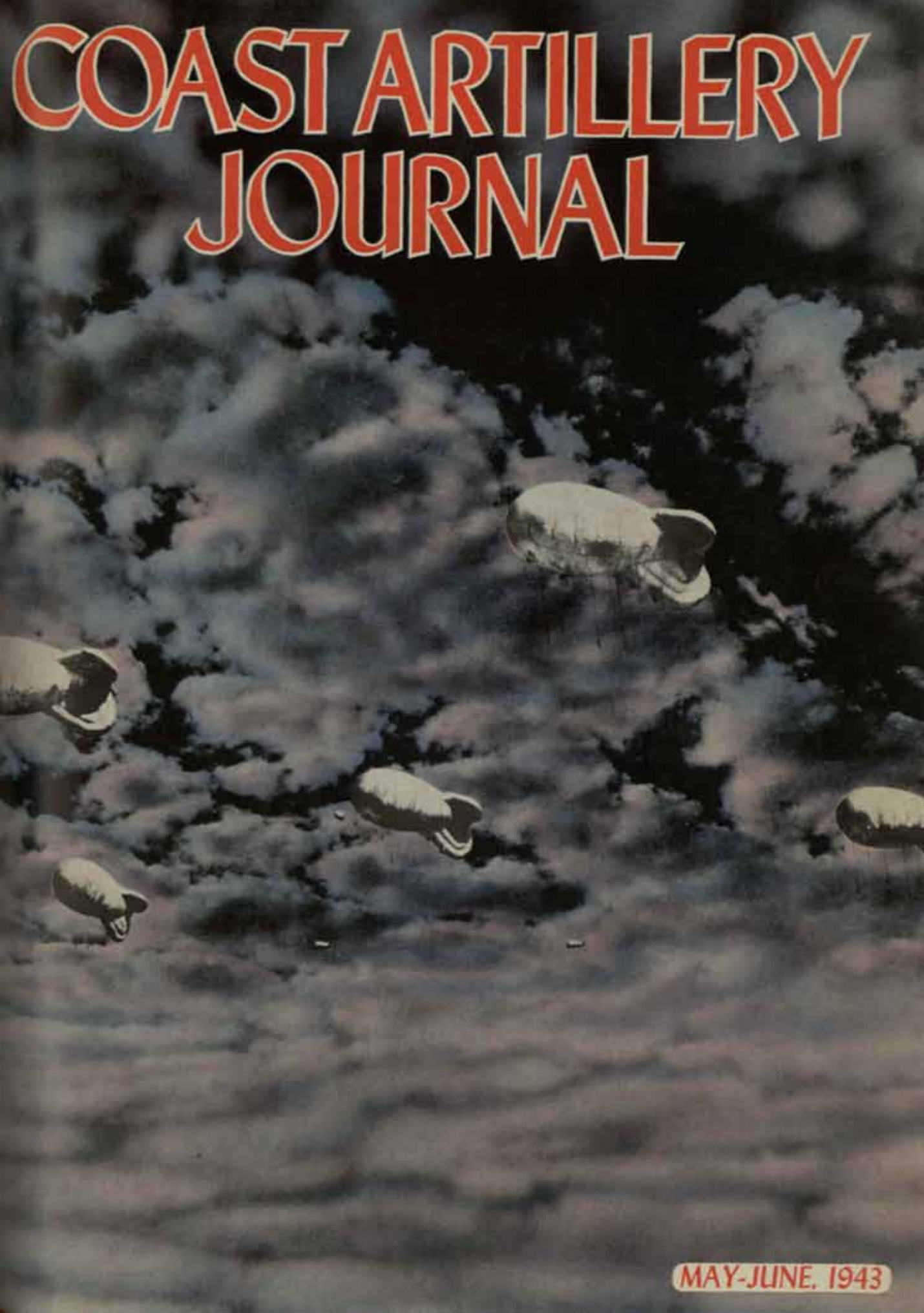
COAST ARTILLERY JOURNAL



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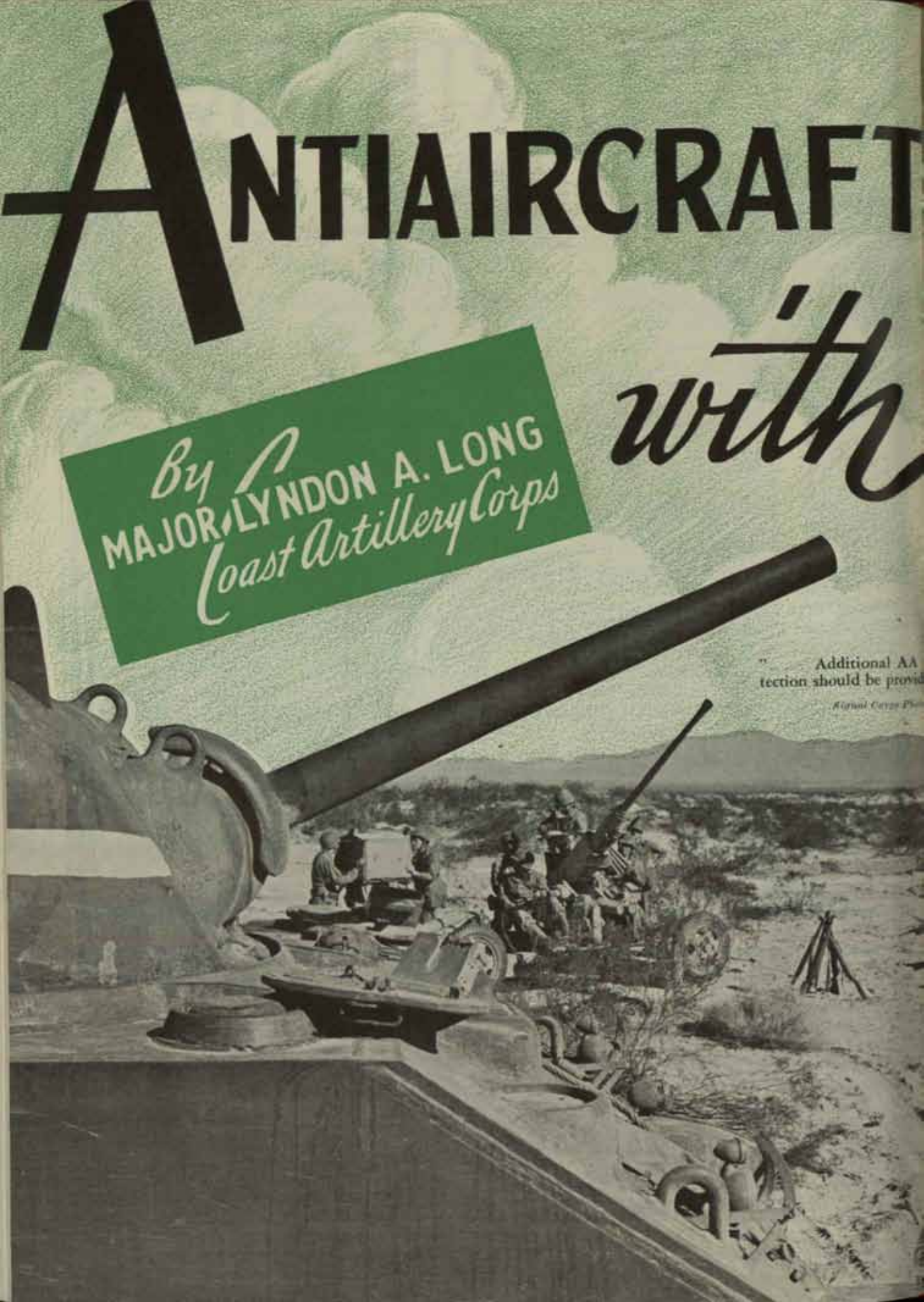
ANTIAIRCRAFT with

By MAJOR LYNDON A. LONG
Coast Artillery Corps



" Additional AA
tection should be provid

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A test of men and machines.

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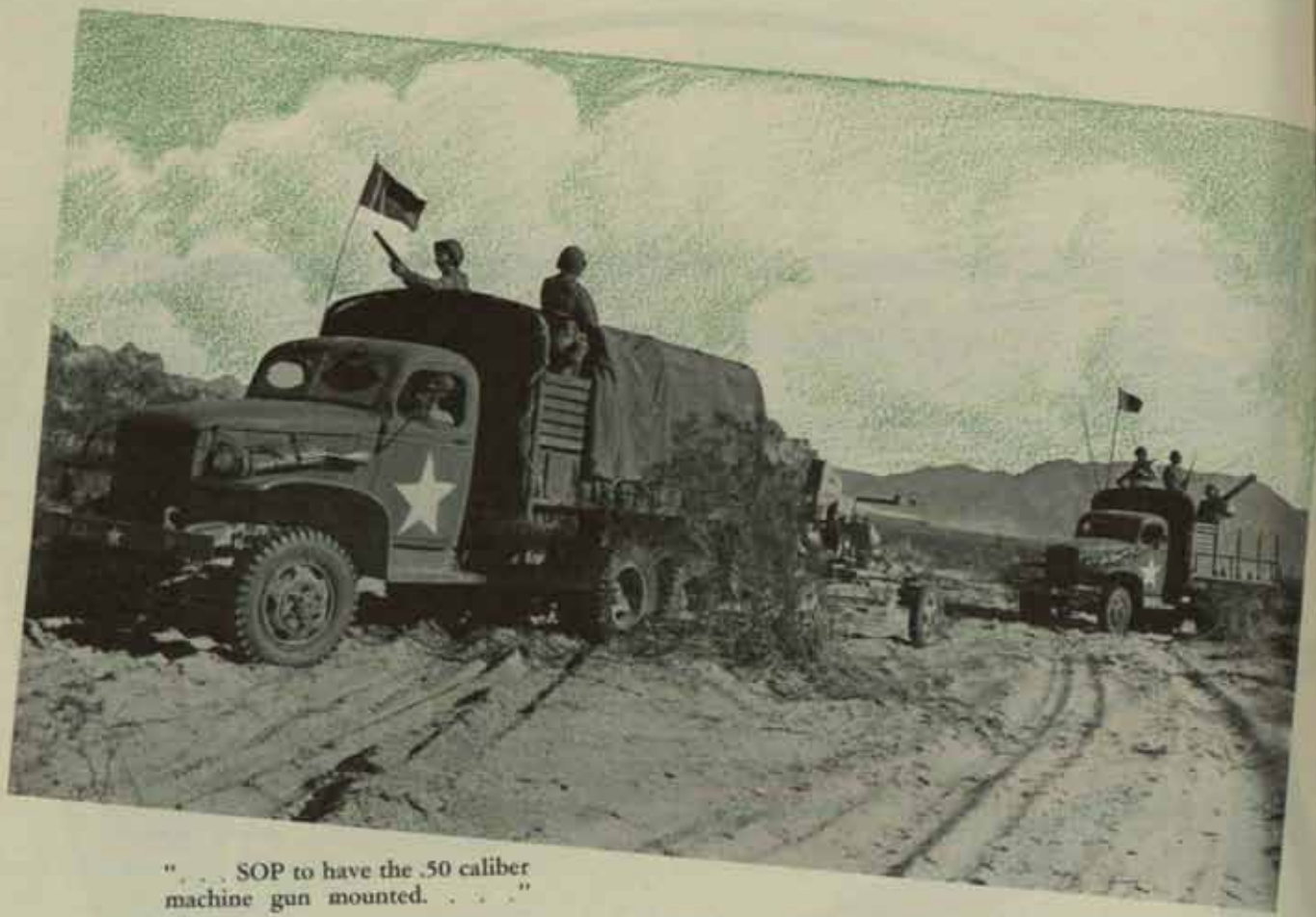
ARMORED DIVISIONS

Antiaircraft Automatic Weapons Battalions will find themselves assigned to duty with Armored Divisions in increasing numbers. All vehicles without antiaircraft protection are particularly vulnerable to attack by low-flying aircraft and such planes are the natural targets for the antiaircraft automatic weapons.

Armored Divisions themselves conscientiously follow out every passive means of antiaircraft defense with particular attention being paid to the practice of dispersing vehicles at a halt or in bivouac. Complete camouflage of vehicles is often impossible due to the necessity of almost constant motion and usual lack of sufficient natural vegetation. However, in certain elements of the command some camouflage is practicable. Concealment is usually used only to the extent that natural coverage can afford.

Armored Divisions can provide a certain amount of antiaircraft protection for themselves by the use of organic automatic weapons, but where such divisions are subject to attack by enemy low-flying planes, additional antiaircraft protection should be provided.

One of the main assignments of such additional antiaircraft units is the protection of the trains of the Armored Division, both in march column and in bivouac. The division maintains all divisional supply, maintenance and Medical establishments which, with



". . . SOP to have the .50 caliber machine gun mounted. . . ."

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the kitchens of combat elements, make up the "A" and "B" trains. The "A" trains furnish supplies of first priority to the combat elements, such as fuel and ammunition. The "B" trains are made up principally of rear echelon supply and maintenance establishments. The "A" trains are constantly traveling from rear supply establishments to the forward combat elements, a distance which varies from twenty to sixty miles. The "B" trains are the supply and maintenance establishments that follow along in the path of the combat elements approximately twenty to forty miles to the rear.

Where the division is split into separate combat commands, the antiaircraft battalion may be split accordingly to furnish AA protection to the "A" trains of each combat command. As a rule, however, all units should be retained under battalion control. In such circumstances each AA unit furnishes AA protection for its column while on the road and also protection of the rendezvous of its column and the combat elements during resupply of these elements.

The defense of such columns is based on the fact that the 40mm guns can be efficiently fired from a traveling position. It is, of course, SOP in Separate AA Battalions to have the .50 caliber machine gun mounted in the range truck so that fire can be brought to bear on an enemy air attack.

The protection of the "B" trains is often somewhat of a problem. This is due to the fact that antiaircraft artillery must protect the trains as they enter the bivouac area and while they are in the area. When AA defense is established over a bivouac area, it is necessary for absolute adherence to be paid to the limits of the bivouac area and the method of entering it by the occupying trains.

Other assignments for which the commander of an antiaircraft unit with an Armored Division should be prepared are:

(1) Mission of protecting an Armored Infantry unit while it is digging in on the main line of resistance.

(2) Mission of accompanying the combat elements into the forward areas. This would necessitate the introduction of armored vehicles with guns mounted in a "ready to fire" position.

(3) Mission of furnishing AA protection to defiles and bridges.

The directors for automatic weapons should always accompany their guns. Emergency firing may be necessary without director control, but for established positions and sustained action in open fields of fire, reliance must be placed upon the director.

When the Division moves in column, on the road, the standard distance between vehicles is seventy-five yards. At first this may seem too close, but lined up in a single column with vehicles at that distance, the Division would extend for a distance of seventy-five

miles, and if extended to one hundred and fifty yards, the length of the column would be doubled, making it one hundred and fifty miles long.

The old routine of the AA Battalion S-3 drawing an overlay for all defenses is completely out in this type of attachment. Because of the fast movement that is encountered, Battery Commanders rarely have an opportunity to reconnoiter their routes of march, let alone their positions. Each officer, down to and including the assistant platoon leaders, must know the basic rules of AA tactics so that when a problem is presented to him he will immediately know the most effective type of defense to use. There will seldom be an opportunity to figure a bomb release line, and then set up the defense accordingly.

Upon arrival at a defended area, where a whole Battalion is to be used in the defense, the most desirable method in coördinating a defense, is to call the Battery Commanders to a rendezvous and draw the defense plan, (frequently in the sand) giving all orders verbally on the spot. The Battery Commanders relay this information to the platoon commanders, who pass it on to the Chiefs of Sections. All field orders received from Division are brief, and, if written, never cover more than a page of ordinary paper for a problem of any length, and from the original field orders on, nothing but fragmentary orders are received, either written or verbal.

Supply, in the field, is handled by the Battalion Supply Officer who estimates the number of trucks needed each night to return to the supply dumps to pick up the daily items of supply. This estimate should be presented to the Supply Officer of the unit to which attached, who in turn supplies the information as to where and at what time the AA column is to meet his column for the resupply trip. This supply problem is handled in the same way no matter how many platoons or batteries are detached from such a battalion. The Supply Officer for each detached unit reports, in each case, and the same procedure is followed.

A good SOP should provide that, regardless of the period of time a fire unit is in position, that it be camouflaged using natural means only. Even though there is no attempt made by elements of the Division to camouflage their trucks, AAA should continue to do so in order to conceal all signs of the presence of AAA in the area.

The SOP should also provide that no matter what the length of time in position, each man dig a shallow slit trench for himself. In lieu of digging slit trenches for each man with the fire unit it is advisable to dig shallow fortifications for the matériel in a fire unit and let the men use this instead of the individual slit trenches. The men should be instructed to use the fortifications for protection only when the area is being bombed by hostile aircraft that are out of range. Even then an observer must be stationed to give the alarm in case the high altitude bombing is a feint for a low altitude attack. No sand bags can be used because of the relatively short periods in any one position.

Particular attention must be paid to the speed of cross country travel when time permits an orderly movement. Keep such movements under ten (10) m.p.h. when possible for the good of the towed matériel. Where movements of this kind are in sandy desert terrain, special low pressure tires must be used.

The experience gained by Armored Divisions in actual combat indicates that AA Automatic Weapons units are a necessary attachment whenever there is a probability of enemy aircraft attack.

Dogs in War

By Lieutenant Harry B. Berman, Coast Artillery Corps

"Leading a dog's life" has become a phrase fraught with double meaning and a double significance. For the most ingenious in the Army's long line of technical specialists is man's old peacetime friend—the dog. Nor is he a warrior of any mean ability. His alert senses, his agility, his strength and his loyalty qualify him as a soldier for the front ranks, as a compatriot with a sense of duty and an ignorance of fear.

At Camp Haan, California, sixteen of these dogs are in training under the supervision of Mr. Lee Duncan, ranch owner and experienced dog trainer. The story of making a family pet into a fighting army dog is one that speaks of thoroughness, patience, and understanding. It is a tribute to the ingenuity of man and to the heart and mind of a dog.

The first step in the making of a dog soldier is the selection of one with the physical and mental characteristics which are adaptable to his future duties. Most of the Army dogs are donated by patriotic citizens and at specified times owners bring their dogs for an exami-

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Examination "prior to induction."

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Plenty of fighting spirit.

nation prior to "induction." In general, the physical standards call for a dog one to five years old, strong, and in excellent health. Army veterinarians examine each canine applicant for these specifications. In addition, those mental characteristics desired are courage, and an even disposition. The dog trainers test their courage by firing shots into the air and otherwise threatening them. The dog with a fighting heart will leap at his antagonist, snarl, or in some way show deep and active displeasure at this violence. A timid or cowardly dog is inspired to flight, or reduced to a pathetic state of cringing, whimpering, or trembling. Those dogs responding favorably to these tests are taken by the Army and are ready for their initial training. In general, German Shepherds, Doberman Pinschers, Boxers, Chesapeake Bay Retrievers, Dalmatians, and Great Danes are preferred. The German Shepherd, because of his strength, courage, and even disposition, is best suited for all-around Army work.

The "basic training" period lasts about two months. During this time, the dog is taught to execute such elementary tactics as heeling, lying down, jumping obstacles, obedience and response to gunshot. The method of familiarizing a dog to gunfire is to fire the gun day by day a little closer to the dog until eventually he shows no fear at all when a gun is fired directly at him at a range of no more than two or three yards.

Part of this basic training is teaching a dog to attack on command. The most difficult phase of this task is overcoming the dog's natural gentleness and friendliness, and the inculcation of the proper amount and degree of viciousness. To achieve this end, various tactics are used. The dog is pinched, shots fired, whips cracked and simulated attacks made on the dog. Most spirited dogs will respond to this antagonism with a frightening ferocity and a most vicious intent. After this, he must be taught to bite, which would apparently seem superfluous education for a dog. But with the aid of gunny sacks, the dog is taught to bite and bite hard and to release on command. This done, there only remains teaching the dog when to attack and where. The right arm, usually the gun arm, is the accepted target for the dog's attack, and the trainer (with his arm well wrapped in bandage, inner-tubing and leather strips) patiently directs the dog's lunges to this spot. He must teach the dog to attack on command, otherwise each time a soldier harmlessly swung his right arm for some reason this might occasion the dog to uninvited and undesired lunges at his supposed aggressors. A normal size German Shepherd can easily overpower a 200 pound man.

A vital phase of this preliminary training is teaching the dog to hunt for and find a man, to assist in tracking the enemy or escaped prisoners and searching out the wounded. To teach the dog to follow a trail, the trainer daily lengthens the distance between himself and the dog, first assuring himself that the dog has become familiar with his scent. A wallet or hat is then dropped at the end of a trail and the success or failure of the dog's training missions is gauged by his success at retrieving these objects. After learning the technique for following a fresh trail, the dog's problem is complicated by the presentation of a trail that is an hour old. After this, the time lag between the making and following of the trail is gradually lengthened to the limit of the duration of human scent under normal conditions.

After training of this sort, the dogs are ready for their advanced and specialized instruction. This consists of

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Another lesson learned.

Signal Corps Photo

The wire goes forward.

one or a combination of the following: sentry duty, locating the wounded, assistance in laying wire communications, carrying messages or messenger pigeons.

Teaching methods for locating the wounded call for involved techniques—following a trail, retrieving and differentiating between the wounded and dead men. When a dog locates a fallen man, he is taught to nudge him, and if the soldier shows signs of life, to pick up a brindsel* hanging around his neck, return to his base, and lead the aid men to the man.

In Camp Haan, principal stress is laid on training dogs for sentry duty. Night as well as day instruction is given, and in fact, the dogs are more responsive and alert at night, as if, as the trainer put it, "they have the feeling as though they were intended to watch at night while others slept." The advanced stages of sentry training require adapting the dogs to different handlers, and in turn, teaching the guards to handle the dogs. Such things as the giving of commands, handling the leash, which side to hold the dog on, etc., make up the curriculum. Twenty military police at Camp Haan are in

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If the man moves, the dog goes for help.

*"Brindsel" is a German word, adopted by our dog experts, for the wooden plaque that the dog wears around his neck. The Germans were the first to use dogs in large numbers in warfare, and some of their terms have infiltrated into our usage. The word is spelled "brindsgel" by some dog experts.

training eight hours a day for a one month period.

The dog is a valuable soldier. Beef, milk, and eggs are part of a standard diet. The veterinarian conducts a "sick call" every morning, including Sundays, supported by a stock of pills, medicines and bandages.

One of the formidable problems facing a semi-isolated antiaircraft gun position is the threat of surprise attack and possibly annihilation. With most of the gun crew's faculties directed to the maintenance of firing, timing and precision, the enemy using but few men might move from gun position to gun position, quickly and quietly wiping out each emplacement. The use of dogs, which with their extremely acute sense can detect the approach of strangers, could in part remove this danger. Mr. Duncan, whose experience qualifies him as one of the top experts in dog knowledge, claims that the use of dogs for this work would be of inestimable value in alerting our men at the approach of the enemy. "Surprising gunners guarded over by good scenting dogs is a risky business for the enemy," asserts Mr. Duncan.

AA MARCHING SONG CONTEST

. . . A *Reminder*

There is still time to submit entries for the 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 song will be found in the greatly expanded Antiaircraft Artillery.

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:

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 4, 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.

Antiaircraft Target Practice*

The Antiaircraft Artillery Board has completed and forwarded to the Commanding General, Antiaircraft Command, a draft of Technical Manual 4-234, *Antiaircraft Artillery Target Practice*. This manual is a revision of those sections of TM 4-235, *Coast Artillery Target Practice*, relating to antiaircraft artillery. Major changes included in this new manual are outlined here.

The new manual is written for all antiaircraft artillery units at home and abroad who have the opportunity to engage in target practice. It is designed to serve the troops in theaters of operation who are not actively engaged against the enemy as well as the units in training centers.

The following is quoted from Chapter 1:

(*a*) "It is recognized that training conditions vary widely in the many commands in which antiaircraft artillery troops are serving. For this reason, it is impractical to prescribe definitely the exact procedure in the conduct of antiaircraft artillery target practices under all circumstances. A guide covering all phases of conduct of target practices, under a standard set of conditions, for reference purposes only, is desirable. This manual is published as such a guide.

(*b*) "As outlined above, when local conditions require, defense, army, task force, base, department, or corresponding commanders, and the Commanding General, Antiaircraft Command, Army Ground Forces, are authorized to modify any of the prescribed procedures for target practices for antiaircraft artillery units except those pertaining to safety precautions and matériel and ammunition reports. The importance of target practice analyses as a means of determining the efficiency of the organization and matériel must be appreciated by all commanders; analyses should be made even in a modified form, whenever circumstances permit."

The use of chemical agents during target practices to simulate service conditions is now authorized.

The yearly classification of organizations is removed so that local commanders can be as severe as they desire in prescribing service conditions for target practice, and still not have their organizations feel that they suffer by comparison with organizations of other commands firing under more favorable conditions.

The detection phase has been made *optional* because in many places it has been found that the time and facilities required have interfered with training which is more urgently needed. However, it is desired that all units conduct this phase of target practice when conditions permit.

Phases include an *optional* detection phase, antiaircraft artillery firing phase, and antimechanized firing phase, for both primary and secondary antiaircraft armament. The following chart shows the required phases for each type battery:

Phase	*Gun Battery*	*Automatic Weapons Battery*	*Searchlight Battery*
Detection phase (optional)	Guns Machine guns	Automatic weapons including machine guns	Machine guns
Antiaircraft artillery firing phase	Guns Machine guns	Automatic weapons including machine guns	Machine guns
Antimechanized firing phase	Guns Machine guns	Automatic weapons including machine guns	Machine guns
Searchlight practice			Searchlights

To emphasize the difficulty of quickly engaging low, fast targets with automatic weapons, and the need for local warning nets for automatic weapons, an *optional* detection phase for automatic weapons is added. Firing phases are divided into basic firing and record service firing.

Record service firing is divided into technical practices and tactical practices. Technical practices though involving some service conditions emphasize the technique of fire. Tactical practices include as many combat conditions as possible. The requirements placed on a gun battery in a tactical practice are quoted:

"25. *b. Conduct.* The record service tactical practice will be conducted under the following conditions:

(1) The battery will receive orders to occupy the position as though it were part of a defense.

(2) The battery will conduct a tactical motor march ending at the firing position.

(3) Where possible, the entire battalion will be tested at the same time.

(4) The battery will develop its position.

(5) The battery will be prepared to fire on any aerial target coming within range. It will fire on any course when the safety flag is up and the line of metal officers have cleared the guns.

"*c. Special requirements.* In addition to the requirements of a technical practice, the following will apply:

(1) All targets will execute bombing runs on the objective which the battery is defending.

(2) On at least one course firing will be conducted by an emergency system (improvised, if necessary) using only the height finder for basic data but using no cables and no director.

(3) On at least one course firing will be done as though the target were unseen (system improvised, if necessary) using no visual tracking.

(4) At any time during firing, the inspection team may designate a total of three men in each

*Written for the JOURNAL by members of the Antiaircraft Artillery Board.

Phase	Practice	Courses: Number	Courses: Type	Altitude	Special Conditions	Score Per Course	Score Per Practice
				GUNS – EACH BATTERY			
Detection (Optional)	Record Service	12 4 by single planes 4 by double planes 4 by 3 or more planes	All	Variable, all above 9,000 feet.	(1) At least 6 attacks with no wire communication outside the battery. (2) At least 4 courses visual pick-up will be used.	$C_1 = \frac{R}{R_m} + K$ R — horizontal range to target at time first burst would have occurred. R_m — horizontal range to point where plotted course intersects 30 sec. fire curve. K — {5, if pick-up; 0, if no pick-up.	$C = C_1 + C_2 \ldots\ldots\ldots + C_{12}$
A.A.A. Firing	1 Record Service Technical Day 1 Record Service Technical Night	3	2 crossing 1 incoming	(1) Must differ by more than 500 yards. (2) Each average slant range (except incoming) more than 5,000 yards.	(1) Altitudes on at least 2 courses per practice determined by stereoscopic height finder. (2) Altitude of 1 course per practice by other means (if available). (3) Director will be offset 200 yards. (4) On at least 2 courses, remote control of guns (if available) will be used.	$C_2 = (10 + H)\left(\frac{HGM}{H'G'M'}\right) + K$ H — average altitude in thousands of yards. HGM — hits/gun/minute. H'G'M' — expected HGM, from graph. K — {10, if hits — 1 or greater; 0 if hits — 0.	$C = C_1 + C_2 + C_3$
	1 Record Service Tactical TOTAL 3 practices	3	2 crossing 1 incoming	(Same as above)	(1) Same as Record Service—Technical. (2) Targets execute bombing runs on objective. (3) On at least 1 course, firing will be by an emergency system using only the height finder. (4) On at least 1 course, using an seven method. (5) On at least 1 course, battery will shift fire from one target to another.	(Same as above) Except: K — 0 unless hit is obtained before the bomb release line is reached.	(Same as above)
Antimechanized	Record Service	3	At least 2 changes of direction.	Range 500 yds. minimum.	(1) During at least 1 course, 2 targets will be presented. (2) Firing unit: one gun without director.	$C_3 = \frac{10HR}{S}$ H — number of hits. R — average range in hundreds of yards. S — number of shots.	$C = C_1 + C_2 + C_3$
				AUTOMATIC WEAPONS – EACH FIRING UNIT			
Detection (Optional)	Record Service	8 for each gun battery and for each A.W. platoon. 4 for machine guns in each searchlight platoon.	All		(1) Only minimum operating crews. (2) At least 2 courses (37mm or 40mm) laid by remote control. (3) At least 2 courses (37mm or 40mm) use no central control or director.	$C_1 = 10 - t_s + K$ t_s — {time from optimum range to time fire was simulated, or the opposite (whichever comes first). Not greater than 10. K — {0, if no pick-up; 5, if pick-up.	$C = C_1 + C_2 + C_3 + C_4$ for firing units in gun battery and AW platoon. $C = 2(C_1 + C_2 + C_3 + C_4)$ for firing units in searchlight battery.
A.A.A. Firing	1 Record Service Technical Day 1 Record Service Technical Night	3	1 crossing 1 incoming 1 diving	At least 1 course above 700 yards for MG or 20mm, 1,500 yards for 37mm or 40mm. On incoming the minimum horizontal range less than 100 yards. At least 1 course below 400 yards.	(1) One course for 37mm or 40mm without central control or director. (2) Illumination during night practice.		For 37mm or 40mm: $C = \frac{50H}{S}(D + 10)$ For caliber .30, 20mm, or subcaliber: $C = \frac{800H}{S}(D - 4)$ H — number of hits. D — average slant range in hundreds of yards. S — number of shots.
	1 Record Service Tactical TOTAL 3 practices	3	1 crossing 1 incoming 1 diving	(Same as above)	(1) Same as record service—technical. (2) All targets execute service condition attacks. (3) At least 1 course for 37mm or 40mm guns without central control or director. (4) One man per section may be designated a casualty. (5) On at least 1 course, firing will be shifted from one target to another.		(Same as technical)
Antimechanized	Record Service	3	At least 2 changes of direction.	Range (yards) Caliber .30 or 20mm: Minimum Range 150 yards. 37mm or 40mm: Minimum Range 200 yards.	(1) On 1 course, 2 targets will be presented. (2) For 37mm or 40mm guns, 1 course conducted by central control or director; 2 courses without central control or director.	$C_3 = \frac{40HR}{S}$ See A.A.A. guns antimechanized for symbols.	$C = C_1 + C_2 + C_3$
				SEARCHLIGHTS – EACH BATTERY			
	2 Record Service Technical	4	All	Variable	(1) Underside of airplanes must be camouflaged. (2) Planes must not be visible with unaided eye from ground.	$C_1 = \left(\frac{S_g}{20} + \frac{10}{t_s}\right)\left(\frac{D_s}{D_{max}}\right) + K$ S_g — ground speed in yards/second. t_s — seconds from "in action" to pick-up. D_s — slant range in yards. D_{max} from table. K — {0, if no carry of 90 sec.; 10, if carry of 90 sec. or more.	$C = C_1 + C_2 + C_3 + C_4$
	1 Record Service Tactical TOTAL 3 practices	4	All	Variable	(1) No wire communication, except within light section will be used. (2) On 2 courses both low and high altitude attacks will be made at the same time.	(Same as technical)	(Same as technical)

of two sections as casualties. An individual designated as a casualty during one course may be used only as an ammunition handler in successive courses.

