in any type of motor movement over any type of road.

Intersectional friction on our present highways is the second inescapable type of friction to anticipate. An advance study of maps is essential to spot probable sources of this hazard. You will find intersectional friction where any roads join or cross. On crossroads, one stream of traffic must either be stopped to let the other pass, which completely curtails movement for a time, or the cross stream can take its chance of bucking through, which disrupts both columns and separates individual, or groups of vehicles from the main movement. On merging roads the main stream, if it is a multiple one, must shuffle itself to allow the merging stream to enter, which builds up a backflow of vehicles that delay traffic. On one-lane roads the merging traffic must dart into position whenever it can find space enough

between two vehicles moving down the main stream.

In planning for the entrance of merging traffic, have your double-banked column drop to a single column sufficiently ahead of the intersection to permit merging traffic to enter and use one lane of the road. If you're running a single column in close-column formation, have it open up to permit merging traffic to slip in.

There are three ways of solving intersectional friction. The first is to block off all traffic from crossing or merging roads, or block off the main traffic flow. Either one brings one column to a dead stop.

The second solution is area control. In this cross streams are diverted behind or ahead of the area in which the main movement is being made. This allows both the main and the crossing or merging streams to keep moving without interfering with each other. However, it requires close control of the main movement so the head and tail clear specified control points at exactly the specified times.

The third solution is that adopted by civilian highway engineers: the construction of elaborate cloverleaf intersections that allow incoming merging traffic to ease into the main stream without actively disrupting it; or the building of over- and under-passes which allow cross streams of traffic to bisect the main stream without interference.

This third solution to intersectional friction, unless it is already existing, can usually be ignored for military movements because cloverleafs and passes require extensive construction. However the first and second solutions, blocking traffic and area control, are well within the planning range of higher commanders who must prepare for mass motor movements.

In many cases, unless it has been prohibited, individual motor movements can reduce intersectional friction by whizzing traffic-control personnel ahead of a march column and spotting guards at strategic intersections to divert or altogether stop intersecting or merging traffic from entering the main highway. This action minimizes, but it doesn't eliminate, intersectional friction.

So much for the two types of highway friction that depend on external causes for their existence. For the next two types of friction are found within the motor march column, and depend largely on column control and driver discipline for their existence or nonexistence.

Medial traffic friction is found on any multiple-lane highway between motor columns moving simultaneously in two different directions. Civilian highway authorities are minimizing medial friction by painting traffic lines down the center of highways and imposing heavy penalties for crossing them. They are permanently eliminating medial friction by building so-called parkways between traffic lanes to separate opposing streams and prevent reckless swinging in and out of line. Chicago has even gone to the extent of building disappearing highway dividers that can be lowered or

One of the cures for the hazards of marginal friction and accidents is to pull halted motor columns well off the road. If the shoulder is not wide enough to leave plenty of clearance between the column and the highway, then the column should be driven into the fields.

Any kind of bad weather will add to the troubles of a motor column.

raised, separating traffic into distinct streams to meet the fluctuating demands of traffic at different times of the day. Solvers of military traffic problems will usually have to forego this last desirable eliminator of medial friction, except where the highway is so equipped. However, they can minimize medial friction by using the center-traffic line idea, or by declaring one-way traffic either permanently or for limited times while some priority convoy is rolling through. The declaration of one-way traffic naturally depends on having a parallel road along which return traffic can move.

Although the definition of medial friction specifies traffic moving "simultaneously in two different directions," you can expect to finds its equivalent wherever there are two lanes of traffic, particularly where double-banked columns are moving at different speeds. Medial friction is particularly prevalent where civilian and military traffic is mixed, unless there is some way of preventing civilians dodging in and out of line as they try to pass. Disciplined personnel who automatically drive well over on their side of the road can help minimize medial friction, but discipline alone is no sure cure. A physical barrier between opposing columns of traffic is the only certain solution to medial friction.

Internal friction is caused by any disturbance within single, or any number of, traffic streams. The plaguy accordion whip in a convoy is a type of internal friction. It is particularly bothersome where both civilian and military traffic are using the same road. Cars and trucks whipping in and out of line to pass each other, or groups of vehicles leapfrogging around other groups, not only aggravate medial friction, but are largely responsible for internal friction. Drivers who jackrabbit along, accelerating in bursts and jamming on the brakes, are prime culprits.

By strictly maintaining intervehicular and interserial distances and by absolutely prohibiting passing without authority, you can greatly minimize the ebb and flow of internal friction. Because internal friction depends on no outside factors (unless civilian traffic is involved), it is the one type of friction that can theoretically be eliminated by maintaining rigid convoy control and by achieving perfect driver discipline. Neither of these are possible, of course, but the problem can be minimized if you know your stuff.

With the exception, possibly, of intersectional friction, you will always find all these types of friction on any one road, regardless of how many lanes it has or how many columns of traffic are moving on it in how many different directions.

For example, if you presume a one-track road without any intersections, you will certainly find marginal and internal friction. Theoretically you may not have medial friction but since on a one-track road you'll find marginal friction on the left as well as the right side of the road, for all practical purposes you'll have what amounts to medial friction on the left-hand side. Throw in a couple of crossroads and merging roads and you will have the whole gamut of highway friction.

The only—but very great—importance of knowing the definitions, the differences and the results of these types of highway friction is this: They are inescapable physical factors that must be treated with the same care as any type of friction in the vehicle itself. A knowledge of their causes and effects is just as important to a motor movement as a supply of engine oil is to the individual truck. Unless you overcome highway friction by lubricating your motor movements with careful planning and control, your march won't get much further than the individual trucks would without lubrication.

Seacoast Training Expedients*

Case III Pointing of 155mm Guns on Panama Mounts

The following method of firing the 155mm gun has been evolved as a training aid when circumstances render it necessary.

The areas about the guns were divided into sectors, 45 degrees being selected as convenient for the purpose, and approximate trail positions for each sector marked on the trail ring. Aiming rule positions were located in each sector, oriented on approximately the mid-azimuth of the sector. Sockets, made of eighteen-inch sections of two-inch pipe, were set in concrete in each sector position in order to permit utilization of one aiming rule per gun for all positions.

Azimuth circles were constructed in 45-degree arcs for each sector. These were made by bending a four-inch board to the curvature of the trail guide rail and clamping it to the rail. It was then graduated in whole degrees, directly from the gun sight, using the deflection scale to turn off each degree interval. Fractions of degrees are set off on the deflection scale of the gun sight. Each azimuth arc carries an index mark at the precise azimuth of the aiming rule for that sector. In orienting, after collimation of gun sight and aiming rule sight in the usual manner, the gun sight is depressed until it bears on the azimuth board, after which the board is shifted laterally until the index mark falls under the vertical hair of the gun sight. The azimuth board is then clamped in position and the gun is ready to be fired Case III in that sector as follows: Using that part of the deflection scale between reference numbers 3 and 4 only, the desired fractional unit of a degree is set off; the gun is then traversed until the vertical cross hair rests on the whole degree desired. Example: If it is desired to set an azimuth of 300.25 degrees (in the 270-315 degrees sector) the deflection scale is set at 3.25 and the gun is then traversed until the sight points at the 300 degree mark on the azimuth board. The gun is then pointed at azimuth 300.25.

The aiming rule was constructed by the local Ordnance Officer. The supports were made of one and one-half inch water pipe, the top member or sight bar having been first trued up in the lathe. This sight bar carries a key-way along its length in which rides a key fixed to the sight arm. Since the sight is rigidly clamped to the sight arm the unit is constrained to parallelism in movement. The sight points at right angles, or approximately so, to the sight bar, and must of course be constructed to preclude any rotary motion about a vertical axis. An open sight was first used, but was later replaced by the sight, elbow, M1917 which is more accurate.

The aiming rule vertical members are machined for the lower eighteen inches of their length in order to provide a snug fit in the sockets. A shoulder is welded to each, eighteen inches from the lower end, which position the vertical members in the sockets. In order to assure that the sight bar will be horizontal an Engineer's level must be employed in setting the sockets. After the sockets are emplaced, the aiming rule is mounted and the exact azimuth of the aiming rule sight is determined.

This method is substantially as accurate as Case III pointing of fixed guns employing fixed azimuth circles. It is, within sectors, as fast as any Case III pointing. It permits employment of the battery under any of the usual Case III conditions and, by utilizing Field Artillery methods with forward observers at suitable locations, makes it possible to bring accurate fire to bear anywhere within range of the battery.

*Developed by officers of a Coast Artillery regiment of the New England Sector.

Training the Spotting Section

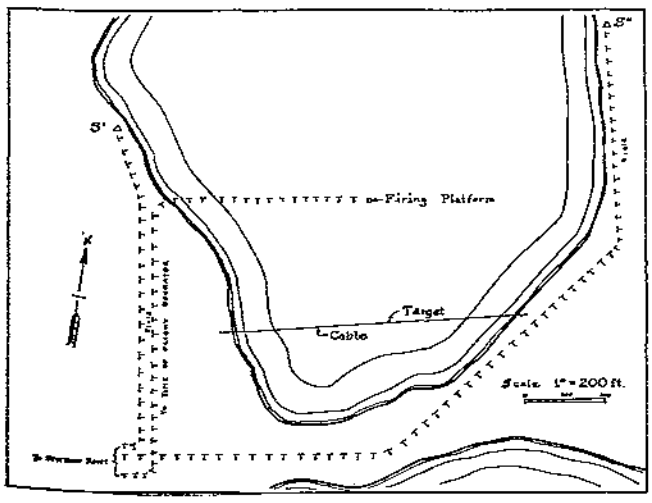
One of the greatest problems confronting the battery commander in training a seacoast battery is the training of spotters. In drill there are no splashes to be observed and only "canned" data can be sent to the spotting board by the spotters. In subcaliber practice there are splashes to be observed, but with a maximum of three hundred rounds of subcaliber ammunition allowed to

any battery there is not adequate ammunition to train the spotters and all the alternates necessary at the present time when there is such a constant turnover of enlisted personnel. This problem has been solved in this regiment and, although no subcaliber ammunition remains, training of spotters is proceeding unabated.

The accompanying sketch shows a miniature battery set up which utilizes a pond adjacent to one of the batteries. The firing platform was constructed by sinking a crib and filling it with stones. It accommodates two (or four) riflemen armed with .22 caliber rifles. It was located as far forward as possible without restricting the vision of the spotters and was raised about five feet above the surface of the pond in order to increase accuracy of placement of splashes. The spotters' positions are on opposite sides of the pond; instruments are set on low platforms on which the spotters themselves lie prone so that they will not have a site advantage which they would not have under service conditions. Their telephones are cut in on the spotter's lines from the base end stations to the spotting board. The firing platform is connected by telephone to a time of flight recorder in the plotting room.

The target, a wooden miniature of a pyramidal target, floats on the water and is kept upright and in position by means of a light cable which is stretched across the pond and from which it is suspended by a wire. The target is also attached to a continuous cord stretched clothesline fashion over a pulley on one bank and a drum on the other so that it may be moved at any desired rate of speed across the pond.

This set-up is operated as an integral part of the drill of the battery and simulates service conditions as closely as possible. The battery commander assigns a target and proceeds with his trial fire phase in the usual manner. The time of flight operator starts a stop watch on the firing bell on which the guns are fired and two or three seconds before the end of the normal time of flight calls "Splash." At the command "Splash" the riflemen on the platform fire and the spotters read the



center of impact of the splashes and phone the deviations to the spotting board where they are run through as though they were the results of observation of service firing. Corrections are determined on the fire adjustment board, trial fire is continued, and subsequently the battery enters into fire for effect. If, for any reason, a relay occurs on any gun, this fact is noted by the time of flight observer who instructs the riflemen as to how many are to fire and the spotters as to the number of splashes to expect. A recorder at one end of the target cable records sensings as a check on the deviations reported from the spotting board. Ranges and azimuths are set into spotting boards (M-2 for major caliber batteries, Thompson board for 155mm batteries) from plotting board data in the usual manner.

Five impact zones are designated for the riflemen as follows: Far over, close over, hit, close short, and far short. Courses are made up for the riflemen in advance using data from former target and subcaliber practices as well as purely fictitious data. In this way the battery commander makes up his adjustment problems beforehand and is able to include such unusual conditions as may be expected in service firings such as wide dispersion, shifting center of impact, failure of guns to react to a correction, etc.

Training of lateral adjustment personnel is accomplished as follows:

a. For 155mm batteries using a separate azimuth instrument with telephones direct to gun pointers: The lateral spotters are included with the S′ spotting detail; the S′ spotting line is parallel to the gun pointers. The deviations reported to the spotting board by the S′ spotter are received and set by the gun pointers on their deflection scales and thus become the lateral adjustment corrections. This furnishes the lateral spotters with training in locating the center of impact and the gun pointers with practice in applying adjustment corrections. If a separate azimuth instrument is available it may of course be used by the lateral spotters exclusively.

b. For batteries equipped with the M-2 spotting board: The miniature set-up, not being a scale reproduction of the conditions on the ground, does not furnish satisfactory lateral deviations from the spotting board. Therefore the battery commander furnishes the chief spotter with "canned" lateral adjustment problems in the form of lateral deviations. The deviations are reported to the operator of the lateral adjustment board at the same time that range deviations are reported to the operator of the fire adjustment board.

This method of training is now employed by all batteries of this regiment. By utilizing field wire in conjunction with fire control telephone installations spotters are paralleled onto the normal spotting lines into each plotting room. Results are most gratifying, particularly with respect to spotting personnel and fire adjustment board operators.

Searchlight Control Trainer

By Major Calvin O. Smith, Coast Artillery Corps

Figure 1. Control trainer device.

"Flick." The detectors or sound locators have performed their duties, and they go back and search for another target leaving the mission of tracking up to the control station operators.

Are the control station operators properly qualified to perform this mission? Anyone who has seen searchlight practice knows that on numerous occasions after getting a flick, the target has been lost due to improperly trained trackers. It is believed that since accurate location of the target is the hardest task, the training devices and training have emphasized detector and sound locator training to such an extent that the training of control station operators has been sadly neglected in many instances, because it has been erroneously assumed that their mission can be performed easily.

Of what value is a flick if the target is lost before night fighters attack or gun fire is accomplished? None, therefore it is intended to provide a training schedule for the control station operators, so that they will be as strong if not a stronger link in the searchlight chain as the sound locator operators.

The training of the searchlight tracker has been divided into three phases which may be called: (1) Basic, (2) Advanced, and (3) Tactical.

During the basic stage the tracker should become oriented with the searchlight unit, and become thoroughly acquainted with the operations of the control station. To give him the big picture of the searchlight unit, the normal gunner's instructions will serve the purpose excellently. Next, to get him thoroughly acquainted with the handwheels of the control station, have him turn the azimuth handwheel on command to the right then to the left, next follow the same procedure with the elevation handwheel. He should then close his eyes and at the commands up, down, right, or left be able to move the control station handwheels so as to give this desired movement to the control station. His basic training should be complete when he can move the control station in two directions (up and right, etc.,) on command without any appreciable dead time.

In the advanced training use is made of the regular government issue flashlight attached to the control station, as shown in figure 1. This attachment is easily constructed at the cost of about 15¢. By painting a course on the wall in a building similar to the one in figure 2, the tracker will be able to become more proficient in the operation of the control station. The above course was made with chalk in a shed. As most stations have sheds or buildings of like nature, it will be a simple matter to construct this course. During this phase of training, accuracy, speed, and smoothness should be stressed. The tracker should not use the binoculars on all courses, since it is impractical to use them on fast low flying aircraft, but since they are necessary for high

Figure 2. The target course.

Figure 3. Miniature CPX for a searchlight platoon.

flying aircraft at long range, he should be trained to track both with and without binoculars. When the tracker has mastered smoothness, speed, and accuracy, he is ready for the tactical and final phase. This advanced training may be conducted night or day, rain or shine, and without plane missions.

The tactical phase is taught outside, unless an unusually large building is available, using five or more of the control stations mentioned above. This makes a miniature CPX for a searchlight platoon, with wire communications and flash messages included. Figure 3 shows a setup. The targets used are miniature airplanes of the Air Corps identification set so that identification of aircraft may be taught the trackers. Here the tracker is taught the teamwork needed in passing targets from one searchlight to another, the various commands, use of flash messages, necessity for speed and accuracy of operation and identification. This setup may be tied in with an operations board to lend more realism during training. Upon completion of this course it is believed that the control station operator might say without hesitation, "You get the flicks, and we'll keep him in the beam."

The advantages that this method of training offers are: Close supervision of first stages of training, saving of time and expense in training, no plane missions, and familiarization of the tracker with his equipment before going in the field.

The American people are fighting mad. The men they have sent to the front are even madder. They have a healthy hatred for the Nazis and the Japanese, and they are showing it every day. They are showing it by outpunching, outshooting, outbayonetting, outflying and outsailing the Axis.—Hon. Robert P. Patterson.

40mm AA Gun Tower

By Majors Otis R. Fitz and W. Paxton Moss, Corps of Engineers

When providing a close-in antiaircraft defense for vital industrial or military installations, it frequently becomes necessary to spot the 40mm guns among buildings, trees or similar masks which would greatly reduce the efficiency of the defense. Since these weapons must be mutually supporting, a serious problem is presented in finding suitable locations. In and around large cities where the buildings are high there can usually be found some of such structural design as to permit the emplacement of the gun on the roof. In suburban areas where the average building is one or two stories high and has a roof and roof supports designed for snow loads only, the loads imposed by a 40mm gun are too great. A solution to the problem used by the AAA Command, EDC, is offered in the nature of a timber tower from which the gun may be fired over the tops of the buildings or other masks. This solution although not perfect in all cases does increase the field of fire to a considerable extent.

After studying numerous proposed gun sites, existing ground emplacements, and gun characteristics, the following design data were decided upon: Dead weight of the gun, 5,549 lbs.; dead weight of the MG, 650 lbs.; dead weight of the director, 650 lbs.; weight of the crew, 1,400 lbs.; dead weight of 40mm and .50 Cal. ammunition, ready and spare, 6,000 lbs.; and trunion reaction of gun, 4,500 lbs. It was assumed the power plant would always be located on the ground. The final figure decided upon as a design load was, therefore, ten tons.

In general, a practical limit to the height required was forty feet. Where masks existed that required raising the gun over forty feet, a rooftop position could usually be found. It was therefore decided to design a tower forty feet high in sections of ten feet each and of recurrent design so that the same plans could be used for a ten, twenty, thirty or forty foot tower.

In determining the proper size and shape of the tower several factors were considered—the space required for operating the gun, director, and machine gun; the stability of the tower while the gun is fired; the need for space around the gun and machine gun for ammunition. Since it is most desirable that the director remain steady while the gun is firing, the tower developed into two towers completely isolated one from the other with an operating platform twenty by sixteen feet for the gun and eight by sixteen feet for the director and machine gun. Also the director tower platform was raised one foot above the gun platform to permit the director crew to see over the heads of the gun crew. With a space of two feet between each tower and the gun located over the center of the larger one, the director would be placed three feet in from the edge of the smaller tower. Allowing three feet all around the director, the operating space for the machine gun becomes eight by ten feet. (After the construction and test of one tower, the director and machine gun platform was increased to ten by sixteen feet, thus allowing more freedom of action for the machine gun.)

Since the two towers, separated by two feet, must have vertical sides where they are together, and frequently it was found ground space was limited at the proposed sites, it was decided to make the towers rectangular and guy them with steel cables and deadmen. These guys can be anchored into buildings or shifted through small angles (15°) to avoid obstacles. This also was necessary in using a single plan for multiple heights. The guys and deadmen were designed to handle the trunion reaction when the gun fires at zero elevation and wind load of thirty lbs. per square foot.

The bracing follows closely that used in trestle bridge construction with the refinement of blocking between braces and using timber ring connectors at all joints to insure the rigidity necessary.

Concrete footings were designed to carry the entire load on soils with bearing power of 850 lbs. per square

foot or better. When the soils will not carry this load a reinforced concrete mat may be required and special studies should be made.

To insure quick access to the operating platforms, stairs are provided rather than ladders. Four foot guard rails are provided all around each platform. The guard rails are sheathed to provide wind protection for the crew while on duty but not in action. In order to allow full field of fire the guard rails around the guns are hinged at two feet from the floor and are lowered out and down when the gun goes into action. Some using troops have provided stops so these guard rails only swing through an angle of 90° and rest in the horizontal plane. This affords some additional protection against men falling over the edge of the tower.

In order to protect spare ammunition from the weather a tar paper shelter is constructed on the deck below the operating platform. Due to the fact that the cross braces in the middle of the tower chop up this space and it was desired to be as conservative as possible in the use of lumber, only half of the available space was finished off. This eight by twenty foot shelter seems to be sufficient.

In bolting the gun to the deck of the tower, it was originally decided to use large U bolts over the box beams of the gun mount with plates and nuts with washers, under the deck timbers. Many discussions have subsequently arisen over this design due to the necessity of going underneath the deck and loosening the nuts when leveling the gun. It was suggested that the U bolts be replaced with bolts through the leveling jack foot plates. This would permit leveling without unfastening the hold down bolts but would subject the foot plate sockets and leveling jack to considerable stress. In order to determine whether any immediate difficulties would result from this stress several rounds were fired from a gun bolted down in this manner. The test showed the method to be satisfactory and although continued firing might bring out some trouble this possibility seemed remote. By using this suggested method of bolting down, all leveling operations can be carried out from the operating platform. Care must be taken before leveling to see that all guy cables are tight. Some times by adjusting guy cables minor leveling adjustments become unnecessary.

The design of the tower or pair of towers as it finally developed is as shown in the accompanying picture.

It will be noted that some of the timber members are large and difficulty may be experienced in getting such sizes. Building up of these members with laminations of smaller sizes has been tried and is found to be a satisfactory alternative.

The first pair of towers to be erected were thirty feet and thirty-one feet tall and were constructed by a civilian contractor. The total construction time was thirteen days with the use of concrete mixer and crane. Since this first tower many more have been prefabricated by contract then erected by troops of the Antiaircraft Artillery Command, EDC, with technical assistance and advice from District Engineers and officers and troops of the local engineer regiment.