(5) On at least one course, the battery will shift fire from one target to another."

Inspection teams are added. Their need is two-fold: First, to emphasize performance of basic operations common to all firing; second, to afford a method of judging the firing if the records are incomplete. The following is quoted for a better picture of the inspection team operation:

"24. *c.* (2) (*a*) *Sequence.*

1. The inspection team arrives at firing point with a set of Yes or No questions concerning the proper preliminary operations and the proper operations during firing of all personnel and matériel.

2. By observation the inspection team determines the answers to these questions and judges the state of training of the battery.

(*b*) In general each practice will be judged as follows:

	Preparation	*Firing*	*Total*
Guns	20	10	30
Director	20	10	30
Height Finder	10	10	20
Other Detection Means	10	10	20
Total	60	40	100

(*c*) The questions will be simple and will concern basic operations. It is expected that a battery that is properly trained will obtain a score of 100."

A typical check list for inspecting 90mm gun crews is shown below:

AAA INSPECTION TEAM REPORT FOR A PRACTICE*

(Battery) (Place) (Date) (Time)

Type of Practice: *Technical* Equipment manned: *Guns*

Preparation	*Weight*	*Score*
Were guns level?	1	
Were base plates down properly?	1	
Were outriggers flush with ground?	1	
Were stakes in?	1	
Were auxiliary screws tight?	1	
Were oil reserves checked?	2	
Were recoil systems checked?	2	
Were guns oriented properly?	2	
Were guns synchronized?	2	
Was ammunition checked?	1	
Was ammunition protected from sun?	2	
Was level and orientation checked after first round?	2	
Was remote control checked?	2	
Total preparation	20	

*Model only—modify from time to time.

Firing	
Were rounds handled properly by relayer?	2
Did personnel rotate every course?	1
Were men attentive to job?	2
Did crew operate smoothly?	2
Did acting gun commander lead crew?	2
Did crew put gun from automatic to manual control properly?	1
Total firing	10
Total guns	30

Signature———————————

Substitute following question for tactical practice: "Were guns emplaced in a temporary position and ready within fifteen minutes from time of arrival?"

As a method of comparing units locally a system of total scores is outlined for the use of local commanders. Following is an example of a typical method of calculating the total score of a battery in one type of armament.

	Firing	*Technique*
Detection phase (optional)		82.3
Antiaircraft artillery firing phase:		
Technical day	62.1	**93.0
Technical night	33.7	**85.0
Tactical	25.0	**70.0
Antimechanized firing phase	73.9	
Total	4/194.7	4/330.3
Average	48.7(a)	82.6(b)

Total score of a battery equals average of (a) and (b) $= \frac{48.7 + 82.6}{2} = 65.7.$

Service Conditions

Where practical, an entire battalion is required to be tested at the same time. This applies especially to detection phases, tactical practices, and searchlight practices. To be successful, the battalion must have a good standing operating procedure prepared.

Some courses require more than one target plane.

For gun batteries no adjustment of fire is allowed during a course. The director must be offset at least 200 yards. No trial fire can be conducted on the day of the practice. Visual methods of altitude determination can not be used on some courses. The use of remote control is required on some courses.

For searchlight batteries the use of the most modern means of location available is required. Searchlights must be able to shift from illuminating targets for a gun battery, to illuminating targets for fighter interception, to illuminating targets for automatic weapons.

Some other service conditions prescribed are: rotation of all battery personnel, including officers, after each course; wearing of gas masks for one course; and

**Inspection team score.

use of radio communications in place of wire communications in some practices.

Scoring formulae have been changed to place emphasis on the following:

(1) One hit on every course is favored over several hits on only one course. This is accomplished by the use of a constant K which equals 0 if no hits are obtained but equals 10 if one or more hits are made.

(2) For automatic weapons, curves were drawn based on a large number of target practice reports, and scoring formulae were devised, taking into consideration the hit expectancy indicated on these curves. The caliber .50 curve is different than that for the 40mm; therefore different scoring formulae are necessary for the two types of weapon.

(3) All scores are designed to produce a maximum score of 100 for a practice. The method of scoring the automatic weapons practices has been changed so as to require the counting of hits at the end of the practice instead of at the end of each course.

(4) Although the ground speed component has been omitted from the formula for guns and automatic weapons, it is expected that local commanders will make certain that firing is conducted against as fast a plane as possible.

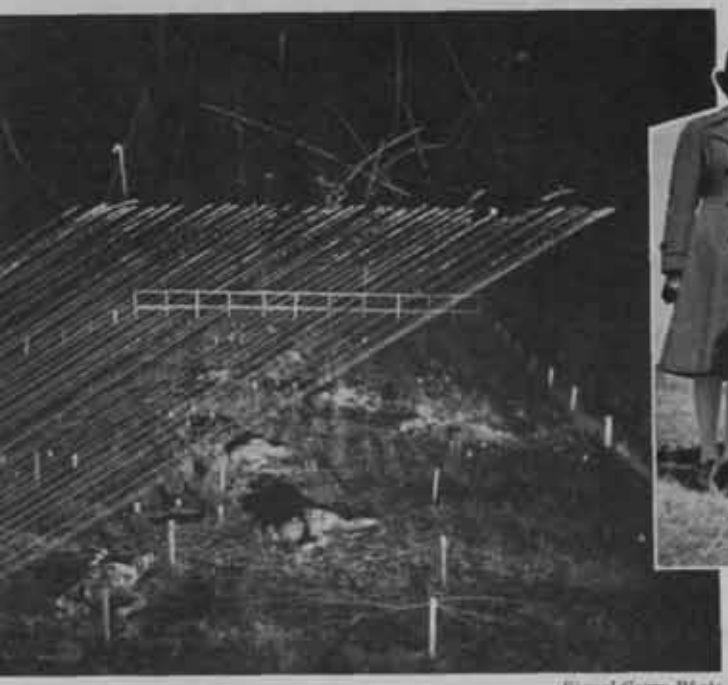
(5) Searchlights are employed in three ways: To illuminate high altitude targets for guns; to illuminate high altitude targets for fighter interception; and to illuminate low altitude targets for automatic weapons. The new scoring formula is designed to compare the slant range of pick-up to an optimum maximum slant range for each type of illumination.

In the preparation of records and reports, the burden is taken off the battery commander by having the records section fill out most of the records, and having the battalion commander submit the narrative report. Instead of forwarding all reports, the training center or corresponding commander forwards a quarterly report to Army Ground Forces. Reports to be transmitted to the AGF are designated by the letters AAC; other records and reports are given AA numbers. A new permanent record, the battery log, is added to provide a uniform method of recording lessons learned by the battery in each practice.

The chart on page 13 shows some of the courses, conditions, and scores for each type of practice.

THE *Journal* NEWSR

Pictures fro



Signal Corps Photo

↑ ARKANSAS—Tank Destroyer men will know the sound of bullets whistling over head *before* they meet the enemy. All U. S. Army combat troops now take this training.

↑ LONG ISLAND (N. Y.)—Bofors meets girl. One of the first WAAC units ordered to AA duties gets acquainted with the matériel. *Acme Newspictures*

← U. S. S. R.—Enemy sources say this picture is a floating Russian AA fortress, location undisclosed.

International News Photo

Marine Corps Photo

ried fronts

GUADALCANAL—An Army 155 helps to clean up the last Jap resistance.

ICELAND—AA gunners stand by.

Signal Corps Photo

MID-ATLANTIC — American troops on the way to Liberia are prepared for air attacks on the convoy.

Signal Corps Photo

NEW CALEDONIA—Caliber .50 AA guns cover the landing of American troops.

MIXED BATTERIES*

By "J.W.N."

EDITOR'S NOTE: *Now that increasing use is being made of our own women in Service it is both interesting and timely to learn how the British started to train and operate "mixed" batteries. British women in mixed AA batteries have already proved to be able substitutes for men in home defense positions releasing more and more men for service overseas.*

The A.T.S. was formed in September 1938, to provide personnel to do noncombatant duties in replacement of men. Later on General Sir Frederick Pile, the G.O.C. in C., A.A. Command, investigated the idea of using girls for certain technical jobs. The first job they took on was the Kine-Theodolite. They have done this ever since they started on it which is in itself sufficient confirmation of their capabilities. They had also been doing instrumental observation work of a special kind at an artillery range somewhere in South of England. They were also used in units as cooks, orderlies, telephonists, M.T. drivers, etc., but in order to have the fullest use of the nation's man power, the girls were tried out on various operational jobs.

All the women serving in A.A. are volunteers so far as the operational numbers are concerned. These women join one of several A.T.S. Training Centers all over the country. The first thing that happens to them is to be given selection tests. These tests take various forms and are designed to determine the recruit's suitability for certain jobs. The tests are gener-

*Reprinted from *Journal of Royal Artillery*, by permission.

British Information Service

Operating the height-finder.

British Information Service

Mr. Churchill visits a mixed battery's director site.

ally reliable and only a very small percentage fail to make the grade selected for them. From the tests the height-takers, spotters, predictor and radio-location numbers are obtained. The non-operational numbers such as cooks, orderlies, telephone orderlies, drivers, clerks, are selected from intakes, usually because they had previous experience in one of these categories, or because they are keen to make this their army career, and more often than not, with a view to learning something that is going to be of use to them after the war—a very healthy sign. Nowadays, of course, the majority of recruits are conscripts, but they still have to volunteer for A.A. operational service. Tests are made and recruits who in civilian life did a job which they can continue to do in the army are encouraged and allowed to continue it.

Technical Training

I think the outstanding thing about their technical training in its early stages is the amount of "chatteration" that goes on, in say a predictor or height-taker team! It takes quite a long time to stop it. However, it is all due to enthusiasm rather than vice. Generally speaking they are slow starters, but once they get the main idea the progress is quite rapid. Height-takers are always good, and in my own opinion are better than men. Predictor numbers after steady progress become really very efficient. The "spotters" are fair. They are rather slow in picking up targets and seem to find difficulty in the recognition of aircraft. This is quite understandable as women have never shown anything like the same amount of interest as men have in types of aircraft. They are picking it up very well though, and womanlike, once they have mastered anything of this sort, the thing sticks. Good spotters are very good, and their progress, if slow, is sure.

How It Works

The foregoing sets out briefly the beginning of a mixed battery. Let us now see how it is formed, and how it becomes an active unit. My cadre of officers and N.C.Ss. came from Scotland. As soon as they arrived they got down to their technical training, which goes on and finishes up with a concentrated period given over to battery training. This ended, the great day comes when the battery leaves the training regiment and goes off to practice camp. The battery commander has the whole battery on parade, tells them that they have done well at their training, and worked hard; that there will be other batteries at camp and we just keep ourselves smart and clean, march about properly, etc., etc. We arrive at practice camp at about midday

in time for dinner. We have our own cookhouse and dining hall, so for the first time we find ourselves standing on our own feet. It is noticed that the girls and men still sit entirely apart, but this does not worry us and we do not intend to force the fraternizing. The remainder of the afternoon is devoted to getting the battery settled down and accustomed to their new surroundings.

The weather at camp was just as appalling as it could possibly have been. Day after day a section would stand by waiting to fire. Both men and girls were grand and stuck to it magnificently. They began to look healthier every day and ate enormous meals. So we went on; firing whenever we could, and drilling when we couldn't fire.

Then the end of camp. The whole battery, now complete with the various specialists sent to us to make us up to establishment, was given leave before taking over our action stations.

We were on our two sites by nine o'clock of our first day of duty. At ten o'clock the outgoing battery marched out! That night we had a raid, but neither we nor any other batteries in the area were called upon to fire. We have had a grounding that no other battery has had. All the battery commander's prophecies came true. Deep snow all over the sites, no hot or cold water for several days on end, bitterly cold weather lasting several days, odd alarms in the night necessitating waiting up at the gun park until "stand easy." All these things happened, but never a let-up on the part of the girls. They carried on picquet duties throughout the day, and the only difference we made to ordinary routine was to put reliefs on for half hour on and one hour off, instead of the usual one hour on and two hours off. During the bitterest weather we put them on to painting their hut interiors and making window curtains. The sickness during this very hard and trying weather was almost negligible.

Routine

There is practically no difference at all between the running of a mixed or any other battery. Hours of reveille, meals and lights out, are all the same. The battery "falls-in" in sections, girls on the right, men on the left. Male officers or N.C.O.'s usually take a parade of mixed personnel and always take a parade of men only, but it sometimes happens that an A.T.S. N.C.O. has charge of a mixed party. The girl in charge of a mixed parade is taken quite as a matter of course, no signs of embarrassment are shown by either the girls or the men, and the men never try to take a rise out of an A.T.S. N.C.O. In any case, these N.C.O.'s know their job and have plenty of self-assurance.

All ranks have their meals together in the common dining hall, and now instead of seeing girls on one side of the hut and men on the other, one invariably sees tables being shared by mixed personnel.

In addition to the mixed canteen we have two huts set aside as Rest Rooms. One of these is for the girls only, and the other for the men only. They are very nicely furnished, have open fireplaces and curtained windows. The girls use their room a lot, but the men don't use theirs a great deal.

Officers' and Sergeant's Messes are of course mixed. Here again the A.T.S. sergeants have their own sleeping quarters, which they also use as a sitting room when they want to be on their own; similarly the officers have a private quarter, but share a common Mess. Messes and dining halls do undoubtedly benefit from "the touch of a woman's hand."

British Information Service

The Kine-Theodolite, or burst-recording camera.

There are three A.T.S. officers in a battery.[1] One junior commander (captain) and two subalterns. The junior commander is the battery messing officer and the two subalterns include in their jobs that of site messing officer. This works very well. Cooks, and mess and dining hall orderlies are, of course, all girls.

Training

Training goes on daily, according to the battery's training programme. Marching and saluting drill are done separately. Gun drill for men, and command post drill for girls. Gas lectures and drill are mixed. Physical training is done separately. All lectures are mixed except when on a domestic or medical subject.

Guards and Picquets

There is picquet of girls on duty throughout daylight hours, which is the equivalent to the men's guard which comes on for the night. The changing of the guard with the picquet is carried out exactly as done by two guards. When the men's guard "Present Arms" the girls give a "Front Salute." This is taken very seriously and is still watched by quite a number of spectators.

The picquet's duties are operational as well as ceremonial. The sentry checks arrivals at the gate, is responsible for sounding the gas, fire and general alarms, and turns out the picquet for ceremonial purposes.

Entertainment and Sport

Each site gets its share of E.N.S.A. concerts and mobile cinemas. This usually works out at one "show" a week. In addition we allow one organized dance a week and no more. We don't allow personnel from one site to visit another just for a dance. Each site has run its own concert party and the talent on both is surprisingly good. Three of our battery were selected to appear in an "Ack-Ack Beer-Beer" programme recently, and have been invited to make another broadcast.

There is a very definite policy to be suggested for entertainments in a mixed battery, and the answer is—make your own as much as you possibly can. This gives an added interest to the performances and brings the battery together in a way where other methods may fail.

Sport in all forms is very popular with both sexes. The girls play hockey, basket- and net-ball, they have played soccer, and they go in for cross-country runs. They have P.T. each day and regular recreational periods.

The men of course play soccer, mixed hockey and net-ball games. The trouble with the men is that we cannot let many off the site at the same time. However, the gunners are very keen on their assault course and will always go for a run in the evening when the idea is suggested by an officer or N.C.O.

We always allow inter site visits for parties to play games against each other, and *esprit de sections* in sport, as in anything else, is tremendous.

Administration

The officers run the battery in exactly the same way as they would in any battery. The "Q" captain[2] runs his department for the battery as a whole. The A.T.S. officers, however, are responsible for the administration and discipline of the women. They pay their women, conduct their physical training, give them certain lectures and talks applicable to women, look after their welfare, hold their own Orderly Room or Office Hour, do their health and hygiene inspections, and arrange the girls' recreational training and games.

The male officers on the other hand are entirely responsible for the operational training of the women. Not long ago it was said that "the women officers do nothing but welfare and administration." This of course is no longer true. In our battery we anticipated that they would eventually become operational and taught our women officers a number of operational jobs. We considered that the girls would have a higher opinion of their officers if they were able to discuss intelligently the girls' jobs. The A.T.S. officers have all to do an instrument course nowadays, and regularly take their turn in a predictor or height-taker team during gun drill.

Miscellaneous

The presence of opposite sexes certainly makes for a pride in turn-out condition of huts, and manners in general. Bad language is extremely rare.

There is a really very fine spirit of mutual help between the sexes. The girls do odd jobs for the men, and vice versa.

The battery has been in one action which lasted for about three and one-half hours. Everybody stood up to the ordeal extremely well, and I am quite sure they always will. We have several times "stood to" for varying lengths of time, at all hours of the day and night, and in all weathers. This always produces one grouse—"Oh I wish we could fire!"

Recently a girl in another battery was killed in action while serving her predictor. Her place was immediately taken by a girl spotter, and the whole command post continued to do their job. Grand girls.

[1] The British AA Battery is about twice the size of ours, and is commanded by a major.

[2] Corresponds to our S-4.

The Newest Thing in AA:
AIRBORNE BATTERIES

By Captain John J. Stark, Coast Artillery Corps

AA From the Skies

Reversing the usual procedure of pumping antiaircraft into the sky, the newest development in the swiftly progressing picture literally drops AA from the skies. The Airborne Command, working jointly with the Antiaircraft Command, has developed new procedures which enable AA artillery to go right along with the Air Force, the air landing troops, and even the parachute troops. Unfortunately most of the details of the Airborne AA are classified information. However, some of the earlier developments can now be disclosed as a matter of interest to all AA enthusiasts.

The need for AA which could be readily transported by airplane has long been apparent. In the Pacific area particularly, where airfields lay far out in the jungles, away from roads, railways, or water transport, AA was needed for local protection of planes, crews, and runways. What was the answer? AA that could fly right in with the Air Forces. And now, thanks to the farsightedness of joint planning between the AA Command and the Army Air Forces working with the Airborne Command, we have AA right where it is needed.

Even greater, of course, is the demand for AA to accompany our new Airborne Divisions. Here the AA is an organic part of these hard-hitting "Commandos of the Air." The exact composition naturally is not to be published. It is enough to say that the AA was considered so important that it had almost first priority in the allotment of airborne troops to the division.

Aerial Logistics

The actual technique of transporting troops by air is a rather exact science. Early in the game, an AA machine gun or two with some crew members were tossed into a plane, a few ropes were tied over the equipment, and the plane took off. Now, however, the exact locations in the plane (called "stations" measured in inches from either the nose of the plane or the front bulkhead depending on the type of plane used) are given for each passenger and piece of equipment. Elaborate training is conducted by already trained airborne units in loading, lashing, and unloading to perfect the airborne technique.

The four principles of airborne loading can be stated briefly as follows:

1. Do not exceed the maximum gross loading for the type of plane used. (In other words, the plane with all its equipment plus the crew, fuel, passengers, and matériel must not exceed the designed weight limitation.)

2. Do not place the load so as to move the ship's center of gravity either forward or behind the allowable limits. (In the C-47 cargo plane, for example, the CG of the completely loaded plane must be between certain definite stations marked on the wall of the plane.)

3. Do not exceed the allowable weight concentration on the floor structure. (Obviously you would not put a Bofors on a 1/32" dural floor unless it had been "beefed up," reinforced. Fortunately, all our new cargo planes have exceptionally strong floor structures.)

4. Do not take off with a load unless it is securely lashed. (Passengers are easily lashed down by using the safety belts. Equipment, however, must be secured by rope, strap, or cable. This is best done by using half-inch rope but it takes time.)

A fifth but obvious principle—do not exceed the maximum usable space in the plane. Thus, if you were transporting pillows, you would have a real problem to use all the allowable cargo weight limit. The big problem with us is: will it go through the door?

The new cargo door sizes would amaze the average person who is used to seeing the 26" x 60" door of the familiar Douglass DC-3 transport, for years the most common airliner. An interesting incident occurred early in the design of a certain air transport plane. When jeeps were thought to be important enough to ship by air—an old story now, by the way—we found that the door size was absolutely the largest which would just *not* let the jeep get inside. By fudging a little and bending the bumper, we squeezed one in but not without angering the pilot and crew chief no little. They like their planes unscratched (from loading) and rightly so. As a result of this experience, the door size was quickly changed and now jeeps are driven right inside.

The equipment carried along with the gun is of course, pared down some from the ordinary T/BA. You wouldn't want to cart along a standard field range, for instance. Nor would even one small wall tent per field officer be worth its weight in air cargo space. Food, ammunition, guns, and enough men to fire them should have priority over every other piece of equipment.

Tactics as Usual

The tactics of these swift-flying AA troops are not too different from the combat procedure now taught at

the AA schools. Once the troops with their guns are landed, it is a matter of seconds till the local AA defense is set up. You have the same weapons as if you had moved in by truck with the exception that it would take a pretty imaginative airplane to transport the larger caliber AA guns. Your ammunition supply, too, is going to be a little slim at first, perhaps even less than a unit of fire for each gun. But after the initial airborne attack, the resupply planes come in and augment both food and ammunition before it runs low. Then too the Air Forces are using the same caliber ammunition and that simplifies the problem.

The antimechanized rôle of AA guns is going to be extremely important in an airborne expedition. Looking at the situation from the enemy's point of view, the best defense against airborne troops would be a mechanized counterattack. This is where the Airlanded AA is again worth more than its weight in air cargo space.

Right here it would be well to differentiate between a few of the terms as used in our Army.

Airborne Troops—All fighting men that are transported by air. (That would include parachute troops dropped from the air, troops that are landed in transport planes, and those that are landed in gliders.)

Airlanding Troops—Troops that are landed by transport plane and which do not have to rely on parachutes to get them to their destination. Conceivably, these troops might be transported in bombers or gliders.

Glider Troops—Troops that are transported in gliders and landed at their destination.

Thus Airborne troops include airlanding troops, and airlanding troops include glider troops. The glider troops, incidentally, are the latest addition to our skyrocketing airborne program.

Morale is High

There are probably no fighting men in the services whose combat spirit quite equals that of the troops who fight down from the air. The parachute troops have long been known for their utter disregard of personal danger, and this same spirit permeates the whole of the airborne training. Soldiers of the flying AA are picked men. Their training is carefully conducted. They are the modern counterpart of the old time Cavalry but go them one better. They are highly technical as well as being intrepid.

An AA Airborne Battery some time ago completed the first permanent change of station by air transport. You can imagine the Battery Commander's reactions when he received a special order, all very neatly mimeographed, two days before departure to proceed via so many C-47 airplanes over the shortest usually travelled airways. The whole journey was completed without a hitch, and to this day it remains one of the largest airborne operations in the history of our far-flung airborne units, some 1900 miles.

Those who work hard with reasonable intelligence in any job will be the men who are sought after by those in charge of the job. Brilliancy of knowledge without hard work is of little use. Hard work, intelligently applied, even though not accompanied by unusual brilliancy, pays big dividends in getting any work done and it pays big dividends to the men who apply that hard work. They are men who are relied upon in getting things done.—Brigadier General L. B. Weeks.

37mm Trainer for Individual Tracer Control

By Lieutenant Richard M. Bleier, Coast Artillery Corps

Need for Gunners Trainer

The introduction of improved fire control equipment for automatic weapons does not eliminate the importance of Individual Tracer Control. During all the twenty-four hours of the day, both the guns and fire control equipment cannot be fully manned and ready for instant action, but should a surprise target appear at a time when equipment is only partially manned, skeleton crews should be prepared to open fire without relying upon fire control. The men should be trained to fire without hesitation, yet with effect, using I.T.C. until the full complement of the crew is assembled and the fire control equipment is fully manned.

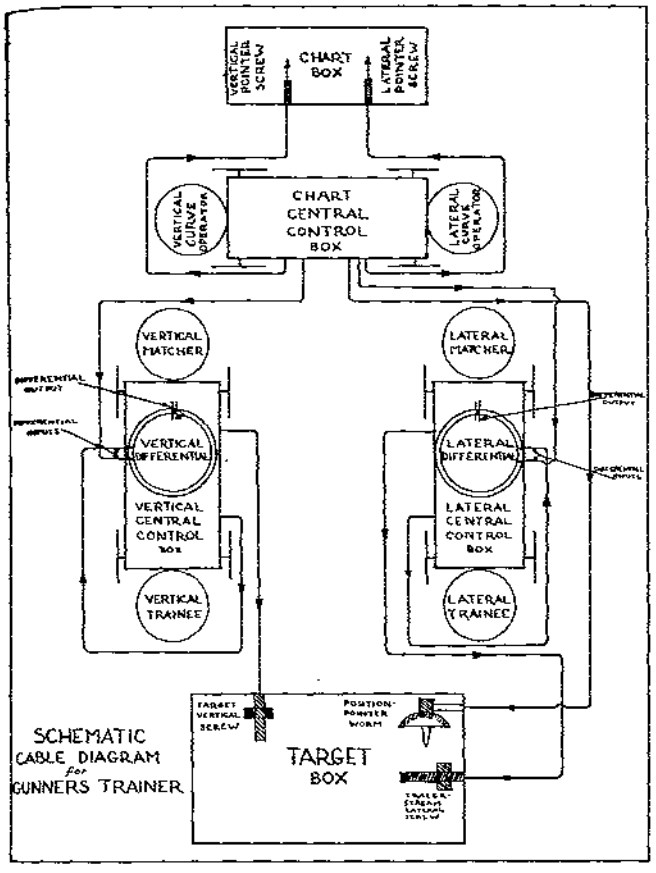
Methods for the training of gun pointers improve in direct proportion as means are provided for more closely simulating the courses of hostile aircraft under combat conditions. The heretofore practical difficulties involved in providing sufficient practice in firing at sleeve targets, coupled with the slow speed of such targets, makes other means for simple and rapid routine training desirable. The Gunners Trainer represents an attempt to provide such a device.

The manner in which the Trainer works is roughly analagous to certain devices used in testing the speed and accuracy of reaction of automobile drivers; devices in which the driver sits in a stationary test car behind a moving picture of a road along which he seems to be moving.

By use of the Trainer, the men are enabled to translate their mental understanding of the manner in which the gun operates into actual visual-mental-muscular coordination, and to make adjustments to what they see automatically. In so doing they will gain confidence that under combat conditions they will effect hits. In addition, the officer has a tool, a teaching aid, which will enable him to instruct physically and not simply by words, and to test objectively the capabilities of his men. He can then, with some certainty, know when his men are trained; can even seek for proficiency in gun pointing among all the men in the battery.

I.T.C. is difficult to perfect, because it centers on the gun pointer all the complex problems of tracking, leading, and adjusting. Battle experience has been the only adequate teacher. Sleeve targets with their relatively slow speeds do not give a proper comparison for actual service targets. Radio-controlled target planes which fly at service speeds are not always available. It therefore appears that a mechanical device which ap-

Gunners Trainer in operation. Lieutenant Bleier on the right watching chart operation. Lieutenant Sinquefield checks trainee's performance at matchers dials.



proximates conditions to be met, and which leads toward proper automatic pointing is the best substitute at this time for actual hostile air action.

Comparison With the McNeeley Trainer

A Trainer has been constructed at this base in the Pacific using only facilities and materials at hand: central control boxes and cables, a phonograph motor, and the materials and equipment available to an ordnance detachment having certain elements of a medium maintenance company.

The Gunners Trainer is similar to the McNeeley Central Control Trainer. The trainee sees a 700 mil area of sky around an airplane and a tracer-stream which is moved in relation to the airplane. The McNeeley Trainer shows deviations of the tracer-stream from the airplane in errors of lead only. The Gunners Trainer, however, shows a nearly complete picture of what is taking place in a patch of sky exactly as a similar operation of the gun handwheels would produce in actual firing. The Trainer teaches the trainee to combine correct tracking and leading with accurate adjustment of fire.

As in the McNeeley Trainer, a central control box is used to provide a differential mechanism wherein a curve on a prepared chart furnishes one of the inputs while the trainee in turning a handwheel provides the other input. One input endeavors to cancel the other, and any output resulting is used to displace the tracer-stream with reference to the airplane.

Although the Trainer is best adapted to handle crossing and crossing-diving courses, it can be used to train in on-coming and on-coming diving courses. Target ground speeds of from 100 to over 400 miles-per-hour can be handled.

What Does the Trainer Teach?

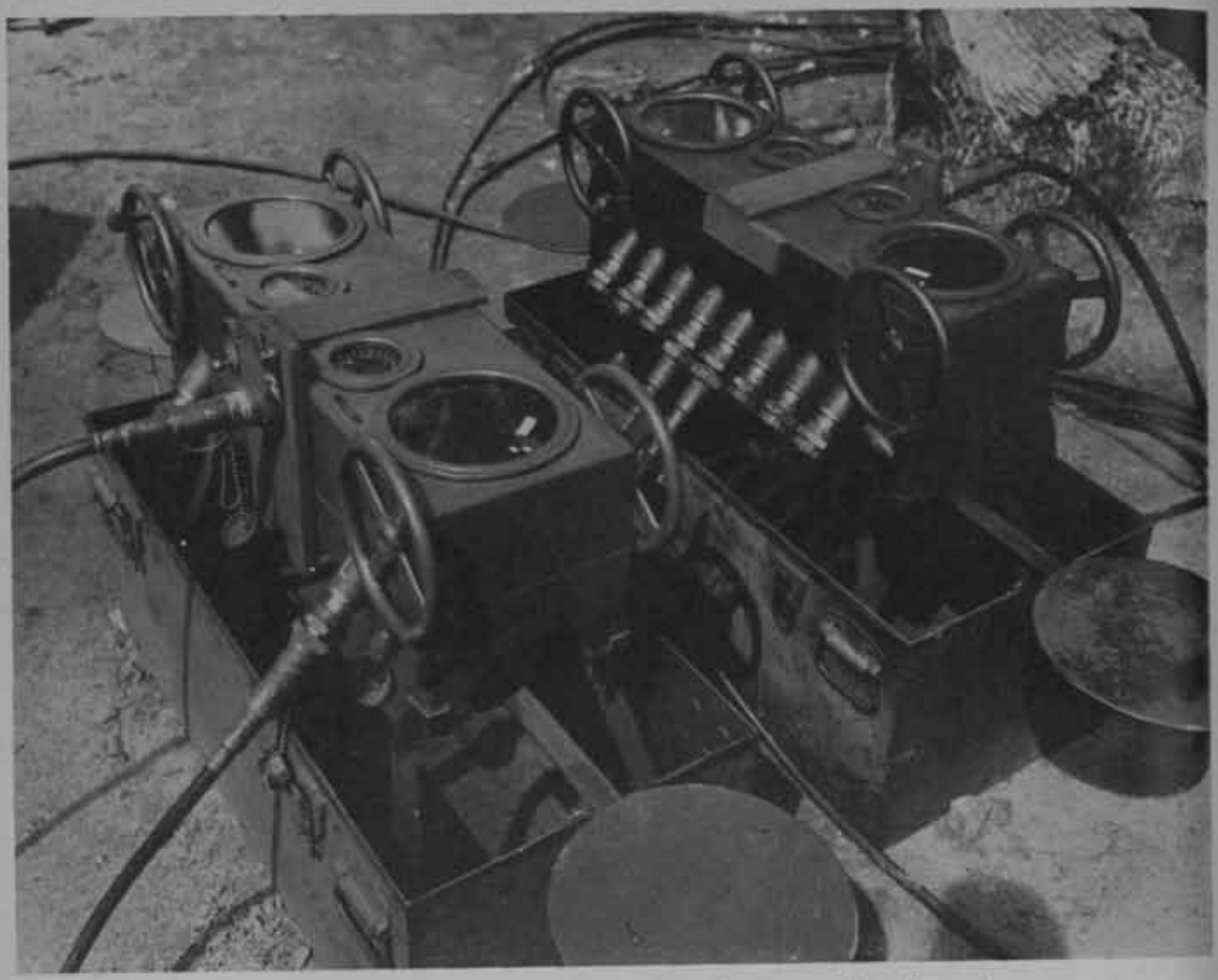
1. The Trainer emphasizes to the men the importance of correct handwheel operation, clearly showing the difficulties involved and the need for practice.
2. It trains both the lateral and vertical gun pointers to work as a team, to have confidence in each other. The two gunners are made to realize that both must be on the target to get hits. The Trainer creates confidence that the other gun pointer having had similar training will handle his side equally well.
3. It teaches the variation in handwheel speeds for each part of the course.
4. It concretely shows in its miniature sky the differential effect of changes in speed, altitude, and mid-point range.
5. It trains how to adjust at each part of the course.
6. It clearly demonstrates the lag which must be expected before the adjustment will take effect. The matching lag during which the matcher must turn six turns for every one by the trainee is comparable to the time-of-flight lag present in actual firing.
7. It illustrates the need for proper automatic correct *direction* of rotation of the handwheels and teaches the gunner to move them in the correct direction to get back on the airplane without conscious thought, just as in driving a car.

Construction

The Trainer is composed of two main units: the target box and the chart box. The target box contains a tracer-stream movable in the horizontal plane and an airplane movable in the vertical plane. Beneath the target box are two central control boxes whose handwheels are similar to the handwheels of a 37mm gun.

It is assumed that the handwheels of the gun would be set for high gear on the lateral and low gear on the vertical. The target box was constructed so that one turn of the lateral handwheels clockwise moves the tracer-stream 200 mils clockwise with reference to the airplane. One turn of the Trainer vertical handwheels clockwise moves the tracer-stream down 67 mils with reference to the airplane. (Actually the airplane moves up to the tracer-stream.) In direction and magnitude this is exactly the same as on the gun using the M3 or M3E1 mount. New threaded shafts and nuts will be machined for use in the trainer when it is desired to simulate the operation of the M3A1 mount.

If one does not add two additional central control boxes to the three already used, it is necessary that the two matchers must occupy the seats at the opposite ends of the control boxes used by the trainees. This requires that the distance between the trainee and his



Target Box lateral and vertical central control boxes showing special cable attachments.

matcher be no more than three feet. Therefore the depth of the target box and the tracer-stream image must also be limited to three feet. The target image is three feet from the trainee and both trainees are spaced apart by their central control boxes. Considerable parallax would occur if both trainees viewed the same target and tracer-stream image; therefore it was necessary to create a separate image for each trainee.

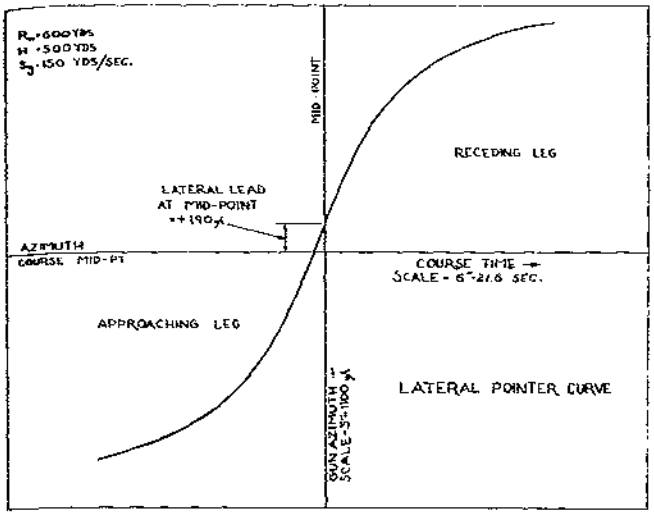
The tracer-stream is made up of a series of suspended miniature red bullets, which along with the airplane target model are illuminated by light through the open top of the target box. The flashing-light type of tracer-stream used in the McNeeley Trainer could not be incorporated because of the lack of materials; and the type actually used in the Gunners Trainer makes an electric power source unnecessary.

The stop mechanisms in the lateral and vertical central control boxes have been adjusted for the matching handwheels so that the stops are activated before the nuts on the lateral and vertical screws in the target box can reach the end of their travel and bind.

In the chart box two curves are used, one each for lateral and vertical data. The vertical curve shows for each moment of time during a course the correct quadrant elevation which must be set on the gun to get hits. The lateral curve shows for each moment of time during a course the correct firing azimuth which must be set on the gun, using the azimuth of the airplane at mid-point of the course as the reference line.

Both charts are mounted on a single table and translated along their time axes at constant speed. Steady movement of the table is derived from a phonograph motor, a constant speed electric motor not being available. The phonograph solves this field problem and makes an electric power source unnecessary.

A third central control box provides lateral and vertical handwheels which enable the operators to move chart pointers. These chart pointers are kept on the curves as the charts are translated along their time axes. The distance up to the curve from its origin is a measure of the required gun azimuth or quadrant elevation at any instant during a course. Keeping the pointer on the curve converts this distance into so many handwheel turns. If the trainee on the target box will



cancel perfectly each movement of the pointer as it follows the curve in the chart box, hits will be secured at every point of the course.

The points for the vertical curve are calculated from the sum of the angular height and the vertical lead. The points for the lateral curve are calculated from the horizontal angle from the mid-point to the line of position, plus the lateral lead.

The chart box was designed to handle courses from over 400 miles-per-hour down to courses at 100 m.p.h., the latter being more useful in the early stages of training. It is important to have approximately the same chart length along the time axis for the short 400 m.p.h. courses as for the long 100 m.p.h. This is accomplished by changing the position of the pivot or fulcrum of the chart operating lever. The chart box is parted so that the top of the box containing the pointer mechanism can be lifted to expose the chart table drive so the fulcrum can be shifted.

The phonograph drives the chart table along the time axis and is connected through a universal coupling. A pin is removed from the coupling at the end of each course so the table can be returned to the start position without turning the phonograph turntable backwards.

Special stops are placed in the chart central control box to activate the stop mechanism before the pointer mechanism can jam at the end of its travel.

Incorporated in the target box is an innovation of great value in training, which was the suggestion of 1st Lt. Charles A. Sinquefield, Ord. Dept., who also collaborated fully on the mechanical design of the trainer. In the background of the target box a pointer is rotated which represents for each moment during a crossing course, in the horizontal plane, a line from the gun to the airplane's position. It gives the trainee an indication of the present position of the airplane with relation to the entire course. The gunner has this same indication when actually firing on the gun. This information is valuable to the trainee in gaging the critical points on the course, and aids in the study of differential effects. Lacking such an indicator the trainee knows only by a sense of the passage of time what phase of the course is current. He might be told by the chart men when mid-point is reached, but usually this mid-point comes after the critical reversal takes place. The target position pointer is attached to a worm wheel, which is driven by a worm. Data taken from the lateral chart are used to rotate the worm. The target position pointer is resynchronized for each new course so as to be perpendicular at mid-point. The position pointer looms large in the background of the target model well within the trainee's field of vision to allow him to be conscious of its current position without having to shift his focus from the target and tracer-stream. This is the first attempt in this type trainer to convey a sense of travel, to impress the trainee that the picture he sees in the Trainer is actually moving panoramically across the sky with the airplane on its course.

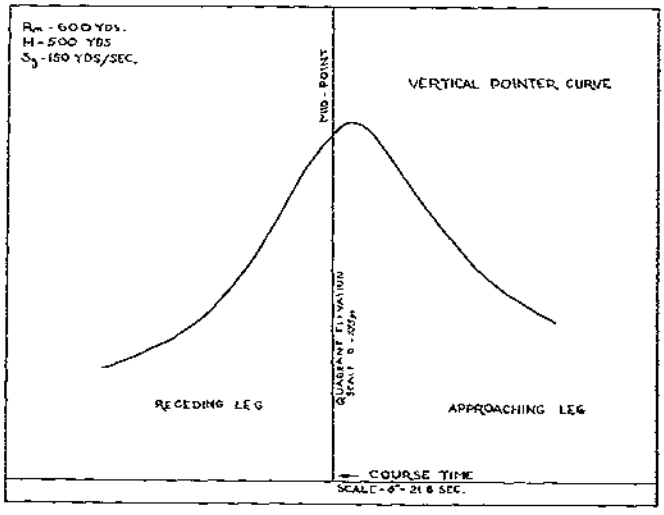
Operating Crew

Six men comprise a minimum manning crew: trainee, matcher, and chart pointer operator are required for both lateral and vertical. A chart operator can start the phonograph to begin the course. It is helpful in early training to have the men operate the chart during a run before taking the trainee position.

From the information available at the matcher's dial, it seems that a scoring basis might be worked out. This would be helpful to the officer in charge and also serve to promote a competitive spirit among the men.

Limitations of Construction

Central control boxes were used to provide handwheels like those on the guns, and cables to transmit rotation. The cables do not perform as smoothly as direct shafting would, but they are quite adequate for training. Design was limited to exclude all gearing through lack of production facilities, and in each connection to ordnance equipment it was the rule not to alter anything permanently by even so much as drilling a hole. In every case the central control equipment can be reassembled quickly to its original condition.



German Doctrine: AA Defense

EDITOR'S NOTE: The following article is a translation of one chapter from the 1940 edition of General von Cochenhausen's *Tactical Handbook for the Troop Commander*. This text is believed to be used extensively by German army personnel.

1. *Antiaircraft Defense from the Ground*. The missions of ground antiaircraft defense are:

Defense against hostile aerial reconnaissance
Defense against hostile artillery observation
Defense against hostile air attacks on living targets and important defense installations.
The support of friendly air combat strength.

A distinction is made between:

Light and heavy antiaircraft battalions
Antiaircraft searchlight battalions
Air barrage balloon battalions.

Light and heavy antiaircraft weapons supplement each other in their effect. In addition to these weapons, troops protect themselves with their own machine guns and rifles against planes flying under 800 meters, slant range.

2. *Weapons*.

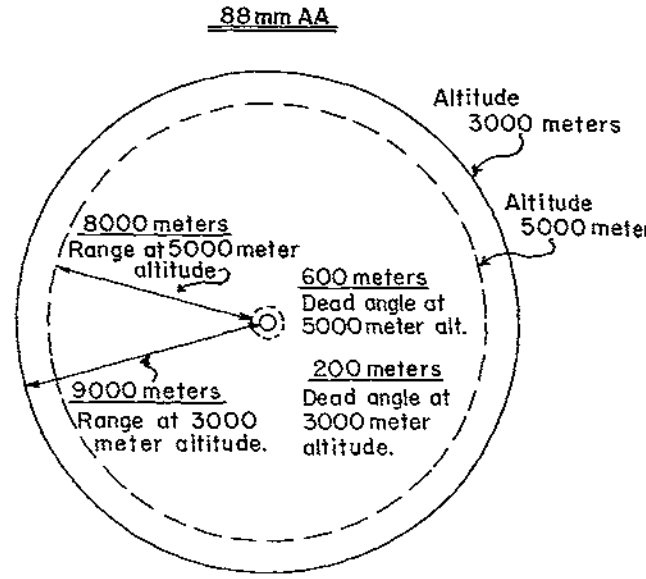
a. Antiaircraft Guns. This weapon is the backbone of the entire antiaircraft defense. The battery is the fire unit, and the suballotment of its elements is not practical.

The heavy battery bears the brunt of the antiaircraft defense in the combat zone. It combines high capabilities and rapid fire with great mobility.

The mission of the heavy antiaircraft guns is to protect the ground troops against aerial reconnaissance and high altitude attacks during the advance, and while at rest or in combat. These weapons are moved by mechanical transport. Their average marching speed is from ten to thirty kilometers per hour. Horse-drawn antiaircraft cannons are employed only by army commands that must contend with fuel shortages and a very unsuitable road net. Antiaircraft units provided with mechanical transport possess the following characteristics: rapid readiness for fire; great mobility; capabilities for employment within the effective range of hostile artillery.

These weapons are employed against hostile airplanes, especially the attack units, flying at altitudes up to approximately 8,000 meters. Heavy antiaircraft artillery cannot be used against planes flying at altitudes under 1,000 meters. Due to the requirements for special fire control equipment and special ammunition, these weapons are only to be used against ground targets in the case of close-in tank attacks.

b. Light antiaircraft cannon are especially suitable for defense against planes flying at short ranges and at low altitudes, such as ground strafing and dive bombing attacks.



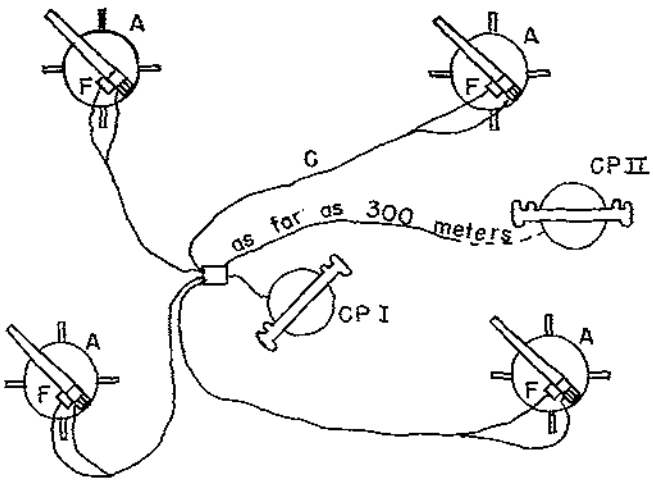
EXPLANATION

The center of the circle should be placed at the intended fire position on a 1:100,000 scale map. The smallest (innermost) circle delimits the dead angle for each antiaircraft battery within which an aerial target cannot be fired upon. Therefore, the effective horizontal range of the given caliber (88mm) at an aerial target flying at the given average altitude (3,000 meters) lies from the small solid circle to the large outer circle, and at 5,000 meters, it lies from the small broken circle to the large broken circle. The effective horizontal range is greater against targets flying at altitudes under 3,000 meters than against targets flying at altitudes over 3,000 meters.

The mission of the light antiaircraft cannon is to protect installations or troops against ground strafing or dive bombing attacks. These weapons are moved by mechanical transport, on trucks or on self-propelled mounts. These weapons are characterized by great mobility and their ability to track aerial targets having a high angular rate of travel and change of ranges (tracers are used to assist in this task). The average marching speed of units equipped with these weapons is from twenty-five to forty kilometers per hour.

c. Antiaircraft searchlight (60 and 150cm). By means of searchlights, alone or in coöperation with pursuit aviation, it is possible to discover hostile airplanes at night and deliver aimed fire at them as well as to blind the airplane crews, thus increasing their difficulties in orientation and preventing them from dropping bombs accurately. Searchlights do not attempt to illuminate the entire sky continuously. They determine the general area of their targets with sound locator apparatus and illuminate their targets, utilizing surprise as much as possible. Searchlights are moved by motor vehicles.

The 60cm antiaircraft searchlight is an organic part



A : Antiaircraft gun
CP I : Command station with command apparatus
CP II : Command station with auxiliary command apparatus
C : Cable for data transmission system or telephone
F : Automatic fuse setter

of the light antiaircraft artillery organization. Each light antiaircraft artillery battalion is provided with twelve searchlights. With good visibility conditions, the maximum range of this searchlight is approximately 5,000 meters.

The 150cm antiaircraft searchlights are organized into special searchlight battalions, each provided with twenty-seven searchlights. With good visibility conditions, their maximum range is approximately 8,000 meters.

d. Air obstacles (barrage balloons and kites) supplement the defense capabilities of antiaircraft artillery around especially important and sensitive objectives. They are installed within and around the defended objective.

The mission of air obstacles, depending on their method of employment and altitudes, is to defend against high, low and diving aerial attacks.

e. Self defense of the troops against aerial attacks. Troops of all arms, including the rear services, with their own light and heavy machine guns, must be able, independent of the antiaircraft artillery, to defend themselves against low altitude attacks up to 800 meters slant range. All light and heavy machine guns are provided with supplementary equipment for firing at aerial targets. All troops defend themselves with rifles against low altitude attacks up to ranges of 500 meters.

3. *Employment.* Several antiaircraft battalions may be assigned to a regimental commander, who, as far as the antiaircraft artillery is concerned, is placed directly under army command. The antiaircraft artillery attached to a corps is placed under the senior antiaircraft officer, who is then designated as the corps "antiaircraft artillery commander." The corps regulates the employment of the corps air units and the antiaircraft artillery as well as their coöperation with the aircraft warning service, in accordance with the orders of the army commander. One or more antiaircraft battalions may be placed under a corps, or in exceptional cases, a division. Then, if no higher staff is available, the "antiaircraft artillery commander" has the mission of advising the ground force commander on all questions concerning: antiaircraft defense; the employment of subordinate air and antiaircraft forces in accordance with the plan of action; the execution of the pertinent orders of the ground force commander.

Antiaircraft artillery missions are generally assigned from a map. Normally, the antiaircraft artillery strength is concentrated around and on the most important and most sensitive points. Accordingly, the ground and air situations prescribe definite aerial defense main efforts, at the expense of exposing a few less important points. March movements generally can be defended only at a few specially dangerous places (such as bridges and defiles), assembly points, rest areas, and entrances to bivouacs. On the battlefield, antiaircraft defense is usually most urgently needed to protect the artillery main effort.

The antiaircraft artillery battalion commander is essentially a tactical commander. Unity of fire control within the battalion is impossible, due to the widely separated battery positions and the characteristics of the targets.

The changing of positions interrupts the fire effect and therefore it must be given careful attention, and generally should be carried out by echelons.

Pursuit aviation coöperates with antiaircraft artillery. Hostile air reconnaissance can be suppressed for a limited time over a limited area, by the concentration of pursuit aviation strength and antiaircraft artillery at decisive points, and by air attacks against hostile air fields. Nevertheless, individual hostile reconnaissance planes may be expected to operate. Therefore, even in case of temporary air superiority, camouflage measures should always be effected. In case only weak pursuit forces are available, then their combined employment with the antiaircraft artillery should at least impede the normal hostile reconnaissance.

Blockading an air area by means of pursuit aviation promises only limited success, and it results in the excessive use of aerial strength.

II. *Air Signal Troops.*

1. *Employment and Mission.* A part of the air signal troops (ground force liaison battalions) are placed under the army, specifically under the air arm commander at army headquarters.

The missions of these units are:

a. Installing and operating communications between the air arm commander and the air arm units (reconnaissance aviation and antiaircraft artillery) that are placed directly under his command.

b. Maintaining connection with the communica-

tion net of the operating air arm in order to:

1) Insure communication with the operating air arm units made available to ground force units for coöperation. These units include bombardment and dive bombing units, as well as pursuit and low flying combat planes.
2) Facilitate the supply of that part of the air arm placed under ground force units.

The establishment of communication to air arm units (reconnaissance and antiaircraft) subordinated to corps and division commands, is a responsibility of ground force signal units.

Separate air signal units of the operating air arm are advanced well forward to carry out the air security and warning service in the zone of operations.

2. *Aircraft Warning Service.* This service depends on the airplane recognition service and it is carried out by the liaison troops.

There is a fixed "German territorial aircraft warning service" and a mobile aircraft warning service which is carried out by "aircraft warning service companies." This warning service is operated through the air district headquarters commanders, under whom the aircraft warning service is subordinated.

The fixed "aircraft warning service net" is mesh-like in character. The distance of individual air guard lines from one another varies between thirty and seventy kilometers. These distances and lines are established in accordance with tactical considerations. "Air guard stations" comprising observation and reporting stations (ten to twelve kilometers apart) and "air guard headquarters," comprising plotting and relaying stations, are agencies of the aircraft warning service.

The motorized warning companies supplement and increase the density of the fixed aircraft warning net. They are mostly employed well forward toward the front. However, they may be employed to open flanks and in rear areas.

The reports of the German territorial aircraft warning service are made by wire, whereas, the reports of the motorized aircraft warning companies are made by radio.

The missions of the aircraft warning service are: to give the command a clear picture of the air situation, especially the activity of the hostile combat aviation; to make possible the timely employment of antiaircraft artillery and defensive aviation; to give timely warning to troops and threatened positions.

The aircraft warning service is supplemented by the troop warning services of the antiaircraft artillery. (Similar to our antiaircraft artillery information service.) Every active antiaircraft artillery unit observes the air in the area under its jurisdiction with specially trained personnel. Thus, these units as air guards, and their staffs as air guard headquarters, execute, or in some cases supplement, the aircraft warning service. The reports, after being checked by the antiaircraft artillery battalion, are transmitted to the air arm commander at army headquarters. These reports must contain the following: name or location of observation position; hour the plane(s) was seen or heard; the number, type, nationality and flight direction of the hostile plane(s); the altitude of the plane(s) and its range from the air guards (only if this altitude and range are unusually great).

In addition, all troop units must use their own air guards to avoid surprise. These guards give warning by means of oral calls, horns, sirens, or blinker lamps. If antiaircraft artillery is present, its fire is the most effective warning.

EDITOR'S REMARKS: *The above article gives no definite information as to the organization of the German antiaircraft artillery. It is noted however that separate units exist as light and heavy AA battalions, AA searchlight battalions and air barrage balloon battalions. It appears that the basic AA unit is the battalion.*

We have become familiar with the basic German idea of organizing a task force based upon the understanding of the problems to be met in the accomplishment of a particular mission or task. Where antiaircraft defense is needed, antiaircraft battalions are assigned to the task force commander according to the particular character and amount of antiaircraft defense deemed necessary.

It can be seen that in the determination of the kind and number of antiaircraft battalions to be assigned a particular task force certain governing factors are considered. Among these may be noted:

1. The assigned mission (its character and importance).

2. The amount and characteristics of enemy aviation to be encountered.

3. The amount and types of friendly aviation available.

4. The task force commander's estimate of quantity and character of AA units required.

5. The quantity and character of AA units available.

6. The terrain.

7. Proximity to enemy.

8. Weather and season of year.

In addition to the prevailing battalion organization, it is believed that two kinds of regimental organization exist. First the regiment that is uniform in its composition of either heavy or medium caliber gun battalions and second the regiment of composite type made up of various kinds of battalions for a particular mission.

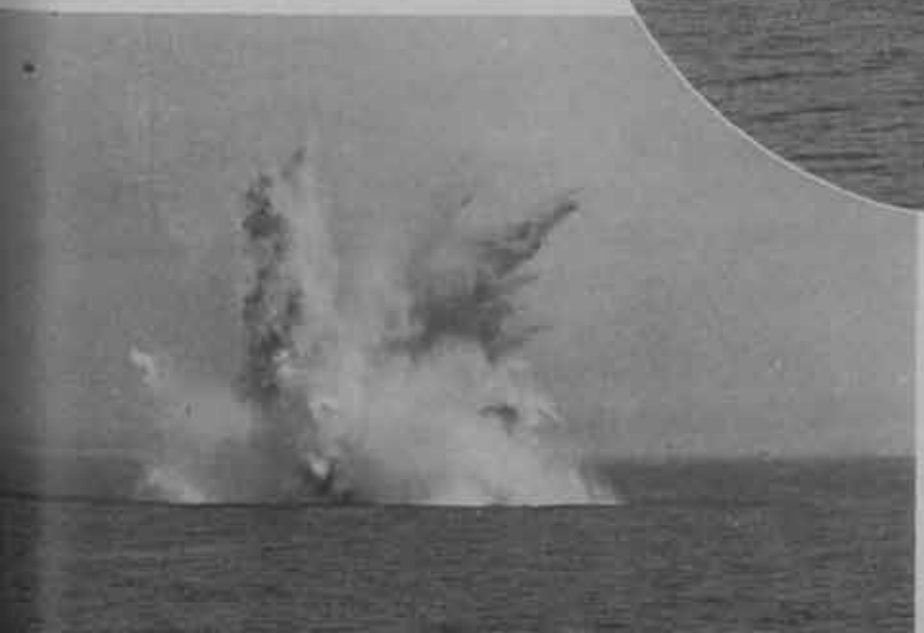
Should friendly air forces gain mastery of the air, or should enemy air strength fail to materialize, then AA units with task forces become available in antitank tactics. The characteristics of the AA gun make it ideally suited for antitank defense. Another auxiliary use of the AA gun is in attacks upon fortifications. However, these are secondary missions and are permissible only when there is little or no threat from the air.

← Just breaking the water.

THE LIFE CYCLE of a MINE EXPLOSION

All three pictures were taken of the same explosion, by Lieutenant R. L. Smirnoff, Sergeant Elbert Phillips, and Corporal Frank Johnson, of the Coast Artillery School

→ The peak of the burst.



← The disintegration of the burst.

Assignment of Targets

By A British Artillery Officer

In recent travels in the USA the writer has had the privilege of talking with many Seacoast Artillery officers. In discussing their common problems the matter of practical assignment of targets in quick night actions or attacks by small vessels by day was a frequent topic.

All our pre-war manuals seemed to rely on the Groupment or Fire Commander to pick out a target and allot it. Our experience has been that this is seldom practicable with the type of attack mentioned, which is the only type that has taken place in the three and one-half years of this war.

In the British service this subject is known as *Distribution of Fire*. In response to requests, I will outline the British doctrine on this most important problem.

War experience in the field as well as in seaward shooting has focused particular attention to the proper distribution of fire. When we come down to real action, whether against tanks in the desert, MTBs in the Mediterranean, or Japanese warships in the Pacific, it becomes a responsibility of the gun commander in most cases to decide which target of the many offered he is to attack.

Reports from Libya, Malta and Guadalcanal indicate more and more that similar principles apply to all three problems. Unless everyone concerned is constantly exercised on the problems and trained in their instantaneous solution the enemy may easily profit by a mistake or indecision. The quickest drill, the best fire discipline and the most accurate shooting can be robbed of their effect if the fire is not used to the best advantage.

Our object is to insure that no enemy vessel shall achieve its purpose.

The principles that must be followed to attain the object are:

1. Every target must be engaged; hence distribution by guns will be required.
2. The principal targets must be the leading vessels whose disablement may hamper others.
3. There should be minimum change of targets.
4. Don't waste time on "lame ducks."
5. Every gun must shoot.
6. Each gun must, preferably, shoot on its own class of target.

There are certain considerations that must be taken into account. They are:

1. Action is most likely at night and then it will be very difficult for any one person to adjust the fires or check their distribution for more than one gun. By day the problem may be easier but with weather, smoke, and casualties to personnel and equipment the same limitations may often apply.
2. The scheme for any one place must be made to meet local conditions.
3. The scheme must be practiced constantly and revised to meet the lessons learned.
4. Every responsible person in the unit must have the correct scheme at his finger-tips.
5. Higher commanders must watch the engagement as closely as practicable so that they can intervene if necessary—and feasible.
6. It follows that any scheme must be simple, understandable by all, and frequently rehearsed.

For harbors with long narrow entrances, long moles or breakwaters, or stretches of coastline with little real "entrance," different methods must be used, for example, gun per ship, or zones of responsibility, or "passing on" illuminated targets.

It is obvious that the same method will hardly serve, as a rule, for the outer harbor area and the harbor channel—let alone the coastwise sea lanes.

It becomes obvious also that effective operation will not be effected without adequate training and practice. Models of the shoreline and water area concerned can be made easily, and model ships moved about. The gun commanders, searchlight commanders, etc., can be given situations until they have their reactions tuned up to concert pitch. Following this stage, vessels may be arranged for with the local Navy and practice given on real ships from real positions. During these exercises flaws in the schemes can often be detected and the schemes improved.

Separate models of each battery or group using one type of scheme can be used frequently. A central model which takes in the whole fort may be used less frequently to practice the "hand over" of targets. Any fort may have conditions incorporating all three of the situations suggested above as to types of harbors. The interlocking of these is important.

Conclusion

To insure that no enemy vessel shall achieve its object much thought must be given to the preparation of a local scheme for distribution of fire. This scheme must be ingrained in all concerned—there will be no time for reference to books. Constant training and practice must be carried out.

The correct distribution of fire is just as important as its production.

Only when the drill is perfect can the Group Commander relax with the knowledge that he is likely to have guarded against the effects of surprise from the sea.

The Artilleryman in Trinidad

By Lieutenant Owen J. Reamer, Coast Artillery Corps

Trinidad saw its first American Seacoast Artillery in April, 1941—some 155mm troops, with some machine guns and searchlights thrown in. They were among the first who came to settle Trinidad as an outstanding base in the Lend-Lease chain girding the eastern end of the Caribbean. The United States wasn't at war then, or even thinking of it too seriously, but the boys went to work and had some efficient looking 155's pointing out towards the Atlantic in short order. By May of '42 they were joined by a second group from the old outfit. At the same time, a Negro antiaircraft unit pulled in. Unlike the seacoast artillery, which had to look to sea for the enemy, the antiaircraft took over the airfields and the chief city, Port-of-Spain, for protection from hostile aircraft.

Between these dates had come Pearl Harbor, and Trinidad was no longer a remote paragraph on some master strategist's plan for defense of the Western Hemisphere. It was an outstanding base, one of the largest in the world as far as airfields were concerned, and an important port of call for merchant shipping. Martinique, only a few hours by air, was a potent base for pro-Nazi Vichy France. Dakar was under the same rule, and enemy activity in Africa made Dakar a very likely jumping-off place for one of the nearest U. S. bases—Trinidad. Both types of artillery knew this, and they scurried to get their guns emplaced and concealed before something broke. Frequent sub activity in the middle of '42 and rumors of submarines carrying aircraft kept everybody's attention sharp and gave a definite point to all the preparations that took place.

Towards the end of 1942 the British Eighth Army and the A.E.F. in North Africa changed the picture considerably. Africa came almost entirely under the hands of the Allies, and Martinique seemed a very lonesome place to start anything from. Trinidad was still an important air base. It was still a big refuge for shipping. Enemy subs still prowled and might make nuisance raids at any time. But the feasibility and imminence of a large scale attack were apparently gone. The artillery relaxed a little and settled down to two new problems—training and morale.

Because of the necessity of settling a big base in a hurry, some of the troops were not at a high peak of training. This state of affairs the officers set out to correct. Physical training came first. The seacoast men, stationed on mountainous terrain and high points, took to getting heavy workouts climbing mountains, first for short distances and finally for distances of fifteen or twenty miles with full field equipment. The antiaircraft men went in for similar programs but, because of their location, covered more flat jungle and swamp land. Sometimes, for variety, they too were carried by truck to the mountains and then sent on a fifteen-miler.

All the while bodies were being built up, minds and hands were getting their share of training too. Officers

Signal Corps Photo

Preparing a welcome.

Signal Corps Photo

Bucking up.

and men alike took time out from routine defense activity to go back to school and improve in various subjects. Most important, of course, were periods devoted to studying the different guns and fire-control instruments. Men who had not been too well trained at home stations were now brought into daily, constant contact with their arms until such things as field stripping, nomenclature, care and minor maintenance were as familiar to them as putting on their clothes. They learned to use the guns too. The 155 men became so speedy they could receive an alarm and get a shell off within a minute, and so accurate they could be normally within three probable errors on their first salvo. The antiaircrafters showed corresponding improvement. In automatic weapons fire they progressed from no hits with tracer fire at towed targets until one crew shot a few courses one day without any tracer ammunition and still scored 21 hits. The men on the "big guns"—the 90mm's—shot better and better, until knocking down a sleeve was no longer an event but a relative routine matter.

Sprinkled in this regular training, at unexpected intervals, were the alerts and practice blackouts, when war conditions were simulated as accurately as possible, and strenuous and sudden demands were made on the artillery in conjunction with the other local defense forces. From the way the artilleryman, officer or private, tossed aside normal routines and tackled the emergency conditions of the war problems, undergoing physical strain without complaint and meeting new situations in a calm, intelligent fashion, it was evident that all his training has not been in vain.