Two general methods were employed in erection. The first was erection progressively from the ground. This required some rigging to hold large members in place while bolting fast. One expedient satisfactorily used was to erect the director tower first (being lighter it was easier) then, using that as a scaffold and frame for hoisting, erect the gun tower. The second general method of erection was construction of the three bents of each tower on the ground; then, using a crane, hoist them into place and fasten the cross braces. This method proved very satisfactory. On the average units of the AAAC, EDC, erected these towers at the rate of one every ten days. This figure is measured from the beginning of delivery of materials to the completion of the program and includes delays for materials, weather, etc.

Placing of the gun on the tower was in general accomplished by using a crane, but in some cases where the crane was unable to go due to soft ground the gun was hoisted with improvised frames, block, and tackle.

Although guns have been fired from several of the towers the most complete test was made when the first tower was completed (30 feet). The location of the tower permitted firing only at one angle, i.e., 60° to the left of a projection of a line through the center of the director and the center of the gun. The gun was fired at various elevations as follows:

−6°	1 round
+60°	1 round
−1°	1 round
+15°	4 rounds automatic fire
+60°	4 rounds automatic fire
+80°	4 rounds automatic fire
+10°	10 rounds automatic fire

and four bursts of 6 rounds each, automatic fire.

In addition to the above approximately twenty rounds were fired from a .50 cal. machine gun at an elevation of +10°. An indicator was arranged to measure the movement of the gun tower during the firing. Maximum movement of deflection occurred during the automatic fire at +10° elevation and amounted to an oscillation of one-quarter inch each side of center in a direction at right angles to the center line of the tower. The director was sighted on a fixed object at about 3,000 yds. range. Observation through the director telescopes during 40mm firing showed that there was no perceptible movement of the director.

It was concluded from these tests that the tower was adequate for the purpose. There seems to be no possibility of reducing the size or number of structural members without sacrificing rigidity. The fifty caliber machine gun should not, unless absolutely necessary, be fired while firing the 40mm gun as the machine gun does cause a slight movement of the director.

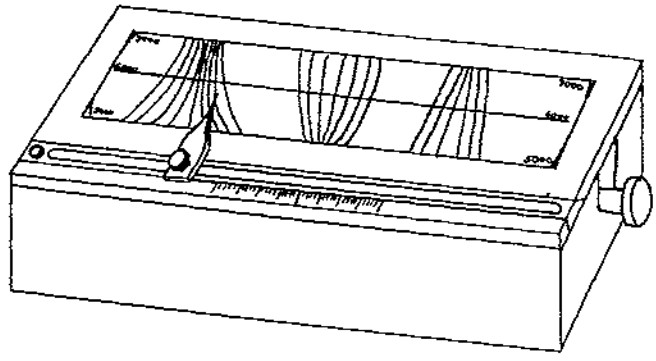
Range Ballistic Corrections for Three-inch Guns

By Lieutenant Roger E. Baker, Coast Artillery Corps

It is desirable that 3-inch seacoast gun batteries have some quick, convenient and accurate method of determining, from each new meteorological message, the initial ballistic correction to be applied. Since a range correction board is not standard equipment for a 3-inch seacoast battery, the board described below has been developed.

Very similar in principle to the Range Correction Board, it consists of a box twenty-two* inches long, six inches square, which contains a single wooden roller five inches in diameter. On the roller is placed the chart of curves, changing effects and range as the roller is turned. Set in the top of the box is a slotted metal rule that can be moved at will. In the slot on the rule, is a movable pointer so constructed, that it can be clamped at any position on the rule. Below the metal rule is a scale of corrections in reference numbers. They are read by a fixed pointer on the rule. By zeroing the fixed pointer on the scale, then sliding the movable pointer to the desired curve, and clamping, the metal rule can then be moved with the pointer to the known effect. By moving the rule and pointer to the different effects, the fixed pointer will show the complete correction for all effects.

A chart of the range ballistic curves can be made up in the same manner as for a standard range correction board chart, to a scale of one inch equals one thousand yards range for the *y* axis and one inch equals two per cent of range for the *x* axis. It is not practicable to plot curves for every small change in effects or to plot curves to the maximum and minimum values of these effects, but rather to the point that it is reasonably expected will cover local conditions.

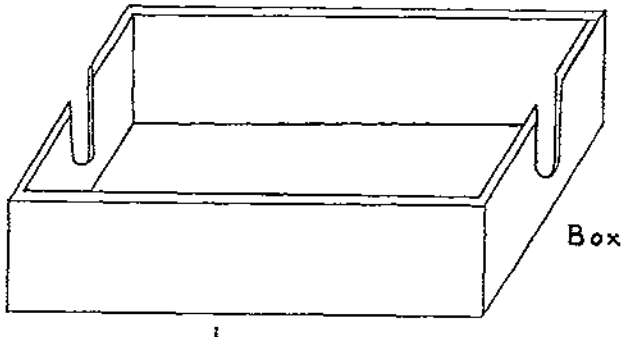


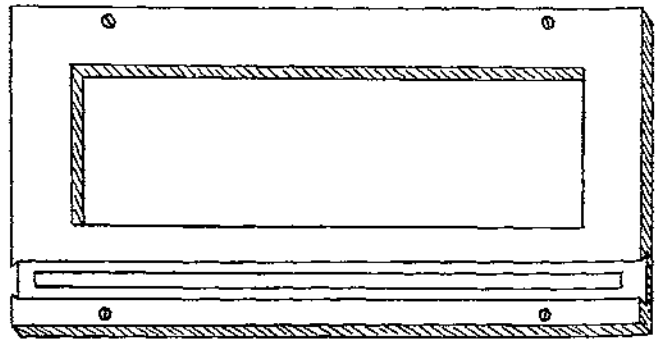
Ballistic Correction Board Assembled

This board has proven to be very accurate. In a series of five consecutive readings on the same data, the corrections came to less than one tenth of one per cent for all readings. It has also been checked by working several problems on the board and then checking results by calculations. The results proved it to be not over one tenth of one per cent error at maximum range.

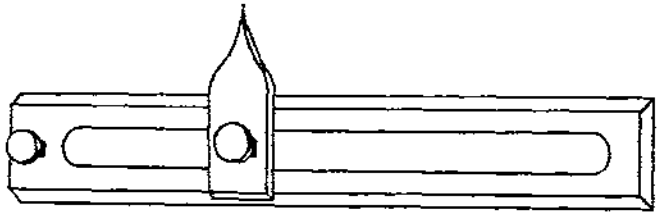
This board was used during a recent target practice and proved to be well worthwhile.

*Editor's Note: The Coast Artillery Board has decided to supply detail drawings for the local construction of a device similar to that described by Lieutenant Baker. Charts for use on this board also will be supplied. These charts will be twenty-seven inches wide, requiring that the board be approximately thirty inches long, rather than the twenty-two inches suggested by Lieutenant Baker. The drawings and charts can be obtained from the Coast Artillery Board on request from batteries manning 3-inch seacoast guns, thus saving considerable work by the individual batteries.





Top of Box



Metal Slide Rule And Pointer

Roller

COAST ARTILLERY IN ACTION

AA In Action

North Africa

Fourteen members of an antiaircraft battery stationed at a military air field in North Africa recently risked their lives to save the crew of an American bomber which cracked up while taking off.

The bomber careened down the runway and came to a stop within ten feet of the pit where the antiaircraft gun was located. One engine was aflame and gasoline was pouring over the ground. The plane was loaded with machine gun ammunition and high explosives.

The antiaircraft gunners rushed to the plane and several went inside to help carry out members of the crew. As the last man was being brought to safety, the bomber burst into flames. Ammunition and explosives went off with a thundering roar, scattering fragments of the plane several hundred feet.

After being sure that the airmen were safe, the antiaircraft crew hooked their gun to a truck and hauled it away from the flames.

None of the gun crew was injured.

Lieutenant Colonel John R. Fordyce, Air Corps, 1801 Shadow Lane, Little Rock, Arkansas, commanding officer of the air group, praised the antiaircraft battery.

"Their quick and resourceful work, in complete disregard of their own safety, helped to save the lives of the crew of the bomber," said Colonel Fordyce. "Had there been any delay the crew would have perished in the fire and explosions. This was real heroic action, and we are all proud of the members of this antiaircraft battery."

Within a short time after the accident, the antiaircraftmen had reset their gun in place and were on the alert.

* * *

A cablegram from Algiers describes how nine enemy aircraft were destroyed by one Multiple Gun Motor Carriage. One aircraft was shot down with a burst of 200 caliber .50 and five 37mm rounds of ammunition while the gun motor carriage was still on a lighter, one while the weapon was still on a sea train. The message indicates that this weapon is very effective against low-level attack by planes, dive bombers, and machine gun positions.

Southwest Pacific: A report from the Southwest Pacific theater on performance of small caliber automatic antiaircraft weapons (40mm, 20mm, calibers .50 and .30) states:

Two occasions were observed when automatic weapons went into action. In one instance, three Japanese bombers flew over the defended area at an altitude of about 5,000 feet. One aircraft was destroyed by automatic weapons fire. On the other occasion, eighteen Japanese aircraft flew over the defended area at an altitude of about 5,500 feet. Three planes were destroyed. Due to the extreme ranges of both engagements and the fact that several types of weapons were firing, it is not known which weapons were responsible for securing the hits. *From speech by Brigadier General Herman F. Safford, Office of the Chief of Ordnance, February 15.*

Citations

Distinguished Service Cross

Private First Class Samie Burns, a member of an antiaircraft battalion, was the driver of the only truck in a convoy in Tunisia last December which was equipped with a caliber .50 machine gun. When the convoy was attacked by seven Junkers 88 planes, he maneuvered his truck into firing position and manned the weapon. During the action, he shot down two enemy planes and damaged at least one other, saving many lives and much equipment. Awarded the Dis-

tinguished Service Cross, his citation commends him for displaying "skill and courage which are a credit to him and to his organization." Private Burns' home address is R.R. No. 3, Springfield, Kentucky.

Distinguished Service Medal

"*George F. Moore*, Major General, United States Army. For exceptionally meritorious service to the Government in a duty of great responsibility as commander of the Harbor Defenses of Manila and Subic Bays, from December 8, 1941, to March 11, 1942. The outbreak of hostilities found his command prepared and on the alert. The controlled minefields covering the north channel at the entrance to Manila Bay were effectively installed and they, as well as the Navy minefield protecting the south channel, were covered by the guns of the seaward defenses. The antiaircraft batteries engaged the enemy effectively throughout sustained and repeated high-level and dive bombing attacks, maintaining an extremely high percentage of destroyed and damaged hostile aircraft. Seacoast batteries repeatedly engaged land targets on the Cavite shore of Manila Bay and on the West Coast of Bataan. By daily personal visits to the most heavily engaged elements, General Moore largely influenced the effective action and high morale of his command."

Major General Moore was born at Austin, Texas, on July 31, 1887. He was graduated from the Texas Agricultural and Mechanical College in 1908. In 1909 he was commissioned a Second Lieutenant of Coast Artillery in the Regular Army. His wife, Mrs. Lucile G. Moore, lives at the Eldrisco Apartments, Pacific Avenue and Broderick Street, San Francisco, California.

"*Charles G. Sage*, Colonel, 200th Coast Artillery, United States Army. For exceptionally meritorious service to the Government in a duty of great responsibility in the Philippine Islands, from December 8, 1941, to March 11, 1942. As commander of the 200th Coast Artillery (Antiaircraft), Colonel Sage disposed his regiment on the outbreak of hostilities for the defense of Clark Field where it fired effectively against heavy enemy aerial attacks. Although depleted by withdrawal of a large number of officers and men to form an additional regiment, his regiment later covered critical points on routes of withdrawal to the Bataan Peninsula and was later disposed for aerial defense on Bataan. His effective leadership was demonstrated by the excellent results achieved by his command in spite of greatly reduced numbers for the armament manned."

Colonel Sage was born at Sparks, Kansas. His wife, Mrs. Dorothy H. Sage, lives at 333 South Tin Street, Deming, New Mexico.

Silver Star

Willard A. Parriott, Technician Fourth Grade, Coast Artillery Corps. For gallantry in action on the North Coast of New Guinea in hostile waters on December 6, 1942. Home address: Minden, Nebraska.

Edgar F. Heater, Technician Fifth Grade, Coast Artillery Corps. For gallantry in action on the North Coast of New Guinea in hostile waters on December 6, 1942. Home address: Route 2, Weston, West Virginia.

Sheldon H. Nutter, Second Lieutenant, Coast Artillery Corps. During a ninety-five plane Japanese attack on an airdrome at Assam, India, Lieutenant Nutter remained at an exposed post in a tree, and with coolness and courage directed the fire of his battery. Home address: 2834 Hillegrass Avenue, Berkeley, California.

Purple Heart

Corbet W. Nunley, Private, Coast Artillery Corps. Casablanca battle area. Home address: McMinnville, Tennessee.

James S. Roberts, Corporal, Coast Artillery Corps. For wounds received at Clark Field, Philippine Islands, December 8, 1941. Home address: Alamogordo, New Mexico.

Antonio B. Martinez, Private First Class, Coast Artillery Corps. For wounds received at Panea Sinan, Philippine Islands, December 8, 1941. Home address: Taos, New Mexico.

Frank Nieto, Private First Class, Coast Artillery Corps. For wounds received at Fort Stotsenburg, Philippine Islands, December 12, 1941. Home address: Albuquerque, New Mexico.

Felipe G. Sisneros, Private, Coast Artillery Corps. For wounds received at Clark Field, Philippine Islands, December 12, 1941. Home address: Garita, New Mexico.

William J. Rushton, Private, Coast Artillery Corps. For wounds received at Manila, Philippine Islands, December 26, 1941. Home address: Philadelphia, Pennsylvania.

Herman H. Vogt, Private, Coast Artillery Corps. For wounds received at Clark Field, Philippine Islands, December 12, 1941. Home address: Sabinal, Texas.

James D. Spranza, Sergeant, Coast Artillery Corps. For wounds received at Fort Mills, Philippine Islands. Home address: Rizal, Philippine Islands.

Legion of Merit

Cleos T. Pate, Staff Sergeant, Coast Artillery, United States Army. For exceptionally meritorious service. By his outstanding performance of duty in connection with emplacement of a 60-inch searchlight in a jungle position, he demonstrated the personal qualities of initiative, force, energy, and dependability. By establishing, under great difficulties, other installations in jungle positions incident to antiaircraft activities within the Pan-

ama Canal Department, he demonstrated ingenuity and leadership of a high order.

Staff Sergeant Pate's mother, Mrs. Lee Ola Pate, lives at Whistler, Alabama.

William Kilcourse, Sergeant, Coast Artillery, United States Army. A sergeant of exceptional ability who has performed all duties assigned him in a superior and exceptionally meritorious manner. Sergeant Kilcourse performed exceptionally meritorious service when on the morning of June 3, 1942, the Navy patrol boat *Bunting* was rammed and in a sinking condition. Sergeant Kilcourse as skipper of the *California Bear* proceeded to the aid of the *Bunting* and due to his skillful maneuvering of the *California Bear* was able to successfully save the entire crew of fourteen officers and men from the *Bunting* when that vessel sank.

Sergeant Kilcourse's mother, Mrs. Gertrude Monk Kilcourse, lives at 2919 Filmore Street, San Francisco, California.

* * *

Soldier's Medal

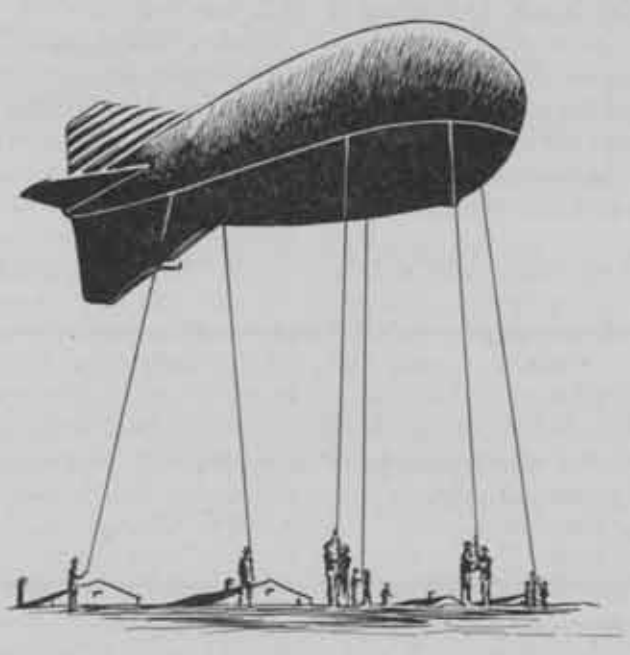
John Accabo, Corporal, Coast Artillery Corps. For heroism at Carolina Beach, North Carolina, August 29, 1942. Residence at enlistment: New Haven, Connecticut.

Joseph J. Lapent, Sergeant, Coast Artillery Corps. For heroism at Fort Monroe, Virginia, September 7, 1942. Residence at enlistment: Philadelphia, Pennsylvania.

Robert S. Chester, Major, Coast Artillery Corps. For heroism at Wrightsville Beach, North Carolina, September 20, 1942. Home state: Michigan.

James Frangella, Sergeant, Coast Artillery Corps. For heroism at Carolina Beach, North Carolina, August 29, 1942. Residence at enlistment: Coeymans, New York.

Frank Earl, Private, Coast Artillery Corps. For heroism at Espiritu Santo Island (South Pacific Area), October 9, 1942. Emergency address: Mrs. Mamie Lett (mother), 41207 Indiana Avenue, Chicago, Illinois. Private Earl, until driven away by extreme heat, worked valiantly to rescue the unconscious pilot of a crashed airplane.



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.

Power rammers. The power rammer being supplied major caliber batteries is equipped with an unstroking device which automatically stops the forward movement of the rammer head and chain. The length of the rammer stroke is adjustable. During a recent test of the rammer using service projectiles, it was found that the stroke of the rammer must be adjusted so that pressure is maintained continuously on the base of the projectile. When the normal distance from the face of the breechblock to the base of the projectile was 132 inches, it was found by trial that the rammer must be set for a stroke of 142 inches without load. The stroke of the rammer can be measured by placing a permanent mark on the chain links at 132 inches from the head of the rammer and then, with the rammer fully extended, checking the distance of this mark from the face of the breechblock.

During the tests in question, the rammer was initially adjusted for a stroke of 131½ inches. Dummy drill projectiles appeared to be rammed satisfactorily with this length of stroke. However, on ramming service projectiles, it was found that nearly all rounds rammed with a stroke adjustment of less than 142 inches fell back against the dummy powder charge which was placed in the powder chamber to prevent damage to the mushroom head, when the gun was elevated.

Since the evidence obtained from a limited number of rounds is by no means conclusive, each battery equipped with this type of rammer should conduct a similar test, whenever feasible. In any event, it is believed that the initial adjustment of the unstroking device should be such that when the rammer is operated without load, the rammer head will stop not less than ten inches beyond the normal distance from the face of the breech to the base of the projectile.

Change in 1943 scoring formulae. The 1943 Supplement to TM 4-235, Instructions for Seacoast Artillery Target Practice—1943, was published November 16, 1942. A minor change in the scoring formulae appears in the 1943 Supplement which has been overlooked by all batteries submitting 1943 target practice reports to date. This change is in the "R" component which is changed by adding +10 to the "B" component of the score prior to multiplication by the balance of the equation. The correct formulae for the range component appear at the bottom of page 5 of the 1943 Supplement, and on page 39 of the new TM 4-235 dated February 4, 1943.

Scale of the M3 plotting board. The present standard M3 plotting board, provided for 6-inch batteries, has a plotting radius of about fifty-eight inches, a scale of 600 yards per inch, and a plotting range of 35,000 yards. A scale of 500 yards to the inch will provide a maximum plotting range of 29,000 yards. The advantage of the larger scale is evident.

The M3 plotting boards provided for the 6-inch modern guns will be graduated to a scale of 500 yards per inch and the arms will be graduated to (approximately) 29,000 yards. This change will apply only to boards manufactured in the future.

Self-contained range finders. The item "finder, range, self-contained" was omitted from the Table of Basic Allowances No. 4, July 1, 1942. This item was reinstated by Changes No. 2, dated October 1, 1942, with the note "until exhausted."

The coincidence range finder for seacoast use is classified as limited standard. The Height Finders M1 and M2 are classified as substitute standard for seacoast use as range finders. There is substantial assurance that a sufficient number of self-contained range finders for seacoast purposes will be available. Whether or not self-contained range finders are wholly available at present does not alter the fact that the requirement for such instruments exists in the seacoast artillery. The expression "until exhausted" appearing after this item in the table of basic allowances indicates that no self-contained

INFILTRATION COURSE

By Captain Walter H. Dustmann, Jr., Coast Artillery Corps

Camp Stewart's Infiltration Course, opened the latter part of January, consists of one hundred yards of barbed wire entanglements, shell holes and sand obstacles which must be negotiated belly to the ground while expert machine gunners fire real bullets just over your head.

Several thousand Stewart antiaircraft troops have now taken this course in stride, thereby securing "realism in training" that one day may save their lives.

Sampling the course with another desk soldier, I found the miniature battlefield plenty tough; but the soldiers we went through it with took it in the spirit of a football drill and came charging through at the finish.

We were marched to the far side of the battleground, clad in dungarees, steel helmet and gloves. They line you up facing three wicked-looking machine guns about 120 yards away, but which look as if they were glaring down your throat. You feel like a condemned man facing an execution squad.

An officer barks out at you:

"Just a few words, men. When you hear the first whistle fall flat on the ground. When you hear the second one start crawling. The machine guns fire thirty inches over your heads. There are just two things to remember: Don't crawl over anything you can go around; and don't go over anything you can go under. That's all."

The whistle blew. I think we all hit the ground simultaneously. At least no one needed any coaxing. Another whistle blast. Several machine gun bursts told us in emphatic tones that this was the real business. Men were crawling like giant ants all around me, not wildly or nervously, as you might imagine, but surprisingly coolly, taking it in stride, heads and bodies well down, legs stretched out.