But what of the other problem, that very large problem which confronts a soldier in a rear area defense who is not subjected even periodically to the exhilarating stimulus of actual combat? What has the morale of the artilleryman in Trinidad been? The answer is simple—GOOD. Sure, when the threat of immediate attack dwindled and almost disappeared there was an emotional let-down too—for a while. It was hard for the white soldier to be in a foreign country whose possibilities for amusement were decidedly limited in comparison with his life at home. It was hard for the colored soldier to adjust to a society which, although of his race, had decidedly different codes and customs. It was hard for an American who was accustomed, if the mood seized him, to take off and travel across several states just for the fun of it, to be curtailed in his movements to tiny islands or outpost cantonments whose boundaries were in terms almost of yards, let alone miles. Normal defense duties and training put a

much heavier demand on the soldier's time than had training back in the States. Week-end passes and over-night leaves went out after Pearl Harbor. A man was lucky to get away once a week or even once in two weeks for an over-night pass. And then he had to be back for reveille in the morning.

Despite all these "hardships" and strange conditions, the artilleryman came through. As he tackled the problem of setting up the island as a base, and that of hardening himself physically and perfecting himself in his trade as a soldier, so he went at this problem of morale. Others helped him, it is true, and deserve full credit: the Red Cross, the U.S.O., the Special Service Division of the Army, the Army Motion Picture Service, and so on. But in the final analysis, it is the artilleryman himself who must get the credit for winning his fight against the possible deleterious effects on mind and character of extended foreign service in the tropics. It is the individual who had to make the final adjustment between the old life of peace in home surroundings to the new life in a strange place where neither faces, scenes nor activities were familiar. Some turned to reading for the first time in years and made excellent use of circulating libraries. Some who had forgotten about sports or who had never had time for such frivolous activities turned to this form of amusement and found not only healthful exercise but relaxation of mind in the fierce competitions. Leagues sprang up in baseball and basketball. Somewhat lazier individuals spent their spare time soaking up sun and enjoying dips at the year-round, even-temperatured beaches. Both artillery outfits had their bands, and good ones they were. They played and were enthusiastically received on any and all occasions—for parades, for dances, for concerts; even, at times, for church services. Periodic dances and mixed dinners and swimming parties gave the boys a chance to meet and mingle with the women of the community and to remember that such a thing as a pretty face and a soft voice still existed in the world.

In this discussion the intent has been to present, not avoid, the truth. Certainly there have been morale "cases." There have been men who have cracked under the strain of extended absence from home. There have been men who have decided that liquor was an easier solution to problems of boredom and loneliness in leisure hours than some of the hardier methods of sublimation already mentioned. Some have even been driven over the verge. But in any large group of humans there are bound to be cases like these, even in home surroundings during peaceful, normal times. The great majority, however, to repeat, have conquered their problem of morale, have made their individual adjustments and are continuing the process as time adds its inevitable changes to the passing scene.

Signal Corps Photo

Not Palm Beach—but the water's fine the year 'round.

Officer Candidate Selection

By Major George G. Bull, Coast Artillery Corps

For some time the army and industry have been separating the function of selection and supervision. The foreman no longer hires his helpers and the unit commander no longer recruits his ranks. The officer candidate school, too, must reject or make officers out of men that have been selected by others. The industrial employment office and the induction station are usually fortunate in having the machinery, if not the expert personnel, to enable them to do a passable job of classifying the men that appear before them. The officer candidate examining board is made up of officers who are performing this function "in addition to other duties." These officers have rarely posed as personnel experts. They realize too the loss to the service that will be entailed by poor selection on their part. At the same time the results of their selection will be subject to audit by their appointing authorities, who frequently inquire as to how the men they have selected are progressing at officer candidate school.

Experience is a slow and, in time of war, a costly teacher, so there is always a search for a rule by which the sheep may be quickly separated from the goats at the time of the selection interviews. This article, while not giving any magic formula, is an attempt to frame some useful suggestions which should be of value to a selection board. These conclusions are based on handling the records of officer candidates at the Antiaircraft Artillery School. The graduates and the "washouts" from this school now number in the thousands.

The Board has a duty primarily of picking men who will graduate. There is one other thing that it must do, which is much easier and will be mentioned first in order that it may be dismissed. The Board must avoid mistakes, such as sending men with less than 110 on their AGCT score.

Men with obvious physical defects must not be sent. Antiaircraft Artillery is an arm and as such needs vigorous officers who can serve in the field. The OCS is among other things a testing ground where many men lacking in physical stamina are weeded out. Officer candidate selection boards should warn the would-be candidates that they would be under a definite physical strain at OCS. It is noteworthy that almost half the physical reliefs from OCS are for ailments that are subtle. In these cases, a doctor could not tell the extent of the effect of an old injury on the patient without questioning him. It is quite evident that many would-be candidates will minimize the ill effect of an old injury in order to go to OCS. When they arrive at OCS they are unable to stand the strain of marching and the other physical rigors of the course. There is also a similar group who see, consciously or unconsciously, that the

leg injury is a graceful way out. They felt quite well until the gunnery course in the fourth or fifth week, and then it was quite surprising how the imminence of academic relief by the faculty board will make that old knee injury throb.

In the main task—that of selecting men who will graduate—the problem which faces the board arises from the fact that the average graduate and the average relieved candidate *are not very different*. Minimum AGCT scores, minimum educational backgrounds, and age limits are no sure guide when one considers the following comparisons (in this article figures are added for a comparable officer candidate school):

	AA OCS		*"X" OCS*	
	Grad.	*Rel'd.*	*Grad.*	*Rel'd.*
Average Age	26.01	27.20	Not given	Not given
Average AGCT Score	131.50	125.40	128.00	124.00
Average Yrs. of College	1.98	1.55	1.00	0.05

This comparison, while emphasizing the difficulty of the selection board's problem, raises the question: Do the AGCT score and formal education mean anything in terms of OCS? The answer is definitely—Yes! There is a great deal of recorded data proving that the men with higher AGCT scores and more years of formal education have a much greater percentage of success at OCS. There have been statistics published, in Major Aber's article in the JOURNAL of May-June, 1942, which point out this correlation. Unfortunately each of these tables measures only one variable at a time, and human beings are a complex mixture of many variables. Therefore the selection board must measure as many variables as possible that seem to have a definite bearing on success at OCS.

It is fully realized that many boards in attempting to fill quotas for OCS may encounter groups of applicants who appear to be so similar that a choice is difficult. However, the following is offered in the hope that boards may not always be faced with the need for choosing between two men both of whom are in the lowest category of desirability.

In choosing candidates for a technical school like the AAOCS, the most significant statistical correlation that has been found is on the basis of the *nature* of higher education rather than the *extent* of it. The following data show the value of the recommendations regarding educational background in AR 625-5, par. 33.

This survey covers a sample of 1,000 students who had attended college.

1) Men who have completed courses in Mathematics, Physics, and Engineering (Mechanical, Electrical, Civil, Mining, or Chemical) graduated twenty-eight men for every one relieved.
2) The average of men who have taken these courses even if they do not complete them is thirteen men graduated for every one relieved.
3) There is little difference among all other types of college education, whether completed or not. Five and 3/10 men graduated for every one relieved.
4) The average for the school is slightly more than four and 2/10 men graduated for every one relieved.

It is impossible to fill quotas with men of only engineering background. Such men as possess this background, however, should be given opportunities to develop leadership so that they will not have trouble with the military aspects of the course. With a minimum of engineering training, it would seem that their academic success was practically assured.

The second factor is military experience. Length of service is not so important as the nature of that experience. In a technical branch like the AA, it is better to have been a line sergeant for a few months than a first sergeant for years. A classification of 2,500 candidates on the basis of military experience gives the following results, which clearly show the value of artillery experience.

Type of Service	*% Candidates Graduated*
Antiaircraft Artillery Background	85
Coast Artillery Background	85
Replacement Training Centers of other branches with definite quotas	84
Branch "X"	71
Branch "Y"	65
Branch "Z"	64
Miscellaneous Small Groups in US and Foreign Service	76

The third factor is specific preparation. The following are the results obtained with candidates from three AA Replacement Training Centers:

	RTC "F"		*RTC "G"*		*RTC "H"*	
Per Cent Graduated ..		90.0		81.7		83.0
Per Cent Relieved						
Disciplinary	0.4		0.6		0.3	
Leadership	3.2		1.4		3.2	
Phys. and Misc.	0.6		0.9		0.4	
Academic	5.8		14.4		13.3	
Total		10.0		18.3		17.0

It is a known fact that Replacement Training Center "F" has the most complete and thorough system of OCS preparation of the three replacement training centers.

The fourth and last factor is the candidates' desire to go to a particular school. Many men find it hard to reconcile themselves to being in an officer candidate school not of their choice and as a consequence do not do well. The following table shows the effect of interest in the work of a school.

	An Entering Group	*A Relieved Group*
AAOCS 1st Choice	76.3	48.6
2nd Choice	12.9	19.4
3rd Choice	3.6	10.2
4th Choice	0.9	5.0
Did not choose AA	6.3	16.8
Total	100.0	100.0

In conclusion, the problem of the selection board resolves itself into two parts: The avoidance of gross errors (mistakes by selection boards make interesting table conversation) and picking candidates who will graduate successfully. In this latter part of the problem, the board will find more intangibles to be influenced by than tangibles. The factors affecting a man's success at OCS may be divided into two classes, as follows:

Those Statistically Measurable	*Those which must be Evaluated by Judgment*
1. Age	1. Maturity
2. AGCT Score	2. Quality of Education
3. Years of formal education	3. Civilian Occupation or other practical experience
	4. Military experience:
	a. Nature
	b. Ability of individual to profit thereby
	5. Specific Preparation
	6. Desire to succeed at AAOCS

Too many fine officers have been graduated from the AAOCS who were statistically poor risks to enable anyone to set up a rule of thumb which will relieve selection boards of the need of relying more on judgment than on statistics.

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Streamlined O. C. S.

By Major John Edward Aber, Coast Artillery Corps

"In the Antiaircraft Artillery Officer Candidate School there is but one standard—that of *Perfection.*" Keynote of the institution, and the watchword of every candidate, that principle could find no better illustration than in the new, augmented and streamlined officer candidate course recently put into effect at the Antiaircraft Artillery School at Camp Davis, N. C.

Never satisfied, members of the Staff and Faculty believe that even a good job can always be done better, and are constantly striving for that goal of perfection. No sooner had they launched their revised, condensed course last August than they set themselves to the task of making even greater improvements. Constant tabs were kept on effectiveness of instruction; criticisms and suggestions were solicited from instructors and candidates alike; up-to-the-minute reports from the fighting fronts were consulted; officer candidate schools of other branches were visited and ideas borrowed; comments and criticisms on recent graduates by officers in the field were received and considered. The result of these efforts, sifted, compiled, and integrated into a new thirteen week course, appeared to be only one step short of the goal. Still lacking, because of the great urgency of quickly turning out large volumes of junior officers, was the time necessary to train officers thoroughly in a branch as highly technical and multi-weaponed as the Antiaircraft Artillery. To fill the remaining gap, the War Department recently increased the time length of the course by four weeks, thus extending it into a seventeen week training program. So extensive had been the anticipatory "tooling up" already undertaken, no rebuilding of machinery was necessary, but only a shifting of gears. Shortly after, on March 15, 1943, the weekly incoming class of officer candidates found itself embarked on a new seventeen week course which is believed to be the last word in streamlined education and leadership development.

Amid the many changes ushered in by the new course, three definite objectives can be noted—specialization, practical application, and physical training. Principal keynote of the entire schedule is specialization. Graduates of the Officer Candidate School will no longer be "jacks of all training," generally qualified on all types of antiaircraft matériel but expertly competent on none. Specifically designed to obviate the period of orientation and bewilderment experienced by many new officers while familiarizing themselves with their new weapon, the revised course is geared to produce skilled, competent junior officers, thoroughly and especially trained in the type of unit to which they will be assigned upon graduation.

No perspective is lost, however, as a result of the specialization. Condensed into the first nine weeks of the new course are all the essentials of the former twelve week course, so that candidates still receive a general fundamental knowledge of all types of antiaircraft matériel before starting the seven-week specialization period.

Insofar as prescribed proportions and the candidate's own academic proficiency will permit, the potential officers are assigned to Automatic Weapons, Guns, or Searchlights according to their own preference. With every student working on the matériel of his choice, and knowing that within the space of a few short weeks he will be instructing others on that same matériel, greater interest and application has been evidenced, and instruction more thoroughly absorbed.

Hand in hand with specialization is the stress on practical application. Every effort has been made to eliminate any and all theoretical work that is of no immediate, essential value to the prospective officer. For example, candidates will no longer have nightmares over diagrams of the mysterious inner workings of directors, for the former one week, theory-laden course is now only a sub-topic in a compact, practical coverage of all fire control instruments. Graduates may not know what mechanism positions the E_0 cam, but there will be no doubt as to their ability to keep the target within the cross-hairs.

Particularly illustrative of the emphasis on the practical in the new program is the Battle Inoculation course, which takes up where the field manuals leave off on the subject of individual field training. How to dig a fox hole under fire with minimum exposure, negotiation of barbed wire entanglements, and sandbag architecture are but a few of the "what every field soldier should know" subjects taught in field-craft, a subcourse which round-robins in the two day and one night, all outdoor program with detection and neutralization of booby traps and land mines, employment of grenades, and several combat courses.

While successively illustrating street fighting, surmounting of natural obstacles, infiltration, and night assault, it is the primary objective of the combat courses to relieve candidates of their Hollywood notions of warfare and accustom them to actual combat conditions. In that reports from the fighting fronts point out that even the best trained troops are usually numbed into ineffectiveness and its consequent casualties by the harsh shock of their first encounter with battlefield noise, death, and confusion, every effort is made to duplicate exactly the stress of battle, within reasonable

limits of safety, and only in the absence of serious casualties do the combat courses appreciably differ from actual, heated combat. Trying to make a coördinated advance and score hits on the silhouette targets that unexpectedly bob up in deserted farmhouse windows and suddenly dart between trees and bushes, candidates get a realistic taste—or rather, gulp—of the noise and distraction of battle in the concussion and dirt-spraying of reduced-charge land mine explosions all about them, the terrifying swoop of screaming dive bombers above, the blaring of amplified sound tracks of battlefield noises in their ears, and the whistling of live machine gun ammunition streaking by only several feet over their heads.

Also illustrative of the stress on practical application is the week-long, extensive field problem at the end of the specialization period. Scholars become field soldiers in a carefully planned maneuver which is designed to bring out in practical review all the training of the preceding fifteen weeks. Problems in field messing, sanitation, and supply, heretofore regarded with only academic, classroom interest, now take on new significance. Candidates acting as gun commanders, platoon leaders, and mess officers must know their business, or receive the open, unstinted criticism of their harshest judges, their classmates. Every effort is made to simulate conditions in a theatre of operations. So complete is the mock war that even such contingencies as the necessity of abandoning guns to act as an infantry rear guard, or the sinister and demoralizing effects of sabotage and fifth column work, are not overlooked. Strafing attacks, low-level "bombings" with flour bags, surprise assaults by mechanized units, night movements under blackout conditions, all combine to create a realistic picture of warfare that is not easily forgotten, and which not long hence may serve the candidate well on some distant battlefield.

In many of the additions and changes ushered in by the new course can be seen direct reflections of latest developments in antiaircraft artillery on the fighting fronts. Because of the much greater scope of the expansion of automatic weapons over that of guns, as well as the new, more mobile tactics of guns themselves, the importance of orientation has declined, and consequently, the time allotted to this subject has been greatly reduced. On the other hand, the time devoted to Motor Transportation has been almost quadrupled. Horizontal fire is receiving new and greater emphasis, better to prepare candidates for the Antiaircraft Artillery's new rôle in antimechanized warfare.

Although most of the expansion in the new course has been in the specialization period, in which candidates now receive a vastly greater amount of detailed practical instruction in their assigned matériel than they did under the old course, certain minor subjects which are believed to be of particular value to the antiaircraft officer have also been augmented, and several new ones, for which there was formerly insufficient time, have been added. Mathematics, the key to almost all subsequent subjects, has been expanded into a full week's course; Communications, the nerve system of any organization is given a full week of study. Antimechanized Defense, Recognition of Aircraft, and Mess Management all receive more time than in the old course. Camouflage has been dropped as an individual minor subject, and is taken up in greater detail as it applies to each type of matériel in the specialized training.

Because of the ever present possibility of Antiaircraft Artillery having to act as infantry, simple field problems illustrating lessons in minor tactics are enacted, with one unit of candidates pitted against another. Instruction in small arms is keeping pace with the times in the substitution of carbine and sub-machine gun instruction for pistol firing, while rifle marksmanship and bayonet fighting receive their usual attention. Since latest AA tactics require close coöperation with the Army Air Forces, two new subjects, "Tactics and Technique of Air Corps" and "Organization of the Fighter Command" have been introduced. Another of the newly introduced minor subjects is Field Sanitation.

Military Leadership is the subject of a short subcourse conducted by a selected, senior officer. Since all officers must be capable instructors as well as competent leaders, the new course also includes six fact-packed hours on military training methods and the technique of teaching.

One of the most important advantages of the new course is not readily apparent in looking at the schedule. In the greatly increased amount of practical application and outdoor work, battery officers are presented many more opportunities to observe and evaluate candidates' character and leadership ability. Candidates are watched particularly closely in the combat firing courses and the sixteenth week field problem. Those who do not measure up to the demands of combat leadership and who "go to pieces" under pressure are recommended for relief at the very next faculty board meeting, however close to graduation. However harsh this may seem, it is believed far better to relieve weak men while they are still candidates than to allow them to graduate and later crack under the strain of combat while responsible for the lives and safety of many enlisted men.

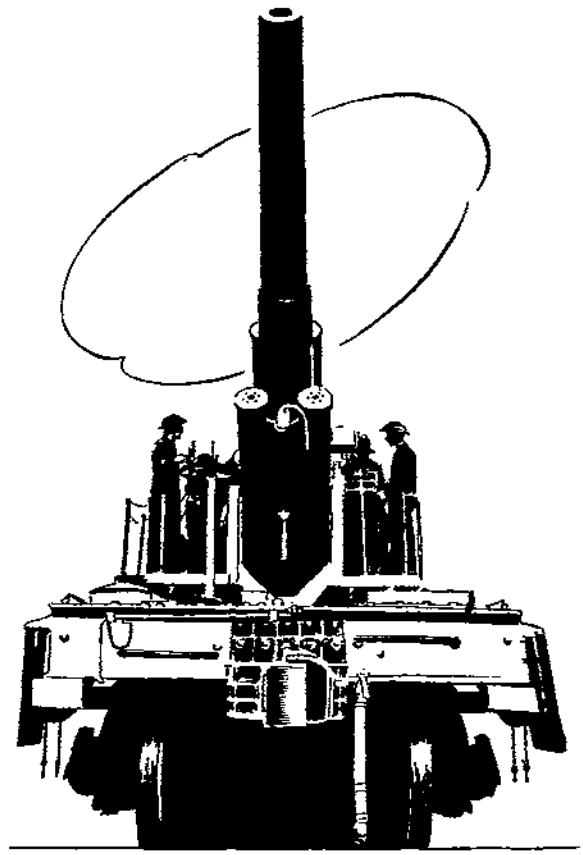
"Every graduate in fighting form" might well be the slogan of the physical training program instituted in the new course. From beginning to end, the candidates' physical abilities are developed in a program which is designed not only to keep them in good health while in the school but also to prepare them for the rigors of battle conditions and render them a match for any enemy in personal combat, with or without weapons. Before embarking on the academic course, neophytes are put through a processing and hardening week which, while introducing them to the rigorous academic and disciplinary program that lies ahead, also prepares them for the physical demands of the high-geared daily routine of an officer candidate. In addition to calis-

thenics, obstacle course workouts, bayonet training, and foot marches during the first week, candidates are subjected to physical agility and muscular efficiency tests. Those who fail to meet the standards are given another chance later on in the course, and, if still unable to qualify, are relieved for physical inaptitude.

Throughout the academic course, one hour of almost every afternoon is spent in some type of outdoor work, insuring that candidates get the exercise necessary to health and muscular development, and precluding their becoming either physically or mentally stale. Many a sagging stomach disappears, and muscles take on toughness, as the program becomes increasingly strenuous.

Principal innovation in the new physical training program is a course in hand-to-hand combat, in which the gentlemanly rules of the Marquis of Queensbury or the American Wrestling Association are strictly taboo. Based upon latest available information on hand-to-hand combat, the course illustrates commando-like tactics that brook no squeamishness, and whose object is solely to dispose of the enemy—for keeps—by whatever method that may present itself, fair or foul. Brutal? Possibly—but it must be remembered that these same candidates, or the men that they must similarly train, may someday be pitted in individual combat against an enemy to whom rules of fighting are unknown, and who would sooner gouge out an eyeball or bite through a jugular vein than deliver a right to the jaw.

With its emphasis on physical training, practical application, and specialization, the new, streamlined course is believed to be the "approved solution" for producing officers who can immediately and capably take over the duties of their assignment, and who can command respect from their enlisted men because of their physical as well as mental abilities. Whether armed with the 90mm gun, the carbine, or merely bare hands and quick wits, the O.C.S. graduate will be a match for any enemy that may confront him.



Hunting for Diamonds

By Lieutenant Colonel Russel K. Havighorst, Coast Artillery Corps

The commanding officers of all units should take action to develop a systematic succession of trained small-unit leaders. Such a program leads naturally to a reservoir of qualified applicants for Officer Candidate Schools and equally important, to better informed non-commissioned officers and technicians.

We all know the problem, but perhaps a brief restatement of its elements and explanation of one Officer Candidate Selection Board's method of approach may serve a purpose. It is not submitted as an ideal, but it does reduce intangibles to figures and has returned a satisfactory harvest of gold bars from the cultivation.

The qualifications listed in W.D. Circular 126, for the guidance of our Boards, leave a great range of choice (and a heavy charge) upon the members themselves, which was probably the intention. The single indefinable stipulation which we find is the one forceful sentence, "An applicant must have demonstrated high qualities of leadership during his period of service."

All Boards from the start have run head-on into the problem of choosing and evaluating the components which add up to form the final index, "*Immediate* value to the Service."

Our plan is not a ten year development program for Sales or Production Managers, but a three months intensive training season for fighting team leaders. All applicants for interview before the Board have a first indorsement from one of a dozen unit commanders, each with his own quality standard. We must be mindful of these differences as well as of any rule of thumb which judges evidence of leadership solely by chevron display. A semi-skilled officer or technical man can accumulate these without one ounce of what it takes in the Commandos. On the other hand, we must recognize that they entitle him to most careful scrutiny, since he has shown something out of the ordinary as the result of day by day observation. Whether this extra something is leadership must receive consideration in each individual case.

The Board's own information will not permit the use of the long question and answer chart used by the unit commanders. Its present value, even to the commanding officers, is doubtful since many of them have observed their men for only a few weeks and have not the slightest idea just how various individuals react to some of the obscure specifications. However, in some way, it is our job to shake all the estimates down into definite figures and the attached rating sheet was finally adopted as a workable compromise. (Fig. 1)

The Board's use of the sheet is based on the following general definitions of the qualities listed:

1. Appearance—neatness, carriage, build and bearing.
2. Personality—command of simple English, attitude before the Board, method of answering questions, self possession, impression generally created.
3. General Education—high school or liberal college training, avocations and present habits of reading, choice of literature and study.
4. Technical Education—law, engineering, accounting or trade school: unusual capabilities which may meet special military requirements: practical accomplishments due to self-training or professional experience.

			Inf	87	AA	90	AA	89	RH	
			Inf	90	AA	94	AA	90	H	
			C.E.	89	AA	91	Inf	91	D	
			Inf	91	Inf	92	AA	93	GM	
			C.E.	90	AA	90	F.A.	90	G	
			5	447	5	457	5	453	Final	
				89.4		91.4		90.6		
				Williams, Cpl. Inf.		Murphy, Sgt. (AA)		Sexton, Pvt. (AA)		NAME
				88		90		90		APPEARANCE
				89		90		90		PERSONALITY
				85		85		95		GENERAL EDUCATION
				86		85		95		TECHNICAL EDUCATION
			85	170	95	190	82	164		LEADERSHIP
				91		90		90		PHYSIQUE
			7	609	7	630	7	624		
				87		90		89		

FIGURE - 1

5. Leadership—school organization record, athletic team record, civilian executive record, civic or service club record, opinion of unit commander.
6. Physique—medical officers' opinion, apparent robustness, athletic achievements.

After a brief review of his application and report of physical examination, the applicant is called before the Board. Each member may ask questions and each scores the applicant independently by percentage grades. In order to emphasize proven leadership, its percentage is entered separately in an adjacent column and doubled before it is added to the other five grades to determine an average. The practice of entering the original leadership estimate in the same manner as for the other qualities, before it is doubled, was chosen so that the individual Board member might use a uniform mental unit of appraisal. This method does at least reward a good leadership rating and penalize a poor one.

When grades are finally averaged as at the top of the sheet, each member notes the Arm or Service for which he believes the applicant best fitted. Thus ratings and priorities may be compared directly only between applicants approved for the same branch. A rough general comparison for all, however, is available, which reveals much under closer scrutiny. And if we use it after the recommendations have been forwarded, we have a basis for the really valuable part of our assignment, that of development and training.

In practice, we see it progress somewhat as follows. The Board is in session. Among others, we find two applicants for Antiaircraft Artillery. The first is a twenty-four year old graduate engineer, a ten week veteran with a wing back personality and an A.G.C. 144 score. He was inducted from a junior executive job in which he successfully directed the activities of a dozen men. Germs of field leadership, yes, but not yet proven. The next applicant is a boxjawed buck sergeant, on his third hitch. Yes, he has been an observer, plotter, recorder and gun commander. He can run or repair a truck or tractor. One year of high school before he first took on; "Hard times then, Sir." He believes he had a little Algebra once, but no Geometry or Trigonometry and "maybe if the Board doesn't mind, he had better make his first choice Infantry." This alternative is not a sound one, since our dough boys go into action with their own highly varied Artillery, and at the Infantry School, some instructor may start curving cosines at his head to the utter confusion of a superb potential leader.

We must not overlook the fact that this man has lived Artillery and likes Artillery. His A.G.C. score of 127 is evidence of native ability, and if the Board is viewing its job against a background of wet bamboo, or rusty rimrock, this capable man is a battalion commander's dream.

Under the urge of war requirements, the services of both these men, and of others where the issues are not so clearly cut, are in the greatest demand. Our rating scale, or one similarly conceived, may make it possible for our practical go-getter to lead the parade as number one priority and will admit others with limited educational backgrounds. But, there is a follow up of even greater importance; that of filling in the gaps in his education with lean meat essentials.

Without submerging ourselves in side issues, we may say that the confidence with which any candidate approaches his officer candidate school course may be the deciding factor in building the aggressive attitude which will carry right on through to the tough days ahead. His Training Directives and Field Manuals will carry many charts with Trigonometric and Algebraic references. Let us concede that he might do just as good a job of training his platoon or battery without knowing any of the theory—IF he was dead sure that he could. It seems probable that any educational program which we may have in mind for him may be even more valuable as a confidence booster than as an O.C.S. prerequisite.

But it is for early direct value that we must now build. We cannot hope to develop a mathematician, but if our practical men can become familiar with some of the language, the coming texts will not be nearly as great a mental hazard; and even more than this is, or should be, possible. Board members who have gravely advised ambitious applicants to initiate a course of study and have recommended certain standard elementary texts have acutely shared the student's feeling of desperation when this student has come in to ask for assistance with a 200 page Algebra under his arm, and the realization of four or five more texts to follow.

Just what are the bare essentials of military mathematics? This question suggested itself after such an interview. The answer appears to be: it consists of an understanding of the principles of an equation, of the laying out of triangles on paper, in the air and on the ground, an interpretation of the results to be obtained through the construction and solution of these triangles, and of the ability of curves, graphs and charts to give us quick, and in the form of instruments, automatic information.

The time available to impart this volume library must be measured in hours. The specialized terms (the language of technical mathematics) must be simply and clearly defined, and the general phraseology be of the shortest and most familiar nature.

After some consideration of these requirements and an attempt to see just what could be eliminated from some of the standard text books without killing the entire subject, a mathematical practical training outline of less than thirty pages was written with the assistance of some of the enlisted men in the Public Relations Office.

Six basic principles were kept in mind as a guide in selecting and writing the text matter.

1. Its purpose must be briefly explained in such a way as to stimulate interest.

2. The subjects of Algebra, Geometry, Trigonometry, Logarithms and Chart theory and application were to be covered in one thin booklet, so that the fundamental relationship between all of them will be felt as well as seen.

3. There must be plenty of line drawings and illustrations.

4. Sentences should be short and expressed in clear familiar words.

5. All problems and examples would deal with military matériel and situations.

6. Only the barest essentials were to be provided for. Brevity should promote the idea of continuous relationship, so there are no discussions of factoring, quadratics, or the binominal theorem.

The text matter as finally printed consisted of twenty-five pages. Its general nature is best described by extracting selected paragraphs from the introduction and from each of the principal subdivisions originally decided upon. Its language is informal and the booklet starts as follows:

What It Is All About

"This circular is written as a sort of airplane photograph of Algebra, Geometry, Trigonometry, and their uses. It will give the applicant for Officer Training School a start so that he may better understand the training manuals and instructors. It should also be of some help to the man who wants to use his spare time for something else besides play. If you will spend ten hours on this circular, carefully and thoughtfully, you should have an idea about the principles that turn the wheels at the base end station, range board, deflection board, plotting board, director and height finder. If you want to go farther after this, you can buy larger books. This is purposely kept short. In any case, don't be afraid of it."

Algebra

"The characteristic that seems to puzzle most beginners in Algebra is the use of letters like X and Y for numbers. This comment is often heard, 'Letters can't possibly mean numbers and in Algebra they never mean the same number anyway. All this does is confuse you.'

"It won't confuse you if you will look at the use of these letters as a *simple* new language which will help you shorten up complicated problems. For example, let us take a problem and solve it, with and without the language of Algebra.

"The following four pages are devoted to illustrations of the principles of the equation and of algebraic addition, subtraction and multiplication with several typical problems. In a similar manner, the elements of Geometry, Trigonometry, Logarithms and Graphical Mathematics are introduced as shown in the following successive paragraphs.

Geometry

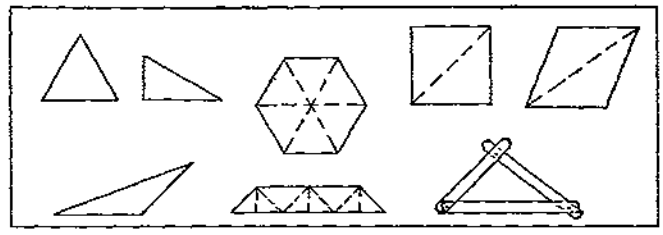


Figure 2

"Look at the outlines in Fig. 2. They are of all shapes but all may be broken into triangles. Geometry and Trigonometry are concerned with just such figures and the triangle is the basis of all of them.

The Triangle in General

"A few words about the general nature of the triangle will start you out right. It is the only naturally self-supporting figure known. You can prove this by taking three boards of any size and making a triangle out of them by nailing them together with just one nail at each corner. You will find that this wooden triangle is stiff, and strongly resists any force which you may exert to change its shape. This is not true of the square, the parallelogram or other figures. Each has to be braced by making a series of triangles out of it. This is the reason why all bridges, roof trusses, scaffolding, and general construction look like a continuous series of triangles.

"The practical principles of Geometry and Trigonometry are no more complicated than Algebra, although you may go as deeply as you wish."

Trigonometry

"The science of Trigonometry is devoted to making practical use of Geometry in our daily work.

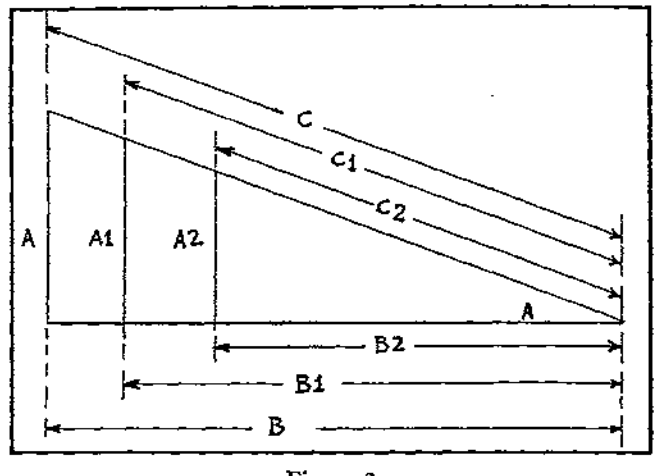


Figure 3

"You will notice that Figure 3 is made up of three similar triangles. In the study of triangles we are not only interested in sides and angles, but in the *relationships* between the sides and angles.