With each new machine gun burst—and they came all too frequently— the bullets zinged overhead and each man instinctively dug his head and belly and arms and legs a little bit deeper into Mother Earth. You appreciate the good earth as never before. Then an explosion of dynamite, to simulate artillery or bomb bursts, not a foot away, deafens you and a shower of dirt covers you momentarily, but you keep on crawling as though stopping was impossible.

After the first few hectic minutes you forgot the bullets, or rather they bother you in a detached sort of way, like a gnat zooming around you; and instead all your thought and energy is devoted to the physically tough job of crawling and hugging the ground at the same time. It employs every muscle in your body—especially when you have spent the past two years at a desk—you are tensed all over, you know this is the real thing and you must go through it with colors flying, just as all the men around you are; you feel ready then for anything.

Another surprising thing, to me, was the ease with which you can go under the barbed wire, like a human mole, when you know that you have to do it that way, or else.

Then, when you reach the trench right before the chattering guns, and a final whistle tells you it is over, and the soldiers come out charging and yelling like Comanche Indians, hardly winded, fit and ready for lots more (myself excluded!), then you know that the American Army is plenty tough, getting tougher, and that real bullets are just an appetizer!

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range finders will be authorized in the future, and is likely to lead to the belief that provision for using self-contained range finders need not be given consideration in planning construction for new batteries. The design of certain BC stations requires that provision be made for a self-contained range finder.

The expression "until exhausted" will not hereafter be included as a remark pertaining to self-contained range finders in Table of Basic Allowances No. 4. Due to the fact that from July 1 to October 1, 1942, Table of Basic Allowances No. 4 did not contain authority for the issue of self-contained range finders, some BC stations for 6-inch batteries were planned without facilities for the installation of the self-contained range finder. Plans are available for the construction of a BC-CRF station.

Coast Artillery Journal

Fifty-second Year of Publication

COLONEL FREDERIC A. PRICE, Editor
LT. COL. ARTHUR SYMONS, Associate Editor
MASTER SERGEANT CHARLES R. MILLER, Circulation Manager

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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 materiel 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.

News and Comment

The *Bundy* and the *Ricker*

Two new mine planters, the *Bundy* and the *Ricker*, have been launched recently. The two vessels were named after Coast Artillery officers who were killed in the crash of a plane in California several days after the attack on Pearl Harbor.

Colonel Charles W. Bundy was born in Somerville, Massachusetts, April 29, 1890. He was commissioned second lieutenant in the Coast Artillery Corps November 28, 1916, after having served in the Maine National Guard. He graduated from the Coast Artillery School in 1924, from the Command and General Staff School in 1926, from the Army War College in 1934, and from the Naval War College in 1939.

Colonel George W. Ricker was also a New Englander, born in Newburyport, Massachusetts, November 6, 1892. He attended Bowdoin College, receiving a B.S. degree in 1915. He graduated from the Coast Artillery School in 1924, the Command and General Staff School in 1934, the Army War College in 1937, and from the Air Corps Tactical School in 1939. He served in four campaigns during the World War.

"Gold Is Where You Find It"

One of the striking facts that are evident to those of us who labor in the JOURNAL's office is that certain units send in bulk subscription orders month after month, while other units are seldom heard from except for a few subscribers. The 69th Coast Artillery, commanded by Colonel William C. McFadden, is one of the units that continue to bob up with bulk orders. One of the reasons for this came to our attention the other day—the 69th has mimeographed subscription application forms for use of its new officers and other interested personnel. Colonel McFadden believes in the JOURNAL as a source of live material for his soldiers, and has taken steps to make it easy for his officers and men to subscribe. The 69th's last order called for nine individual subscriptions and six unit subscriptions.* The JOURNAL will supply printed application forms to interested unit commanders.

A tradition-blasting "first" came from Second Officer Elna Jane Hilliard, WAAC, of Headquarters, 36th Coast Artillery Brigade. Lieutenant Hilliard sent in an order for eleven subscriptions for her sister WAACs, who are welcomed cordially, even enthusiastically, both to the subscription lists and to membership in the United States Coast Artillery Association.

*Three more subscription orders from Colonel MacFadden, received after this article was written, totaled thirty-one names.

Lieutenant Colonel V. W. Wortman, commanding the 122d Coast Artillery Battalion, is another frequent repeater with bulk orders. This time Colonel Wortman sent in thirty-one subscriptions for both organizations and individuals. Captain Peter P. Bruce, another whose name has appeared frequently here for the subscription orders he sends in for the 422d Coast Artillery Battalion, forwarded nine new subscriptions to retain his unit's 100% record.

Lieutenant Colonel Edmund H. Stillman, at Michigan State College, submitted twenty-six subscriptions from the Junior Class at that school. He had previously sent in eighteen from the Senior Class. Lieutenant Sherwood Smith, personnel officer of the 601st CA, accounted for twenty-two new subscriptions, and his letter was followed in a few days by one from Colonel H. A. McMorrow, his regimental commander, with an order for eighteen more. Lieutenant James R. Cunningham of the 469th CA Bn. sent in six, and Captain Otto F. Yanisch, adjutant of the 215th, eight.

Captain Edward Libit, adjutant of the 502d Coast Artillery Battalion, sent us seven subscription orders. Lieutenant George J. Cowper, commanding officer of the 501st Coast Artillery Battalion, forwarded thirty-one subscriptions to bring his unit's subscriptions to 87.5%.

* * *

Antitorpedo Boat Firing

Army Times for February 13 carried a short account of an AA gun battery firing at simulated torpedo boat targets in Panama. Slow and rapid fire were used in the practice, which was observed by Major General William E. Shedd and Major General Homer R. Oldfield. The reporter, not permitted to announce scores, proclaimed the shoot an unqualified success.

* * *

Tachanki

The Coast Artillery Journal

Sir:

In the January-February issue (page 8) of your publication there is a photo of a Russian weapon which is labeled "—an ingeniously-contrived AA mount, using a terrestrial machine gun."

The name of this weapon* is the "tachanka." It is a Maxim machine gun carried on a four wheeled vehicle, and pulled by three and sometimes four horses. It carries a crew of three, driver, gunner and assistant gunner. The MG is so mounted that it can be used off of the "tachanka" as either an AA gun or for ground fire. Generally it is used dismounted on the ground in the normal MG fashion.

The "tachanka" was developed during the Russian Civil War by the Cossacks as the old Maxim MG (heavy) weighs 90 pounds. It uses the "Sokolov" mount

The tachanka

which enables it to be drawn on the ground on the wheels you see. The "tachanka" not only increases the mobility of the MG, but it also allows for the crew to carry a liberal supply of ammunition.

This vehicle is in use today on the Russian front by Cossack units and other cavalry. The Cossacks adopt the system of using their four (often three) horses abreast as this allows the animals to be quickly unharnessed in the event the outside ones are injured. This is an advantage over using four horses in tandem (column twos) as the two closest to the carrier make for difficulty in unhitching in the event they are wounded. I mention this, however, as they are often seen in parades in this arrangement. Normally these weapons are employed with Cossack (or cavalry) saber or gun troops as per our use of the LMG in pack with horse cavalry.

Though not an artilleryman, I find much of interest and education in the Coast Artillery Journal. Mention of the "tachanka" is made here because I happened to have made some investigation on the subject of Cossacks; what I cite can be backed up with source material, if the Colonel so desires.

Sincerely yours,

Robert B. Rigg,
Captain, Cavalry.

* * *

ATS Girls Score Fifteen

(From *London Daily Mail*, December 23.)

A.T.S. girls in a mixed heavy A.A. battery in East Anglia shared yesterday in the destruction of a Dornier 217.

This was the fifteenth German plane which mixed

*Combination, not weapon. Actually "tachanka" is name of carriage. Plural of "tachanka" is "tachanki".

batteries have either destroyed or helped to bring down.

The plane was skimming the roof tops when it was identified by the battery spotters, whose work is described as being "remarkably smart."

Some of the rounds fired by the battery hit the raider. The aircraft was seen to wobble, but it recovered and headed for the sea. Losing height, it came into the field of fire of a light battery, who finished it off.

Home Guard A.A. gunners, too, have "opened their score." They have been credited with their first certain kill—a German bomber shot into the sea by a Tyneside battery during a recent raid.

Last night they paraded at their gun site and stood to attention while the Regular Army major in command of the battery read out a message of congratulation from General Sir Frederick Pile, General Officer Commanding A.A. defenses.

Miners, shipyard workers, clerks, half of them veterans of the last war, form the ranks of the battery.

Designation of Training Activities

The Antiaircraft Command, by letter dated November 20, 1942, has clarified the designation of certain antiaircraft training installations. Under the provisions of the letter, the AA installations at Camps Davis, Stewart, Edwards, Hulen, and Haan, and Forts Bliss and Sheridan, are designated Antiaircraft Artillery Training Centers, with the abbreviation AAATC. Camp Tyson is the Barrage Balloon Training Center (BBTC). Fort Eustis and Camps Wallace and Callan are Antiaircraft Replacement Training Centers, abbreviated AARTC. The terms AAAS and AAAB should be self-explanatory to Coast Artillerymen.

Overseas Mailing Restrictions

The War Department has definitely restricted the amount and size of packages that may be sent to service men with an A.P.O. number. This to conserve space for war materials. Enlisted men and junior officers desiring to secure books or equipment through the COAST ARTILLERY JOURNAL should obtain their battalion commander's approval to their list of articles before mailing it to us. We must submit this approved request to our local Postmaster in order to obtain permission to mail.

Such packages may not be more than five pounds in weight, not more than fifteen inches in length, nor more than thirty-six inches in length and girth combined.

The JOURNAL is still prepared to continue its book service to officers and soldiers overseas but requires the approval of the proper officer. Since packages weighing more than five pounds may not be sent, it is suggested that larger book orders be broken into smaller units and each one separately approved.

The above restrictions do not apply to articles mailed to the commanding officer of a military unit. Books for a unit library, for instruction purposes, or for the day room, are included among those that may be sent as before.

The JOURNAL regrets the necessity for this new restriction, but pledges to continue to the best of its ability its policy of service to Coast Artillerymen and other service men wherever they may be.

London's New AA Defenses

The nightmare barrage which routed the Luftwaffe over London on Sunday night (January 17) was the result of months of careful planning by some of the best scientific brains in Britain.

It contained some closely guarded military secrets. New weapons were used for the first time. New methods were tried out which foxed the enemy and forced many of the raiders to turn away at the outskirts of the capital. These great changes followed large-scale experiments. When, in recent months, puzzled Londoners watched searchlights chasing bombers, while the guns remained silent, they were, without knowing it, spectators of tests which yielded much valuable information to our antiaircraft experts.

General Sir Alan Brooke, Chief of the Imperial General Staff, who is a gunnery specialist, has taken a close personal interest in the new developments.

The new methods are still an official secret. But they are noisy secrets, and Londoners were quick to detect the sound of new guns above the general din.

There were spectacular happenings in the sky, too. Shells burst in a close pattern around the diving, jinking planes, lighting the sky with a red glow.

The ack-ack fire was terrific, the raiders being enveloped in tremendous concentrations of exploding shells as soon as they were picked up by the searchlights.

The strengthening of London's defenses had not been kept secret, but the extent to which the batteries had been reinforced astonished many.

London is now one of the most strongly defended cities in the world—and improving all the time.

Almost all of London's new and still-secret ack-ack guns are now manned by Home Guards, who "stand by" at the battery one night in eight.

An official of Antiaircraft Command said last night that the Home Guard gunners did extremely well in what was their first real test.

He revealed also that 3.7 in. guns were fired operationally for the first time by Home Guards on Sunday night and yesterday morning.

"In two different parts of London Home Guards who are in training to use these heavier guns were actually receiving instruction at their gun-sites when the raid began.

"They are so keen that they persuaded their instruc-

ers to let them have some real practice. Although they are not fully trained, they behaved like veterans."

The master mind behind the barrage on Sunday night was a high-ranking Army officer who, sitting on a raised platform in the gun-control room deep below ground in Central London, controlled the whole of London's guns as a conductor directs an orchestra.

On the desk in front of him stood a microphone, through which he gave orders which echoed round the gun-sites from loud-speakers.

Radiolocation, which has made great strides since the last big raids on London, enabled A.T.S. (Auxiliary Territorial Service) girls to plot the course of aircraft in the gun-control room on a huge colored map, which told the G.O.C. (General Officer Commanding) exactly what the guns had to cope with.

These A.T.S. girls were plotting in the control room on Sunday night for the first time, although they have long performed this duty in the batteries.

These have their own radiolocation equipment and, within the general supervision of the G.O.C., the battery commanders give the orders for the guns to be fired.

"Ack-ack gunners now shoot to kill," I was told last night. "Radiolocation has made prediction and range-finding so exact that the box barrage is a thing of the past.

"We now aim dead at the spot where our instruments say the plane will be when the shell gets there."

—*London Daily Mail.*

* * *

Campaign Medals

Regulations covering the award of three campaign medals authorized by Executive Order—the American, European-African-Middle Eastern, and the Asiatic-Pacific—to members of the land and naval forces, including the Women's Army Auxiliary Corps, who serve outside the continental limits of the United States during this war, have been announced by the War Department.

Although manufacture of the medals themselves has been postponed indefinitely to conserve metals needed in war production, the appropriate service ribbon which accompanies each medal will be awarded to individuals after their arrival in a theater of operations under competent orders. The service ribbons, one and three-eighths inches long by three-eighths of an inch wide, are worn on the left breast over the pocket of the service blouse. Each service ribbon is designed to symbolize the area that it represents.

Land and naval personnel who serve in the American Theater outside the continental United States will be awarded a blue service ribbon with narrow red, white and blue stripes in the center representing the colors of the United States, and a combination of narrow black and white stripes representing the colors of Germany, and narrow red and white stripes representing the colors of Japan, near each end.

The European-African-Middle Eastern Campaign Medal's service ribbon is green, representing the green fields of Europe, with narrow stripes of United States colors in the center flanked by narrow stripes of the Italian colors of green, white and red near the left end, and by narrow stripes of the German colors of black and white near the right end. The borders of the right and left ends of the ribbon are brown, representing the sands of the desert.

The service ribbon for the Asiatic-Pacific Campaign Medal is orange, with narrow stripes of the United States colors in the center, flanked by narrow stripes of the Japanese colors of red and white near each end.

The regulations specify that the medals are awarded

A rarely photographed action: the ricochet, burst, and subsequent fragmentation of a point detonating H.E. projectile. The tall column of water on the right side of the picture is the splash, the black smoke puff is the explosion, and the spray beneath that is caused by the pieces of metal from the projectile itself.

Photograph by Lieutenant R. L. Smirnoff, Coast Artillery School

for service during the period from December 7, 1941, inclusive, and a date six months subsequent to the termination of the present war. No more than one service ribbon representing service in any one theater will be worn, regardless of the number of periods of duty within that theater.

One bronze star, three-sixteenths of an inch in diameter, will be worn on the pertinent service ribbon for participation in each operation announced by the War Department in General Orders as authorizing participants to wear such recognition. Where more than five bronze stars have been earned, silver stars of the same dimension may be substituted for the bronze in the ratio of one to five.

The policy of awarding campaign medals while the war is in progress is a departure from World War I procedure. It was not until after 1919 that the World War Victory Medal, with its rainbow-hue service ribbon and campaign clasps, was authorized for wear. By the time the medals were obtainable, a majority of military personnel had been demobilized.

✓ ✓ ✓

Detecting the Hedge-Hoppers

By Daily Mail Air Correspondent

In a frank review of the south coast tip-and-run raids this winter, the Air Ministry released for publication for the first time last night an all-important fact which not only largely explains the "sneak" raider but also provides the answer to many points which have puzzled laymen in the last two years. That fact is:

No form of radiolocation employed either by ourselves or the enemy has yet succeeded in functioning reliably in the detection of the low-flying aircraft.

Although it could not be stated at the time, I believe it was also foremost among the reasons for the escape of the *Scharnhorst*, *Gneisenau*, and *Prinz Eugen* from Brest early last year.

This curious weakness in one of the greatest scientific wonders of the war has led to the extensive development by both sides of low-flying attacks at "zero" feet by fighter bombers.

All the latest German fighters have been equipped to carry light bombs in lightning-like forays beneath the level of effective radiolocation.

The R.A.F.'s exploitation of this weakness has far exceeded that of the enemy's—represented almost entirely by his sneak raids on the south coast of England.

If German towns had been situated on the other side of the English Channel instead of French towns they would have been rendered completely uninhabitable by this time instead of merely uncomfortable, as is the case with England's "front line" towns.

The enemy raiders, whipping in at "zero" feet, now fly at an average speed upwards of 350 m.p.h., compared with the 150-180 m.p.h. speed of the Battle of Britain raider.

There is generally only about five minutes' warning of a tip-and-run raid, and almost no way of predicting where it will strike.

The average length of stay of a raider on this side of the Channel is now between three and four minutes. In that time he covers about 20 miles.

Finally, here is the actual experience of the 64 enemy aircraft which have attempted since January 1 to reach one of the most frequently visited points on the south coast.

Twenty out of the 64 were actually intercepted and turned back before they crossed the coast.

Thirty-seven only carried out some form of attack.

Ten were destroyed by R.A.F. fighters.

Two were destroyed by light antiaircraft fire, now substantially increased.

Six more were known to be damaged seriously.—*London Daily Mail.*

✓ ✓ ✓

Rope Cutter

The Mine Buoy Rope Cutter, described in *Coast Artillery Board Notes* in the November-December issue, was designed by Major Wilmer C. McCall, Coast Artillery Corps. Major McCall has assigned the patent rights on the device to the government.

✓ ✓ ✓

Marine Barrage Balloons

(Excerpted from the *Baltimore Sun.*)

The Barrage Balloon Training Center for Marines is the official name of the Marines' newest training center, located at the New River, North Carolina, Marine combat training reservation. The Marines expect to raise their own balloons around airports and other points they want to protect from enemy planes. Londoners, during the *Blitz*, found that even experienced German dive bombers are afraid of the balloon cables.

Marine Corps balloonists are being trained to supply barrage balloon service to widely scattered and distant points.

At the unit here, the flabby blimp-shaped balloons are raised and lowered several times a day, "bedded down," "close-hauled," inflated, tested, inspected. Balloons "bedded down" are held on the ground by means of sandbag weights; "close-hauled," they are flying on a very short cable, ready for immediate ascent. In the close-hauled position, their fins flopping, their noses wiggling to and fro in a slow, rolling motion, they look like something you wouldn't be seeing if you had gone easy the night before. One of the main jobs at the balloon unit here is the training of sailors in balloon technique.

Convoys, like airports and cities, use the balloons to keep low-level and dive bombers away. At sea, each ship in a convoy flies a balloon. The seagoing balloon is somewhat smaller than the land article, and hence

does not fly so high. But it is easier to bed down on the deck of a ship. The type of balloon most commonly used is about 80 feet long and has a diameter of about 30 feet. With a volume of about 20,000 cubic feet, it will lift about 350 pounds of cable. The cable used weighs 87 pounds per thousand feet. An American type of balloon, known as "dilatable" (it expands as it rises), will lift more weight and hence will go higher, but it is less maneuverable in a high wind and harder to handle on the ground. It bucks and flies "off wind." The English design, with its air-filled fins, is in more common use.

The marines expect to use barrage balloons to protect airports and encampments from low-level bombing. As a matter of fact, the balloon men say, they may be used for a good many other purposes—they are still in the experimental stage.

But even the Germans have recognized their value. It has been reported that vital industrial areas in Germany have been ringed with the balloons. How many balloons are needed to protect a given point is still a matter of debate. In England, according to Colonel Smith, the balloons have been raised in fixed patterns, to make it impossible for an enemy plane to fly through the cables without losing a wing. Sometimes the balloons can be raised into the clouds in such a way that nothing at all is visible. But in any case, because the wind never allows the balloon to rise directly over the winch, it is impossible to tell from the location of a balloon just where the cable is hanging.

Around airports in England the balloons have been placed in much the same manner as a minefield. Friendly pilots must know where the opening is in order to get through and land.

Airborne Troops Seize Airdrome*

Assume that the enemy field has already been heavily bombed.

First come the paratroopers. Planes fly over at a low level and drop the "umbrella men" to seize and hold the airfield. After a sharp engagement, they gain control and immediately set up radio communications. By this means, together with pyrotechnics and ground panels, they direct incoming transports to landings on the field.

This is the second phase—the deplaning of airborne infantry and the unloading of jeeps, trailers, motorcycles, artillery pieces, ammunition and supplies. As quickly as they are emptied, the planes take off again for fresh loads; this procedure continues throughout the day, even into darkness.

Third phase of the pattern of attack comes on the second day and is primarily a problem of re-supply and consolidation. Food and ammunition are dropped by bright-colored parachutes. Additional men and pieces of equipment are brought in.

Here the gliders play their part. Towed by large camouflaged aircraft, the huge motorless ships are quickly cut loose, landed and parked at the unloading area. From each glider rolls a jeep under its own power, rapidly followed by armed men.

Fourth and final phase of the operation is the evacuation of casualties—stretcher cases and walking patients alike—to be followed, ultimately, by complete evacuation of personnel and equipment as the attack moves forward.

*From an article by Brigadier General Fred S. Borum in *Air Force*.

Service Flag

War Department Circular No. 35, dated February 2, 1943, describes the approved service flag and service button for members of the family of service personnel, and of organizations which have furnished members to the armed services. The circular also designates the occasions for displaying the flag or button, and provides for the licensing of manufacturers of the devices.

The service flag resembles in most particulars the familiar flag of the last war, and the buttons follow the same general design.

Nineteen Per Cent at Malta

An Associated Press story from London, quoted below, indicates that antiaircraft fire accounted for approximately nineteen per cent of the enemy planes brought down over Malta.

London, Jan. 6 (AP).—Malta, the British Mediterranean stronghold which has suffered more bombing raids than any other one spot during this war, destroyed 955 enemy aircraft during 1942, the Middle East News Service of the R. A. F. said today.

Of these, 773 were shot down by R. A. F. fighters with loss of 195 British craft. The pilots of eighty-nine of the British craft were saved, however. Antiaircraft fire accounted for 182 of the enemy craft.

New Training Aids

Training Film 1-401, Effects of Aerial Bombs; and Film Strips 4-30, Antiaircraft Searchlights, General Electric M 1941, Distant Electric Control System—Data System; 4-32, Rigging for Barrage Balloons; 4-33, Orientation, Part 1—General; 4-28, Identification of Merchant Ships; and 4-41, Fire Control and Position Finding for Antiaircraft Artillery, Part VIII, Data Transmission Theory, are among the recently-released training aids of interest to Coast Artillerymen.

Coast Artillery Activities

Southern California Sector

BRIGADIER GENERAL FORREST E. WILLIFORD, *Commanding*

The Fort Rosecrans Band, under direction of Chief Warrant Officer James Semer, is one of the most active organizations at that post. Besides playing for reviews, the Band and its subsidiaries are in evidence almost daily.

Hospital patients each week are serenaded from a picturesque hillside back of the Station Hospital. A newly organized choir under direction of an experienced choirmaster, Private Honeyman, contributes its music to Sunday church services. All post dances and many outside hops for enlisted men benefit by the dance section of the band, led by guitarist Sergeant Vito Mumolo.

The Band entertains with a 15-minute concert as a preliminary to each Friday night fight program, punctuates the announcements, and keeps things lively during intermissions. The "Fightin' Band" usually is led by T/Sgt. Aime J. Reinwald, former national bugle champion whose musical timing of the athletic events contributes much to their entertainment.

Not content with getting the utmost in performance from his boys, Mr. Semer himself is a busy composer of military music. His last piece, a highly individualistic and stirring production, was dedicated at a formal concert in February to the officers and men of the station. It is titled *The Fort Rosecrans March*.

The three B's of sports, Boxing, Baseball and Basketball, have vied with each other for popularity during the past two months. Boxing still is the most favored spectator sport as it invariably draws capacity crowds to the service club where regular Friday night cards are offered. Two ex-professionals recently have earned post championships by beating all comers. Private Dallmos Ontiveros, who had to beg permission to fight when he came here as a recruit a few months ago, has licked everything in sight to win the lightweight title. Ontiveros had been a Golden Gloves and pro fighter in San Francisco, Hawaii and Los Angeles before the Army claimed him and assigned him to the MPs.

Private Louis "Hangman" Sandoval, nicknamed because of his tendency to play the ropes, took the Senior Welter Weight crown with no apparent difficulty. Interbattery competition for boxing points is keen.

The Fort Rosecrans Baseball Team under direction of Captain Wm. Saunders has had an unrivalled winning streak through several series. Last month it copped the San Diego County Winter League's first series, and at present is well on the road to top position for the Winter League's second half.

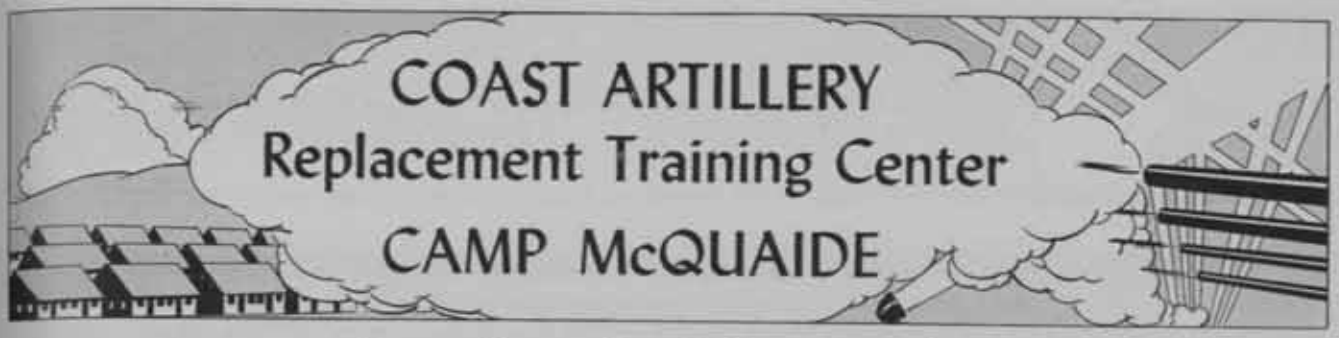
The Fort Rosecrans Basketball Team now thick in local competition has just downed The Bluejackets, hitherto undefeated Naval Training Station cagers, which may indicate another county championship in the making. The same Private Earl Chapple who has pitched the majority of wins for the baseball team is also the basketballers' star.

The Life of Henry Aldrich, the Broadway play that is the basis for a popular radio series and for a motion picture, was presented to Fort Rosecrans personnel by San Diego High School players December 29.

Recruit Revue of '42, with less than a week of preparation and with the most meager of props, scored a surprise hit. The performers, inspired by the enthusiasm of Special Service Officer Captain Otto Wolgast, organized their show between duty and target practice. Highlights included a pony chorus, four-piece novelty orchestra, clog and hula dancers, singer, and a bang-up recruit drill number.

USO's roadshows, *Cavalcade of Music* and *Victory Sweethearts*, played to SRO during the past two months.

A new fort—Fort Emory, has been named in honor of Brigadier General William H. Emory. The General was a member of the Boundary Commission which established the International Boundary between Mexico and the United States. The line was about to be drawn north of San Francisco when Emory, a lieutenant at the time, appeared before Congress to protest. He argued with such persistence, pointing out the strategic importance of San Diego and the fact that its bay is one of the best on the Pacific coast, that it was decided to hold



BRIGADIER GENERAL FRANK S. CLARK, *Commanding*

By Captain H. A. Sherwood

Training at Uncle Sam's Coast Artillery (Seacoast) Replacement Training Center has taken on increased vigor and enthusiasm the past several months as the camp is gradually becoming better organized and better prepared for the training of thousands of men for Coast Artillery combat duty.

Several inspection parties from the Replacement and School Command, Birmingham, Alabama, and the Coast Artillery School, Fort Monroe, Virginia have been guests of the CARTC, and have left behind them many new ideas and suggestions for improvements.

Officer Candidate School quotas, especially for the Coast Artillery School, have been increasing monthly for the CARTC. Officer candidates are now being taught the fundamentals of being a Second Lieutenant at the OCS Preparatory School, conducted by the officers and cadremen of the Enlisted Specialist School. The largest preparatory class in the history of the training center is expected to start very soon. Besides filling quotas for the Coast Artillery School, men of officer qualifications have been sent to the Adjutant General, Finance, Infantry, Tank Destroyer, Armored Force, Engineer and other Officer Candidate Schools.

Newly constructed and former drill fields and roads at the Coast Artillery Replacement Training Center have been named in honor of former Coast Artillerymen of the United States Army.

The drill fields include the following:

Allen Field, in honor of Captain Francis Allen, who died while on foreign service.

Bundy Field, in honor of Colonel Charles W. Bundy, who died December 12, 1941, while on a flight.

Ricker Field, in honor of Colonel George W. Ricker, who died December 12, 1941, while on a flight.

DeMerritt Field, in honor of Colonel Robert E. DeMerritt, whose death in 1942 was the result of overwork in connection with the establishment of the new Antiaircraft Training Center at Camp Davis, North Carolina.

Five roads were named in honor of Coast Artillerymen:

Hero Road, in honor of Major General Andrew Hero, formerly Chief of Coast Artillery.

Gulick Road, in honor of Major General John W. Gulick, formerly Chief of Coast Artillery.

Miles Road, in honor of First Lieutenant Robert W. Miles, who died on foreign service.

Schumann Road, in honor of Warrant Officer (jg) Wesley A. Schumann, who died in an airplane accident while on foreign service.

Hayden Road, in honor of Private First Class Henry Stoke Hayden, who died while on foreign service.

New training features at the CARTC include several retreat parades which have been held by the various training battalions; special radio equipment, which has arrived and will be installed soon for actual use; and the new Physical Training program, which has been reorganized.

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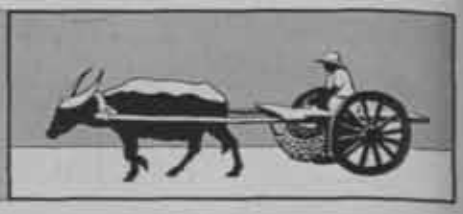
out for San Diego at all costs. Thus the new Fort Emory protects land for whose ownership we are largely indebted to the General.

The Fort Rosecrans Cannon Report, weekly camp newspaper, ran a special sports section in its January 15 issue that set a record among Army papers for pix. The four page section carried numerous sketches by Staff Artist Private Archie Wilson, plus twenty-eight sports photographs, the majority showing boxers in fighting poses.

After campaigning for a year, *The Cannon Report* and NCO Post Exchange Sub-Council persuaded the PX management to install hot food counters. A contest is under way to name a special 'burger featured by the PXes. It is said to be so super that no known superlative suits it.



I SHALL RETURN!

MACARTHUR

Corregidor needs no comment from me * * * *It has sounded its own story at the mouth of its guns* * * * *It has scrolled its own epitaph on enemy tablets* * * * *But through the bloody haze of its last reverberating shot* * * * *I shall always seem to see a vision of grim, gaunt, ghastly men, still unafraid* * * * *"*

Douglas MacArthur

BRIGADIER GENERAL JAMES R. TOWNSEND, *Commanding AAATC*

By Lieutenant Donald A. Carlson

Camp Haan, once identified by the public as "that camp across the road from March Field," rapidly is specializing its training of AAA Units to combat the axis in every clime and terrain, with every effective weapon known to the fighting battery.

"If You Don't Know You Get Killed" has been the serious thought and slogan of the Judo instructors who teach hand-to-hand combat with bayonet, bolo, machete and the knife. Major General Joseph A. Green, with his Chief of Staff, Colonel Cortland Van R. Schuyler, recently witnessed a demonstration of Camp Haan's methods of teaching confidence and skill in close-in combat. Brigadier General Floyd L. Parks, Chief of Staff of the Army Ground Forces, and Brigadier General John M. Lentz also witnessed a vivid demonstration that included the use of a newly-designed obstacle course, closely simulating actual fighting conditions. It is hoped that a training film can be made of the new technique to aid other camps in adopting this "fool proof" training.

Under direction of the AAATC combat intelligence, an effective method of teaching aircraft identification has been developed. Replacing the time-worn WEFT system, flash cards of plane silhouettes in at least three positions are used by platoons and by individuals. Each man is encouraged to prepare his own set of flash cards, so that he may constantly improve his ability to identify Allied and Axis aircraft. Where feasible the training is supplemented with motion pictures and illuminated slides. The flash card system can accompany the soldier wherever he travels and new models of planes can easily be added. Tanks, armored vehicles and scout cars of friend and foe are also adaptable to this training system.

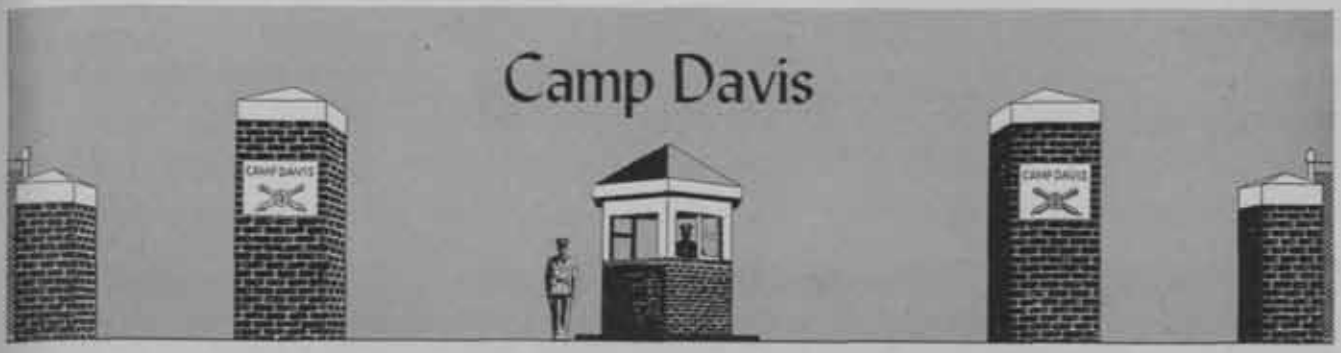
Signal Corps Photo.

Captain William K. Wolf demonstrates his cardboard splints.

Important in the development of training aids has been the AAATC Training Aids Shop, first developed as a Hobby Shop. Its production has been turned to dummy rifles to be used in Judo training, full-size dummy tanks, replica M5 directors to train azimuth and elevation trackers and a host of ideas that emerge in plywood, scrap lumber and paint to become a part of the battery property.

Outstanding in its effectiveness for casualties in the field is the new type bandage and splint as developed by Captain William K. Wolf, medical officer of AAATC, and Captain George Donich of March Field. Captain Wolf has pioneered the use of simple splints that can be made from castoff cardboard boxes that carry food and supplies. It has been found that in many respects they are superior to the usual wooden ones. The cardboard splint facilitates manipulation around elbows and joints, and is light, durable and strong. It can be packed in a small space and shaped with a pocket knife or by hand. Charts showing the application of the many types of bandages and splints are being made available for unit instruction in field use.

A riding club has been formed with headquarters on property adjacent to the Camp. Fine horses and polo mounts have been loaned by several noted Southern Californians. A clubhouse and stables are being made ready for the opening. A new Camp Haan and Camp Irwin newspaper will make its appearance the week of March 15 with an initial issue which will carry articles and pictures of Judo, aircraft and tank identification to coincide with current training.



Major General Homer R. Oldfield, *Commanding*

By Lieutenant R. B. Doulens

This center of training for antiaircraft artillerymen lost by retirement the major general commanding the Antiaircraft Artillery Training Center—and gained another major general as his replacement.

Major General Frederic H. Smith, who on May 30, will reach the statutory retirement age of 64, cleaned off his desk—busy to the last—and late in February went to Hampton, Virginia, to await May 31, when his retirement becomes effective. Shortly before General Smith left this post, Major General Homer R. Oldfield flew in to confer with the retiring veteran whom it was understood he would succeed.

On February 20, the largest formal parade ever staged at Camp Davis was held as a tribute and farewell to General Smith. Taking part were many battalions of antiaircraft artillerymen including several battalions from the Antiaircraft Artillery School, situated at Camp Davis. While the troops marched past a reviewing stand set up in front of the Air Base Administration Building, observation planes roared down the line of parade in perfect formation.

Brigadier General Oliver L. Spiller, commandant of the Antiaircraft Artillery School, was in command of the troops assembled for the review. After the troops had begun to pass in review, he joined General Smith in the reviewing stand. General Oldfield witnessed the spectacle from another grandstand. Before the march began, the gun salute to a major general was fired in honor of General Smith.

The Antiaircraft Artillery Training Center continued to expand in recent months. Additional barracks, administrative and other structures—all of temporary war nature—are continually under construction. The camp, previously laid out in solid rectangular shape and front along U. S. Route 17, has taken on a T-style formation. Many rows of barracks have been built and are being augmented in a westerly direction from the center of camp. These house, mainly, troops in basic or secondary training, formed in separate battalions.

Maneuvers, field problems and other activities involving the tactical training of troops are underway at all times. One of the most interesting exercises recently carried out embraced the defense of an air field and ammunition dump (simulated) in the vicinity of Catherine Lake, North Carolina, some twenty miles northwest of this training center.

The problem assigned to an automatic weapons group, augmented by a gun battery, called for the repulsion of both air and mechanized ground assaults on the theoretical air field and ammunition dump. It was assumed that the imaginary enemy forces would be part of a hostile invading army which had established itself in a line from Plymouth, N. C. to Raleigh, N. C. Five days was set as the time for the maneuver. The terrain was heavily wooded, traversed by a few sand and clay roads. These became difficult for travel during sleet and rain which prevailed through much of the exercise.

At the conclusion of the main attack by the enemy on the third day of the problem, umpires agreed that the defense was successful. Attacking forces had included light tanks—marine mechanized units from the New River, N. C. base—and airplanes. Paratroop attacks were also assumed.

Outstanding phases of the exercises were the successful moving of all troops, guns, and matériel by the group during complete blackout conditions over practically unfamiliar territory. A second major development of the exercise was demonstration of morale by the troops. Umpires termed the morale superb in the face of bivouacs in rain and sleet, under blackout conditions. During part of the exercise ration C was used by both enlisted and officer personnel.

Another administrative development at Camp Davis recently was the designation of Colonel Adam E. Potts, Headquarters staff, as camp commander.

Signal Corps

General Oldfield and General Green at Camp Davis.

Camp Wallace

BRIGADIER GENERAL HUGH N. HERRICK, *Commanding AARTC*

By Captain Christian F. Beukema

A new twist has been given the much-overworked adage that "an army travels on its stomach." Here at Camp Wallace, within two weeks of the introduction by the Army Ground Forces of a mental conditioning program for combat training, trainees were using the newly constructed Infiltration Course.

The Infiltration Course, one hundred yards long, filled with slit trenches, fallen logs, barbed wire entanglements and shell holes, offers a splendid medium of introducing the recruit to combat fire. Three .30 caliber machine guns fire a traversing fire a bare three feet above the ground. Land mines controlled from an observation tower explode at various intervals showering dirt and debris over the troops crawling on their stomachs. Recorded battle noises and sirens blend in with the explosions and machine gun fire to produce a crescendo of sound that closely parallels actual warfare. The long crawl, an excellent physical conditioner, culminates with a bayonet charge once the safety zone behind the machine guns is reached.

The course was first "crawled" by a guinea pig detachment composed of staff officers. Experience gained from this sortie was of much assistance in planning the inaugural instruction of trainees when the first battery burrowed its way over the course.

Probably the most important news item concerning this replacement training center since the last JOURNAL copy was sent in, is the change of command. Early in January Brigadier General E. A. Stockton, Jr. was ordered to another station. Colonel Herrick arrived as

Signal Corps Photo

Under the wire at Wallace's Infiltration Course.

Signal Corps Photo

Mines explode throughout the course.

his replacement and was nominated to the temporary rank of Brigadier General shortly thereafter. The Senate confirmation closely followed.

With the advent of the thirteen week training cycle to the schedule of this Replacement Training Center, the entire schedule of increments was revised to permit the training of battalions as a unit. With all batteries of a training battalion in the same week of training, it was possible to institute a new type of training inspection.

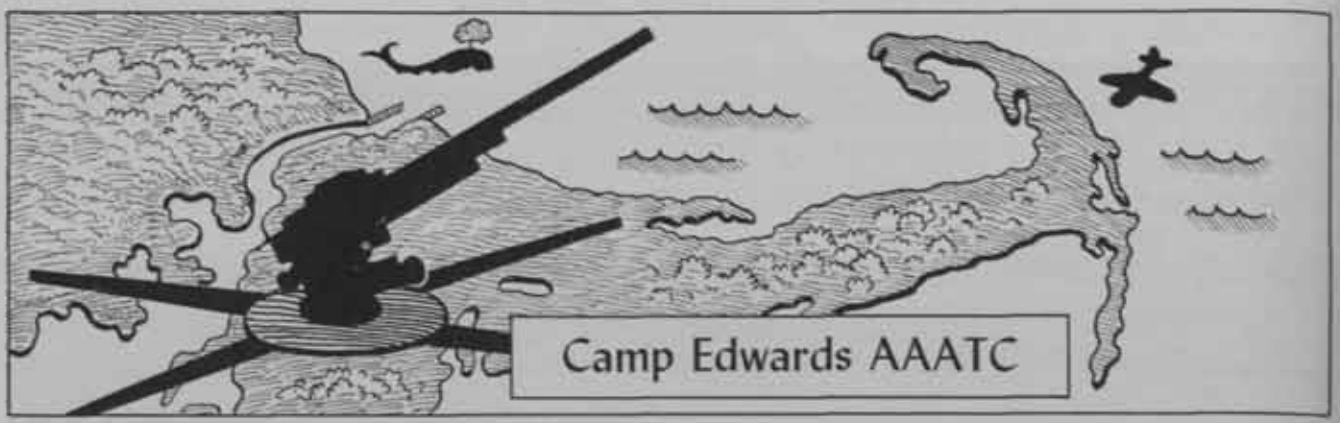
In this new type of inspection a team of officers visits a battalion in its fourth or final basic week of training on short notice. An inspecting officer is assigned to each battery. He assigns to each platoon a subject in which the demonstration instruction will be given. The entire inspection is conducted informally. Care is taken to avoid repetition in the battalion of the subjects demonstrated. Since each platoon represents the entire battalion on a different subject, emphasis is naturally given to prepare each platoon for every topic. In the eighth week of training another inspection is conducted covering additional subjects of the training program. A final proficiency test is given in the twelfth week of training. The objective of this test is to determine the proficiency of the individual soldier in his SSN classification. The results of the new inspection program have been most gratifying.

The increase in the length of the training period has permitted the inclusion of more hikes and overnight bivouacs into the schedule of instruction. The present course of marches consists of three marches per week for the first four weeks with the length of march increasing from two to eight miles and the rate of march increasing from three miles per hour to four miles per hour. Two marches per week are scheduled for weeks five to thirteen inclusive. Marches for the fifth and sixth weeks of training are of ten miles length, and the marches for the seventh and eighth weeks are of twelve and fifteen miles length at an average of three and a half miles per hour. Marches for weeks nine through thirteen are planned to increase the rate of march until a goal of seven miles per hour is realized.

On all road marches except the first four the men are equipped with rifles and full pack.

Although the higher rates of march may appear difficult to attain, the entire program was recently encouraged when a single unit covered the distance of seven miles in one hour and twenty minutes.

In the twelfth week of training a twenty-five mile march and overnight bivouac are combined as a climax to the hardening program. Since the size of Camp Wallace prohibits large bivouacs, "maneuver rights" have been obtained on private acreage through the cooperation of civilian agencies. All marches and bivouacs are conducted under simulated battle conditions. Special endeavor on bivouac is made to achieve complete "blackout." The success of this plan is apparent from a report of a recent bivouac which stated that one soldier had slept all night on his rifle believing it to be the root of a tree.