"We use the word 'ratio' a great deal in the study of

Trigonometry. Let us define 'ratio.' A ratio is simply the relationship between two numbers, expressed as a fraction. If you say that one automobile is driving twice as fast as another, the ratio between the speed of the first and the speed of the second is 2 to 1. You can put this another way and say that the ratio of the slower to the faster is 1 to 2. In one way all numbers are ratios in themselves. For instance, the number 4 is the ratio 4 to 1, etc. Ratios are usually expressed 4/3, 2/1, 5/4, etc. Those of you who are auto mechanics know the expressions 'compression ratio' and 'gear ratio.' They have the same meanings as defined above.

Logarithms

"Tables of Logarithms offer much help in the solution of problems such as you have just completed. Also you will better understand the slide rule and other instruments which you may use, if you know something about log tables. Although they are not used as much now as they were before the adding machine, slide rule, and electric calculator were invented, they are still very useful.

"Briefly, the logarithm of a number is the power which 10 must have to make up that number. That is to say, the log of 10 itself is 1. Or as it is usually written, $\log 10 = 1$. Since $10^2 = 100$, it is clear that $\log 100 = 2$ and since $10^3 = 1000$, it is clear that $\log 1000 = 3$. Similarly $\log 10{,}000 = 4$ and $\log 100{,}000 = 5$.

Charts and Curves

"We do not need to be told that a picture is worth many words. Imagine trying to explain a deck of cards to a man who has never seen one. Just regard charts and curves as pictures of mathematical facts which would require columns of tiresome figures."

The entire booklet was first issued as a Training Directive at Fort Wadsworth to those who expressed an interest in its subject matter and who were at the same time willing to obligate themselves for the time and energy required for its mastery. If an officer or other qualified instructor is available for one or more class exercises the subject matter will undoubtedly be understood more thoroughly.

However, several determined men have used it to advantage solely through their own efforts and have reported favorably on it. It has been used in the Master Gunner's School at Camp Davis and reprinted by the Commanding General of the 48th CA Brigade for similar use.

The favorable nature of the results so far reported is responsible for the description above, as it may prove beneficial to others. Time is more than ever the stuff life is made of and it is not long enough to await the results of long observation and data accumulation. Before this brief text was mimeographed, there were an appreciable number struggling over texts which no one could conceive as fit for the requirements of this crisis. Resolute students were willing to try, and many officers and men with previous training were equally willing to help. It is the sheer over-burden of nonessentials and lack of continuity which robs such endeavors of value. Comments on the new project have been favorable, questions more plentiful, interest higher. All of these have revealed obscurities which were not foreseen, have suggested additional explanatory sentences and paved the way for a corrected and improved reprinting.

Lest this article has overemphasized the case for the prospective candidate officer, mention should be made of the fact that the Master Gunners and previously commissioned officers are often in need of just such a reference and medium for review or for reinforcing their own unrealized deficiencies. Progressive education for those now wearing their bars is at least as desirable as for the others.

Have we overemphasized the purely technical? Perhaps, because of space limitations. Other classes with the organized use of such texts as Technical Manual 12-250 and recent Tables of Organization are also promising and have given encouraging results in individual cases.

One definite fact which should be, and is not well and universally understood, is the indoctrination of a sense of deep personal responsibility within the heart of the man who presents himself as a leader. Even a high grade noncommissioned officer has not always had occasion to learn that shoulder straps truly put him on twenty-four hour duty and deposit the weight of all personal and tactical necessities for his unit permanently on his shoulders.

All of us in civil and military life alike have encountered the freshly promoted man who feels that he has fully arrived instead of having earned only the right to start. Of course, the truth should be and is obvious. But if all organizations and men corrected the obvious errors and took positive action on the obvious requirements, many of the later complexities would never appear. A huge percentage of each executive's time is required for the correction of mistakes made by his subordinates.

One organization of which the writer has knowledge calls a prospect for promotion into the office with the statement "Joe, we have a job here with more headaches, harder work and a pay scale which is not larger in proportion to the problems involved. Do you want it?" If he accepts, Joe will at least not be surprised at a fair share of midnight oil.

The Arms and most of the Services are full of engineering problems. If we can make a start at teaching our practical young men some of the preliminary language, convince them that they are asking for infinitely harder work at precious little more pay, and inculcate a tenacious sense of duty, some of the unfit will release their room and overhead to better material, and individuals and Nation alike, be better prepared for the task ahead.

The S-2: His Functions and Responsibilities

By Colonel Frank L. Lazarus, Coast Artillery Corps

The Intelligence Officer (S-2) practices what has been called "the oldest art of warfare." His assignment, reduced to its simplest terms, is to collect information on what the enemy has done, is doing and may do, to evaluate that information and transmit it to all concerned. He is therefore the special counselor and advisor of the officer in command, and his primary duty is to keep his commander constantly informed of the enemy situation.

In peacetime, especially in armies that exist for the protection of nations which believe that they have no enemies who can—or will dare—attack them, the Intelligence Officer is apt to find himself regarded with some indifference. If there is a belief that the nation's enemies are remote, inferior and impotent to attack, there will also be a feeling that the Intelligence Officer is something of a luxury. His job will usually be submerged in a number of additional and unrelated duties.

In some instances not even a sudden plunge into war will bring Military Intelligence the recognition it deserves. Everyone will admit that an S-2 in a combat zone has a vital rôle to play, but the usefulness of an S-2 in areas far from the enemy is apt to be questioned. This particularly is true when the unit is stationed in a training camp or defense command.

What is often overlooked is that a good S-2 does not "spring full-grown" from the crucible of battle. His is a job requiring much study, experience and training—training not only for himself and his immediate section but for all the intelligence agencies of the command and for every man in the command so that all personnel will have the chance to learn what constitutes Military Intelligence and how to transmit important and timely information to the unit S-2.

It is of fundamental practical importance to recognize that the duties of an S-2 cannot be adequately discharged by an officer who lacks experience and authority, or who is expected to act, without assistants, as Special Services Officer, Public Relations Officer, Gas Officer, etc. S-2 work is a full time job. Even undivided day-to-day attention will not automatically ensure its being done as it should be. For warfare's oldest art is by no means the simplest. It is one of the "higher" arts, calling for special aptitudes along with energy and zeal.

As Napoleon phrased it long ago, "the science of the engineer, of the gunner, can be taught nearly as well as geometry. But the knowledge of the higher arts of war can be acquired only from experience and from studying the history of the wars of the great commanders. You cannot learn from a grammar how to write a book of the Iliad, a tragedy of Corneille."

If the Intelligence Officer's task was exacting a hundred years ago, it is far more demanding today. In our time warfare is undergoing a revolution, and the S-2, whose value derives in some part from a general understanding of all the tools of war, is almost daily confronted by the appearance of new tools or of new uses for old ones. His task is not made easier by the fact that it is our enemies who introduced and who are most experienced in many of the greatest changes in tactics and strategy that have come to pass.

The ideal S-2 must come to know the enemy army or enemy air force almost as well as he knows his own army or air force. He must understand its organization and composition. He must be familiar with the characteristic temper of its personnel and the variety and quality of its matériel. He will have sought out specific details as to possible and probable enemy capabilities, the strength and disposition of enemy forces, the condition and location of enemy defenses and lines of supply. By means of charts, photographs, patrol reports and perhaps even personal observation, he will have studied the terrain between his own lines and the enemy's lines and the topography, climate, resources, industry and communications of the country as a whole.

He will, in short, have so equipped himself that he has readily available any facts that his commander or other responsible officers may require in the formulation of their plans. In the course of the preceding days, weeks and months he will have weighed and organized these facts as they came into his hands, and passed them on, with his deductions and evaluations, to interested officers not only in his own but in superior, subordinate and collateral commands. Before, during and after a battle he will make every effort to keep informed of the latest developments and will make certain that the information he obtains is quickly transmitted to all concerned.

Time, in Military Intelligence, is of the essence. The most painstakingly gathered and complete information is patently worthless unless it reaches the units for which it is intended in time to be of use. The responsibility of an S-2 does not end when he has collected his information and stowed it away in indexed, cross-indexed, locked and guarded files. It is also important that the S-2 makes sure that all elements of this information

are disseminated in proper quarters—"all elements," because data that may seem inconsequential or irrelevant in itself may assume great value when the higher echelons of Intelligence consider the situation as a whole.

These general rules and comments apply to the work of all S-2's, whatever their command and situation. But generalities reveal too little of the practical side of Military Intelligence and fail to show what is expected of an S-2 in a specific circumstance and organization. So it may be well to turn to a more concrete discussion of Intelligence duties, particularly in terms of antiaircraft.

Antiaircraft units stationed to the rear of a combat zone—guarding strategic rail centers, higher headquarters, bridges and defiles, supply and troop columns, ammunition dumps, industrial sites and so forth—need a full-time S-2 equally as much as units operating in direct contact with the enemy. The ultimate object of both is to obtain pertinent information concerning the enemy and to distribute it so that it reaches higher, lower and adjoining units at the proper time. In this war some of the enemy's most spectacular victories have been won by striking at lines of communications, higher headquarters and other rear area installations by air attack or with mechanized forces which have pierced or encircled the front lines. All-round defense is the watchword of armies today, and the S-2 of an AA unit, wherever situated, cannot regard his duties as negligible. If there were no chance of attack, his unit would not be stationed where it is. The question in his mind should be not so much: Will the enemy attack? But when and where will he attack, with what forces, and by what methods? He should be as vigorously alive to his duties as the Intelligence Officer in daily sound of enemy guns and enemy planes.

For the Intelligence Officer of AA units in static rear positions and defense commands, the AAAIS (antiaircraft artillery intelligence service) is a primary source of information regarding the enemy. Hence AA Intelligence Officers supervise its installation and operation. While the actual training of AAAIS personnel is an S-3 function, the S-2 is charged with seeing that the system is manned by observers with certain specific and indispensable skills.

Foremost among these skills is the prompt and accurate identification of aircraft, both hostile and friendly. The S-2 must not only have skilled observers in this field but must himself be thoroughly acquainted with the appearance, behavior and performance of enemy planes capable of operating in his area. He should also make certain that his commander and the officers and men of his unit are provided with as much aircraft identification data as will be of use to them in the field.

Observers trained in the ability to gauge the distance, altitude, speed and direction of planes, to distinguish to some extent among motor sounds and to report concisely and accurately upon all phenomena and occurrences seen and heard are absolutely essential.

The reports of such observers, incidentally, should be recorded on forms designating the observation post, the number, type, direction, altitude and general location of the planes seen or heard and the time at which they were detected. To prevent delays in the transmission of these reports, observers should understand the communications system and the making of elementary repairs.

The AA S-2 in a defense command is expected to have a detailed knowledge of the channels and lines of communication open to him and must maintain the closest liaison with the S-2 of the Fighter Command in his region, the S-2 of the Naval District, the S-2 of the Sector, the Service Command and all other local units. He should be personally acquainted with each of these officers to the point of understanding their qualities, habits of mind and quirks of personality so as to be better able to estimate the accuracy and reliability of the information they transmit. He should take care to keep them informed of any pertinent data that may come his way and, in turn, arrange to be kept informed of all that they may learn. He should take special care to maintain close contact with his higher echelon, for he is not only the eyes and ears of his immediate unit commander but an integral part of the intelligence system of the next higher command.

Not least among his day-to-day duties is the keeping of files of current information and information likely to prove of future value. These files are logically and systematically arranged so that their contents will be instantly available to the commander and other interested officers. In general, the S-2's files contain intelligence reports of other units, intelligence reports of enemy equipment, silhouettes and models of aircraft and tanks (both hostile and friendly), photographic material and situation maps. His files are the S-2's arsenal and they are guarded, maintained and augmented with appropriate care.

An S-2 with an AA unit making direct contact with the enemy—operating with front-line troops, defending beaches or bridgeheads and forward airdromes, employing its guns to reduce fortifications or in an antitank rôle—assumes functions quite similar to those of general combat intelligence, the primary object of which is to reduce uncertainties regarding the enemy and local conditions. By throwing light on a shadowy situation, the S-2 assists the commander to make decisions and the troops to execute their mission. Principally, his reports seek to outline the situation and capabilities of the enemy, to provide information relative to the tactics of hostile aircraft and to evaluate the action taken by AA defenses against hostile aircraft.

The data essential to an S-2's successful performance of duty must necessarily be of many kinds. He seeks information regarding the enemy's location, strength, composition, disposition, movements, armament, equipment, supply, tactics, discipline and morale. Information concerning the terrain—both that under enemy control, and that over which operations against the

enemy are contemplated—is equally relevant. In the terrain study, moreover, meteorological conditions are now generally included, and are especially significant for AA units.

An AA S-2 is especially interested in data that will give pertinent clues to the strength of the opposing air force in comparison with that of the friendly force. He tries to learn as much as possible of the types and performance of enemy planes in the area, their lanes of approach and the methods generally employed. He seeks information on the size and weight of bombs dropped by the opposing air force in previous attacks in the combat area and he is concerned also with the extent of enemy photographic reconnaissance, and with the proper camouflage of his own unit and their installations.

The S-2 tries to outguess the enemy both tactically and psychologically. This he can do only if he makes the deliberate effort to analyze his unit from the enemy's point of view, calling attention to weaknesses and mistakes that might contribute to defeat. By putting himself in the enemy's place, the S-2 supplements the work of S-3, whose primary concern is with the employment and training of friendly personnel. The two should collaborate closely in order that the commander may have a fully rounded tactical picture. In action a joint S-2 S-3 map is commonly maintained and posted with the latest developments. The unit commander will frequently consult the S-2 S-3 map to keep abreast of the situation.

The competent S-2 coöperates not only with S-3 but with all elements of a command. He stresses that military personnel not directly assigned to intelligence work should at all times, and especially during the shifting course of an engagement, transmit all and any information about the enemy. A grim incident which occurred during an actual engagement may be told to underscore the importance of this point. It concerns an AA battalion commander who, before the battle began, had been ordered not to engage in counter-battery fire. As the fighting progressed, his battalion found itself within view and easy range of an enemy AT unit which was barring the way of friendly tanks. In literal accordance with previous instructions, the AA battalion commander withheld his fire and also failed to report the presence of the enemy AT battery to higher headquarters. As a result of his silence, friendly tank units plunged into ambush and much matériel was lost.

Thorough training in the transmission of individual observations of enemy activity might have prevented this tragedy. Clearly, the groundwork for successful S-2 operations must be laid far in advance of an actual engagement.

Before his unit moves into position, the efficient S-2 promptly sees to arrangements for liaison with adjacent units and for direct contact by telephone, radio or other means with lower, adjacent and next higher units. Whenever possible he makes these arrangements through personal visits and contacts. In highly mobile situations or under march conditions a system of radio-equipped motor patrols is employed, if available, to provide route march warning. If an aircraft warning system (AWS) is in operation in his sector, the S-2 endeavors to arrange with Air Forces agencies for such use of the system as may be possible.

It is also vital to obtain all available air photographs and maps of the area of projected operations and distribute them to units in sufficient quantities. Further, the S-2 has the job of instructing unit personnel that in the event of imminent capture, they must destroy any information of value to the enemy and that, if captured they will give only name, grade and serial number. Still another responsibility is to take measures to insure that all identification markings on personnel and equipment which might disclose the unit's designation are obliterated or removed before entering the combat zone. He must also, of course, see that his own confidential codes and documents are destroyed or left behind in safe hands.

Once in the field, the S-2 relies on a variety of information sources. Much of his data regarding enemy aircraft and activity is collected from the Air Forces. The special information services of the field artillery, signal corps and corps of engineers, and messages intercepted by radio and telephone listening stations will all prove helpful. All arms, indeed, should have something to offer, and the S-2 who neglects liaison with adjacent units does himself and his unit a grave disservice.

In the main, however, the S-2 of any AA unit depends largely on the information supplied by his own troops, ground observation posts, patrols, AAAIS and intelligence scouts operating alone or in conjunction with reconnaissance parties. Higher echelons, with their facilities for wire tapping, "flash" messages and the like, also aid the S-2 in collecting relevant data.

The S-2 himself must be able to read maps and aerial photographs with as much ease as he reads newspapers and magazines, while immediate examination of captured documents, matériel and personnel (when this is ordered by higher authority) may provide as valuable evidence of the enemy's intention as the data provided by intelligence scouts and the network of observation posts. Letters, diaries, maps and insignia taken from enemy prisoners or enemy dead by front-line troops are, indeed, a prime source of information. Battery command posts send prisoners direct to the regimental S-2, who then segregates them into three groups—officers, non-commissioned officers and privates—and interrogates them in accordance with instructions from higher authority. Normally the S-2 of a lower unit will request that S-1 evacuate prisoners and captured documents to higher headquarters without delay. In this case the S-2 merely makes out a report stating the total number of prisoners, the time and place of the capture, the unit making the capture, the degree of resistance encountered and the casualties inflicted.

Secret agents and inhabitants of the region are still another source of information, but their reports should not be relied on until they have been skillfully and searchingly appraised. In general, all items of information gathered, from whatever source, must be interpreted in the light of their probable accuracy and significance. Transmission, however, should not be delayed for a leisurely study of information collected.

Reports, whether to lower, lateral or higher authority, are usually submitted in fragmentary form, and the efficient S-2 knows that it is more important to transmit a report speedily than to submit it formally in writing. In general practice, the S-2 sends out a report as soon as the enemy is engaged and thereafter on the hour, except that events of critical import are transmitted immediately. Usually S-2 reports are sent by wire or radio, supplemented by the free use of liaison motor couriers and messengers. When possible, important reports are sent simultaneously through at least two different mediums—by both radio and messenger, for example—in order that delivery may be assured.

At the earliest possible moment reports showing the enemy's strength, tactics, (including mission, if known), nature of operations (whether by air, mechanized units, ground troops or naval forces), accomplishments, losses and present action are sent to higher headquarters. A general narrative of enemy operations for the area concerned usually covers the weather, the scale of attack, the area of operations, general tactics and the effects of the attack. Detailed information covering any restrictions on AA fire, type of target engaged, type of fire control adopted, rounds fired and any special technical points is also transmitted. Particular attention may well be paid to details on searchlight activity, both in coöperation with night fighters and with AA guns, and claims of any enemy aircraft destroyed are rendered immediately after the engagement, all details being given which may assist the higher intelligence section in analyzing and allotting the claim.

Requests for special information from higher headquarters are submitted to the S-2, as are also requests from lower and adjacent units. In addition the S-2 keeps a brief journal of events together with a work sheet, which consists of notes for subsequent reports and serves as a cross-index to information received and deductions drawn.

A secondary function of the S-2 is to assist the commander in the formulation and supervision of counterintelligence which will conceal the intentions and activities of his own unit. It falls upon the S-2 to prepare all plans for security measures and to coördinate and oversee their execution. Among his most important duties in this category is to make certain that the establishment and operation of communication facilities are arranged with the utmost care and that the use of radio in a forward area is kept to a minimum. Lack of precaution can only result in the enemy's obtaining useful information. Codes, in particular, will be broken down by the enemy unless they are ingeniously devised and intelligently employed. The alert S-2 never forgets that the enemy will also constantly resort to wire tapping and to the dissemination of false or misleading reports. Against such wiles he must always be on guard.

Camouflage is the direct responsibility of the organization commander, but as already noted, the S-2 does much to assist in the enforcement of this discipline. Whenever possible, positions are occupied at night, and the S-2 sees to it that camouflage measures are immediately taken. Coöperation among the S-2, the Air Forces and special camouflage officers is essential if this aspect of counterintelligence is to be effectively handled.

The censorship of mail, news and photographs originating in the theater of operations also comes within the S-2's province, and in higher echelons the S-2 is charged with disseminating counterpropaganda which is usually effected by the distribution of leaflets inside the enemy lines. Other duties of S-2's in larger units are the "jamming" of enemy broadcasts and the maintenance of a high degree of propaganda resistance among the organization's personnel.

When his unit moves out of position, the S-2 has new tasks to perform. If the move is occasioned by the arrival of a relief unit, the S-2 turns over all pertinent information to the Intelligence Officer of the relieving unit and renders all possible assistance. He also notifies higher headquarters as soon as the move has been made. In the case of a move dictated by enemy successes, the S-2 provides for the destruction of all files, documents and papers not essential to the unit's further operations and personally inspects to see that no tell-tale personal or official correspondence or other means of identification or information is left behind.

Clearly, the duties of an S-2 are as numerous as they are varied and exacting. To perform them adequately, the Intelligence Officer should be a man of experience, imagination and much common sense. He should be that rare combination, a student and a man of action. Above all, he should be a man in whose knowledge and judgment the commander has full trust. The best Intelligence Officer will be of little service if his commander hesitates to base plans on the information and evaluations the S-2 transmits.

Finally, the Intelligence Officer should be intimately acquainted with all plans and with the disposition of the unit's troops so that he will know where operations are contemplated, and can decide what elements of information are most needed. And not for these reasons alone. In the heat of battle, when the commander may be out encouraging the front-line troops by his presence and the operations officer may be off visiting units to see that orders are being carried out, the S-2 may find himself the only officer at headquarters. In that event it will fall to him to receive messages and take action in his commander's name. He must be ready and able to assume this great responsibility.

Improvised Seacoast Devices

By Lieutenant William Watts, Coast Artillery Corps

I. Set Forward Scale Chart

When new set-forward scales were being made up, several difficulties were encountered. Since it was necessary to be able to plot accurately for a dead time of either 15 or 20 seconds, and with either normal or super charge, four sets of set-forward scales were required. In addition to the inconvenience of constructing the four sets of scales, it was felt that some confusion might occur in changing from one set to another, and there was also the possibility of mixing the scales of the different sets. Therefore, to avoid these difficulties, a system was devised, which required only one set of scales, and utilized a chart for selecting the proper scale for the set of conditions under which firing was expected.

To make up this set of scales and the chart, it was first necessary to compute the Y/X ratio (i.e., the travel during time of flight plus dead time, to the travel during one time interval) for each of the four conditions mentioned above, at every range from minimum to maximum. The formula $Y = X/M\ (t + D)$ was used in which:

Y	Travel during dead time plus time of flight.
X/M	Rate of travel (yds/sec)
t	Time of flight
D	Dead time

With these data, a graph was plotted using the range in thousands of yards as abscissas, and the Y/X ratio as ordinates. The four resulting curves are shown on the accompanying graph (Fig. 1) and represent the values of the four conditions at any range. A set of these values, which would give the best range limits on the four curves, was picked out, and horizontal lines drawn through each value to cut the four curves. (For the purpose of illustration, Figure 1 contains only fourteen of these lines; in the actual construction of these scales it is desirable to provide sufficient horizontal lines so that each time zone covers approximately two seconds time of flight.) By inspection, the range limits of each of the fourteen values on the four curves were determined and recorded in the Set Forward Scale Chart (Fig. 2). The set-forward scales were then constructed by using the Y/X ratios of the fourteen horizontal lines on the graph. The scales were made of heavy white Xylonite with the marks and numbers scratched into the surface so that they would be durable as well as serviceable.

In use the Set Forward Scale Chart is kept on the right corner of the Plotting Board under a sheet of clear white Xylonite (Fig. 3). The assistant plotter by glancing at the chart, picks out the appropriate set-forward scale and hands it to the plotter. Whenever the range

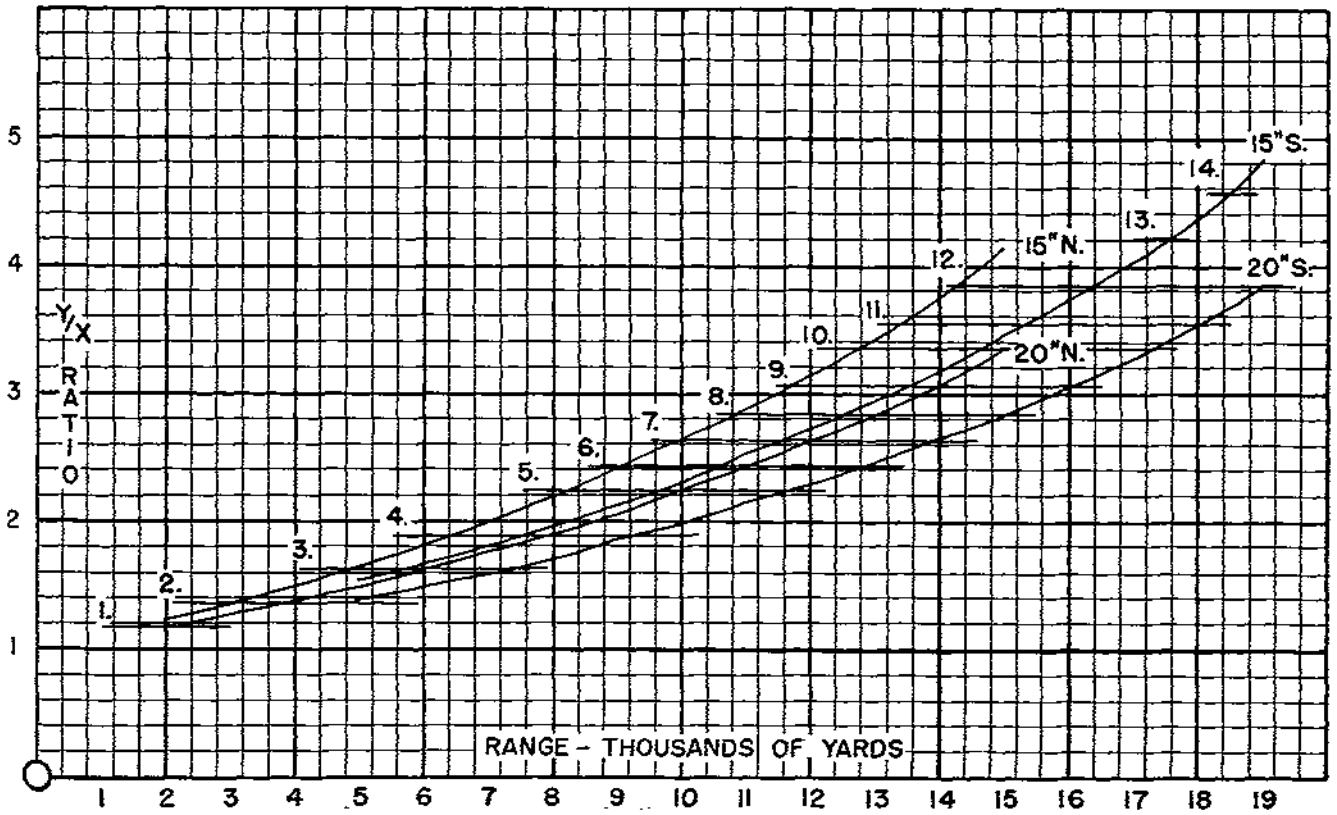


FIGURE 1

SET FORWARD SCALE CHART

Scale No.	20 Sec. Normal	20 Sec. Super	15 Sec. Normal	15 Sec. Super
1	1000– 3000		1000– 2000	
2	3000– 5000	4000– 6000	2000– 4000	
3	5000– 7000	6000– 8500	4000– 5500	5000– 6500
4	7000– 9000	8500–10500	5500– 7500	6500– 8500
5	9000–10500	10500–12500	7500– 8500	8500–10000
6	10500–11500	12500–13500	8500– 9500	10000–11000
7	11500–12500	13500–14500	9500–10500	11000–12000
8	12500–13500	14500–15500	10500–11500	12000–13000
9	13500–14500	15500–16500	11500–12000	13000–14000
10	14500–15500	16500–17500	12000–13000	14000–15000
11		17500–18500	13000–14000	15000–16000
12		18500–19500	14000–15000	16000–17000
13				17000–18000
14				18000–19000

Figure 2.

Figure 3.
Set Forward Scale Chart on the right corner of the Plotting Board, with the Xylonite set forward scales arranged in order from 1 to 14.

changes, or there is a change in the dead time or powder charge, a new scale is selected by the assistant plotter and passed on to the plotter. In this manner the plotter is always supplied with the correct scale, regardless of range, or the conditions under which the battery is firing.

II. Tide Chart

Editor's Note: *The tide chart described in this section is satisfactory for use where actual tide gauge readings are not available. However, it should be noted that tide values obtained from tide tables are subject to errors because sea level varies with barometric pressure and wind. These errors are especially serious if a depression position finder is used.*

The tide changes at our position were sometimes as great as 15 feet and therefore had to be considered in the Height of site settings on the Range Correction Board. When these values were obtained from a tide table which gave only the high and low tides, it was necessary to interpolate in order to find the exact height of the tide for the time at which firing data were being calculated. This caused some delay and also introduced a possible source of error into the range corrections.