BRIGADIER GENERAL MORRIS C. HANDWERK, *Commanding*

By Lieutenant John H. Thornton

Because "Readin', Ritin' and Rithmetic" is so important to the development of an efficient antiaircraft artilleryman, the AAATC at Camp Edwards has its own "University" made up of centralized schools, where trainees develop particular skills which can be best handled by specially qualified instructors and equipment. In this manner one of the most important aspects of the AAATC training program at Edwards is the employment of specialized instruction in teaching the more difficult phases of antiaircraft artillery, thereby at the same time releasing much valuable time for concentration on decentralization of leadership and the development of aggressiveness and responsibility among officers and enlisted men within the units. Six centralized schools are sponsored by the AAATC at the present time, ranging all the way from a Special Training unit for soldiers who cannot read or write through advanced courses in the care and operation of highly technical radio type equipment.

Each of the schools has been set up to meet a definite problem in the training of an antiaircraft artillery unit. Candidates to attend are carefully selected and tested within the units before attending the AAATC centralized school. Upon graduation they return to their own units to fill key positions and at the same time to serve as instructors in training replacements.

In each of the AAATC schools the "faculty" has been carefully chosen from available officer material. Each has had a full background in instruction and in practical experience. In the same manner the most modern training aids available have been assembled, in order to attain the most efficient results in instruction.

One of the most outstanding examples of the success of the centralized school system at Camp Edwards is the Officer Candidate Preparatory School. Recognizing the necessity of providing officer candidates with a complete academic background, the training center requires that all prospective entrants at the antiaircraft artillery officer candidate school attend regularly comprehensive classes in algebra, trigonometry, logarithms and coördinates.

For candidates who are academically sound but who may lack self-confidence or military bearing, the AAATC has developed its unique Voice and Command School. Here the would-be officer is given full instruction in voice control, command, and the various factors which add to the military bearing and dignity necessary for an officer.

Net outcome of the AAATC's OCS "Prep" has been that less than 3% of the candidates sent from Camp Edwards to Officer Candidate Schools have failed to receive commissions.

Early in its existence the AAATC recognized the need in unit training for expert motor maintenance men. Therefore the Motor Maintenance School is one of the oldest courses of instruction. It is divided into three week sessions with the subject matter arranged in three sections—carburetion, ignition and chassis maintenance. Expert civilian instructors are utilized in teaching and full benefit of training aids is made. One of these training aids about which future motor maintenance men learn the fine points of automobile engines is a cutaway motor which once graced an automotive exhibit at the New York World's Fair.

Communications men are trained in the Radio School. Radio, telephone and visual methods of communication are taught to enlisted men who will later form the bulwarks of the communications sections in their units. Under the same group of officers, instruction is given other officers and enlisted men in the operation and maintenance of other types of radio equipment.

Gun batteries at Camp Edwards have found valuable assistance in the AAATC centralized school for the height finder. Instruments from the units are pooled and the school's up-to-date methods of instruction have resulted in highly satisfactory results. Operators are given all the necessary stereoscopic tests and train every day on the same height finders which they will operate when the gun batteries are firing. Careful day-to-day records of progress are kept, and in addition to the actual operation of the height finder, training in maintenance is an integral part of the course. By this method every gun battery in the training center is assured of an adequate supply of trained range section

A class at the Aircraft and Tank Identification School.

observers, all of whom have received the benefit of uniform and highly proficient methods of instruction.

One of the largest of centralized schools is the Aircraft and Tank Identification School. "I sure was glad I had that course," a noncom, now in action, wrote back to the Training Center recently. "All the way over on the ship and after we got here I didn't have any trouble at all identifying planes of every sort."

The ability of this sergeant was the direct result of the four weeks' course in Aircraft Identification at the AAATC centralized school.

Training aids of all types are employed. These include model airplanes of every description, pictures from civilian publications, training films and official information bulletins. Staff artists are constantly at work providing the latest plane silhouettes. A delineascope makes possible the projection of small pictures on a large screen, and in its new quarters The Identification School is able to make full use of a large projection room for training films.

The student body at the Aircraft and Tank Identification School is made up of picked officers and enlisted men from the units in training. They are given a day-to-day review to refresh them on the technical points, eliminate obsolete material, and fit them to return to their units to act as instructors in the subject of identification.

As the result of the efficiency of this school, a number of officers from other branches of the service located at Camp Edwards have been trained after the regular AAATC hours for instruction. Close liaison has made it possible to keep abreast of all advances in matériel and also to secure valuable instructional aids. For example, through the coöperation of one of the larger commands the AAATC was recently able to secure full sets of reproductions of all its silhouettes, drawn by a trained artist, for distribution to units in the training center to be used as training aids in the batteries.

Most recently developed school at the AAATC is the Special Training Unit for enlisted men who are non-English speaking or who have not shown sufficient aptitude to progress with their organizations. A balanced program of academic and military subjects has been designed by the Classification officers and the Personnel Consultant to fit these men for active duty with their units.

Two other centralized courses of instruction for the perfection of officers in the training units are now being conducted. For the first time, unit Gas Officers under the direction of the AAATC Chemical Warfare Officer are undergoing intensive training in the use of chemicals for offense and defense, in detection of chemicals and elaborate instruction in treatment of gas casualties. The other course, supervised by the Intelligence Officer, will cover all phases of military intelligence with particular emphasis on antiaircraft artillery combat and counterintelligence.

Thus the picture of the activity on Cape Cod this cold and windy winter is basically the same, whatever the overtones. It is bound up in the single phrase which expresses the aim as well as scope of the AAATC—*to train antiaircraft artillerymen.*

Fort Eustis

BRIGADIER GENERAL EDWARD A. STOCKTON, JR., *Commanding*

By Lieutenant Gould M. Beech

"There will be some men—and officers—who can't keep up as the new schedule of physical training is put into effect. But if a man does not have, or cannot develop, the necessary endurance, it is better for him and for the Army to discover that fact here rather than in Africa or New Guinea."

This observation was made by Brigadier General Edward A. Stockton, Jr., as he announced the inauguration of more rigorous schedules of marches, calisthenics and obstacle course runs shortly after assuming command here. The training increment has been extended to thirteen weeks, and in addition to the accelerated physical conditioning program all phases of training have been intensified. Emphasis is being placed on more intensive gun drill and preparation for range firing, and also on an increased number of formal guard mounts, retreat parades and reviews.

The schedule of 32 marches begins with a series of 2.5 mile courses and is climaxed in the final week of training with a march of 24 miles to be completed with

In keeping with their Virginia surroundings, officers and men of Battery A, 14th AA Trng. Bn., Fort Eustis, feasted on barbecued hams recently. A group looks on in anticipation as the delicacy nears the well-done stage.

full pack and rifles at an average cadence of 127. Also included is a series of four marches of 8 miles at an average cadence of 169.

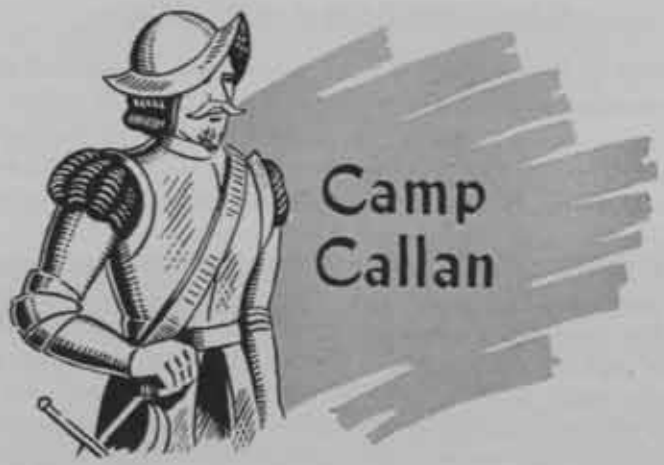
All officers, cadre and trainees except those essential for administrative purposes, or not physically qualified, participate in each march. Coupled with the marches is a more rigorous schedule of obstacle course runs and calisthenics. Movements to and from drill fields and to and from schools are double time. Classes in Judo have been started for officers and cadre. Some units have completed a training cycle under the new schedules, and the officers and men who have completed the marches have an air of confidence and readiness for whatever assignment awaits them at Destination Unknown.

Brigadier General Stockton has relinquished command of the Post, and Colonel Andrew G. Gardner is now Post Commander. Colonel Gardner was formerly Post Executive Officer. Freeing the AARTC command from administrative functions is designed to permit greater concentration on the training program.

Increasingly effective methods are being developed in "salvaging manpower" through fitting the round pegs and the square pegs in their proper holes. Major M. S. Guttmacher, MC, who was a psychiatrist in Baltimore before entering the service, has been assigned here and will work with Major Joseph Letteriello in the Personnel Consultant Section of Classification. The maladjusted, emotionally unstable, non-English speaking, and other types requiring specialized handling are referred to this office by unit commanders. Cases where there are indications of emotional instability are then referred to Major Guttmacher for psychiatric examination. From that point the problem is to determine whether a change of duty or classification will turn the soldier into an asset, or whether his condition is such that he will be a net liability to the Army.

Fort Eustis entered off-Post athletic competition for the first time with a basketball team which won the runner-up place in the Capital City League for service teams in Richmond. Camp Pickett won the league competition with a one-point margin over Eustis in the final game, 38-37. Games were also played with other service and collegiate teams in this area, and the final count for the season was ten wins and five losses. Two of the five losses were to the Norfolk Naval Training Station, which boasts one of the top service teams on the Eastern Seaboard. For the most part officers and men followed their team through the sports pages, but when the College of William and Mary was played in near-by Williamsburg, 800 officers and men were on hand to do some cheering.

Several anniversaries have been remembered recently. Miss Gladys Lyle, who has been bringing a singing and entertainment troupe to the Post from Newport News for two years, was given many thanks and two bouquets for her part in brightening up off-duty hours in battalion recreation halls. Cpl. Charles Boehm completed a year of broadcasting with his program of organ music. Mr. Sgt. Ullysses Savage recalled that twenty-five years ago he was a member of the gun crew which fired America's first heavy railway artillery shell at the Germans. Cpl. Ernest F. Bonnette returned to his birthplace at Fort Eustis to visit his father Mr. Sgt. Ernest F. Bonnette, who was stationed here during the post-war years. Wives of Post personnel who are members of the Red Cross Auxiliary completed a year of work, during which time they prepared more than 50,000 surgical bandages, made curtains for most of the mess halls and recreation halls on the Post, and a long list of warm clothing for soldiers and for children of war-torn countries. The annual Red Cross drive also got underway with an enthusiastic response. And the Post itself completed two years of service since its reactivation.



BRIGADIER GENERAL FRANCIS P. HARDAWAY, *Commanding AARTC*

By Captain W. J. Hauser

Recent changes have caused the separation of the Antiaircraft Replacement Training Center from the Camp Callan housekeeping installations, and the Commanding General has relinquished his command of Camp Callan while he retains command of the Training Center. After this change, the commanding officer of Camp Callan, Colonel Kenneth C. Masteller, with more than two years' duty at Callan, announced the officers of his staff.

The Commanding General of the Antiaircraft Replacement Training Center, Brigadier General Francis P. Hardaway announced, in compliance with Antiaircraft Command directives, the commanders of two sub-groups. The training battalions were divided and Colonel William R. Stewart now commands one sub-group and Lieutenant Colonel Don R. Norris commands the other. Along with these assignments came the announcement of an officer in charge of physical conditioning and another in charge of mental conditioning. Under the new program, all members of the command are hardened and conditioned in both mind and body.

Training cycles have been extended to thirteen weeks for all trainees. This one change permits a modified extended program to include many important subjects. All non-swimmers now are taught how to swim and before the thirteen weeks' training are brought to a close, each battalion spends a week in the field. This week includes conditioning marches, bivouacs, and tactical exercises. Night or day, and rain or shine makes no difference as these important phases of training go along without interruption. These items added to the lengthened training program, now give the trainees more actual experience similar to what they may expect in their later combat assignments.

Troop conditioning at Camp Callan.

Captain A. K. Mills and his carved wooden model of antiaircraft gun.

Firing over the heads of troops crossing no man's land with its barbed wire entanglements and many other front line obstacles give the troops a feel of the actual sensations of close combat. The song of machine gun fire overhead is quite impressive as troops infiltrate from cover to cover.

As all these new training features are going on along with the activities of the former shorter cycle, one can never guess when planes may swoop down from the sky in simulation of a strafing attack on the troops in training. These additional training items are proving to

be of great interest and add the touches of combat realism that one can expect to find when they come into actual conflict with the enemy.

Hobbies in a limited way still seem to exist among some of the officers and men at Camp Callan. Handicraft classes are conducted one night each week at the camp Service Club for those who have a yearning for such hobbies. One officer has for many years made it a hobby to make models of various large objects, out of carved wood. Captain A. K. Mills commands a replacement training battery and in his limited leisure moments he has recently carved out and fashioned a perfect model of an antiaircraft gun. Complete in every detail, the gun operates in recoil and elevates and traverses in the same manner as the service gun. Captain Mills finds that such models are an aid in training.

New England Sector

MAJOR GENERAL K. T. BLOOD, *Commanding*

By Captain Josef C. Dine

Although beset by consistent sub-zero weather and several snow storms accompanied by marrow-chilling winds, New England Sector functions have been maintained. While civilians were being treated by the hundreds at police surgeries and hospitals for frozen ears, hands and feet, soldiers in the Subsectors turned their ear flaps down, their coat collars up, hunched their shoulders—and went right ahead with their work.

During the past month several service practices have been completed by batteries of this command affording some of the new men of the organizations an opportunity to function as part of a seacoast gun crew under service conditions for the first time. The precision with which these comparatively new Coast Artillerymen worked was gratifying to their commanders, and showed the benefits derived from an intensive training program.

Several new obstacle courses have been completed throughout the Harbor Defenses and are now being utilized to the fullest extent. These courses provide plenty of interesting workouts as well as muscle building and coördinating exercises. At a recent track meet held at the Malden, Mass. High School a six man team from the Harbor Defenses was entered in a special servicemen's obstacle race sponsored by the local A.A.U. and gave a very satisfactory account of themselves.

Schools and training films for both officers and enlisted men take their places in the regular training program.

In athletics, the Harbor Defenses of Boston are doing very well. Interpost games are played by a six-team basketball league, and in addition games are played with outside teams, both military and civilian. At Fort Banks, Harbor Defense Headquarters, a post bowling league keeps the Post Exchange alleys busy almost every evening. Boxing shows comprised of all-soldier personnel are conducted throughout the Harbor Defenses, and an elimination series is now in progress to select a team to represent the Harbor in a tournament to be conducted by the First Service Command in the near future.

Another item of interest to a large number of soldiers was the exhibition given at Fort Banks recently by Willie Hoppe, the greatest billiard champion of all time.

In the Harbor Defenses of Portland training problems and guerrilla warfare training continued, and frequent tests were made of the ground defense plans. Communication drills are being held weekly to test the efficiency and alertness of crews manning various stations.

Fort Williams is leading the Portland Subsector Basketball League with five wins and no losses. Other teams in the league are from Forts Levett, McKinley, Preble, Williams, H. E. C. P., Portland Coast Guard, Infantry and Engineers. Half the schedule has been completed. Basketball is also being played by intra-fort teams.

Bowling league matches have begun at Forts McKinley and Williams. Great enthusiasm has been exhibited. At this writing, a double-header basketball game has been arranged to mark the first use of the new floor at the Fort McKinley gymnasium, with the Coast Guard meeting the Infantry, and Fort McKinley playing the Engineers.

Harbor Defenses of Portland boxing bouts were held at the Fort McKinley gym on Washington's Birthday.

Harbor Defenses of Portland also plan a tournament to uncover the singles and doubles table tennis champs.

Bailey Island Hockey team has competed with several college teams in the vicinity. Ice skating is popular at Forts McKinley and Williams.

Four travelling libraries received from the War Department are being rotated around the outposts, and, according to officers, their use is vastly appreciated by soldiers at isolated installations.

Seventy-five Sector life insurance officers attended an insurance conference at Hotel Statler, Boston, 23 and 24 February. Opening address was given by General Blood, who urged the insurance officers to bring information regarding the benefits of National Service Life Insurance to the soldier by educational methods and by personal interview.

All men armed with the M1 Rifle as well as those who have recently been issued other small arms weapons have fired familiarization courses, and those who have not fired a qualification course since 1 January 1940 have had to fire the courses recently. A bayonet course has been built, and training has been begun in the use of this weapon. Infantry tactics have attained a prominent place on the training program and field problems, with blank ammunition, will be conducted soon.

Officers and enlisted personnel have been attending classes on the 90mm gun and .50 Cal. machine gun. Each man participates in at least one hike each week. Basketball and bowling are being turned to, also, by officers and enlisted men.

Minimum training standards for troops in the Harbor Defenses of Long Island Sound, emphasizing combat efficiency of the individual and unit, have been applied effectively, and an upward trend has been noted. Sound artillery procedures have resulted in a large percentage of the firing batteries attaining target practice scores rated as excellent. During the past six months, the average target practice scores on the entire harbor defenses has increased by 60.3 points.

February 1st found the Harbor Defenses of Portsmouth celebrating the completion of the third year of activation and the end of a most successful target practice season. This last year saw many changes taking place both in personnel and in the physical appearance of these harbor defenses.

During the past year, all scheduled target practices were completed. During November the first "Advanced" practice was fired by a battery here. The alert came as a complete surprise to the officers and men who were scattered about Fort Foster in the performance of their various duties, and it was an excellent demonstration of the high state of training attained by this battery.

The second "Advanced" practice came late in November fired by a battery using case III pointing. This "Advanced" practice was rated "Excellent" by EDC and First Army.

Three night practices were fired in December with good results. The gun pointers found that pointing was easier and better than in the daytime. A large variety of targets were experimented with.

Field exercises involving the combat team versus CA units simulating small landing parties demonstrated the training status of both branches. All units participate in a bi-weekly hike, one of which is an all-day march held during even the roughest weather.

Target practices conducted with the thermometer hovering around zero and with heavy seas running have introduced some elements of interest in recent activities in the Harbor Defenses of Narragansett Bay. There is little doubt that the troops in these defenses have proved they are not "fair weather soldiers," but can master any of the hardships and difficulties which New England winter puts in the way of Coast Artillerymen. Waiting for a break in the fog and haze to get off a shoot in the middle of a tough New England winter is not the easiest thing in the world, but the troops took it in stride and proceeded to do a fine job.

Emphasis during this period has been placed on schools. One of the more unusual ones is a noncom school operated by one of our units. Run on officer candidate school standards for a 10-day period, during which the students have no other duties, it is proving very effective in equipping the newer noncoms with background to carry out their duties with maximum skill and efficiency.

Segregated into a single large barracks, they live, eat, study, and drill far away from any of their units, and, while the first few days appeared to most of them to be a "blitzkrieg" of instruction, the students soon hit the pace and thoroughly enjoyed the training. Objectives of the school were to teach how to use field manuals, how to lead men, how to instruct, and to increase their specialized knowledge of soldiering in Coast Artillery.

The school was designed to compensate for the loss of so many of the old-timers among the noncoms who have departed for officer candidate schools or who have gone up to the warrant grades.

BRIGADIER GENERAL OLIN H. LONGINO, *Commanding AAATC*

By Lieutenant Thomas E. Deacy, Jr.

On February 19 Brigadier General La Rhett Stuart was transferred from the command of the AAATC at Fort Sheridan to the command of an AA brigade. Succeeding General Stuart in command of the Training Center is Brigadier General Olin H. Longino. General Longino comes to Fort Sheridan from the command of an AA brigade in foreign service. Prior to that he served in the Eastern Defense Command.

The troops in training here, having endured the most severe winter experienced in this locality for many years, are now, with the coming of warmer weather, given the opportunity to demonstrate their ability to cope with terrain comparable to the thawed regions of Russia and the rain soaked deserts of Africa. These additional difficulties are being met and surmounted with the same determination and initiative that enabled units to be continually in the field even during the most severe periods of the winter.

The emphasis continues to be placed on firing and on field problems. The highlight of the latter has been exercised under the control of a Group Headquarters, during which two or more units are engaged in a tactical problem. Most valuable experience has been gained, particularly with regard to reconnaissance, use of unfamiliar terrain, and communications.

As to firing, for both gun and AW units, every hour in which flying missions are possible has been utilized. Full service firings for entire AW battalions are conducted in one day. For these firings AAATC Records Section furnishes complete range analysis records with graphical representations for critiques the day following the firing. These critiques are closely coördinated by the AAATC AW Gunnery Officer, and the records are retained by the individual batteries for further analysis with the troops immediately concerned.

Gun units have recently conducted firing at unseen targets. The results obtained were excellent. The degree of coördination required of trackers on the director, guns, and special equipment to produce smooth data was such that the success of the entire operation was surprising even to the firing units.

The centralized schools, as well as those conducted by the units, are continuing in full swing. Emphasis is now being placed upon physical and mental toughening. Classes for officers and selected NCO's are being held in Judo, and it is expected that this strenuous art will hold a high place in the physical conditioning programs of the units in training. In addition, nearing completion is our new "Blitz" course, the modern version of the old, and now considered tame, obstacle course. The "Blitz" course is three and one-half miles in length, over terrain cut by deep ravines and including a long stretch of soft sand beach and several cliffs. Throughout the course will be planted land and water mines and along the beach the troops pass directly below several AA firing points, subjecting them to muzzle blasts. The route is climaxed with an infiltration course, where the men must push themselves along in a prone position, under low strung barbed wire with machine guns continually firing closely overhead.

The staff at this headquarters has recently been augmented by a number of WAACs, assigned to aid in the administration work. They are working out surprisingly well, particularly in the Records Section, where the WAACs have taken over the duties of the meteorological section as well as the computation of data obtained in gun and AW firing.

Winter conditions at Fort Sheridan.

The Coast Artillery School

BRIGADIER GENERAL L. B. WEEKS, *Commandant*

The Coast Artillery School continues to fulfill its mission of turning out highly trained and specialized officer and enlisted personnel through its many departments.

The Officer Candidate School under its commanding officer, Lieutenant Colonel Jason E. Jennings, has held several graduations at the Post Theatre. Among the guest speakers to the graduating classes were Major General Archibald H. Sunderland, retired, former Chief of Coast Artillery, and Colonel W. S. Bowen, President of the Coast Artillery Board.

General Sunderland, after his introduction to the newly commissioned lieutenants by the School Commandant, Brigadier General Lawrence B. Weeks, dug deeply into his own wealth of military experiences to illustrate the advice and encouragement he offered.

"I'll refrain from preaching and come down to cases that may apply to second lieutenants. You will find, as you go through military life, that you have grave responsibilities. When it comes to making graduation addresses, I have heard a good many, and I believe the best one was entitled *Noblesse Oblige*. Putting it into plain English, that means 'If you assume nobility, be noble.'

"If I tried to boil down the advice to a second lieutenant into one word, I would say *think*. You have been selected as one man from a battery, or from three or four batteries, by a process of elimination through examinations; and during your course of instruction here, you have undoubtedly passed more examinations. All of the foregoing indicates that you have the ability to think to a fairly remarkable degree. Now that you have earned your commissions, for goodness' sake, don't stop thinking.

"Napoleon said that every French soldier had a marshal's baton in his knapsack. What he meant was that every man in the Army of France had a chance to go to the top, and he has in our Army as well as in the French. In fact, more chances in our Army than any place else.

"The best of luck to you. May your success be such that after forty-three years of commissioned service, you too can come back here and have the opportunity of talking to a graduating class. God bless you."

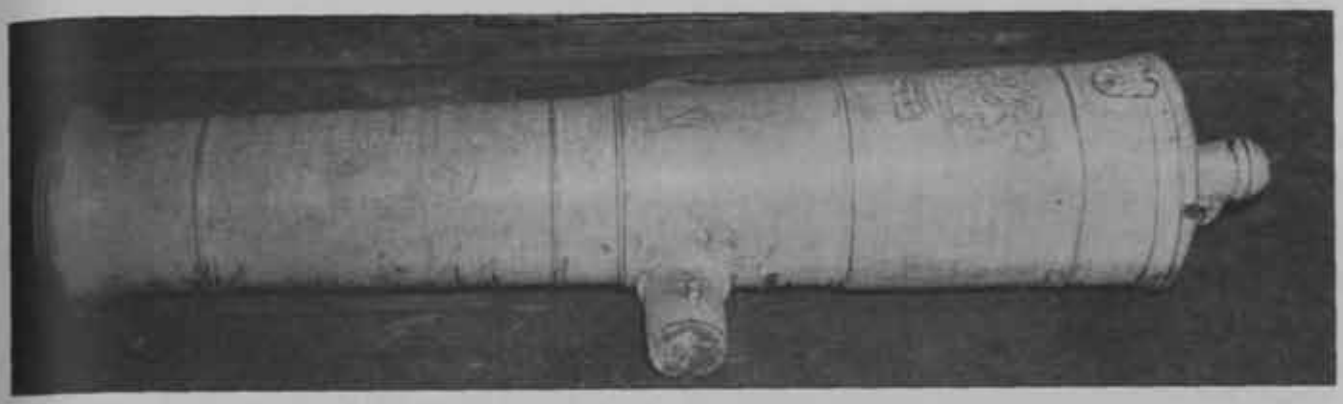
The School's staff and faculty were guests at an illustrated lecture in Murray Hall by Colonel Granger Anderson. Colonel Anderson had just returned to Fort Monroe after a 16,000-mile trip through Alaska. Much of his observation trip was by air. Upon his return, he took over the position of Director of Officer Training while Lieutenant Colonel H. W. Mansfield was appointed Director of the Department of Artillery, Colonel Anderson's former position.

The latest lecture to the staff and faculty was by Colonel C. G. Kershaw, a member of the staff and faculty of the Infantry School. In his talk he covered the operations of the Eighth Army, under General Montgomery, in its pursuit of Rommel in the African campaign.

Both Colonel Anderson and Colonel Kershaw were among the officers sent out as observers, by the Army Ground Forces, to the various theatres of war.

Colonel Harry F. Meyers, Secretary of the School, and Lieutenant Sidney Potter of the O.C.S. Staff recently returned from an observation trip of the Harbor Defenses of the Southern Defense Command. This trip was made in order to obtain, directly from the field, suggestions for improvement of the school courses, based upon observations made by senior officers of school graduates, assigned to their commands.

A story is going the rounds regarding one of the miniature airplane targets. It seems that the plane had fallen into Mill Creek and, carried by the tide, was caught under the Mill Creek bridge. The lieutenant



One of the guns surrendered at the Convention of Saratoga.

in charge of the targets was climbing down the side of the bridge searching for the small-scale plane, when an elderly woman passing by, startled to see a well-dressed officer clinging to the bridge supports, exclaimed, "Young man, what in the world are you doing?" Without thinking he answered, "Madam, I am looking for an airplane!" The woman put her nose up in the air and stomped off muttering to herself.

Three of the Field Officer groups have come and gone with the fourth due to start their studies and conferences this week. These courses are designed for commanders and staffs of battalions and larger units and for officers of field grade. Training applicable to both fixed and mobile seacoast artillery is provided; planning, control, coördination, and execution are particularly stressed. Much of the work in this course is carried on in the form of committee problems in various subjects. Group 51 has graduated from the Battery Officers Course. The Department of Enlisted Specialists has enlarged its facilities and classes and is turning out many more highly trained specialists. The Submarine Mine Department has just had its classes out on the water for two weeks of practical exercises.

A motion picture crew from the Special Services Division of the War Department, under the direction of Mr. Ralph Murphy of Hollywood, spent a few days on location at the Officer Candidate School taking scenes for the new film on the life of a candidate at school. This film will contain scenes from all the Arms and Services.

The Officer Candidate School's newspaper, *CAOCS*, pronounced chaos, has made its appearance. Between the "Gigling" who sprays dust on their bunks and the candidates' love of printer's ink, the editors, Captain H. Dressner and Lieutenant Sidney Potter, have published a humorous satire of their course.

The many recently promoted officers played host to the rest of the staff and faculty at a celebration party. Their Commandant, General L. B. Weeks, was the guest of honor.

Production has been completed on several training films on the 155-mm gun in Hollywood. The numbers and titles of these are:

TF 4-1008, *Preparation of the Ammunition for Firing.*

TF 4-1009, *Checking the Cross Level of the Quadrant Sight.*

TF 4-1010, *Orienting the Panoramic Telescope, M2A1, for Case II Pointing.*

TF 4-1011, *Orienting the Panoramic Telescope, M2A1, for Case III Pointing.*

TF 4-1012, *Checking and Adjusting the Telescope Mount, M6A1.*

TF 4-1013, *Orienting the Panoramic Telescope, M8, for Case II Pointing.*

TF 4-1014, *Orienting the Panoramic Telescope, M8, for Case III Pointing.*

TF 4-1015, *Care and Service after Firing.*

Film strips completed and about ready to release to the field include:

Coast Artillery Ammunition, Part II, Section 2, *Fuzes and Boosters.*

Coast Artillery Ammunition, Part III, *Projectiles.*

Coast Artillery Ammunition, Part IV, *Marking, Packing, and Storage.*

M5 Power Plant, *Nomenclature and Maintenance.*

M5 Power Plant, *Trouble Shooting, Section 1.*

M5 Power Plant, *Trouble Shooting, Section 2.*

Railway Artillery, Part I, *Track Construction,* Section 1.

Coast Artillery Training Bulletins scheduled for distribution shortly are entitled:

Antiaircraft Defense of Minor Craft.

Five bulletins on special radio equipment.

Identification of Aircraft.

Theory and Use of Logarithms.

Introduction to Trigonometry.

Logarithmic and Function Tables.

The new FM's 21-6 and 21-7 are out, breaking up the old FM 21-6 into two manuals. All publications available are listed in FM 21-6, while all training films, film bulletins, and film strips are listed in FM 21-7. Other field manuals to be released in the near future include FM 4-5 (revised), FM 4-15 (revised), and a new manual, FM 4-51, *Operation and Care of Railway Equipment.* This manual includes the fundamentals of

railway track construction, maintenance methods for railway artillery cars and locomotives, and rules for railway artillery train operation. It also contains railway operating data for all railway guns and auxiliary railway equipment.

By request of President Roosevelt, the Department of Interior has acquired several pieces of bronze cannon from the Revolutionary War to be added to the display at the Saratoga National Historical Park in New York. These trophies were all part of the matériel surrendered by General Burgoyne of the British Army at the "Convention" of Saratoga on October 17, 1777. One of the outstanding examples of the gunsmith's art was sent to the Department of Interior by the Coast Artillery School. It is illustrated in the accompanying picture. The cannon was of bronze, and was cast in the Woolwich Arsenal, London, England, in 1748 by A. Schalch. It is a 24-pounder, practically smooth-bore, and is 66 inches long. On the breech field it has the Royal Initials "GR" and on the chase the monogram of a crown and the initial "M" which stands for John, Duke of Montague, Master General of Ordnance (from 1730 to 1755). The gun weighs 1,844 pounds. Behind the swell of the muzzle it has the inscription "Surrendered by the convention of Saratoga, October 17, 1777."

Other pieces have been sent back to Saratoga from Watervliet and Frankford Arsenals, the United States Military Academy, and the State War and Navy Building.

In the School officers' bowling league, top honors for the second quarter were taken by the Coast Artillery School Detachment and the Visual Aid Section, which were tied for first place. The Administration team came in third. The league is extremely popular with the staff as in its sixth month of active play it has ninety per cent of the members of the School on one team or another. Major Howard Michelet and Captain W. T. Grenier are making it a fight for individual honors right down to the last game.

BRIGADIER GENERAL OLIVER L. SPILLER, *Commanding AAATC*

By Captain Walter H. Dustmann, Jr.

Intensification of the antiaircraft training program, including the use of real bullets in infiltration tactics and the stressing of hand-to-hand combat training, arrival of another brigadier general and a place on the *Army Hour* worldwide radio program were highlights of activity for the past two months.

The "infiltration course" was opened the latter part of January when an entire antiaircraft battalion christened it. Since that time virtually every battalion on the post has sampled the course to secure training in "realism."

The 100-yard-long course consists of a miniature battlefield, replete with trenches, shell holes and barbed-wire entanglements. The men crawl through the field in coveralls, gloves, and steel helmets as expert machine gunners fire bursts of real bullets thirty inches over their heads.

AAATC Headquarters stated that the course is designed "to accustom the men to hostile machine-gun fire and artillery fire, and to the tension of the battlefield; and to teach them the use of cover and to keep their heads and bodies to the ground while advancing under fire."

The "infiltration course" has been instituted as a regular phase of the camp's antiaircraft training program.

Signal Corps

A Radio Communications Class at Camp Stewart.

Latest general officer addition to the personnel of the post was Brigadier General Rupert E. Starr, who arrived early in January from the Operations Division of the War Department General Staff in Washington to assume command of an AA brigade.

In a speed-up of its individual and field combat training programs, the AAATC early in February initiated troop schools in judo and the bayonet, and in antitank, antipersonnel mines, booby traps, and assault of field fortifications. The classes are held for hand-picked officers and noncoms from each antiaircraft unit on the post. These students, in turn, upon completion of the courses, will organize schools within their units for mass instruction of the men.

Camp Stewart was featured on the *Army Hour* on Sunday, February 14, marking its first appearance on this popular worldwide Army broadcast. Stewart's part consisted of a brief message from the commanding general and the actual firing of all types of antiaircraft guns on the range, with a description of the firing activity. A member of a gun crew who has been accepted for Antiaircraft OCS, Corporal Lester D. Coleman, also was interviewed.

Another highlight of Stewart activity was the annual Inspection Night or "Parents' Night" at the AAATC Centralized Troop School, which is virtually a university in itself, offering thirty-nine courses of all types and descriptions to officers and enlisted men. Officers of the AAATC and the Service Command and enlisted men of the post were treated to an inspection of the school in action on February 16, under the guidance of instructors who explained the workings of the various classes.

The school, conducted under the director of training, AAATC, turns out dozens of trained specialists each week. It offers courses in everything from ration supplies and tire inspections to officer candidate training and teaching of judo.

Classes run anywhere from one week to ten weeks.

The school is designed to unify, expedite and supplement the specialized training of officers and enlisted men. Practical work is stressed to fit the man to the job under field service conditions.

The school has forty-two senior instructors ranging in rank from lieutenant colonel to noncoms.

Camp Stewart continued to furnish dozens of officer candidates to the Antiaircraft Officer Candidate School at Camp Davis, N. C., during the months of January and February, filling its full quotas at the AA School and all others. Candidates ranging from private to master sergeant and warrant officer, from all walks of life, many with parents who came from European countries, went to the candidate schools. In one class of twenty-five going to AA OCS, eleven of the candidates had parents of European blood, as follows: four from Russia, with one of these half-Polish; two from Poland; and one each from Austria, Belgium, Greece, Ireland, and Italy. One was of Canadian parentage.

Stewart's fast-moving War Bond drive continued to forge ahead for the two-month period, with three antiaircraft units subscribing 100 per cent and many others adding thousands of dollars in subscriptions to swell the total to $500,000 maturity value in bonds taken out by the personnel of the post.

Private John H. Wilson of the Provisional Guard, Service Command, planked down $5,000 cash for a War Bond. Private First Class Adolph Wirth, also of the guard, put $500 cash into bonds. Sergeant Sam Delia, of the Military Police Detachment, invested $1,200 cash in bonds.

A colored regiment, commanded by Colonel Paul French, went 100 per cent in bond purchases.

In sports, Stewart's hard-playing basketball team rolled up a record of eight wins and four losses, winning over such cracker-jack teams as the Air Corps Marines from Parris Island, S. C., the Savannah Coast Guard, the Air Corps at Hunter Field, Savannah, and Moody Field at Valdosta, Ga. Defeats were administered by the Marine Infantry of Paris Island, Cochrane Field at Macon, Ga., and the Savannah and Charleston Coast Guard teams.

Stewart has been invited to participate in the Southeastern Army Team Tournament at Macon, Ga.

Enthusiastic capacity crowds attended the home games of the team at the Sports Arena, held under auspices of the Post Special Service Office.

Highlights of the social and recreational side: the largest colored dance in Stewart history at the Sports Arena was attended by more than 2,000 soldiers and 500 dancing partners from neighboring communities . . . the hunting season on the 281,000-acre reservation netted twelve deer and lots of quail and rabbit to soldier hunters . . . the famous Henry Ford Square Dancers from near-by Richmond Hill, Ga., a Ford model community, came to the Stewart Service Club Number One for two performances and also gave individual dancing lessons to interested soldiers . . . a branch bank of the Citizens and Southern National Bank, entirely self-contained, was opened at Stewart for the convenience of the military and civilian personnel . . . more than forty World War I vets got together at the near-by NCCS-JWB USO and organized a "Retread Club" so that they could meet weekly and "bat it out" . . . a new theater seating 1,038 persons was officially dedicated by Colonel William V. Ochs, post commander . . . the colored enlisted men organized a Service Club Council to promote a more representative and intensified use of Service Club Number Two.

Camp Hulen

BRIGADIER GENERAL HARVEY C. ALLEN, *Commanding AAATC*

To bring readers up to date on Camp Hulen activities is to give almost a day-by-day account of the past several weeks. The calendar shows the winter months to be still with us; but for the soldiers here on Texas' Matagorda Bay, weather is no barrier to training or recreation.

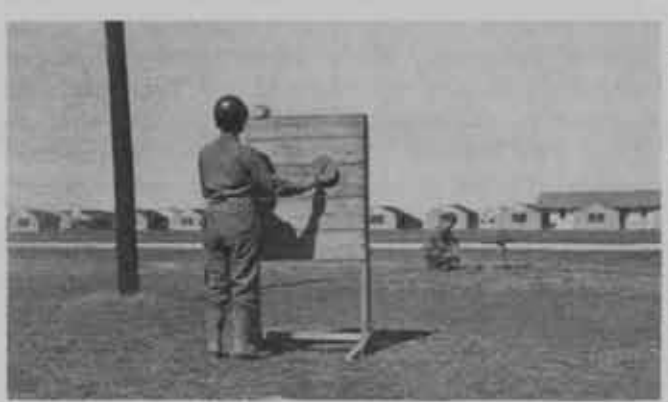
Combat units leaving this Training Center will find few climatic conditions with which they are not familiar. Temperature changes here are rapid and frequent. Several times in the past few weeks units on Tactical Exercises have experienced a forty-five degree change in temperature within less than twelve hours. They also have ample opportunity to cope with Old Man Mud. The training received under such conditions will prove of value in future operations.

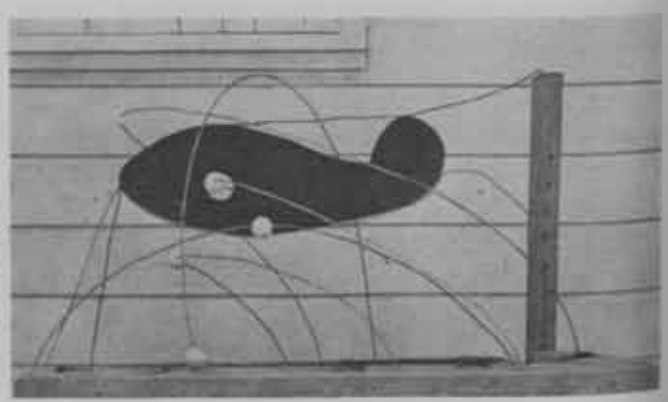
All reports from combat zones have stressed the importance of superb physical condition for all combat units. With this in mind, this Training Center is emphasizing physical hardening. One of the best methods of conditioning is the Ranger Course. The conversion of the obstacle courses to Ranger Courses brought many new obstacles for the men to clear. Every officer and man must run this course at least four times a week. The water is deep and frequently ice cold—a real incentive to clear the obstacles. There have been completed here several physical test courses. These courses include facilities for accomplishing all phases of the prescribed physical test. All distance runs are complete with lanes similar to a regular track. By systematic use of this course a battery can be given a complete test, with the exception of the forced march, in about forty-five minutes.

An interesting training aid here pictured has been developed by one battalion to teach proper tracer sensing. Briefly, the ping pong balls have been drilled and strung one each on the several wires which pass through and around the model plane. As the ball is released, by a spring similar to a mouse trap, it is sent along the wire, in a manner approximating the trajectory of the projectile near the target. The aeroplane silhouette has been cut from wood and can be used for either incoming or crossing courses. Several wires are used to show "doubtful," "overs," "shorts," and "hits." About 100 feet away the range setter cranks in on an improvised Director Panel, appropriate range changes as indicated by the sensings of the balls in relation to the target. This device has also proved helpful in giving forward area sight men the correct conception of the tracer stream. It is simple to construct, inexpensive, and effective.

The change from tents to hutments is nearing completion, and a tent within the camp proper is almost an object of interest. The area has hundreds of hutments and miles of all-weather streets and walks. "General Mud" has been defeated here in the camp but is still a potent enemy in the maneuver areas.

Camp Hulen, through the auspices of the USO, has been provided with excellent entertainment this winter. For those who enjoy variety acts an excellent bill was presented in January, headlining Elyse Knox and Nigel Bruce; later an all-New York cast put on the comedy





A home-made training aid in use at Camp Hulen. (See text.) *Signal Corps Photo*

Claudia to an appreciative audience. *Junior Miss* with an excellent cast was enjoyed by many thousands. In February the Don Cossack Chorus entertained capacity houses with their stirring songs and dances of Russian color.

On February 14, NBC broadcast the Sunday afternoon Army Hour for one half-hour from Camp Hulen. The program carried to its millions of listeners many phases of training. Machine guns, 40mm, automatic weapons, and 90mm guns firing from Well Point and Turtle Point ranges were highlights of the program. Announcers cut in on classes being conducted in 40mm maintenance, aircraft recognition, bayonet training and other subjects. There were very few phases of training which did not have a spot on the air.

Camp Hulen has been fortunate in having a number of visitors from other Training Centers here during the last two months. Such visitors permit an exchange of ideas on training methods and are very helpful to this Training Center.

Chesapeake Bay Sector

BRIGADIER GENERAL ROLLIN L. TILTON, *Commanding*

By Major Alfred C. Andrews

American soldiers go into battle as thoroughly prepared as painstaking training can make them, Secretary of War Stimson declared recently in commenting on the current African campaign. They are inexperienced in one sense only—actual combat with an enemy in a kill-or-be-killed fight.

Directed by Brigadier General Rollin L. Tilton, the Commanding General, units of the Chesapeake Bay Sector have plunged into increasingly intensive training programs underscoring the "smoke-and-heat-of-battle" aspect.

"The smell of smoke and the crack of the rifle and the gun has stimulated the morale of the troops," one officer observed in connection with a recent training performance.

Typical of Sector activity was an exercise at Fort Story, and another at Fort Monroe, where air-ground missions were conducted in the strafing of troops, aerial spotting of seacoast fire, panel, code, pickup, drop, and radio communication, and aerial flights of seacoast officers to study camouflage and terrain features of the area.

The efficiency of the training program soared as imagination and inventiveness were brought into play. New fire control methods and new fire control equipment were checked in conjunction with the Coast Artillery Board.

Obstacle and assault courses have had a direct bearing on awareness of the need for physical improvement. Fort Story's new 350-yard assault course presents battlefield problems for the soldier.

"The participants," Story's correspondent writes, "are kept on edge by the instructors, who call directions to them as they approach different obstacles in their path. The course is so arranged that a participant may run it several times and still *NOT* know what the instructor will require him to do at any particular point on the course." The soldier encounters a maze of tunnels, foxholes, obstacles, barbed wire entanglements, trenches, dugouts, gulleys, low bridges, shell holes and water hazards. Smoke, gas, booby traps, and other conditions of the battlefield are used. Planes also aid by simulated strafing of ground troops. The total effect of this course is to require the soldier to think and act instinctively.

Units of the Beaufort Inlet Defense Force got a taste of the uncomfortable side of training in early January during a field maneuver. Units of Camp Battle motored in early afternoon in pouring rain for about five miles. After detrucking and hiking through ankle-deep mud

Limited service men get complete training.

along an unimproved road for about eight miles, they pitched tents in a bivouac area, under a persistent downpour. Blackout conditions were effected at nightfall, and following chow, night problems for squads were executed. Camp was struck at daybreak and the return was completed entirely by foot through more mud.

A month later, another field maneuver took all the units of the camp, plus those at Camp White, on a fifteen-mile march. Weather proved more favorable, resulting in stepped-up morale of the troops. Although a good pace was set and maintained, only one man of the entire organization was reported to have been unable to complete the march unassisted.