To expedite this process and to eliminate any possible source of error in these settings a Tide Chart was made up as shown in Figure 4. The chart consisted of a graph on which abscissas were hours of a 24 hour day with a four hour overlap on each side. The ordinates on the left side of the graph were feet, height of tide, above mean low. The ordinates on the right side, were marked to read height of site (or Target below

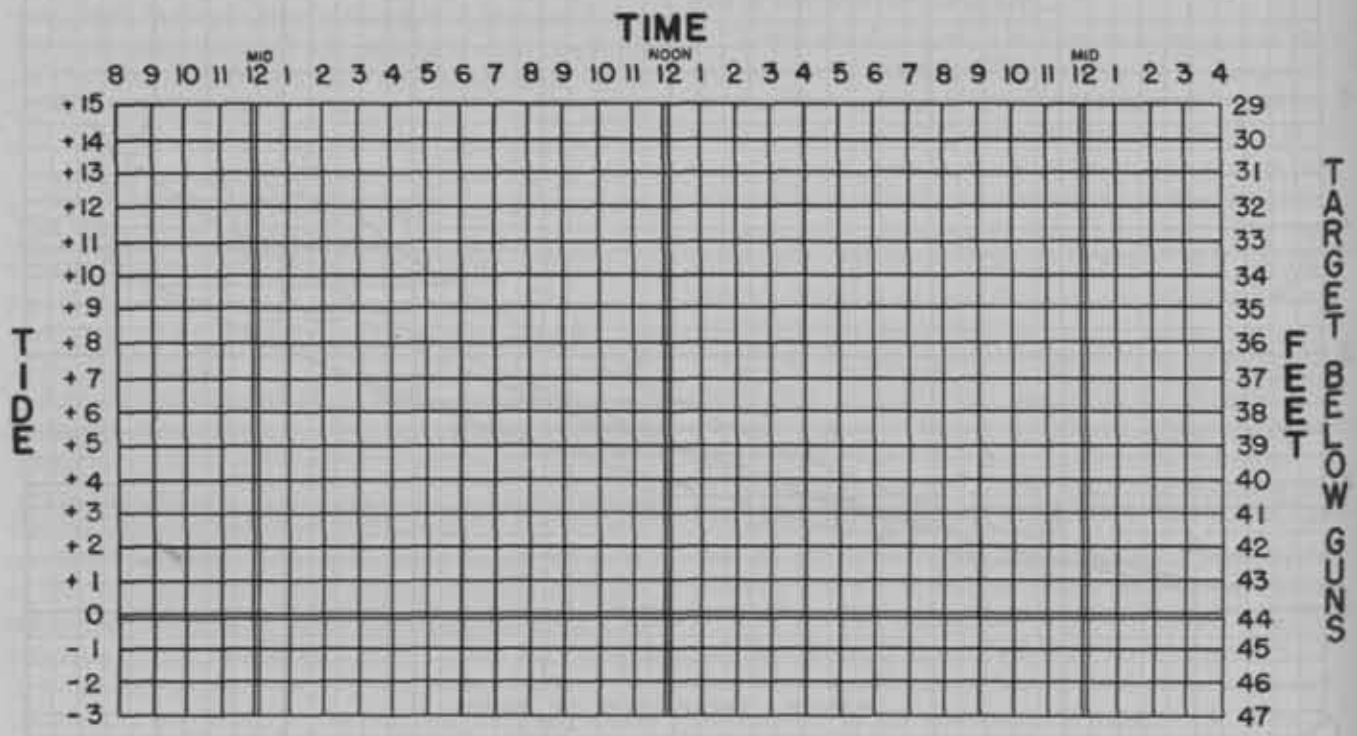


FIG. 4 - TIDE CHART FOR RANGE CORRECTION BOARD

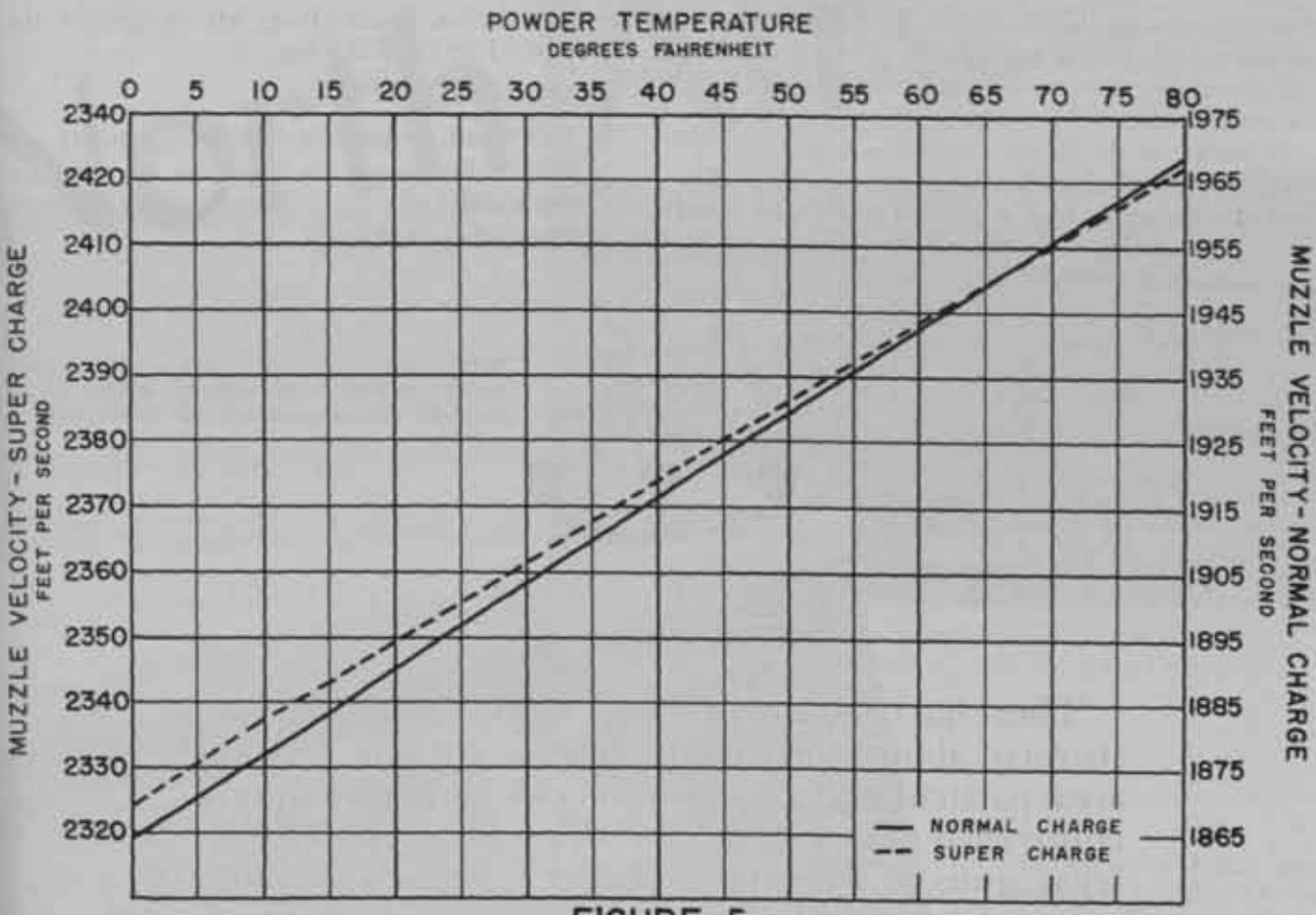


FIGURE 5

guns), with the height of the Battery above mean low tide corresponding to the zero tide on the left of the chart.

To use the Tide Chart, it is set up each day (at midnight) with the tide for the coming twenty-four hours plotted on the chart by means of pins, marking the highs and lows, and a string running from one pin to another across the chart. Then, the correct Height of Site setting for any time during the day may be found by simply following the vertical line, of the desired time, down to the point where it is crossed by the string. The Height of Site (or Target below guns) for that point is then read directly, in feet, on the right side of the chart. The Tide Chart in use is shown in the picture of the Range Correction Board, Figure 6.

III. Muzzle Velocity Chart

Another time loss and possible source of error was found in the determination of muzzle velocities by the usual method of interpolating from the table "Changes in Muzzle Velocity due to Changes in Powder Temperature" (Part 2b–1, Table B of the Firing Tables) and then subtracting the result from the standard muzzle velocity. To eliminate the necessity for these calculations, a chart (Fig. 5) was made up which would give the muzzle velocity for either normal or super charge at any powder temperature with which the battery might expect to fire.

Using powder temperature (in degrees Fahrenheit) as abscissas, and the muzzle velocity (in feet per second) as ordinates one curve was plotted for normal charge and one for super charge. The muzzle velocity for the normal charge was marked on the right side of the chart and the muzzle velocity for the super charge was marked on the left side.

To determine the correct muzzle velocity from this chart, the temperature of the powder is first observed.

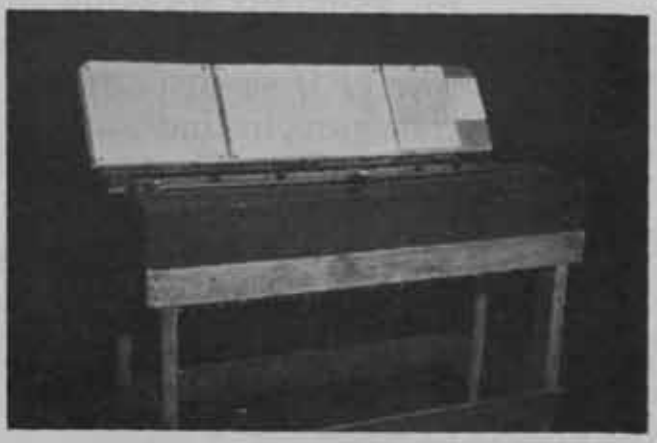


Figure 6.
Range Correction Board on special stand, with a slanting display board on which may be seen the Muzzle Velocity Chart, the Tide Chart, the Tide Table, and the Meteorological Message.

Then by entering the chart with the temperature, the muzzle velocity may be read directly in feet per second, for normal charge on the right side, or for super charge on the left side.

A picture of the Range Correction Board (Fig. 6) shows the special stand that was constructed for it. The stand has a slanting back to be used as a display board for all information necessary for the operation of the Range Correction Board. From left to right on the display board are the following:

1. Muzzle Velocity Chart
2. Tide Chart, set up with the tides for one day
3. Tide Table, giving the high and low tides for one month
4. Meteorological Message

There has been and probably will be continued controversy about antiaircraft defense, in the forward areas particularly. The question of whether we should equip each unit with certain means of antiaircraft defense, guns, or whether we should have the unit fairly stripped down to the essentials and have a roving mass of antiaircraft means. That is a tough question and has been from the beginning. It hasn't been resolved by the Tunisian campaign. There are a good many divergent opinions about that. There is the angle that if we have a given number of antiaircraft guns scattered uniformly among the units—fixed in those units—we are guilty of what we call dispersion. If we disperse our strength we, generally speaking, are strong nowhere, we have some strength everywhere, but no great strength anywhere. If we disperse our present number of antiaircraft guns in that way, everyone will feel the comfort of having some guns near him and watching over him but he may not realize that the number of guns is inadequate to stop much of anything in the way of an air attack. That is a question that there is no exact answer for.—LIEUTENANT GENERAL LESLIE J. McNAIR.

North Africa

In central Tunisia, an American 155mm gun blasts the Germans at Bir Marbott.

AA gun crews of three nations work side by side. Americans man the Bofors in the foreground; Frenchmen tune up their Oerlikon in the center; and in the background a British crew stands by another Bofors.

Acme Newspictures

Near Medjez-el-Bab, a British AA crew prepares gun and ammunition for counter-battery fire to cover a bridge-building operation.

IT'S STICKY UP THERE!

By Lieutenant Colonel K. C. Smith, Coast Artillery Corps

Once upon a time many of us sat serenely in cloistered academic halls surrounded by a wealth of monographs, texts, and theses on exterior ballistics and differential effects. We thumbed through these occasionally, but indulged in little serious study. In the author's case this lack of serious study was caused by his failure to digest or even comprehend much more than the introductory paragraphs of these learned works. These learned works are no longer available to most of us, and really aren't supposed to be. After all, we are a *using arm,* not a technical service. However, we are occasionally confronted with certain phenomena that we haven't given much thought to previously, and curiosity is aroused. For example, new editions of firing tables for antiaircraft guns will contain three sets of differential effects which have been ignored in antiaircraft fire up to the present time. These effects are:

1. Differential effect on fuze setting due to nonstandard muzzle velocity.
2. Differential effect on fuze setting due to nonstandard density.
3. Differential effects due to nonstandard air temperature (the elasticity of the air).

It is believed that better corrections for these effects may be made; that is, fewer corrections will be applied in the wrong direction, or in an incorrect magnitude if we have some smattering knowledge of the characteristics of the effects and their probable causes. The theories expounded herein are believed to be reasonable and logical explanations. Now, having in mind that a husky majority of the antiaircraft artillerymen now in service have a knowledge of theoretical exterior ballistics which is limited to the truths expounded in FM 4-110, we might first dwell briefly on the theory of the elasticity effect. No mention of this effect is made in FM 4-110.

The whole business seems to be tied in with the relative velocity of projectiles and the velocity of air waves which we know as the velocity of sound. The air wave velocity varies principally with the temperature of the air. A certain amount of this temperature effect is damped out in the use of a ballistic density. However, it is not all damped out, because we can get the same ballistic density with innumerable combinations of temperature and pressure. The cohesiveness of the atmosphere and the velocity of air waves will still vary primarily with temperature. This will result in a varying amount of air which will be dragged along with the projectile, as well as retard the projectile's rotation, because of skin friction. The eddy currents will also vary with temperature as well as with the velocity of the projectile. So we think of the projectile setting up wave motion and expending energy to a greater or lesser degree, depending on its own velocity and on the velocity of air waves, this velocity of air waves being that for the air temperature existent at the time. During the travel of most of our projectiles, they travel

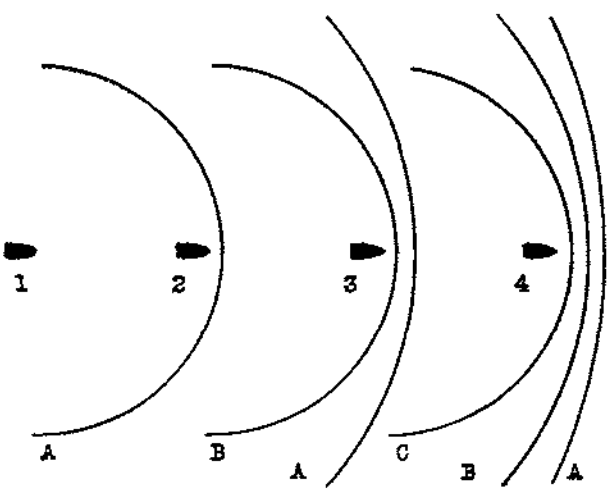


Figure 1

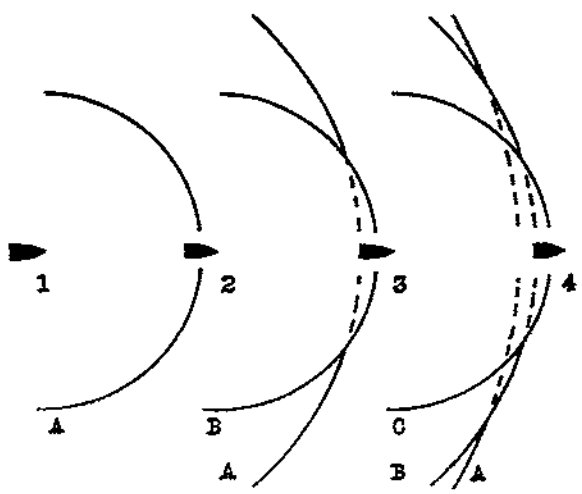


Figure 2

1 First considered position of the projectile.
2 Second position of the projectile, one second later.
3 Third position of the projectile, two seconds after "1."
4 Fourth position of projectile, three seconds after "1."
A Successive positions of wave front emitted by projectile at time "1" at times "2," "3," and "4."
B Successive positions of wave front emitted by projectile at time "2" at times "3" and "4."
C Position of wave front emitted by projectile at time "3" when projectile is at time "4."

first faster and then slower than the speed of sound as retardation progresses.

We can illustrate the major portion of this activity and show how it varies by assuming some ridiculous air wave velocities just to bring out the point involved. For example, in Figure 1, we have set up successive positions of a projectile traveling at velocity of 1100 feet per second. Then let's say that the weather is so hot that air waves like to travel at 1200 feet per second. The projectile is then traveling behind its own wave front and the energy expended in making an atmospheric disturbance is not too great. It is not possible to show all the waves emitted by the projectile during one second on the sketch. The single wave per second indicated represents all the waves generated during that period of time. This same representation is used in Figure 2.

Now in Figure 2 we have used the same projectile, traveling at the same speed, but the weather is so cold that air waves will only travel 1000 feet per second. Hence the projectile is preceding its own wave front. The amount of turbulence is terrific, as is the energy expended in creating such a mess. Consequently we would expect less range than with air wave speeds of 1200 feet per second.

We now quote a Government pamphlet of older vintage. "The natural method for obtaining a range correction (considering horizontal fire) for a change in temperature is to integrate the equations afresh with the resistance function appropriately altered. This is, of course, a long process and requires great percentage accuracy in order that the small difference in range shall not be proportionally in serious error. In practice, the effect of a uniform change in temperature may be readily obtained by means of an approximate formula derived from the exact conditions, but simplified by the use of a constant mean value in one of the terms. The method of obtaining this formula would involve the study of differential equations and adjoint systems and will be omitted. The formula, while not theoretically exact, gives results which are entirely satisfactory in practice."

Expressed in symbols which we regularly use, the formula is:

$$100\,\Delta R = R - \frac{MV\,\Delta R'}{2} - \frac{20{,}000 - Y}{200}\,\Delta R''$$

where ΔR = increase in range (yards) for 1% uniform rise in absolute temperature.

R = yards of horizontal range.

MV = muzzle velocity in yards per second.

$\Delta R'$ = change in range for plus 1 yard per second in muzzle velocity.

$\Delta R''$ = change in range for plus 1% in the ballistic coefficient.

Y = the maximum ordinate in yards.

So—we can state, *very roughly*, that the elasticity effect on a projectile depends on the temperature of the air and the average velocity of the projectile. A very learned acquaintance of the author had a neat little chart to give the sign of the elasticity effect on horizontal range that worked under most conditions:

	Temperature of the Air	*Average Velocity of Projectile Compared With That of Sound*	*Elasticity Effect*
Combination 1	Above Normal (+)	Greater than Sound (+)	Decrease in Range (−)
Combination 2	Above Normal (+)	Less than Sound (−)	Increase in Range (+)
Combination 3	Below Normal (−)	Less than Sound (−)	Decrease in Range (−)
Combination 4	Below Normal (−)	Greater than Sound (+)	Increase in Range (+)

Within the limits of antiaircraft gun fire as determined by maximum fuze settings, our average velocity is nearly always greater than that of sound. Hence the differential effect tables will show greater distances and flatter trajectories for air temperatures below normal, and the converse for air temperatures above normal, except at extremely long range.

All the differential effects due to the mass, humidity, movement, and temperature of the air are closely related and interdependent. One of these is the effect of nonstandard density on fuze setting. And we are talking about mechanical fuzes. The less dense the air, the easier it is for a projectile to retain its speed of rotation. That is, in thin, light atmosphere, retardation of rotation is less than normal and a projectile will make more turns in any given unit of time. With muzzle velocity greater than normal, a projectile will have an initial rate of spin which is faster than normal, and again will make more turns during any unit of time in its flight than at normal muzzle velocity.

This extra spinning apparently makes fuzes run faster and gives us early bursts, calling for a plus correction in fuze setting. Without dipping into fuze design there is plenty of reason to believe that the effect is the same as that which we get in some watches and clocks, as the principles involved are identical. They run faster when well wound up, and slower when nearly run down. The same principle explains the usually misunderstood discrepancy between the numerical value of time of flight and fuze setting found in firing tables. For short times of flight when the fuze is "wound up tight" by strong centrifugal action, we must cut our fuzes long in terms of numbers because they are running extra fast. For long times of flight, when rotation has slowed down and centrifugal action is weak, the slow running fuzes must be cut shorter to keep them from poking along past the desired point of burst.

The Relationship of the Eye to Antiaircraft Gunnery*

By Captain Erwin E. Grossman, Medical Corps

By and large, it is quite essential that every man inducted into the service possess at least the minimum visual requirements, which will allow him to do full military duty. However, certain branches of the armed services require more than the minimum requirements and more than normal central visual acuity. The antiaircraft artillery represents a radical change in tactics; one to meet the demands of a modern and different type of warfare, thus inheriting innumerable new technical apparatus, which, in turn, present new problems, many of which are intimately connected with visual efficiency. The function of the Antiaircraft unit is to locate and destroy small and distant targets moving at an extremely rapid rate of speed. To accomplish this successfully requires a maximum degree of ocular efficiency. The human eye is limited in extent to which it can perceive distance and, more essential, it is quite limited in the extent to which it can discriminate depth or difference in plane between two objects. It is a well known fact that the eyes cannot discriminate a difference in plane between two objects if these objects are much more than five hundred yards away. This figure is based on a pupillary diameter of sixty-five millimeters and a parallactic differential of thirty seconds of the arc. This figure, five hundred yards, assumes that the observer has maximum visual coördination, which cannot be further increased. It becomes necessary, therefore, to utilize some artificial means whereby this distance may become greatly increased in order to become effective at the range at which modern aircraft operate.

The ordinary setup of the antiaircraft crew using the smaller caliber guns consists of four spotters who are placed about two hundred yards in front, behind, and on each side, and who are in direct telephonic communication with the adjusters at the control box. It is the function of these spotters to help the gunners locate the target by watching the tracer stream in relation to the target. The gunners observe the target through a telescopic arrangement consisting of one eyepiece placed about fifteen inches away from the eyes. The newer guns are provided with directors, which are also optical devices, and are automatic in their action, but require one man who sets the so-called slant range, and which require the utmost of ocular efficiency and degree of depth perception for satisfactory performance.

It is quite obvious that here is a lush field for scientific selection of gun crews, which at first hand appears to be an enormous, Herculean task in view of the rapidity in which such units are being organized. It is the intent of the author to attempt to show that such selection can readily and expediently be carried out, and to show the value of such a selection.

The problem was first presented at the Camp Hulen Antiaircraft Training Center, where Colonel Maurice Morgan, in a continuous attempt to improve the accuracy of his gun crews, noticed that some of the men badly underestimated the relationship of the tracer bullet to the target sometimes, whereas their accuracy was phenomenal at other times. The probability that this variance might have been due to an increased distance of the target, *i.e.*, beyond the range of normal stereoscopic vision, led to the search for an improvised optical device, excluding the Height Finder, the cost of which is prohibitive, which would increase the effective stereoptic range to about fifteen hundred yards. Based on the principles of the Height Finder, or range finder, but on a smaller scale, such an instrument would be of great value.

At the present writing, I have been informed that Colonel Morgan has completed his apparatus, and has been gratified with the results in actual training practice.

At the same time it was agreed that the men assigned to gun crews be given a selective examination, not merely for the purposes of selection but also for the purposes of comparison. The basis of this examination consisted of a combined selection of tests taken from those of the Height Finders School and Air Corps, with a few minor modifications to suit the particular case, with stress laid largely upon the sense of depth perception and its modifying factors. These factors may be said to consist of the following:

1. External eye pathology, especially of the lids. 2. Inequality of vision. 3. Inequality of the refractive error. 4. Color vision. 5. Muscle imbalance. 6. Internal ocular pathology.

The rôle of the depth perception faculty being established, it was decided that all men already assigned to the gun crews be thoroughly examined, and that all new recruits receive a selective examination before permanent assignment is made to the gun crew. The following personnel in each battalion were examined: 1. Observers and spotters. 2. Adjusters. 3. Instrument

*Adapted from an article in *The Military Surgeon*, by permission of the editor.

corporals. 4. Platoon commanders. 5. Individual gunners. 6. Any other individuals who may have to act as substitutes for any of the preceding.

As noted previously, the standards chosen were those obtained by a combination of Air Corps and Height Finders' School requirements, with the addition of a few pertinent tests deemed necessary for our purposes. A mimeographed form is used in each case, a copy of which is retained at the Station Hospital, and the original sent to the battery commander. The Commanding General at the Antiaircraft Training Center, Camp Hulen, also receives consolidated reports for each battery, and thus is able to determine the progress of the examinations and the individual efficiency during the training period. The following requirements were set forth as those thought desirable for the efficient performance with the gun crew:

1. The vision should be 20/20 or better, and one eye should not have more than one diopter difference in refraction.
2. The convergence angle should not be less than forty degrees.
3. The depth perception should not be persistently more than thirty degrees separation of the rods on the Howard-Dolman apparatus.
4. The color perception should be normal or only slightly deficient.
5. The eyes should be free from lid infection, or abnormal sensitivity to glare and to wind.
6. The muscle balance should be within the following limits: Esophoria 12, Exophoria 8, Hyperphoria ½.

The visual acuity tests are being conducted at twenty feet using the standard Snellen chart with the usual illumination. Cycloplegic refractions are done on all men not possessing 20/20 vision, and upon some who it was thought possessed an appreciable amount of hyperopic error. The near point of convergence is measured with the Prince rule held at 11.5 millimeters from the cornea. Twenty-five millimeters is added to obtain the PcB, which is then converted into degrees by reference to the tables found in the Aviation School of Medicine Manual. The pupillary diameter is being taken in each case, not only for the purposes of computing the angle of convergence, but also to have available this figure in the records for future reference in the selection of candidates for the Height Finders' School, which requires that the pupillary diameter be no greater than seventy-two millimeters nor less than fifty-eight millimeters.

The muscle balance tests are being done with the Stevens phorometer, and are taken for distance and near. Color discrimination is tested by means of the pseudoisochromatic charts. Depth perception is measured on the Howard-Dolman apparatus, which was constructed in the utility carpenter shop according to specifications. Each examinee is given at least five trials in which to line up the two upright rods within thirty millimeters. The fundi are examined in each case through the undilated pupil. The presence of any suspicious lesion calls for another examination with the pupil dilated.

Comment: This study has not been statistical, and is not meant to prove facts by figures. The study has not been extensive enough nor has sufficient time elapsed for one to correlate the findings with the actual results in the field. Up to the time of this writing 770 men were examined.

Of these men twenty or 3.5 per cent were found to have marked anisometropia, sixty-four or eight per cent were definitely color deficient, ten or 1.3 per cent had some form of strabismus or amblyopia of one eye, and seven or 0.8 per cent had disturbing retinal lesions. No attempt was made to classify the phorias at this time, nor relate the degree of phoria with the depth perception test. Among the 770 men only thirty-two or four per cent could not line up the upright rods within 30-40 millimeters, all others tests being normal. Twenty, or seventy-five per cent, of those amblyopic or possessing an unequal visual acuity, failed in the depth perception test. Ninety-five, or twelve per cent, did not have 20/20 vision or better, but of these, sixty or eight per cent had no less than 20/30.

Conclusions: 1. Seven hundred and seventy men were given thorough ocular examinations in an endeavor to scientifically select the most desirable talent to operate the antiaircraft guns.

2. Judgments of distance within the sky are almost entirely based upon binocular clues, and the basis of these clues is horizontal disparity. The ability to interpret horizontal disparity in terms of depth can be estimated fairly accurately with the Howard-Dolman type of apparatus, but it must be remembered that in antiaircraft gunnery the plane of observation is never simply horizontal, but often calls for the assumption of various positions of the head and neck, and thus calls into effect the vestibular mechanism.

3. The essential qualifications for antiaircraft gunnery are: (a) The ability to appreciate a depth under laboratory conditions of at least thirty seconds of the arc (fifteen seconds might be more desirable). (b) Great promptness of fusional movements in the horizontal plane (this is the basis for the muscle balance requirement).

4. It is considered that all other factors are secondary to the prime requirements noted above.

5. It is hoped that a large enough series of these tests can be accumulated in the near future, and that the examinees' progress, during the training period be tabulated, so that at some future date a definite correlation can be made between the results of the examinations and the actual performance by the members of the gun crews.

Ration Breakdown

By Lieutenant Samuel C. Stimson, Jr., Coast Artillery Corps

The ration computing device described by Lieutenant Colonel A. L. Bullard in the July-August (1942) issue of the JOURNAL is an excellent solution to the problem of breaking down rations for issue to individual batteries, but we of the 66th Coast Artillery (AA) feel that our own system is perhaps more applicable to a highly mobile organization that must keep its equipment light and compact.

As outfits in the field or on foreign duty are confronted with the problems of speed and compactness of implements, the Crichlow Slide Rule, Antiaircraft's "right hand," proves most satisfactory. The food breakdown has to be made in the back of trucks due to the situation with which we are confronted. The Crichlow Slide Rule can be used there as well as in an office.

The method is simple. It consolidates the computations of per cent and multiplication of this per cent by the total number of units received of a particular item, giving the amount of food for a specified number of rations in proportion to the total number of rations drawn. The average private easily learns this method of breakdown within an hour.

The method of computation is fast. By practical application, it has been proved that forty different items can be proportionately divided among the batteries of a full regiment, according to ration strength, in less than thirty minutes.

The Crichlow Slide Rule is also available to all and easily obtainable. As far as accuracy is concerned, this rule reads to three decimal places which is more than adequate. Any method requires rounding off and balancing, because one cannot practically divide a single can of peas or corned beef between two or more batteries.

This particular slide rule is in the form of a circle with two celluloid arms, one longer than the other. When the long arm (L) is moved, the short arm (S) moves, keeping the set angle between the two arms.

The procedure is as follows:

(1) Set arm *"L"* on scale *"E"* to the total number of men in the regiment.

(2) Set arm *"S"* on scale *"E"* to the total unit of items to be divided.

(3) Move *"L"* to the number of men (Scale *"E"*) in a battery and read *"S"* (Scale *"E"*). This may be done any number of times without changing the relative setting between the two arms.

All settings and readings are made on scale *"E."* The setting of the arms is changed for each item that

DISTRIBUTION SHEET FOR FIELD RATIONS 66TH CA(AA)

NONPERISHABLE PERISHABLE Issued 6/8 1942 For Consumption 6/7 1942

ARTICLE (Battery Strength	REG. HQ. 429 %	HQ. 1Bn 250 %	A 112 %	B 299 %	C 210 %	D 302 %	HQ. 3Bn 283 %	I 180 %	K 82 %	L %	M %	TOTAL 2147 %	UNIT	ALLOWANCE PER 100
Bread	360	210	94	252	176	254	238	150	70			1804	lbs.	
Bacon	62	36	16	44	31	44	41	26	12			312	lbs.	
Beef, ground	219	127	57	152	107	154	144	92	42			1094	lbs.	
Beef, liver	111	65	29	78	54	79	73	47	21			557	lbs.	
Butter	81	47	21	57	40	57	54	34	16			407	lbs.	
Milk	429	250	112	299	210	302	283	180	82			2147	½ pts.	
Cheese	132	77	36	92	65	93	87	56	25			661	lbs.	
Yeast	45 oz.	26 oz.	12 oz.	31 oz.	22 oz.	31 oz.	30 oz.	19 oz.	8 oz.			14	lbs.	

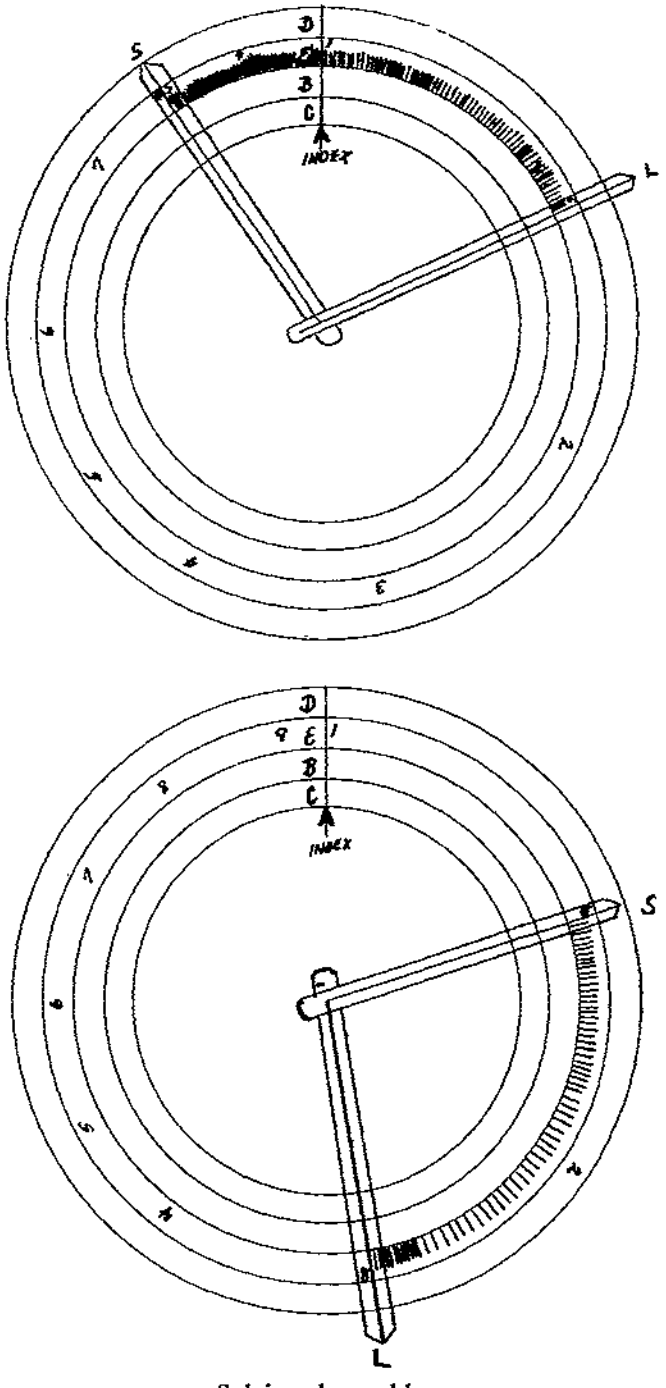
is to be distributed, but the time required is negligible.

We developed a columnar form known to us as a "distribution sheet." This form is used in conjunction with the Crichlow Slide Rule. The column on the extreme left of the form is used for listing the articles to be distributed. The remaining columns are headed with the names of the batteries with their respective daily ration strength. Horizontal rulings across the ARTICLES column are extended to form squares in the battery columns. Each square is divided into three sections. A vertical line cuts the square in half, and the right half is divided by a horizontal line. In the left half, the amount of an item actually issued to a particular battery is recorded, while in the upper right section is noted the fractional amount computed on the Crichlow Slide Rule. The difference between these figures is recorded in the lower right section, (red for minus and blue for plus).

These computed overages and shortages in distribution afford a basis after two or three weeks of this procedure, for making adjustments in subsequent distributions so that, over a period, a fine degree of equity may be obtained. However a running balance of the overages and shortages was maintained for a time but was dropped as, in our opinion, the effort did not justify the more accurate results. When necessary, balancing computations now are made mentally during distribution by brief reference to the preceding distribution sheet(s). This is done at the time of figuring the distribution. Over a period of six months this method of recording the breakdown has afforded fair distribution to the batteries and has been very satisfactory administratively. With our recording system we can, with a moment's notice, tell a battery the exact amount of a particular item they received on any date since the field ration has been in effect. The idea that the supply officer knows how much and what items will be received on a certain day is outgrown. There are so many substitutions made at the time of drawing that the calculations made before the draw are a waste of time. Therefore, rapid computations must be made while the food is being drawn in order to avoid spoilage of meats and other perishables through unnecessary delay.

Explanation of Slide Rule Diagram:

Assume that there are 1,500 rations for one day in the regiment, and 800 pounds of an item to be distributed. Set "S" on 800, as in diagram, and "L" on 1,500 as in diagram. Then move "L" to 300 (men in one battery), and read "S" which is on 160 pounds. That is the amount of this item 300 men will receive. Continue moving "L" and reading "S" until the entire amount of food has been divided among the regiment. The setting is then changed for the next item to be distributed.



Solving the problem.

KEEP 'EM ROLLING
On Ice Floes or Deserts
By Richard Gordon McCloskey

Army motor transportation is rolling to the corners of the world. "Not snow, nor rain, nor heat, nor gloom of night stays these couriers from the swift completion of their appointed rounds" if . . . if motor transport officers are ready for the constant emergencies that arise when operating in extreme cold and extreme heat.

Good driving and constant preventive maintenance, of course, will keep 'em rolling almost anywhere in any climate. But when something new is added to these two constants, something more than the books call for, the trucks will keep rolling farther, longer, and faster despite the hellish transport conditions we face around the world.

The two extremes—heat and cold—require special preparation by MTO's and resourceful drivers plus constant attention to details that can (but shouldn't) be overlooked in normal climates.

In cold weather operation the precautions of flushing the cooling system correctly before using antifreeze, checking for leaks, using radiator covers, tagging drained cooling systems and using winter lubricants are so elementary that you should know them awake or asleep. If you don't, brush the cobwebs off the maintenance manual and read all about it. Here are some extras that aren't in all the books:

One of the alleged reasons for the Nazi halt before Moscow was a breakdown in their ersatz lubricating oil. Your lubes aren't ersatz, but they'll harden and channel in extreme cold just the same, keeping the vital protective coating of lubricant from between the working surfaces. When you reach temperatures of below minus thirty degrees Fahrenheit, even SAE 10W is too thick, and you will have to dilute the crankcase oils before using them. The diluents given below are in order of their preference:

1 quart of gasoline to every 5 quarts of engine oil
1 quart of kerosene to every 5 quarts of engine oil
1 quart of distillate to every 4 quarts of engine oil

Mix the diluent thoroughly with the oil before filling the crankcase and watch the bayonet gauges more carefully than usual—diluents increase oil consumption considerably.

Transmission, transfer cases, and differentials should be drained and filled with extreme-cold EP lubes, diluted with ten per cent gasoline or kerosene below minus thirty degrees Fahrenheit.

Arctic-type greases must be used undiluted, and use a 10 or 20W oil instead of the usual lube in the steering gear housing.

Hydraulic brakes will need a mixture of twenty per cent castor oil and eighty per cent diacetone alcohol.

Engines that aren't in tip-top condition won't start. Compression, timing, distributor, and plugs must all be correct. Engines have a "critical cranking speed," that is,

The jeep has proven itself in the jungles of Bataan, on the Libyan desert, in Russia and in Alaska. Here one makes a turn in the slush and mud of a thawing Alaskan road.

Half tracks have tough going across the rocky wastes of Iceland.

a minimum RPM before any fuel can be drawn into the cylinders. This critical speed varies between forty and seventy RPM, which means that your battery must be fully charged (Sp. Gr. 1.275-1.300) in extreme cold or the engine won't reach even these low speeds. Batteries are practically useless from minus forty degrees Fahrenheit down, even though a fully-charged battery won't freeze above minus eighty-five degrees Fahrenheit. You will have to crank by hand, warm the whole truck, or rig up an inertia starter in really cold weather. When you add water to a battery run the engine for at least an hour so the water mixes thoroughly with the electrolyte —in other words, don't add water until you are going to start driving, unless you have plenty of gasoline to waste—and who has?

At freezing temperatures and below, the moisture in the air will condense and freeze in the air-brake and fuel lines. Ice in the lines means broken lines. A couple of teaspoons of alcohol added to the air tanks will absorb the precipitated water while the tanks are being filled. Drain the air tanks every night, or before prolonged halts, and never set the brakes—air or hydraulic—in extreme cold. They may freeze to the linings. Block the wheels instead, and run the tires on boards, mats, or cloth to keep them from freezing to the ground.

Strain your gasoline if possible to remove any water, and add about half a pint of alcohol to every fifteen gallons of gas. The alcohol will absorb the water.

In blizzards and snow storms you can expect a lot of trouble. Schedules will be scrapped. Drivers tire easily and you will be wise to have trained relief drivers ready to take over. Whenever a truck breaks down, have another truck halt and stand by until the maintenance gang arrives. Never leave one vehicle alone unless it has two pioneer tool sets, complete hand tools, a pump for tires and blowing out clogged fuel lines, and fuel, heat, and food for at least four days—and even then think twice before doing it.

Set up an SOP for blizzard driving. Rotate your trail-breaking truck and pioneer gang. Have plenty of colored stakes for the reconnaissance party so they can mark routes and danger spots covered by snow drifts. Make extra allowances for gasoline supplies—consumption is three or four times the normal when the going is really bad. Check your spare parts. You will find twice the number of burned-out clutches, broken wheel chains, axles, and connecting-rod bearings. Have dark glasses ready for everyone when the blizzard is over and the sun comes out to glare on the snow and ice. Snow blindness can put your men out of commission for a week or ten days.

Many of the precautions you take in the Arctic are reversed on the desert, but many of them are the same. The SOP for broken trucks is the same, even to the sun glasses. Use the "buddy" system for broken trucks and have a good one stand by. Only in the greatest emergencies allow your men to overdrive in an effort to regain the column. The increased wear on the vehicle, and the increased fuel and oil consumption, seldom make it worth while.

Three years of war in Libya have given the British more experience in motor maintenance in the desert than any other of the United Nations. Here a British crew works over a Bren gun carrier.

The extreme heat hits the cooling system, carburetion, rubber parts, and lubricants.

Oversized cooling systems with six-bladed fans are almost a must. Condensation tanks on the cooling systems, which catch the overflow from boiling radiators, cool and return it to the cooling system, are invaluable.

Motorcycles that are air cooled are useless. There isn't any cool air during the day on a desert. "During the day." Remember that. It can get plenty cold at night.

The life of rubber parts and supplies is very short in the desert. Tire life is reduced one-fifth. Rubber gaskets and mountings shrink and become gummy. Keep them tight and replace them often. Inflate your spare inner tubes and powder them with tire talc—or else they will fuse into one solid mass of chewing gum.

Vapor lock—something you probably haven't experienced in years—is a daily occurrence on uninsulated fuel lines. Carburetion will go crazy unless you tighten all fuel system gaskets frequently.

Lubricants will thin out, expand, and blow oil seals unless you maintain gear box lubes at the minimum safe level. Overfilling gear and crankcases in the desert is as bad as underfilling them.

Next to heat, sand and dust are your worst enemies. If you get caught in a sand or dust storm, turn the vehicles so the engines face downwind, and hood them tightly—top, sides, and bottom—with paulins to keep out the dust and sand.

Your men may have to wear respirators. An operating engine breathes air too, so heavy-duty oil-bath air cleaners are a must. Change the filter elements frequently—sometimes every hundred or less miles of operation. Second echelon stockage of filters must be heavy. All supplies must be carried in sealed containers to protect them from dust and sand. Check them at loading, during the run, and at unloading, for leaks and contamination.

Watches, compasses, generators, carburetors, distributors, and grease cups must be dustproof. Remember the crankcase and gearcase breather pipes.

Sand drifts are as bad as snow drifts. Your pioneer and reconnaissance parties must plant guide poles as they would in the Arctic. Have them watch for "rat holes"—soft sand spots caused by bushes or shrubs covered with drifting sand. Everyone should be familiar with the "watch-sun" and Pole Star methods of orientation.

Sand is as tricky to drive over as ice. If the tires cut through the outer crusted surface of the sand they will lose traction on the soft sand underneath. When the wheels sink in, they pile the sand ahead of them, which makes another hill to cross. Deflating tires to twenty pounds helps maintain flotation, but it ruins the tires if you don't inflate them to normal as soon as hard ground is reached.

Trying to jump a stuck truck out of the sand by revving the engine and slamming the clutch in burns out the clutch and twists the axles without getting the truck out. Traction devices—chains or mud and snow tires—do more harm than good because they break the precious top surface. Sudden turns in sand will make the front wheels break through and lock in the soft sand, and will probably turn the truck over. Treat sand with exactly the same respect you would ice.

The suggestions given here, even though they deal with motor transport, all boil down to one thing: Hoss Sense. In the Arctic it's cold and things freeze. Pay special attention to anything liquid. In the desert it's hot and things boil. Pay special attention to anything liquid. Anything liquid on a truck is gasoline, oil, and water. Keep your gasoline, oil, and water scrupulously clean, and have them in the right quantity, at the right temperature, at the right place, at the right time, and most of your Arctic and desert driving troubles will be licked before you start rolling.

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.

THE COAST ARTILLERY BOARD

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Firing tables for 90mm guns for use against naval targets. Printed copies of Firing Tables 90-C-1 have been distributed recently for 90mm guns firing standard ammunition against naval targets. However, additional range firings at Aberdeen Proving Ground have shown that the data in Firing Tables 90-C-1 require certain modifications. New firing tables are being prepared now and will be published as Firing Tables 90-C-2. Pending the printing and distribution of Firing Tables 90-C-2, advance photostat copies may be obtained directly from the Coast Artillery Board, Fort Monroe, Virginia.

Sound-powered telephones for harbor defenses. As a result of recent additions to harbor defenses under the modernization program and the installation of recently developed special equipment, cable facilities in many of the harbor defenses are becoming severely taxed. Because of current restrictions on the procurement of items containing strategic materials, there appears to be little possibility of relieving this situation to any great extent by the installation of additional cable. In common battery telephone systems, which are the type found to be best suited generally for fire control purposes in harbor defenses, each telephone must be connected by a cable pair to the storage battery in the fire control switchboard room for the application of transmitter power. In the case of those telephones which are switched by means of the Switchboard BD-95, an additional "dry" pair must be used between the fire control switchboard and the Switchboard BD-95. These two pairs frequently terminate in the same room, as in the case of arm setters' phones in the plotting room. There are many purely local circuits containing two or more telephones within a single casemated structure, each of which must be connected to the fire control switchboard room for transmitter power. Throughout the harbor defenses, there are numbers of more or less isolated installations of considerable size, in which the telephones are powered from fire control switchboard rooms located a considerable distance away. It is the opinion of the Board that the requirements for cable facilities in situations such as outlined above can be reduced considerably by the use of sound-powered telephones, which require no connection to fire control switchboard batteries; in fact, these telephones require no battery power whatsoever.

At various times in the past, the Board has service tested different types of sound-powered telephone equipment (see reports on Project No. 1056, Coast Artillery Board Notes, COAST ARTILLERY JOURNAL, Volume LXXIX). While this equipment was found to be capable of highly satisfactory performance in field wire circuits up to eight miles in length and 19-gage cable circuits up to twenty miles in length, the advantages were not considered sufficient to warrant the introduction of a new type of telephone, at the time, since the sound-powered equipment could not replace entirely either local battery or common battery telephones then in use.

The Board has requested a number of Telephones TP-3-T1 (sound-powered) and Head and Chest Sets HS-25 for test in circuits where the use of sound-powered equipment might reduce considerably the requirements for fire control cable pairs. If it is demonstrated in the test that considerable improvement in the fire control telephone system can be effected under present circumstances, the Board will initiate action toward furnishing sound-powered telephones in a form suitable for use in the harbor defenses.

Testing targets for 155mm Guns M1 and M1A1. The Ordnance Department does not contemplate supplying testing targets for use with the various sights with which 155mm Guns M1 and M1A1 are equipped, since the requirements are not sufficiently great to warrant the cost of reproduction. However, the necessary drawings for these testing targets have been sup-

plied to the Coast Artillery Board and reproductions of these drawings may be obtained directly from the Coast Artillery Board, Fort Monroe, Virginia.

Two types of drawings are available for each sight, a full-scale drawing and a half-scale drawing. The full-scale drawing, suitably mounted and varnished, can be used directly as a testing target. However, for permanent use it is recommended that testing targets be painted on plywood, using the detailed dimensions shown in the half-scale drawing.

Drawings are available for use with the following sights and mounts on 155mm Guns M1 and M1A1:

Panoramic Telescope M8 on Telescope Mount M43

Panoramic Telescope M12 on Telescope Mount M18

Panoramic Telescope M5 on Telescope Mount M18

Removal of paint from bourrelets of projectiles. As a result of an inquiry made by the Coast Artillery School to the Chief of Ordnance as to the necessity for removing paint from bourrelets of projectiles prior to firing the following reply was received:

"1. The only purpose served by removing the paint from bourrelets of seacoast projectiles is to insure that the maximum diameter of the bourrelet is less than the minimum diameter of the bore of the gun. In the case of a 12-inch gun the minimum bore diameter is 12.000 inches and the maximum diameter of the bourrelet is 11.975 inches—minimum clearance of .025 inch or .0125 on each side. If the coating of paint on the bourrelet is over .0125 inch it may interfere with proper seating and will prevent ramming home and affect ballistics thereby increasing dispersion.

"2. The original coat of paint will not exceed .0125 inch and this office concurs in discontinuing removing paint from any ammunition which has not been repainted. However, there may be considerable ammunition which was repainted a number of times during peace time on which the coating of paint does exceed .0125 inch. In such cases, the paint should be removed from bourrelets.

"3. The above discussion applies particularly to seacoast weapons. The Field Artillery does not remove the paint, but in the case of fixed and semifixed ammunition the seating of the projectile in the gun is largely determined by the cartridge case. In addition, Field Artillery ammunition is usually stored under different conditions and is not often repainted.

"4. In the interest of accuracy of fire and minimum dispersion it is essential that bourrelet diameter be less than bore diameter. This can be insured in the case of repainted ammunition by:

a. removing the paint from the bourrelets of all repainted ammunition, or

b. if that is not desirable, all shells could be gaged at the bourrelet before firing, the paint being removed from those which are oversize."

In view of the statements of the Chief of Ordnance, it is suggested that separate loading projectiles on hand be gaged at the bourrelet to determine if the removal of paint is necessary. Apparently, newly manufactured ammunition will not require the removal of paint; however, a few rounds should be gaged as a check. It is apparent also that paint need not be removed from the bourrelets of fixed ammunition. In the event that it becomes necessary to repaint any type of projectile, the existing paint first should be removed, and after repainting a few rounds should be gaged as a check.

Sight and sight mount for 90mm MTB gun. The Elbow Telescope M6 mounted on Telescope Mount T61 will soon be in production for the 90mm Fixed Mount T3 to be used in Case II firing against motor torpedo boats. The telescope has a power of eight and a field of view of eight degrees and forty-five minutes. The telescope mount allows a deflection setting of plus or minus seven degrees to the nearest one hundredth of one degree. The reticle consists of one vertical cross-hair in the center of the field of view for tracking on the target. Provision has been made for lighting the reticle, the deflection scale, and micrometer drum, and four filters are built into the telescope.

Coast Artillery Board tests of two pilot models of this sighting system indicate that it will be very satisfactory for the purpose for which it was designed.

Failures of M8 sights for 155mm guns. Certain malfunctioning of the Panoramic Telescope M8 on Telescope Mount M6A1 has been reported in target practice reports from various Coast Artillery units. Certain temporary corrections can be made in the field, and all malfunctions should be brought to the attention of the local Ordnance officer.

Sixteen-inch seacoast gun matériel. Technical Manual 9-471, covering the 16-inch Gun Mk IIM1 on the Barbette Carriage M4, was distributed in March 1943. This manual contains all the essential information of a technical character required by the using arm for the identification, use, and care of the weapon, ammunition, spare parts, and accessories. The manual should be available to all units manning the subject equipment.

Table of organization for MTB batteries. The Coast Artillery Board recently collaborated with the Coast Artillery School in formulating a proposed table of organization for harbor defense anti-motor torpedo boat batteries. Based on a firing unit of two guns and with an appropriate range section, the total strength came to seventy-six enlisted men and three officers.

High speed targets. During the past month, the Coast Artillery Board has tested two designs for high speed targets. One of the targets has handling and constructional features which make its use undesirable.

The second target consists essentially of two hollow pontoons which are held in position by an "X" frame which also provides the support for the mast. The target weighs approximately 400 pounds and has been towed by one of the JR radio-controlled boats at speeds in excess of thirty miles per hour. However, speeds of twenty-five miles per hour are considered as a practicable maximum in view of the light construction of the hull of the JR boat. The target can be towed also by mine yawls or L-boats without reducing their speeds appreciably. It is hoped that as soon as some minor modifications have been made and tests completed, authority will be granted for the Board to distribute plans to each harbor defense for use in this year's target practices. A description of a simple rope towing bridle, the design of which can be employed with all small boats, will be included.

Ammunition handling for 16-inch batteries. The Coast Artillery Board is conducting tests to determine the most satisfactory method of handling ammunition in 16-inch batteries. Two systems are being considered: Using the overhead trolley system for the service of projectiles and the Ammunition Truck M4 for the service of powder; and using the Ammunition Truck M4 for the service of both projectiles and powder.

The tests to date indicate that if the overhead trolley system is to be used for the service of projectiles, certain improvements will be necessary, the most important of these being the provision of a new type of projectile tongs which will support the projectile more positively. The present Gilmartin type yoke (tongs) supports the projectile only on the under side at its center of gravity. On several occasions, projectiles have slipped from the yoke and fallen to the floor of the gallery. If the Ammunition Truck M4 is to be used for the service of both projectiles and powder, additional trucks will be necessitated, probably twelve per gun.

Additional information on this subject will be available on completion of the tests now in progress.

Mounting of paper on plotting boards. Information has been received that at some batteries interference is being encountered between station arms and thumb tacks which are used for mounting paper on plotting boards. Such interference should not occur if proper procedure is followed. The entire plotting surface should be covered with paper so that the plotting board is ready for use for any part of the field of fire. Thumb tacks should be used only where they will not interfere with the station arms, such as on the beveled edge around the circumference of the plotting board. Wherever it is necessary to secure paper to the surface of the board at places over which the station arms must slide, scotch tape may be used. The scotch tape is provided with each battery drafting set. For daily drills, small sections of paper may be placed over the large sections and held in place with scotch tape.

Medium Tractor M4. The Medium Tractor M4 is the standard prime mover for 155mm guns on M1, M2, and M3 carriages, and is to be issued on the basis of five per firing battery. This prime mover is a full-track high speed vehicle powered by a 225-horsepower gasoline engine. It has three forward speeds and one reverse speed. Provision is made for transporting a driver and ten men without full field equipment; when the men have full field equipment, a driver and nine men can be carried. A cargo box is provided for the storage of ammunition and section equipment. The vehicle is equipped with a 40,000-pound capacity winch, a rear pintle, and front and rear clevises for towing. A standard ring machine gun mount for mounting a caliber .30 or caliber .50 air-cooled machine gun is provided. The entire unit loaded but without personnel weighs approximately fifteen tons.

The Medium Tractor M4 can tow the 155mm gun at maximum speeds up to thirty-five miles per hour, and at average speeds of from twenty-two to twenty-five miles per hour on good surfaced roads. It can haul the gun through difficult terrain at good rates of speed, except where very deep mud is encountered, when it is necessary to move the gun by winching.

Technical Manual 9-785, dated February 1, 1943, contains instruction on the operation and maintenance of the Medium Tractor M4. However, care must be exercised in the use of this manual, since it was written before modifications, found necessary in service tests of the pilot models by the Field Artillery Board, the Antiaircraft Artillery Board, and the Coast Artillery Board, were incorporated in production models.

In our visions of the world to come, we must never lose sight of one clear-cut rock of realistic necessity. No peace can come that will be more than a mockery until we have destroyed for all time the military might of our enemies.—Hon. Robert P. Patterson.

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

The JOURNAL prints articles on subjects of professional and general interest to officers of all the components of the Coast Artillery Corps in order to stimulate thought and provoke discussion. However, opinions expressed and conclusions drawn in articles are in no sense official. They do not reflect the opinions or conclusions of any official or branch of the War Department.

The JOURNAL does not carry paid advertising. The JOURNAL pays for original articles upon publication. Manuscripts should be addressed to the Editor. The JOURNAL is not responsible for manuscripts unaccompanied by return postage.

The United States Coast Artillery Association

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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 matériel and methods of training and by fostering mutual understanding, respect and coöperation among all arms, branches and components of the Regular Army, National Guard, Organized Reserves, and Reserve Officers' Training Corps.

News and Comment

"Where There's Smoke . . ."

Three interesting news items, which appeared a few days apart, indicate something new in AA:

London, (Wednesday) April 7 (INS).—British battleships for several months have been firing 16-inch antiaircraft shells at enemy planes many miles away, the *Daily Herald* said today.

The shells are fitted with time fuses so they explode near the plane. The force of the explosion is so great that planes within a wide area are crippled.

From *Newsweek*, April 19:

On the banks of the Potomac in Tidewater Virginia, the Navy last week took some of the wraps off some of its newest weapons. After months of secrecy about how it was sharpening its teeth, the Naval Proving Ground at Dahlgren invited news correspondents to watch it bare them in an impressive demonstration of newly developed might that featured a new type of projectile for a battleship's 16-inch guns, with enemy aircraft as the target. Details of exactly how this development works were withheld, but the feasibility of using 16-inchers against planes was outlined recently by Admiral William V. Pratt in his War Tides column (*Newsweek*, March 8). He explained that with a high bursting charge and timed fuses, fragmentation shells from a battleship's big guns could catch enemy squadrons within their fire zone for a period of roughly three or four minutes, even if the planes were flying from 20,000 to 30,000 feet and at 300 miles an hour. In three minutes, Admiral Pratt said, a battlewagon could thus throw about 113,400 pounds of metal at attacking planes.

From *Sea Power*, for May:

It is likely that, in the future, battleships often will find themselves in a secondary rôle, but a secondary rôle which is becoming more and more important. For, in addition to the great concentration of high-angle, rapid-fire guns they now carry, battleships are destined to develop into floating fortresses of the world's largest antiaircraft artillery. Rear Admiral W. H. P. Blandy has disclosed that special projectiles are being made to permit the use of 16-inch guns against aircraft.

How far this revolutionary development has been perfected is, of course, a military secret. But when it has reached the state of readiness for combat use (if it has not already done so), the battleship will have a multiple rôle in large, combined task forces: it will remain as the designated opponent of enemy battleships; it will be an important—perhaps the most important—element in defending carriers against enemy aircraft, and will be ready to close in for the kill against any

surface forces remaining after the enemy's air cover has been knocked down. In this last capacity, what would we have given for fast battleships capable of pursuing the Japanese after their carriers had been sunk off Midway! We have them now.

Pardonable Pride

Some psychologists maintain that a certain amount of boasting is necessary to build up self-respect. The JOURNAL has never carried this thought so far as to print commendatory letters just because they are commendatory; we find our basis for pride in the increasingly large number of group orders that indicate that some one person in various units thinks enough of his JOURNAL to recommend it strongly to his associates.

Group orders from unit commanders are to us, the final accolade. Few unit commanders have time to waste on the nonessentials. When these officers recommend the JOURNAL to their organizations, we at the office feel that the magazine is truly a training aid—which is one of the things we intend it to be.

Colonel F. S. Swett, commanding the 604th Coast Artillery (AA), sent us forty-three subscriptions along with a copy of his memorandum to his officers, recommending the JOURNAL. If we were to write a sales letter as strong as the Colonel's, it might be considered boasting of the worst sort. From Colonel Swett—it was very gratifying.

Colonel O. D. McNeely, whose articles have graced the pages of the JOURNAL many times, sent in twenty-six subscriptions, followed a few days later by seven more sent by Major Philip G. Brown, Adjutant of the 507th CA, Colonel McNeely's command.

Colonel D. B. Greenwood, commanding the 11th Coast Artillery, sent along thirty-eight subscriptions to make his unit a member of the 100% Club. The 423d Coast Artillery Battalion, through Captain K. S. Kennerly, Adjutant, sent in twenty-five new subscriptions to put it into the 100% circle. Major John T. Efford, commanding the 556th Coast Artillery Battalion, sent along thirty-one subscriptions to boost his unit into the ranks of the 100 percenters. In a later letter, Major Efford sent in eight more subscriptions for officers who joined after his first letter.

Lieutenant Colonel Erin E. Rentz, commanding the 2d Battalion of the 204th Coast Artillery made one of our days happy with twenty-one new subscriptions. Ten officers of the 250th Coast Artillery sent in their subscription orders on 3 x 5 cards— there was no letter of transmittal, but the envelope had Captain John T. Dabbs' return address on it.

An unusual letter of transmittal listed eight names, all of lieutenants, and was signed, "Officers of Battery C, 778th Coast Artillery Battalion (AA)." Since no one officer seems to want to take credit for the spade work, the JOURNAL will express its thanks to the unit.

Lieutenant Colonel William P. Bray's headquarters of the 34th AAA Group went 100% with seven subscriptions. Lieutenant Julius Lindner, at the Verona Training Center, New York Region, Antiaircraft Command E.D.C., submitted thirteen new subscriptions. Captain Milton S. Hoffman, Adjutant of the 491st Automatic Weapons Battalion, came in under the wire for this issue with sixteen subscriptions.

Postal Restrictions Modified

It no longer will be necessary for a soldier serving overseas to obtain the approval of his commanding officer in order to receive a package from home.

A modification of the overseas mail restrictions on parcel post was made by the Army Postal Service which will permit the mailing of packages to soldiers overseas providing that a request is received from the soldier and that the envelope bearing the APO concellation mark is presented at the time of mailing.

This modification of the overseas parcel post regulations will become effective as soon as the Post Office Department can notify postmasters throughout the country of this change.

The current restrictions as to weight and size, five pounds and not exceeding fifteen inches in length and not more than thirty-six inches in length and girth combined, will remain in effect.

Not more than one such package will be accepted for mailing in any one week when sent by or on behalf of the same person or concern to or for the same addressee.

Correction

Lieutenant Colonel G. B. Jarrett, O.D., Chief, Foreign Matériel Branch, Aberdeen, Maryland, has written to express his appreciation of Willy Ley's article in the January-February JOURNAL, *German Siege Guns*.

Colonel Jarrett informs us that the picture on Page 14 of that issue, captioned "142mm Krupp mortar," is really the 42cm Krupp mortar; also that the picture on Page 15, captioned "Eight-inch Austrian gun," is a 21 cm German Krupp mortar. The JOURNAL's picture source supplied the captions that were used, and the JOURNAL regrets the error.

AAA School Graduates

Camp Davis, N. C.—In a year after its establishment here the Antiaircraft Artillery School boasts of 23,300 graduates.

Three divisions contributed to this number. The Officer Candidate School led with 14,500 former enlisted men receiving commissions. In the Enlisted Division, 4,500 soldiers finished specialized courses. Advanced courses in the Officers' Division were completed by 4,300 commissioned men.—*Army Times*.

Enter the Bazooka

For close-in defense against tanks and other armored vehicles, American soldiers now have a weapon that was secret up to a few weeks ago—the bazooka. The news of this weapon, released for publication recently, will be of special interest to antiaircraft gunners, whose antitank functions take on increasing importance as the African fighting unfolds itself.

According to Major General Levin H. Campbell, Chief of Ordnance, "In defensive action, the operators of the bazooka will be recruited from among chauffeurs, truck drivers, ammunition bearers, orderlies, clerks, and mess personnel. All men in the service, however, will be schooled in the care and use of the weapon."

The bazooka, which can be operated by two soldiers, one to load, and the other to fire, can be carried by one man. It is a close-in weapon, and is meant to be supplemental to other, larger weapons such as AA and AT guns. General Campbell describes the device as a "rocket gun," but more information than that has not been released. It is known, however, that the personnel of a French tank platoon surrendered after one shot by a bazooka that missed. The wild shot felled a tree across a road, and the Frenchmen thought that a 155mm gun had done the damage.

The projectile from the bazooka, which is a shoulder weapon, will drive through brick walls and rock masonry, as well as armor. It can be used for destroying bridges, pill boxes, and other works. What it does after it penetrates is still a military secret—but the enemy won't like it.

Radar Information Released

Up to April 25, censorship regulations prohibited the use of the word "radar" in the JOURNAL. On that date, the War and Navy Departments, following their policy of releasing information when it is no longer of value to the enemy, made the following announcement:

"The term 'Radar' means radio-detecting-and-ranging. Radars, then, are devices which the Allies use to detect the approach of enemy aircraft and ships, and to determine the distance (range) to the enemies' forces. Radar is used by static ground defenses to provide data for antiaircraft guns for use in smashing Axis planes through cloud cover, and by airplanes and warships.

"It is one of the marvels made possible by the electron tube. Ultra high-frequency waves travelling with the speed of light can be focussed, scan the air and sea. When they strike an enemy ship or airplane, they bounce back. Radio waves travel at a constant speed of 186,000 miles per second. Thus a small space of time is required for such signals to travel to a reflecting surface and return to a receiver, so that, with means provided for measuring this time interval, it is possible to determine the distance to a given target. Radars operate through fog, storms, and darkness, as well as through cloudless skies. They are, therefore, superior to both telescopes and acoustic listening devices.

"Radar is used for both defense and offense. In fact, the British, who call their similar apparatus the radio locator, say it was instrumental in saving England during the aerial blitz of 1940 and 1941. At that time the locators spotted German raiders long before they reached a target area, and thus gave the RAF and ground defenses time for preparation. Since then Radar has stood guard at many danger points along United Nations frontiers and at sea, warning of the coming of aerial and sea-borne enemy forces, and contributing towards victory in combat. The new science has played a vital part in helping first to stem and then to turn the tide of Axis conquest.

"It was first discovered in the United States in 1922, when scientists observed that reception from a radio station was interfered with by an object moving in the path of the signals. Accordingly, a radio receiver was set up on the banks of a river and the effects of signal reception caused by boats passing up and down the river were studied. The experiment of installing the receiver in a truck was also tried, and it was observed that similar disturbances were produced in the receiver when the truck moved past large buildings. Development work was immediately undertaken so that the new discovery might be used for detecting vessels passing between harbor entrances, or between ships at sea.

"So far, it had been necessary to have the moving object pass *between* the radio transmitter and the receiver. This obviously limited the possible fields of application. In 1925 it was found that the surface of an object, or target, would act as a reflector of high frequency radio waves. In other words, the radio signals sent out by a transmitter could be made to strike a target, and then 'bounce' back to a receiver. This made it possible to have both the transmitter and the receiver at the same location.

"By 1930, research engineers were able to pick up reflected signals from planes passing overhead. By 1934, they had developed a satisfactory means of measuring the distance between the radar transmitter and the target. Since then other advances in the field have been made, some of which, after the war is over, will undoubtedly contribute to the security and comfort of a world at peace."

Bigger Bertha

Professor Mueller, chief designer of Krupps, repeated over the German radio yesterday his recent assertion that Germany hoped to put a super-gun into action.