At Camp Pendleton, training is speeded by centralization of instruction. Regimental lectures on all important subjects, each accompanied by a carefully coordinated demonstration, aim at achieving uniformity in subsequent individual instruction, which is under officers and cadre members.

Maneuvers, besides accustoming the men to battle conditions, inform observers of the progress of the men themselves. Back to more intensive work went several units following maneuvers early in January. Their new objective is to iron out mistakes and point for the next field problem when they can expect to demonstrate improvement.

Honors came last month to a battery of Colonel Wilmer S. Phillips' regiment at Fort Monroe, officially commended by General Tilton for obtaining an "E for Excellence" in submarine target practice.

Honors came, too, to three individuals in the sector. Lieutenant Colonel Wilson H. Stephenson, returning from a nine weeks' course at the Command and General Staff School at Fort Leavenworth, assumed command of the Cape Henry Defense Force. Lieutenant Colonel Eugene Walter took over the command of the Harbor Defenses of Beaufort Inlet, and Colonel Winfred G. Skelton succeeded Colonel Joseph R. Carvolth as commander of the Chesapeake Bay Sector Mobile Force.

A new note has been struck in the Sector's entertainment field. A mobile entertainment unit, originating at Fort Monroe, and drawn from Monroe's enlisted men, travels through the sector, presenting fourteen acts to eleven posts. To heighten the local interest, individual camps hold competitions to select their own star act to be staged in conjunction with the travelling show.

A 12-inch D.C. rifle goes to the scrap pile.

Brigadier General Oliver L. Spiller has been relieved as commandant of the Antiaircraft Artillery School and named Commanding General of the Antiaircraft Artillery Training Center at Camp Stewart, Georgia, it was announced February 25. Colonel Edgar H. Underwood was named as his successor.

Twelve months ago the Officer Candidate Division of the Antiaircraft Artillery School moved from Fort Monroe to Camp Davis. "Expansion" and "Improvement" have been the key words of the school's policy during this important year of the war. Thousands have gained their commissions since the first class graduated little over a year ago. The first class numbered only eighty-eight men.

Recently several new changes in the curriculum have been made to improve the brief education of the candidate. A new course has been established to enable the candidate to specialize in one field during his eighth, ninth, and tenth weeks. The three specialized courses are AA Gunnery, Automatic Weapons, and Searchlights. Prior to this innovation a candidate took a brief course in each of these subjects but did not have the opportunity to major in any one of them. Under the new system the prospective officers will have a more thorough and technical background for their future assignments.

The eleventh week is now completely turned over to field exercises. During this spell of miniature maneuvers the candidates will be faced as nearly as possible with the conditions they will meet in the field.

Each new candidate now encounters "zero week" on his arrival at the camp. This week is devoted entirely to physical conditioning. In addition to drilling and calisthenics the men go on a full day hike. Before the week is over the men are well acquainted with the various hurdles on the two new obstacle courses. The battery officers will be able to get a good idea of the qualities of their men during this initial week.

Although the school has not eased in its requirements or in its high standards, many men with only a high school education are graduating each week. Sometimes the lack of mathematics has been a stumbling block for these men as well as for college graduates. To aid such men a solid week of mathematics is now given for those who do not pass the first math test. This review is usually sufficient to carry the men through the course.

Colonel John H. Madison has replaced Colonel Harold R. Jackson as Director of the Officer Candidate Division.

On March 18 the Fiftieth Class marches to graduation.

The Officers' Division of the Antiaircraft Artillery School is an extremely busy place as is indicated by the monthly turnover. The bulk of these officers are officer cadres for new organizations. The course is of four weeks' duration. A new group enters every two weeks. In addition there are being conducted courses in Radio Detection, Radio Controlled Aerial Targets, Recognition of Aircraft, and Firing at Unseen Targets. Refresher courses run concurrently with the instruction in Cadre Groups. Marine Corps and Naval officers have been members of practically every Refresher Course.

The course of instruction for cadre officers is predominantly practical, containing only a minimum of theory and scientific background. All officers are given specialized instruction in the arm to which assigned. Stress is placed on all latest developments. New matériel, new films, and experiences of officers just returned from combat zone are used to great advantage.

In view of the assignment of Antiaircraft Artillery Units to Divisions, Corps, etc., it has been necessary to introduce to the students the capabilities and limitations of other Arms. Special emphasis is placed upon the logistics and tactical employment of the Infantry Division.

Thirty-seven recent graduates of the United States Military Academy are attending a thirteen-week course of instruction in this Division. They are given a comprehensive background of the powers and limitations, together with the technical and tactical employment of all Antiaircraft Artillery matériel.

Instruction in the Officers' Division is aimed at a point where the largest number will obtain the greatest profit. There is presented the latest developments and technical improvement of all Antiaircraft matériel. All efforts are bent towards the ultimate aim of preparing all students for that struggle which will take place upon the field of battle.

Since its inception at Camp Davis, the Enlisted Division has been functioning to capacity in turning out enlisted specialists. As equipment becomes more and more technical, the need for competent enlisted spe-

cialists to provide for maintenance of equipment in combat has grown. The objective of the school is, as it always has been, the turning out of thorough, dependable soldiers who are qualified to perform maintenance and repair under all conditions. Reports from the various theaters of war have shown time and again that, due to the vastness of military operations, it is a physical impossibility to provide service personnel everywhere. The rôle, therefore, of the unit specialist is emphasized.

The source of students for this school is from Training Centers, Replacement Training Centers, and Defense Commands. Men coming to this school from units are returned to their organizations upon graduation. Students from Replacement Training Centers without the proper background for the Electrical and Radio and Wire Communications courses receive their basic instruction in electricity and other subjects at civilian schools under Army auspices.

The Enlisted Division is divided into six "teaching" sections: Electrical; Radio and Wire Communications; Master Gunner; Radio Detection; Automotive; and Stereoscopic Height Finder. There are, in addition, three administrative sections: Headquarters, Supply, and the Records Section.

The Electrical Section turns out qualified maintenance men in gun directors (including remote control), automatic weapons directors and remote control, and searchlight electricians.

The Radio and Wire Communications Section conducts a course for communications chiefs—men capable of organizing, supervising, and instructing all communication personnel of a unit.

The Radio Detection Section conducts courses for chief operators for both guns and searchlights.

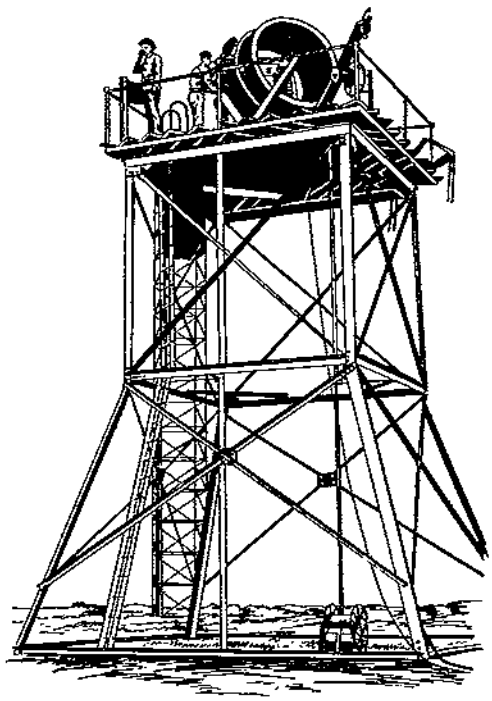
Graduating students of the Master Gunner Section are qualified to perform the duties of a Master Gunner in the battalion, regiment, or group. In addition, a certain number qualify as Warrant Officer (Reconnaissance) upon graduation from the course.

The Height Finder Section conducts a twelve-week course for Height Finder observers. These men are also given thorough instruction in aircraft recognition.

The Automotive Section qualifies enlisted men (who receive preliminary instruction at Ordnance Schools) as motor transportation NCOs for batteries and higher units.

In addition to the above courses for enlisted men, various specialized courses for officers are conducted. Among these courses are: Radio Detection (gun and searchlight); Aircraft and Mechanized Vehicle Recognition (course for officer instructors); Height Finder Observers and certain short courses for selected cadre officers.

While each student is given a thorough understanding of the operation, maintenance, and repair of equipment, he is also indoctrinated with a sense of responsibility and the qualities and attributes of a soldier.



The JOURNAL can supply any book in print, at the usual Association discount.

Pacific Theater

Solomons Duo

GUADALCANAL DIARY. By Richard Tregaskis. New York: Random House, 1943. 263 Pages; Illustrated; $2.50.

BATTLE FOR THE SOLOMONS. By Ira Wolfert. Boston: Houghton Mifflin Company, 1943. 200 Pages; $2.00.

Richard Tregaskis is a painstaking and literate reporter. He covered the Guadalcanal battle from July 26 to September 26, 1942. Ira Wolfert might be considered more of a feature writer than a reporter, but a good feature writer. He was in the Guadalcanal area in October and November of 1942. The result is two books, about different stages of the same campaign, that are as unlike as two books could be.

Tregaskis made the landing with the Marines, and stayed right up front all the time they were making their advances, and making the Japs pay for their resistance. He writes a bit about tactics, but more of what the man with the rifle or tommy gun thinks and feels when the jungle is alive with treacherous enemies. Tregaskis knew, because he went right along and learned the hard way how a jungle war is fought. The reader about to meet the Jap on one of the tropical isles can learn a lot about minor tactics, technique, weapons, and leadership psychology from Tregaskis' book. The Marines were well trained before they landed, but they learned more in contact with Tojo's minions than they learned in training. The author tells what and how they learned, in a style of writing so smooth that the reader doesn't realize how exciting the story is until he tries to find a stopping place to lay down the book for more pressing business.

Wolfert's book is more a series of separate events, told in a masterful manner, than the running report of a battle. Wolfert tells how it feels to be in a duel between two bombers, of the naval battle in which Admiral Callaghan was killed, of the sinking of the *Coolidge*, of the fighting on Guadalcanal. He tells his stories in a slangy, intimate way, so the reader feels he knows the people concerned. And all through the book there is the theme that the American soldier, sailor, and marine is a good man, better than the Jap. The Jap knows how to die, and does it in droves, but the American knows how to get the most for his life before he gives it up. The younger generation, says Wolfert, was not softened by the cataclysmic 'thirties—it does more than can be expected, and does it cheerfully.

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Eyewitness Account

I SAW THE FALL OF THE PHILIPPINES. By Carlos P. Romulo. New York: Doubleday, Doran and Company, 1942. 323 Pages; Illustrated; $3.00.

Colonel Romulo, last man off Bataan, and a member of General MacArthur's staff, has written a stirring and touching story of the Japanese invasion of the Philippines. Colonel Romulo has the Filipino's genius for writing English in a manner that is short of flowery, but far removed from the dry and merely factual. With a subject that is replete with the things that make literature—death, patriotism, bravery, self-sacrifice, and pain—his style is particularly fitting.

As newspaper editor and soldier, the author has fought Japan with every weapon, words or bullets, at his command. The Japs had him marked for death, and his family is in occupied territory, presumably in Jap hands, but Romulo still writes proudly of Filipino resistance to a victorious end.

We should be reminded frequently of the magnificent resistance our own troops and our Filipino comrades placed in the path of the invader, even when the task was hopeless. With the war picture changing as suddenly and as often as it does, many of us are prone to forget our first real theater of war. It will be hard to forget the Philippines, even momentarily, after reading this book.

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Peaceful Solomons

DARK ISLANDS. By John W. Vandercook. New York: Harper and Brothers, 1937. 367 Pages; Illustrated; $3.00.

This is a reissue of a book that created a mild stir in the literary world when it came out six years ago. The reissue, of course, came about because the area Vandercook visited in happier times is now a center of a particularly bitter type of fighting—the Fijis and the Solomons, with New Guinea thrown in for good measure.

Vandercook is a particularly odd type of travel writer—he travels because he enjoys seeing the little-known places,

and because he likes the contacts with the so-called savage races. His work is as far removed from the scientific type of exploration as possible, and his writings are more enjoyable because of it.

The Pacific islands, before the coming of the Jap, had their own charm, and Vandercook describes that charm with humor and balance. The jungles that resound to the cracks of M-1's and mortars, the people who must wonder what sort of madmen kill each other in their hitherto peaceful lands, and the discomforts and joys of travel are easy to visualize as we read.

Pacific Echo

SINGAPORE IS SILENT. By George Weller. New York: Harcourt, Brace and Company, 1943. 300 Pages; Index; $3.00.

To some, war is a mixed evil. Had it not been for the present war, many a newspaper reporter would not have become a War Correspondent—and would not have written a book, which is the dream of most newspaper reporters. George Weller has gone a bit further down the line than most of his brethren; he has written his book, and has not permitted any inhibitions to dull his occasional flashes of literary inspiration. The fine flowerings of language that usually disappear under the copy reader's pencil on any newspaper desk remain in the text.

As a reporting job on the fall of Singapore, Weller's effort is not as complete as Cecil Brown's, but neither is it as boring in the insistence of explaining to the reader the difficulties of censorship. Both authors agree on the main facts and questions of Singapore's fall, but Weller found a shade less ineptitude in higher quarters, and less complacency among the more well-to-do residents, than did Cecil Brown.

Closest to Japan

ALASKA COMES OF AGE. By Julius C. Edelstein. New York: American Council, Institute of Pacific Relations, 1943. 62 Pages; Illustrated; Maps; 15¢.

Alaska is a much misunderstood territory. Few strategists of the armchair and typewriter variety realize the truth of the size, climate, population, or even the global location of this vast area under the American flag. Mr. Edelstein's pamphlet tells enough about Alaska's present and past to permit the reader to draw his own conclusions about her immediate and distant future. There is no question that Alaska is important—the book tells how and why.

Seward's Folly

ALASKA UNDER ARMS. By Jean Potter. New York: The MacMillan Company, 1942. 194 Pages; Index; $2.00.

The title is unfortunately misleading—the "under arms" part is a poorly kept promise, as might be expected when we consider that practically every item of purely military information about Alaska is classified. Miss Potter informs us that there are soldiers in Alaska, that they are building airfields and other installations, and that the Navy is patrolling the waters. All of this we knew, and more cannot be told.

However, as a treatise on Alaska, and as one of the latest fair and factual accounts of this important region, this book is most informative. Alaska's economic structure, her people, her sociological problems, her geography, her transportation difficulties, her political frustration and her hair-on-chest attitude are coolly and calmly appraised by an experienced reporter. Miss Potter writes as a reporter and not as a woman.

Late Estimate

BEHIND THE JAPANESE MASK. By Jesse F. Steiner. New York: The Macmillan Company, 1943. 156 Pages; Index; $2.00.

This is another evaluation of the Japanese nation and people, written this time by a former teacher of English in a Japanese college. Dr. Steiner's observations are based on teaching in Japan from 1905 to 1912, another visit in 1935, and a long career in sociology. The book covers little, if anything, that has not been mentioned in most of the flood of books on the subject that have been published since the date of the Pearl Harbor attack.

Thriller

BUSHIDO: THE ANATOMY OF TERROR. By Alexandre Pernikoff. New York: Liveright Publishing Corporation, 1943. 284 Pages; $2.75.

It is easy, right now, to believe almost anything nasty about the Japs. This book, which purports to be a true story of the Japanese conquest of Manchuria in the early 'thirties, told from the standpoint of a young Russian student who was entrapped into working for the Japs as a spy, reads like a combination of a Polish White Paper and a Sax Rohmer thriller. Systematic torture, robbery, kidnapings, murder and other means of extracting the last penny from the populace, then killing off the people, are detailed by the author, whose foreword claims that the story is written from the penciled notes of the young spy.

Coming from an unknown author, with no method of checking any point of the authenticity of the story, the reviewer will not put unquestioned credence in the book—but it is exciting reading, and helps to keep aflame the hate against the Jap, if help is needed.

European Theater

Dieppe With Reynolds

DRESS REHEARSAL. By Quentin Reynolds. New York: Random House, 1943. 278 Pages; $2.00.

To one wearied by the innumerable books by war correspondents, the name Quentin Reynolds on a new volume is like the "sterling" mark on silver. *Collier's* correspondent is a keen observer, a very human man, and a tip-top writer. Combine these qualities with Reynolds' presence at the Dieppe raid, and the result is a book that is good reading as well as solid food for the military diet.

Reynolds rode the destroyer that was the on-the-scene headquarters of the raid. His description of how the modern combined headquarters operates under fire, with split-second timing, the well-known fog of battle, and the normal hazards of warfare complicating the work of the commanders and staff, is worth an hour of any soldier's time. The *Calpe* was the first vessel through the minefield to the scene of the raid, and the last vessel to leave. Bombed and strafed, the staunch destroyer remained afloat, while the staff planned and gave orders in tones as calm as in training.

Only Reynolds could get away with his digressions from the subject of the raid, and only Reynolds can begin to give the reader a picture of the color and excitement of battle through the media of a Pole with a new nose and an American colonel who lost a leg. Reynolds himself says that the book was not meant to be a lesson for the War College, but a statement of his impressions of the raid. The book is both.

* * *

Dieppe With Austin

WE LANDED AT DAWN: The Story of the Dieppe Raid. By A. B. Austin. New York: Harcourt, Brace and Company, 1943. 217 Pages; $2.00.

The author made the landing at Dieppe with Commando Four, the force that smothered and destroyed the German howitzer battery at Varengeville. His story of the raid, although tailored for popular consumption and therefore a bit too sticky on the "Gee whiz" side, is a vivid account of the preparations for the raid and of the action itself. The synchronized coöperation of land, sea, and air forces is stressed; certain mistakes as well as misfortunes are touched upon. The worst misfortune of the entire operation occurred when a portion of the raiding forces chanced upon a guarded German convoy, with the resultant loss of surprise. This accounted for many casualties that might not have happened otherwise.

The reasons for the raid have never been announced in convincing form. The author seems to believe that it was primarily a test of coöperation between the services, with the collection of information and the harassment of the Nazis secondary.

* * *

An "Expert" Writes

THE AIR OFFENSIVE AGAINST GERMANY. By Allan A. Michie. New York: Henry Holt and Company, Inc., 1943. 176 Pages; Illustrated; $2.00.

Mr. Michie divorces himself from the Ziff-Seversky school of "bomb-Germany" enthusiasts, and puts forth his own plan for the softening up of the Reich. Michie, in contradiction to the supertheorists, does not believe that air power alone can beat Germany, but that it can soften up the land of the *Luftwaffe* to the point where the necessary landings and invasion can complete the job. Where he differs with our leadership is on the question of the type of planes to do the job, and the possibility of doing the job now, and quickly.

Michie wants this country to give up the idea of daylight bombing, since Fortresses and Liberators cannot carry the bomb-loads of the night bomber types, and since the overcast sky of Europe is not conducive to accurate high-altitude

bombing. He believes that we should produce night-bomber types in large numbers, and coöperate with the British to pulverize Germany with night operations almost exclusively.

The author has an irritating habit of producing facts and figures without giving the source, which automatically makes them suspect. In his foreword he says, "The general public cannot be versed in strategy or tactics, or the performance details of war weapons. It is our (journalists) job to know those facts for them." The reviewer, although slightly versed in strategy and tactics, will still continue to put his trust in the leadership of the General Staff and the Air Forces, rather than in the newsmen who have so kindly offered to show the way.

* * *

Geopolitik

GERMAN STRATEGY OF WORLD CONQUEST. By Derwent Whittlesey. New York: Farrar & Rinehart, 1942. 269 Pages; Bibliography; Index; Maps; Charts; $2.50.

Written in collaboration with members of the National Planning Association, this book traces the German desires and plans for world domination back to medieval times. The much-discussed German *geopolitik* is explained with text, maps, and charts, and quotations from German leaders of the past and present. Hitler, the book indicates, is not unique in his desires—the German people as a whole, for hundreds of years, have dreamed of world domination regardless of the price it may cost. The book is scholarly, not easy to read, but crammed with facts that indict Germany as well as the Nazi party for the strife in Europe and a large part of the world since 1870 and before.

* * *

Early Nazi

FLIGHT FROM TERROR. By Otto Strasser. New York: Robert M. McBride and Company, 1943. 361 Pages. $3.00.

Otto Strasser helped to build the Frankenstein with the hysterical voice and the funny moustache who put the world where it is today, and is now one of Hitler's most hated enemies. It is hard to work up too much sympathy for a man who assisted in kindling the fire that came close to consuming civilization, but Strasser, by organizing the Black Front in Germany and in other countries, has done what he could to correct his earlier labors.

The present book is a combination of an apology for his earlier efforts, an exposition of his labors to break Hitler, and some of the most blood curdling adventure stories to see print since Poe. Fifteen years ago, Strasser's story of the Nazis and their lack of conscience and human feelings would have been considered the most impossible fiction, with no resemblance to verisimilitude. We know better now, and the tales of Hitler's rise are easily believed.

Strasser's ideas and ideals are still far from what the average American might call normal or democratic, but he has seen the glimmerings of the light of day. By intelligent and thoughtful reading of this book, we can understand better what and why we are fighting, and why the mere defeat of Germany will not settle that country as a problem to world peace.

Junior Partner

ITALY FROM WITHIN. By Richard G. Massock. New York: The Macmillan Company, 1943. 392 Pages; Index; $3.00.

Richard G. Massock was one of the small group of American newspapermen who stuck at their posts in Italy until war was declared on the United States, and who were then interned for several months until an exchange was arranged. His book touches upon the rise of Fascism, the Ethiopian and Spanish campaigns, and the state of Italy up to the time the author left that unhappy country. His conclusions are little different from those of others who have treated the same subject, although Massock has succeeded in writing probably the most objective book written by a foreign correspondent. We read little of Massock, much about Italy.

* * *

Our Allies

THE RUSSIANS. By Albert Rhys Williams. New York: Harcourt, Brace and Company, 1942. 239 Pages; Index; Charts; $2.00.

One more of the flood of books on Russia and the Russians, this one tells more about the people, and less about the political and diplomatic aspects of the subject. Mr. Williams is well qualified to write about Russia, since he knows the language thoroughly and has traveled the country quite extensively in the past twenty-five years.

* * *

Mathematics

Trig

SPHERICAL TRIGONOMETRY WITH TABLES. By W. C. Brenke. New York: The Dryden Press, 1943. 71 Pages; 27 Additional Pages of Tables; Illustrated; 80¢.

This paper-covered pamphlet is Chapters eleven and twelve of *Plane and Spherical Trigonometry*, which will be published within the next few months. The treatment is in two sections: in the first the formulas are derived and applied to the solution of spherical triangles; in the second, the applications are presented, principally in navigation and nautical astronomy.

* * *

Beginner's Book

BASIC MATHEMATICS. By William Betz. New York: Ginn and Company, 1943. 498 Pages; Index; Illustrated; $1.48.

Written for the war program by a mathematical specialist in the Rochester (N.Y.) public schools, at the request of one of the country's largest publishers of text books, this book was designed for an "emergency course in essential mathematics" as outlined in the pamphlet *A Wartime Program in Mathematics and Physics*.

The text includes basic material in arithmetic, informal geometry, elementary algebra, and numerical trigonometry. It was written with the idea of giving the student the opportunity to master as quickly as possible the basic concepts, principles, and processes which constitute the permanent framework of elementary mathematics. Although designed for classroom work, the book will be valuable also for the solitary student.

Planned Course

WARTIME REFRESHER IN FUNDAMENTAL MATHEMATICS. By Eddy, Pulliam, Brolly, Upton and Thomas. New York: Prentice-Hall, Inc., 1943. 248 Pages; Illustrated; $1.40.

The multiple authors of this text have covered the ground of arithmetic and basic algebra in a unique and effective way. The book is arranged in twenty one-hour lessons, or enough lessons for four five-day weeks. Intended for use at home, each lesson provides an explanation of the subject of the lesson, a series of problems, a list of "cues" to aid in solving the problems, and the answers. Weekly reviews at the end of each five lessons bring the course up to a normal twenty-four hours.

The problems and applications come from naval, military, and shop incidents, and convey an air of reality, rather than abstraction.

* * *

Weather and Navigation

Weather Stuff

A START IN METEOROLOGY. By Armand N. Spitz. New York: The Norman W. Henley Publishing Company, 1943. 86 Pages; Questions and Answers; Index; Illustrated; $1.50.

Although this book was not written particularly for adults (rather for the teen-agers who will be the fliers of five or seven years from now) no adult need feel that he is reading "kid stuff." The simple (not childish) language and the well-conceived and well-drawn illustrations do very well to provide an introduction in meteorology. A bibliography, divided into books slightly more advanced than this text, and those even more advanced, provide the person who knows nothing about the subject with a practical reading course in weather and weather forecasting.

* * *

Flying Weather

WEATHER. By W. G. Kendrew. New York: Oxford University Press, 1943. 94 Pages; Illustrated; Index; $1.00.

Designed especially for airmen, this little book is written for the student who knows absolutely nothing about the science of meteorology and wishes to learn. It is written in every-day language, and explains the scientific terms before they are used. Well illustrated with charts and sketches, it lives up to its subtitle, "An Introductory Meteorology."

* * *

Place to Place

AIR NAVIGATION FOR BEGINNERS. By Scott G. Lamb. New York: The Norman W. Henley Publishing Company, 1943. 87 Pages; Questions and Answers; Index; Illustrated; $1.50.

This is another of a series of books being written for our youngsters who will be the flying cadets of 1947 and later. It is frankly a book for beginners, and reading it will not fit a person for air crew duties on a Flying Fortress, but

for the person who knows nothing about navigation, it is an excellent introductory text. Well illustrated, written in nontechnical language, and authoritative, it explains the navigation problem and how it is solved, providing a good foundation for the person who intends to go on to a fuller understanding of the subject.

* * *

. . . and Back Again

AIR NAVIGATION. By Herbert S. Zim. New York: Harcourt, Brace and Company, 1943. 304 Pages; Glossary; Bibliography; Index; Illustrated; $3.00.

Dr. Zim is primarily an educator, although he knows his science of navigation. Combining these talents, he has constructed a book that puts forth as clear an explanation of air navigation as this reviewer has seen. With a minimum of technical verbiage, and being careful not to build his explanations on a false foundation of previous knowledge of the student, the author begins at the beginning and follows through, step by step. He defines and explains technical terms before he uses them. In fact, the entire book brings to mind an overly patient tutor who wants to be very sure that each step is learned before the next one is considered.

The illustrations are particularly well designed to demonstrate the facts they are to explain. A full-color airways map, tipped in at the proper place, is a very real help in visualizing the lessons.

* * *

Military Texts

Wintringham's Latest

THE STORY OF WEAPONS AND TACTICS. By Tom Wintringham. Boston: Houghton Mifflin Company, 1943. 230 Pages; $2.25.

Tom Wintringham, a World War I R.F.C. and R.A.F. pilot, and an officer on the Republican side during the Spanish Civil War, has been training British Home Guards with one hand and carrying on a private war with military conservatives with the other. This book is another skirmish in his private war, and contains much that is provocative and constructive.

It is difficult, of course, to try to put the gist of an important book in a few words, but the main theme of the book seems to be that in the age-old struggle between armor and attack, with the resultant effect on tactics, there has been a definite rhythm, and by a proper study of this rhythm, something of future tactics and weapons can be deduced. Wintringham's deductions indicate a growing importance of the People's Army, or guerrilla warfare—in conjunction with the more formal fighting forces, each of which can do little without the other. As examples he cites Napoleon's Spanish troubles with guerrillas while Wellington engaged his armies, and the success of the Russian partisan warfare against the Axis armored formations which harassed the flanks and rear of the formations while the Red armies resisted their forward elements.

Web defense, gaps in military training, and the seeming lack of ability of the military to learn from history take

up much of the book, along with Wintringham's explanations of the battles and tactics of former times.

The author is no wild-eyed military radical. He can see the conservative's side. For instance, touching on Lloyd George's criticism of Haig's immense losses in frontal attacks in World War I, Wintringham writes, "Now that we are in a very different sort of war, it is easier to see 1914-1918 in perspective; it is easier to see that there was an element of the inevitable about these suicidal massacres in the mud. It was not any general's fault they occurred; they were not due to the prejudices or mistakes of a staff or caste of officers. They were due to the whole shape and nature of war as war then existed, a shape and nature imposed on war by the natural development of weapons."

There is much to be learned from this book. Where we do not agree with the author, our own ideas will be clearer as the result of analyzing his thoughts—where we do agree, we will read what is probably a clearer statement of the ideas than we could do ourselves.

* * *

Scientific Basis

THE PSYCHOLOGY OF MILITARY LEADERSHIP. By L. A. Pennington, Romeyn B. Hough, Jr., and H. W. Case. New York: Prentice-Hall, Inc., 1943. 264 Pages; Glossary; Index; $2.95.

Most of the works on military leadership, with the possible exception of those of Major John Burns, are based on experience and inductive reasoning, rather than on scientific psychology. The authors of this book, including a professor of psychology, a retired lieutenant colonel of the Army (who died just before the book was published), and an industrial personnel specialist, have found no new world-shaking truths in the science of leadership. In the main, they emphasize the tried and true methods that have been proposed by writers on the subject, but they give reasons and principles of application of the methods.

The references at the end of each chapter are valuable, in that they open the field for those who wish to pursue the subject further. It is interesting to note that the COAST ARTILLERY JOURNAL is one of the sources most often quoted.

The reviewer, writing from the standpoint of a mess officer rather than as a psychologist or leader, takes issue with the authors on one point—K.P. is *not* a fit punishment detail. Although it may have a salutory effect on the man being punished, the ill effects on the kitchen far outbalance the good derived.

* * *

Financial Guide

THE FOURTH HORSEMAN. By J. H. Doherty. Harrisburg: Military Service Publishing Company, 1942. 88 Pages; Tables; Index; $1.00.

In line with the alert policy of the Military Service Publishing Company, the third edition of this valuable book has been released after being brought up to date. *The Fourth Horseman*, in the year or two that it has been published, has become the standard book for foresighted officers who wish to make provision for their families in the

event of foreign service or death. Clear, concise text, forms for records that may be entered into the book itself, and authoritative information on the subjects of allotments, insurance, pensions, and other financial and legal considerations important to the army officer make this a *must* book for every officer with dependents.

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Checklist

COMBAT TRAINING. By Brigadier General L. R. Esteves. Harrisburg: The Military Service Publishing Company, 1943. 199 Pages, 75¢.

This is an outline, to be used as a checklist, a refresher, or as a guide for study, of the "high spots" of military training, from *Leadership* to *Attack in Jungle*. Under the heading of sixty-two "Notes," General Esteves has listed appropriate outlines of varying lengths. The book should be particularly valuable in the preparation of any type of field order.

* * *

Friend and Foe

IDENTIFICATION. Harrisburg: The Military Service Publishing Company, 1943. 330 Pages; Illustrated; $2.00.

The introduction to this book, by the publishers, expresses the thought that the Military Service Publishing Company realizes that this book has many shortcomings due to a lack of complete information on the subject. Since a book of this type is both needed and valuable, and since nothing official has come out on the subject, the reader can well accept this book as the best obtainable.

Although there are possibly errors of both omission and commission, it still fulfills its purpose admirably. "It is the best handbook of military uniforms and insignia on the market. It is designed expressly for intelligence officers who must know the *exact* manner in which uniforms and insignia are worn; for air officers who are apt to find themselves in different countries on successive days, and for every soldier going abroad who wants authoritative and readily available information on the military and civil affairs of every country to which he may be going." This is taken from the last paragraph of the introduction, and again we agree with the publishers.

* * *

No Royal Road

MODERN JUDO. By Charles Yerkow. Harrisburg: The Military Service Publishing Company, 1943. 295 Pages; Illustrated; $2.00.

The late crop of get-rich-quick books on trick fighting led the Military Service Publishing Company and the author to prepare this volume on the *fundamentals* of Judo. The author and the publishers believe that the knowledge of a few holds and throws is more dangerous than no knowledge at all, since it leads to over-confidence and a stagnation of the desire to learn. The few trick holds are very fine when the opponent coöperates by making the approaches outlined, but a knowledge of fundamentals is necessary to take advantage of the art. Since Judo is an art, according to the author, it can not be learned in ten easy lessons, but

must come with hours of practice each day over a long period.

There are 400 pictures along with the text to help the serious student grasp the fundamentals of the ancient art.

* * *

Auxiliaries' Weapons

A COMPREHENSIVE SMALL ARMS MANUAL. By Charles T. Haven. New York: William Morrow and Company, 1943. 155 Pages; Bibliography; Illustrated; $1.50.

Mr. Haven, co-author of *Automatic Arms*, wrote this little book primarily for the auxiliary forces such as plant guards, State Militia, and auxiliary police departments, who must make the best possible use of the wide variety of small arms that will be available to such organizations in time of war. There are hundreds of varieties of pistols, shotguns, rifles, and automatic weapons available in secondhand stores and other used stocks,that will be issued to or acquired by the auxiliary forces. Mr. Haven explains how to get the most out of such emergency equipment, and what types of equipment not to use under any circumstances. Many firearms were never safe from the time they were manufactured, some were designed for special purposes which make them dangerous for combat use, and others were safe with the old black-powder loads but are dangerous with modern ammunition. This book identifies the different firearms and gives hints on their use.

* * *

Dictionary of Explosives

MANUAL OF EXPLOSIVES, MILITARY PYROTECHNICS AND CHEMICAL WARFARE AGENTS. By Jules Bebie. New York: The Macmillan Company, 1943. 162 Pages; Bibliography; List of Patents; $2.50.

Quoting from the preface, "It is the chief aim of this book to be of service to scientific and technical workers in the field of explosives and war chemicals and to students who are beginning to specialize in these subjects. . . . The nomenclature in the field of explosives and war chemicals is perplexing. Most of the chief explosives are known under many different names and designations, including the correct chemical name, chemical synonyms, American and foreign trade names, and warfare symbols. . . ."

The present book is a dictionary of the names and designations, well cross-referenced, and should aid materially in reducing the confusion for the student.

* * *

Fiction

Old War

RIVERS OF GLORY. By F. van Wyck Mason. Philadelphia: J. B. Lippincott Company, 1942. 572 Pages; $2.75.

Colonel Mason has turned out another of his readable fiction stories with a background deeply rooted in American history. This book is built around the running of the

British blockade, but like the rest of Mason's stories, takes in a wide field of the Revolutionary War. For those who like Mason's work (the reviewer is definitely in that group), this is another enjoyable book to help take our minds off the present war for a few hours.

★ ★ ★

Indian Fighters

ONLY THE VALIANT. By Charles Marquis Warren. New York: The Macmillan Company, 1943. 327 Pages; $2.50.

The West immediately after the Civil War was no place for those with faint hearts or frigid pedal extremities, and the small Army that manned the desert posts harbored few in that category. Charles Warren, a former Camp Hulen Coast Artillery enlisted man turned naval ensign, has written a soldier vs. Indians thriller that ranks with the best of the thousands of books that have been written on that theme.

Captain Richard Lance, of the Cavalry, takes nine men with him on a suicide venture to stop hostile Indians at a narrow pass before they can get to his post. Eight of the nine would cheerfully kill him if given the opportunity, and several intend to create the opportunity. With no water, friction in the command, Indians to spare, and several other strikes against the little party, the men perform their mission, and all but two or three live happily ever after. The suspense leaves nothing to be desired—this is one of those works of fiction that keeps the reader in his chair far past bed time.

★ ★ ★

An Honest Story

HAPPY LAND. By MacKinlay Kantor. New York: Coward-McCann, Inc., 1943. 92 Pages; $1.25.

Most military students know MacKinlay Kantor for his *Long Remember*, one of the best stories of the Battle of Gettysburg, if not the best. *Happy Land* is something entirely different—it is a short story of how one father reacted to one of the official telegrams that start out "THE NAVY DEPARTMENT DEEPLY REGRETS—." William Allen White, the famous editor of Emporia, Kansas, wrote of this book, "A beautiful, honest story which could be written only in a free country about free folks. If I had but one gift I could give to everyone in this land, high or low, rich or poor, military or civilian, it would be *Happy Land*." This is high praise, perhaps a bit intemperate, but not too far from the target. This is a book to remind us of just a few of the things for which we are fighting.

★ ★ ★

Adventure in Colombia

GREEN FIRE. By Peter W. Rainier. New York: Random House, 1942. 296 Pages; Maps; $2.75.

Peter W. Rainier, now a lieutenant in the Royal Engineers in Libya, spent eight years mining emeralds and performing sundry other chores in the mountains of Colombia. This book is autobiography, and tells a rapid-fire adventure story of claim jumpers, knife fights, gun

fights, dangerous travel, and the green fire of newly-mined emeralds.

This is a good story *because* Mr. Rainier is not bothered much with unassuming modesty—he has the courage to write in the first person when even Caesar wrote in the third person. If the book were written as fiction, no one would have taken it seriously; a modest autobiographer would have turned out a dull story. Rainier, a pipe-smoking, gun-toting, *aguardiente*-drinking man, lived a stirring life and had the courage to write a stirring tale about it.

* * *

Miscellany

Soldier Art

THIS ARMY STUFF. By Privates Harry Hogan and Don McGrath. New York: Coward-McCann, Inc., 1942. 30 Pages; Illustrated; $.75.

Thirty cartoons of recruit life are noteworthy not for any particular skill in their execution, but in their choice of subject. Aside from the usual misfires about K.P. duty and the old, old one about the O.D. wandering around at night, there are several cartoons that tickled the reviewer's fancy—especially the one that depicts a very earnest soldier explaining to a blonde beauty that the army must have *some* privates.

* * *

Lighter Moments

KEEP 'EM LAUGHING. By W. A. Brooks. New York: Knickerbocker Publishing Company, 1942. 206 Pages; Illustrated; $2.00.

Mr. Brooks has collected many M1917 jokes that possibly our younger soldiers have never heard, a hoard of jokes M1941 and M1942, poems and paragraphs written over several centuries, and a short chapter of puzzles. Remembering that his subtitle reads "A fun manual for men in the military service," he has stuck to his subject well. For those who like joke book and popular poetry compilations, this volume fills the bill.

* * *

A Needed Language

EASY MALAY: Words and Phrases. By Marius A. Mendlesen. New York: The John Day Company, Inc., 1943. 64 Pages; $1.00.

The jacket of this pocket-size volume states, "Everyday Malay is simple to learn when it is simply presented, as in this book. Despite the hundreds of native dialects and the difficulty of becoming proficient in them, it is easy to master the basic structure of the language and the 800-odd words which are commonly used in transacting business throughout the vast area of British Malaya and the East Indies."

The vocabulary has been chosen with a particular regard for the military user, with a good assortment of military terms. When the "big push" starts in the Pacific, and American troops find their way to more and more Malay islands, this book should prove valuable.

Cape Town North

SOUTH OF THE CONGO. By Selwyn James. New York: Random House, 1943. 340 Pages; Index; Illustrated. $3.00.

With vital theaters of war springing up in the most unlikely places, our interest in the far places of the world must cover a lot of ground. The Madagascar fighting of a few short months ago seems very remote already. How much South Africa means to the Allied cause at the present time is difficult to estimate.

However, in this unpredictable war, supply routes pass Cape Town, and we may breathe easier if South Africa remains favorable to the Allied cause. Selwyn James, a *PM* reporter who worked on South African newspapers up to a short time ago, draws a picture of internal dissension, Boer War ill-feeling, and Nazi infiltration and espionage that is most disquieting. He bolsters his conclusions with actual incidents. Youthful and idealistic, James is perhaps a trifle far from objective in certain instances, but his facts are still facts. South Africa is one more of the would's unsolved problems.

Number Three

THE WAR: THIRD YEAR. By Edgar McInnis. New York: The Oxford University Press, 1943. 318 Pages; Appendix; Chronology; Index; $2.00.

In our reviews of the two previous books of this series, the JOURNAL was unrestrained in its praise of both the author's purpose and his accomplishment of that purpose. We see no reason to change our views with this third volume. Mr. McInnis has taken the widely-separated and complex actions of the third year of the war, condensed the accounts, and coördinated them into a logical and accurate running story that will be of inestimable value to future historians.

The confusion of headlines, radio news flashes, and now-you-see-it-now-you-don't communiques gives way to a calm and factual account of the war under Mr. McInnis' masterly editing.

Medical Progress

MIRACLES OF MILITARY MEDICINE. By Albert Q. Maisel. New York: Duell, Sloan and Pearce, 1943. 373 Pages; $2.75.

Wound for wound, disease for disease, the soldier of this war has a much better mathematical chance to survive, or to recover completely, than the soldier of previous wars. Blood banks, sulfa drugs, immobilization techniques, shock treatment, caring for burns, flight surgery, rapid methods of evacuation, and many other phases of medicine and surgery have been discovered, adopted, or improved. The lessons of the Spanish Civil War, the Russo-Finnish War, and the earlier days of the present war have been learned by the medical men of the armed services.

Most laymen are interested in medicine and surgery because doctors are almost as hard to escape as taxes; line officers should be interested because a certain amount of knowledge is necessary for full coöperation with medical

personnel, and for the protection of a command. Mr. Maisel has written his book in popular style, which the reader with a score of 110 or better should not find too technical. The author's style is as readable as fiction.

* * *

Flit-gun Targets

INSECT INVADERS. By Anthony Standen. Boston: Houghton Mifflin Company, 1943. 223 Pages; Illustrated; Index; $3.50.

"The human population of the world is estimated at 2,145,000,000. There are probably at least that number of insects on or in the soil of every square mile of land surface of the earth, barring deserts and the extreme polar regions, and in addition there are often 5,000,000 or more insects flying around in the air above each square mile.

". . . I agree that there are many, many insects that are useful to us, as well as many that are entirely indispensable, as we shall see later, but I cannot revise my original opinion that insects as a whole are inherently unpleasant and objectionable."

These extracts from Mr. Standen's first chapter promise an interesting and well-told story of one of man's oldest enemies; the promise is well filled. Civilized man everywhere is engaged in a battle for survival against the insect world—Mr. Standen describes some of the battles and some of the fighters on both sides. He does it without driving his readers to scientific dictionaries.

* * *

One of Fifty

DESTROYER FROM AMERICA. By John Fernald. New York: The Macmillan Company, 1943. 155 Pages; $1.75.

The author, a British Reserve naval officer, served on one of our old four-stackers that was turned over to the British before Pearl Harbor. This book, slightly fictionized to overcome objections of censorship and certain Royal Navy prohibitions, is an intimate story of several voyages of the resurrected tin can. The *Porchester* was old, and not of the best design, but her officers and men did the best they could with her, and at least one submarine and one Nazi bomber were accounted for by her guns and crew. Fernald tells his story well.

* * *

Electricity

FUNDAMENTALS OF ELECTRICITY. By Lester R. Williard. New York: Ginn and Company, 1943. 343 Pages; Index; Illustrated; $1.24.

Written as a text for a basic one-semester pre-induction course, at the request of the War Department, this book fulfills the needs of the official pre-induction training course outline. Thirteen chapters and ten appendices cover thoroughly the ground necessary for a first course in electricity, and should provide a firm foundation for the more advanced work in the study of automotive electric work, telephone and telegraph line duties, telephone operating in the field, and the operation of auxiliary generators, as well as work on AA and other directors.

Signal Corps and other photographic illustrations keep the applications of his studies in the mind of the student, and well-conceived line drawings aid in explaining the text.

* * *

Machines

FUNDAMENTALS OF MACHINES. By Burton L. Cushing. New York: Ginn and Company, 1943. 418 Pages; Tables; Index; Illustrated; $1.24.

The content of this book follows the United States Army outline "Fundamentals of Machines—A Basic Course" step by step, covering every topic fully. This outline was designed for a pre-induction course, but it should prove valuable for the soldier who has an opportunity to perform mechanical work or to go to a service school of almost any type other than clerical.

With at least one illustration on almost every page, and a successful aim of applying the teachings to military matériel and military problems, the book is a clear, informative text, easily understood, and interesting far beyond the limit usually associated with the word "text." Signal Corps and Navy pictures, as well as clear line drawings, show the student how the principles and fundamentals under study are applied. Although the book was apparently designed for class work, little would be lost if the student worked alone, since the explanations are so clear.

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