"Just as the famous German 16½-in. mortar which surprised the world in the last war has been surpassed by the 'Sebastopol gun,' it is quite feasible that the 'Big Bertha' of 1918 will soon be outranged by a still bigger gun," he said.—*London Daily Mail.*

A Boost from *Yachting*

"The Coast Artillery Corps," to quote the authoritative COAST ARTILLERY JOURNAL, "has been branching out in all directions. It has not only served big guns on fixed seacoast positions, but has mounted them on railway mounts and has accompanied armies in the field. The Corps has gone into new dimensions with barrage balloons, and has gone to sea in its own mine planters. *In the CAC's newest undertaking, Coast Artillery soldiers are protecting merchant ships with Coast Artillery and naval guns on all the seven seas.*"

Today, fourteen months after Pearl Harbor, it is no longer necessary for the CAC to furnish gun crews for merchantmen. Yet the fact that they were asked to "double in brass" during the first critical months of the war is indicative of the professional skill and versatility of the personnel of this famous branch of the Army.

Time was when the favorite question of any Coast Artillery officer was to ask the layman what service was it that laid and serviced the mine fields guarding our strategic harbors. "The Navy" was the usual prompt answer of the unwary citizen and "You're wrong; it's the Army!" was the prideful reply of the officer. Today, that fact is more commonly known, yet rarely does the uninitiated realize that the task of laying and servicing these mine fields necessitates a sizable fleet of special service vessels manned by crews rugged enough to stand one of the most difficult and dangerous of military operations. Such mines are of the controlled type; they are detonated by shore controls, and for that reason they are wired—one to another, and from the mine field to shore—by a cable arrangement which suggests an electrician's nightmare.

The vessels employed in this service are the CAC's mine planters which are of varying sizes. All are seagoing vessels (as indicated by the fact that, in the days before the Panama Canal, mine planters of the CAC went around the Horn) and the newest types are of a design and appearance of which any naval architect would be proud. Included in this mine fleet are the distribution box boats, which plant and service the control boxes which are wired to groups of mines and thence to shore, and the small mine yawls which are a rugged type of utility boat.—*Yachting.*

Airborne AA

An integral part of an airborne division is the Antiaircraft Battalion. The automatic weapons batteries have 37mm or 40mm antitank or antiaircraft guns while the machine gun batteries are armed with .50 caliber machine guns. This battalion is included in the Airborne division for the protection of landing areas (glider and/or transport) seized by the division or advance elements thereof.—*Military Review.*

Mrs. Roosevelt presents the Soldier's Medal to five enlisted men of an antiaircraft unit for their efforts in saving the lives of civilians in a recent airplane crash and packing-house fire in Seattle. Brigadier General Bryan L. Milburn (behind Mrs. Roosevelt) commanded the unit.

Leavenworth Military Review

With the April issue of the *Military Review* of the Command and General Staff School at Fort Leavenworth, Kansas, it passed from a quarterly to a monthly publication. This change will fill a long-felt want for a more complete presentation of current ideas on the development of modern tactics and technique of military operations.

It will also be possible to publish translations from a much wider field of foreign military magazines. This will enable our officer of today to keep abreast of the best in foreign thought on military subjects and with their development of new matériel.

Subscribers should forward their check for $3.00 in advance made out to "Book Department, Command and General Staff School."

Toy Plane Targets

Army Ground Forces announces that a toy catapult airplane manufactured by the American Junior Aircraft Corporation, Portland, Oregon, and sold at a very low cost, has been found to have value as a training aid for antiaircraft machine gunners. The plane is projected rocket-like from a catapult, motive power being furnished by a shock-absorber type cord. As the rocket plane reaches maximum altitude and starts to descend, its wings open and it glides in a zigzag course for an appreciable time. Wing spread is about eighteen inches. Purchase of these or similar types from Special Field Exercise Funds is authorized.

WAACs in AAA Command

WAACs are the newest addition to the AAA Command, and have reported for duty in various parts of the unit.

Characterized by salutes which would do credit to a seasoned veteran of the Army, WAAC Companies are already efficiently at work doing jobs which will relieve soldiers for combat assignments in the Command. They're taking over filter centers, teletypes, message-centers—doing work which makes a military outfit click or fail.

Soon after their arrival, the WAACs were taken on inspection tours. They looked at antiaircraft gun emplacements, searchlights, automatic weapons, machine guns—all of the fast-firing, death-dealers which give the AAA Command its fighting punch. They looked at huge prime movers and at tiny jeeps. They met beloved mascots—dogs, pigeons, cats, birds.

Army and WAAC first sergeants compared notes, swapped ideas. Message-center operators explained the importance of getting the messages through—and fast. Soldiers on filter boards pointed out bomber flights, speedy fighter patrols. Army mess sergeants talked things over with WAAC cooks.

The arrivals will have the same titles as soldiers, WAAC officers declared. Thus, "leaders" will be called "sergeants," "junior leaders" will be "corporals," and "auxiliaries" will be "privates."—*America's Alertmen.*

CAC General Officers

Recent promotion lists announced the elevation of Brigadier General George R. Meyer to the rank of temporary major general, and of the folowing to the temporary rank of brigadier general: Colonels Clare H. Armstrong, William L. Richardson, Edgar H. Underwood, James G. Devine, Aaron Bradshaw, Jr., and Joseph E. Harriman.

"America's Alertmen" Tops Field

NEW YORK, April 1.—*America's Alertmen,* publication of the Antiaircraft Artillery Command of the Eastern Defense Command, is first prize winner in a competition among camp publications of the services here and abroad.

The grand prize, a gold trophy, has been presented to the staff of the weekly newspaper at Fort Totten and accepted on their behalf by Maj. Gen. Sanderford Jarman, commandant.

The contest, in which there were 350 entries, was sponsored by the camp newspaper service of the War Department. *Yank,* official publication of the War Department, was excluded from the contest.—*Associated Press.*

Russian AA Weapons

The M 31 76.2mm AA cannon is transported on a two-wheeled auxiliary carriage. Its weight ready for firing is 3,900 kg. (about 8,580 pounds) and ready for transportation, 5,000 kg. (about 11,000 lbs.). The tube serves for use in the 76.2mm AA cannon M 38, which is built as a four-wheeled towed weapon. Its weight ready for firing and for transportation is about 4,300 kg. (about 9,460 lbs.). The M 39 85mm AA cannon which is built as a four-wheeled towed cannon, has a like weight and is provided with a muzzle brake. Shells weighing 6.5 kg. (about 14.3 lbs.) are fired from the 76.2mm tube, and shells weighing 9.2 kg. (about 20.24 lbs.) from the 85mm tube.—(*Militar-Wochenblatt,* translated in *Military Review.*)

Berlin's AA Towers

The Berlin radio gave the German people yesterday a description of Berlin's new antiaircraft artillery towers.

A transocean military correspondent was quoted as calling the towers "gigantic" and saying that each one contained as much ferro-concrete as fifteen kilometers —about ten miles— of the West Wall.

"This scarcely believable amount," the broadcast said, "is explained by the immense thickness of the walls, and the strength of the foundation of the guns and of the ceiling of bombproof rooms."

The broadcast asserted the towers also provided protection for valued works of art. It went on:

"Even bombs of the heaviest caliber cannot do any harm to these towers. These towers have twin guns. New calibers and new kinds of ammunition were developed which make defense against high and low flying enemies possible.

"Hitler youth boys have provided needed assistant crews for these guns. Most of them are between fifteen and sixteen and are well educated."—*Associated Press.*

AA Navigators

CAMP EDWARDS, Mass.—Antiaircraft soldiers may become as sextant-conscious as the saltiest of Cape Cod sea-dogs with the introduction of navigation courses to picked units of the Antiaircraft Artillery Training Center by Capt. Ben A. Lentz, assistant to the director of training and operations, Engineer Amphibian Command.

Because of the global aspects of World War II and the possibility that units in training at Camp Edwards may have to fight the Axis in many parts of the world, celestial and dead-reckoning navigation has been introduced as a course of instruction for officers and enlisted personnel of the AAATC.

Need for celestial navigation for mobile antiaircraft units became evident when the African campaign opened.—*Army Times.*

The Siege of Malta

Much has been said and written on the subject of the defense of Malta in recent months, and that is not surprising in view of the great interest aroused in England and indeed, throughout the Empire, about the happenings in that small outpost of Empire. It is possible that this interest was enhanced by the unfortunate happenings in other parts of the world where we were suffering reverses and disasters of the first magnitude—and all the more disquieting because they were so unexpected. In fact, for a period, Malta was one of the very few bright spots on our strategic horizon, a condition which was enhanced when our forces in Egypt were driven back to the gates of Alexandria. It was then, especially, that Malta's continued integrity became so vitally and obviously important. It was our last precarious hold on the Centre Mediterranean. Its loss would have not only impaired our offensive plans for the future, but would have gravely compromised our defense of Egypt in the present. As a fact, its retention by us in those dark days of last summer did make a real and invaluable contribution both to the defense of Egypt and then to our great counter-offensive. It is, therefore, quite understandable that the imagination and interest in Malta have been so greatly stirred.

* * *

The lack of an adequate fighter force at Malta was not offset by a strong force of antiaircraft guns. Rather the reverse. The fighter weakness, of course, threw a greater burden on to the guns, and it was, therefore, doubly unfortunate that they were at this vital period totally inadequate in numbers. There again, we had to make the best of what we had, and use our limited resources to the best possible advantage. Apart from that, all we could do was to decide exactly where to put fresh guns when they arrived and to make every preparation for their installation.

* * *

In the period up to May, 1942, our air defenses were handicapped by a shortage of fighter aircraft. It was a period in which the heaviest and most persistent attacks were experienced, and consequently an unprecedented burden was placed on the A.A. guns. These rose nobly to the occasion and produced truly remarkable results. No doubt the amount of practice they had day after day against "live" targets improved the technique of the detachments, until the A.A. Artillery in Malta reached a standard probably never attained before. In one month the guns of Malta alone destroyed for certain over 100 enemy aircraft. The fighter aircraft also did prodigies, fighting incessantly against great odds, and taking a heavy toll from the enemy. Malta certainly was the graveyard of many Axis aircraft, and this was especially the case in the first six months of 1942, a period when the enemy's air resources were greatly taxed everywhere. We are now (January, 1943) seeing something of the result of that excessive strain imposed on the enemy, and it is not unreasonable to suppose that the "Battle of Malta" has made a real contribution to the advantages and successes we are now enjoying.—*The Royal Engineers Journal.*

Centrifugal Casting

WATERTOWN, Mass., April 30—Coast artillery gun production at the massive Watertown Arsenal has been speeded up nearly sixteen times through a revolutionary centrifugal casting process which took fifteen years to develop, it was disclosed here.

The hitherto undreamed of production basis which turns out superior gun tubes and cannon at vast savings was revealed to a group of news writers.

Before the war, it took 730 days to complete the plant's largest product—a 16-inch coast artillery gun and mount. By the new process, it takes but forty-seven days to finish one of these 400mm guns—the last word in seacoast defense, with a 28-mile range.

Officials said the Army today would be sadly deficient in artillery without the centrifugal casting which utilizes spinning molds instead of forging.

This is only one achievement of the pioneering Government plant which has solved the war-employment problem, yet forged ahead in metal radiography and molybdenum high speed tool steel.—*United Press.*

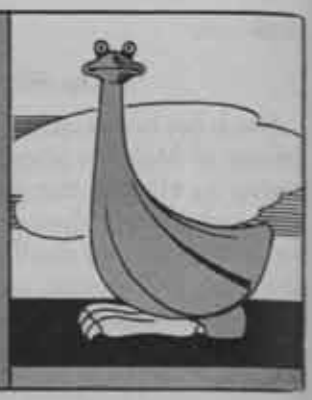
Naval Antiaircraft Production

Production of Naval antiaircraft guns of all types in 1942 totalled more than fifteen times the 1941 output. In every category production schedules for these weapons either are being met or exceeded thus far in 1943. If this pace continues, the 1943 output will better the 1942 record by more than 80 per cent.

The figures, based on a report of the Bureau of Ordnance, include all the main types of Naval antiaircraft armament ranging from the dual purpose, 5-inch gun to the newly developed, powerful 20-millimeter weapon. They do not include the tens of thousands of machine guns which the Army is procuring for the Navy for installation as auxiliary air defense in Naval vessels and aircraft offensive armament.

The increase in Naval antiaircraft gun production was concentrated primarily on smaller caliber, "close range" weapons for repelling dive bombers and torpedo plane attacks, as the lessons learned by our allies in the early days of the present war, prior to America's entrance, became incorporated in the productive output of this country.

Coast Artillery Activities



Gulf Sector

COLONEL LLOYD B. MAGRUDER, *Commanding*

Gulf Sector, Southern Coastal Frontier, Southern Defense Command, has been commanded by Colonel Lloyd B. Magruder, Coast Artillery Corps, since its activation a year ago. From Headquarters located in New Orleans, Louisiana, control is exercised over that portion of the Southern Coastal Frontier which lies within the Southern Defense Command, now commanded by Lieutenant General Courtney H. Hodges. Starting with nothing but a few empty rooms, but with splendid assistance from an extremely coöperative local Naval District, it quickly became a going concern.

Strategically, the Gulf Sector organizations provide a static defense for the Coast of the Gulf of Mexico, but tactically the organization is anything but static. The units manning the coast defense batteries are necessarily more or less permanently located, but they are only the front line, or screen, behind which highly mobile, compact, and powerful combat teams are located ready to strike hard at any threatened point on the long Gulf frontier in the minimum possible time.

The attack on Pearl Harbor found the personnel of the Command enjoying a peaceful Sunday afternoon. However, within an hour after the news of the attack was released, the quiet afternoon had taken on an entirely different aspect. It cannot be said that such a situation was expected, but preparations had long been in progress for just such an eventuality.

In the months that followed, the troops of the Gulf Sector spread out from the original centers at Galveston and Pensacola to cover the shipping centers and industrial localities of the Gulf Coastal Area with Seacoast Artillerymen, Antiaircrafters, and Infantrymen.

Many sleepy villages and bayous which had seen only fishing boats and heard only the calls of waterfowl for many years have become familiar with soldier and coast guard patrols and the sharp crashing reports of coast artillery guns in action. Big industrial plants and small fishing villages alike have extended themselves to provide recreation, friendship, and very tangible physical help to the officers and men of the outpost garrisons, making the tough job of setting up an effective defense in swamp or desert country far easier and much more pleasant.

The joint Army and Navy Operations Center established in New Orleans in May 1942 to operate twenty-four hours daily, proved its worth in the hectic summer months when Axis submarines were active in the Gulf of Mexico. Improvements in operational and intelligence functions are being made in this Center as a result of the experience gained in active operations.

The introduction of realism in tactical exercises is being stressed, and a marked increase in the interest of all participants is apparent. Especially noticeable is the increased interest in target practices, which are conducted as though Hitler, Mussolini, or Hirohito himself had come within range of the guns.

Well rounded programs designed for physically hardening the individual are in progress. Obstacle courses have been constructed; and marches with full field equipment are made in progressively longer stages. Troops are encouraged to participate in athletics of all types, and equipment has been provided for this purpose.

War Bond drives within the Command are meeting with much success. New subscribers are added every payday. There is friendly competition as to which organization is the best buyer of bonds. Many organizations have subscribed 100% to the "10% Club."

Collection of scrap metal is a continuing process within the Command. Many war relics located at posts and stations along the Gulf coast have been salvaged. Only those of definite historical value have been preserved. This program has added many tons of much-needed scrap to the steady flow of metal being sent to the smelters.

Artillerymen manning guns at remote stations on the Gulf Coast do not get to the cities very often, but when they do, they are certain that the faithful U.S.O. will have plenty of good entertainment in store for them. This organization has done a splendid job within the Command. It offers widely varied programs and a warm welcome to all who enter its doors. Its traveling Camp Shows which arrive at outpost camps by boat or reconnaissance car are received with enthusiasm worthy of the best Broadway productions.

The recent introduction of limited service personnel

into the units of this Command has provided an interesting study in the effects of morale and psychological factors on the efficiency of an Army. In brief, these men, who are barred by some physical defect from general service in more active theaters of war really put their best efforts into learning and doing their jobs. Some, after a period of healthy Army life and hard outdoor work, are being reclassified 1-A.

Headquarters, Gulf Sector, Southern Coastal Frontier, Southern Defense Command, has been in operation for one year. Upon this first anniversary, although the organization is not, and cannot, be perfect, it can look back on much accomplished and many obstacles overcome and feel that should the enemy ever reach our shores, he will know he has been in a fight before he ever gets beyond the high-tide mark.

Chesapeake Bay Sector

BRIGADIER GENERAL ROLLIN L. TILTON, *Commanding*

By Lieutenant Alonza F. Colonna

For members of the command, April marked the beginning of a six-months period of intensified training, calculated both to maintain a high level of efficiency in tactically disposed units and to achieve adequate training in units destined for stations elsewhere. Harbor Defense units and the CA Brigade concentrated on development and maintenance of efficient artillery teams, capable of delivering an effective fire on land or water borne targets under all service conditions, while the Mobile Force stressed training designed to enable the Defense Forces to operate in conjunction with larger forces of all arms.

At Fort Monroe one tactical problem, which entailed the laying of a dense cloud of smoke and gas on the seacoast batteries, assumed penetration by an enemy raider into Hampton Roads. In mid-April the local Naval District furnished coöperating naval units for a joint exercise involving the Harbor Defenses of Chesapeake Bay. The training program of the Mobile Force included twenty-four-mile hikes completed in seven hours or less. At Camp Pendleton, one new regiment of which 90% of the members are new recruits of the youngest age group, qualified more than 95% of the regiment with the M1 rifle. Another group, undergoing shakedown training on its new mobile armament, has been taking tri-weekly marches under field conditions, starting before daylight. Over eighty per cent of the limited service men at Camp Pendleton have also qualified with the rifle, despite various handicaps.

Tactical exercises and field training have been supplemented by special schools. A Chemical Warfare School for the Sector, conducted at Fort Monroe, has provided basic training in both offensive and defensive chemical warfare. A special school in unarmed defense lasting two weeks has been conducted in most of the units. And a special two weeks' course conducted by a Red Cross swimming instructor included instruction in functional swimming, life-saving, the use of light boats, and artificial respiration, ending with an outdoor demonstration showing various methods of staying afloat despite full combat uniform and equipment, life-saving, and swimming through blazing oil. To check accurately

Pfc. George Tatar of Lebanon, Pa., demonstrates the proper technique of jumping fully clothed, with full pack and rifle, from a high platform into water. The bent position and folded arms minimize the effects of the impact.

on the progress of training, each unit inaugurated an "Individual Proficiency Card" system.

In addition to special schools and training, the daily routine of personnel firing, battery tests, target practices, tests of Standing Operating Procedures, physical conditioning, and night marches, contributed to improved proficiency in all units.

At Camp Thalia, the Cape Henry Defense Force has made excellent progress toward completion of construction and on Easter Sunday held memorial services for former comrades who have died in the war.

Wartime found Army Day a quiet one. In the sector, the most noteworthy observance was a parade at Fort Monroe reviewed by General Tilton, the mayors of the near-by towns of Hampton and Phoebus, and the vice mayor of Newport News. General Tilton commented that Army Day would best be observed "by every man in the armed forces, especially in this sector, doing his job just a little bit better, and realizing that by a vigorous prosecution of the war on all fronts, victory will come that much sooner."

Distinguished visitors to Fort Monroe in March were members of a sub-committee of the House Naval Affairs Committee investigating wartime conditions in the Norfolk-Newport News area. The committee was entertained by General and Mrs. Tilton at the Casemate Club and from host and hostess learned the history of the legendary Oozlefinch, mascot of the Coast Artillery Corps.

The Soldier's Medal was awarded by General Tilton to Corporal Victor Natale of Warren, Ohio, who was cited by the general for his heroism and resourcefulness in rescuing trapped passengers from a burning train wreck near Frederick, Md., last September.

Hawaiian Seacoast Artillery Command

BRIGADIER GENERAL ROBERT C. GARRETT, *Commanding*

By Captain Donald E. Barrett

When the Japanese struck on December 7, 1941, officers and men of the Hawaiian Seacoast Artillery Command manned their battle stations with speed and orderliness. Wives and sweethearts were evacuated to Mainland United States. Everyone adjusted himself to the realities of war. An on-your-toes spirit swept over the entire command.

Early in 1942 Headquarters of the Hawaiian Seacoast Artillery Command was moved to a new home. Not so long afterward the Headquarters detachment was converted into a headquarters and headquarters battery. Thus Hawaiian Seacoast Artillery Command enlarged the scope of its activity and training program.

Gunnery training was stepped up with emphasis on accuracy in hitting and speed in going into action. No phase of essential training was overlooked. The work day was extended well into the hours of darkness—seven days a week. "Do it now, tomorrow will be too late," was the order of the day. Combat knowledge and the physical condition of officers and men improved; positions were strengthened.

A year and five months after the outbreak of war, we can look back and appreciate the tremendous accomplishment and the high state of training of Hawaiian Seacoast Artillery Command. Proof of this is shown by the fact that every man, regardless of his daily job, is required to attain a proficiency in the rudiments of soldiering. Each man must attain a proficiency in hand-grenade throwing, in the use of the bayonet, in rifle firing, in the use of the machine gun, B. A. R., and tommy gun; and in the fine points of first-aid treatment.

This training does not exclude the personnel of Headquarters Battery, Hawaiian Seacoast Artillery Command.

As any good coach knows, his team can go stale on too much work as a steady diet. So Brigadier General Robert C. Garrett has not overlooked the importance of morale and recreation to keep his team at highest fighting pitch. In accordance with this policy, softball, basketball, and athletic teams have been organized—and inter-unit schedules arranged.

In their free hours, men may frequent day rooms, established in the field; swim at the nearest beach, and attend movies at post theatres. If a theatre is not available, movies are taken to men in the field. All of this is the responsibility of the Special Service Officer. A short time ago he produced an amusing melodrama entitled *The Curse of the Coffin Nail*, with an all-soldier cast save for the two feminine leads. This melodrama, acted on a trailer stage, was presented to seacoast artillerymen at post theatres and at their field positions; and other units in the Hawaiian Department likewise saw it. The popular response to it at its every performance was highly favorable.

General Garrett and the officers and men of every Hawaiian Seacoast Artillery unit send you their heartiest Aloha from the Hawaiian islands.

BRIGADIER GENERAL EDGAR H. UNDERWOOD, *Commandant*

By Lieutenant Colonel Charles H. Scott

To make for uniform instruction in all parts of the Antiaircraft Artillery School at Camp Davis, N. C., changes have been instituted which will consolidate all departments teaching in the same field. Through this innovation each department will not just serve one part of the school but will instruct all students at the school in any particular subject.

The history of the year-old AAA School has been crammed with constant rapid expansion necessary under war circumstances. Now under Brigadier General Edgar H. Underwood, Commandant, the tremendous task has begun of tying together the organization of the school so that the utmost return will be realized from the teaching efforts. Through specialization, each department will become the "last word" in the field it covers so that it can serve as authority in its field to all in the service. Those who seek a particular knowledge will not be faced with various authorities to interview, perhaps with confusing results, but will find all they need to know in one place.

In short, the new set-up of the AAA School has been described as a change from an administrative organization to a functional organization.

All AA instruction will come under the Academic Division. There will be seven departments under this division, each department with sub-departments. Communications will have Radio, Wire and possibly Electronics sections; the Gun Department will have Matériel, Gunnery and Firing, and Fire Control Instrument sub-departments; the Radar Department will be divided into Guns, Searchlight and probably Automatic Weapons subdivisions; the Automatic Weapons Department will have Matériel, Gunnery and Firing sections; the Searchlight Department will have Lamp Mechanism, Data Transmission D.E.C., Power Plants, and General Subjects of Matériel and Technique under it; the Tactics Department will be made up of Command and Staff, Battery Officers, Staff Course (other branches) and Basic Tactics and Field Exercises for Officer Candidates; under the General Subjects Department will be Motor Transportation, Orientation (Master Gunner), Target Recognition, Miscellaneous and Record Section.

A Marine, a soldier, and a sailor take the Advanced Course at the Antiaircraft Artillery School.

New under the reorganization will be the Director of Operations by which a great deal of the consolidation will be accomplished. There will be an Operations Section under which will be a Reproduction Coördinator, Schedules, and Training Aids; Target Missions, Firing Ranges, Troop Requirements, Class Rooms, Instruction and Maneuver Areas; and Transportation, Civilian and Service Schools. Inspectors are listed for the Enlisted Students, Officer Students and Officer Candidates sections. These Inspectors will know what instruction is to be given to each type of student and make sure it is given. An Intelligence Information Officer will supply latest information which students should have. An Instructors Course will acquaint instructors with teaching methods.

Known previously as the Department of Training Publications, that section will be known as the Division of Training Publications. Headquarters will remain about the same for administration, one of the innovations being a Public Relations Officer.

The Student Brigade will administer to student officers and officer candidates. In addition it will provide instruction in small arms, infantry drill and basic military subjects. The School Regiment will administer to the enlisted students. The 108th Group will furnish enlisted men and equipment for instruction purposes. Two target squadrons of the Air Force will be under the school to provide target missions.

I SHALL RETURN!
MACARTHUR

Intrinsically Corregidor is but a barren war-worn rock, hallowed as so many other places by death and disaster.

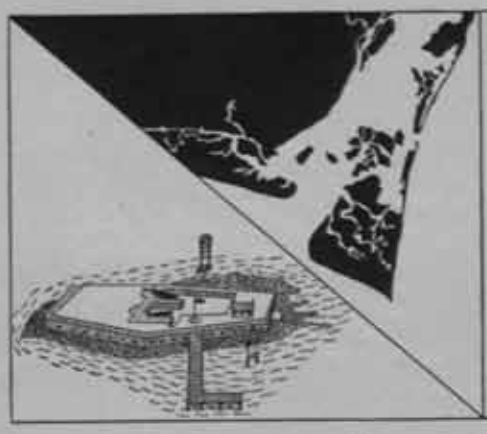
Yet it symbolizes within itself that priceless, deathless thing, the honor of a Nation.

Until we lift our flag from its dust, we stand unredeemed before mankind.

Until we claim again the ghastly remnants of its last gaunt garrison, we can but stand, humble supplicants, before Almighty God.

There lies our Holy Grail.

General Douglas MacArthur
May 6, 1943



SOUTHERN SECTOR

Eastern Defense Command

BRIGADIER GENERAL HAROLD F. LOOMIS, *Commanding*

By Lieutenant Colonel Robert L. Hood, Jr.

An interesting and effective means of training officers in Adjustment of Fire has been instituted at the Harbor Defenses of Charleston. Three officers from each battery are designated to fire a 3-inch sub-caliber practice. One officer is assigned as battery commander, another to the lateral adjustment board and the third to the range adjustment board. Data given these officers consist of range, speed and direction of wind, azimuth of target and a hypothetical angle of travel. They are directed to calculate firing data, construct adjustment charts and then conduct sub-caliber firing. A complete record is maintained of all deviations and corrections ordered. Upon completion of firing a critique is conducted in which the officers participating justify all corrections applied. It is planned to give every battery officer an opportunity to participate in a similar exercise.

In order to maintain 155mm mobile batteries in a state of readiness for movement in an emergency and for landward firing and the use of Field Artillery methods when applicable, the Sector Commander has directed each battery to schedule problems involving the movement of one gun from position at frequent intervals. These problems are designed to increase the efficiency of all personnel in moving and emplacing guns, overnight bivouacs, reconnaissance of new positions, communications, camouflage discipline and all-round defense measures.

A minor joint Army-Navy exercise of three days duration, in which all forces of the Carolina Subsector and local Naval District were involved, was conducted during the latter part of April. For the purpose of the exercise it was assumed that an enemy force had been assigned the mission of destroying the Army and Naval installations in and around Charleston. The enemy task force was simulated by troops of the Carolina Subsector and ships of the local Naval District.

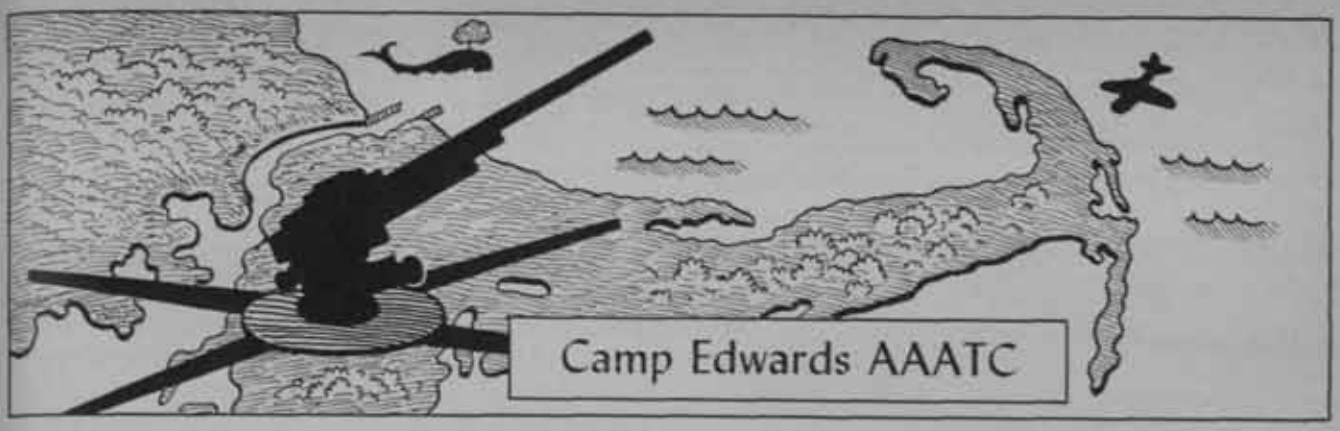
The Field Artillery batteries of the subsector combat teams were tested and graded recently according to standards prescribed by the Eastern Defense Command. Each battery was assigned a given defensive position to occupy in order to defend against enemy vessels that are assumed to be heading toward shore. Grades were based upon the ability of the batteries to quickly and accurately occupy and organize positions; establish bi-lateral observation by survey; construct firing charts; and fire one CI adjustment and two battery concentrations. Each battery so tested received excellent scores.

Training in 90mm batteries has been accelerated since the return of the group of officers and enlisted men selected to attend a special school offered by the Commanding General, Norfolk Region, AAA Command, Eastern Defense Command, in the care and use of 90mm guns and automatic weapons.

Continuous plans are underway to increase the recreational facilities and equipment of Southern Sector units. All units are now receiving some type of entertainment offered by the U.S.O. Recently, new type recreational buildings were approved for the combat team camps at Carolina Beach, North Carolina, and Atlantic Beach, Florida.

Due to the rapid promotion of enlisted personnel necessitated by the activation of new units and loss of experienced noncommissioned officers and noncommissioned officer material to Officer Candidate Schools, a large percentage of the recently appointed noncommissioned officers are not fully indoctrinated in basic military subjects and principles of leadership. In order to alleviate this situation, the Florida Subsector has activated a Noncommissioned Officers School for the purpose of developing leadership and stressing basic subjects. Students who fail either the academic course or to meet required standards are returned to their units and their commanding officers informed of the reasons. To insure the suctess of the school, unit commanders have been instructed to relieve all noncommissioned officers who fail the school and transfer them to another unit within the organization.

The three-month old *Fort Moultrie Defender* has been judged one of the best Army mimeographed newspapers in a contest sponsored by the Camp Newspaper Service, New York City. The contest was open to all Army newspapers.



BRIGADIER GENERAL MORRIS C. HANDWERK, *Commanding*

By Lieutenant John H. Thornton

The ever-quickening tempo of troops preparing for battle in the Antiaircraft Artillery Training Center at Camp Edwards is nowhere more evident than in the use and development of the new firing range and tactical exercise area at Wellfleet.

Approximately six miles in length and one mile wide, and overlooking the Atlantic Ocean, the range is ideally located for the rigorous training of antiaircraft artillery units under field conditions. One of the finest ranges in the East, the site affords the perfect combination of an ideal firing point with suitable adjacent terrain for extensive tactical exercises.

Stretching atop a bluff which is more than sixty feet above the beach, the firing line will accommodate more than three battalions at one time. To the rear of the firing line is ample bivouac area for each organization conducting fire.

The Wellfleet tactical exercise area is located in the southern portion of the area, and its broken terrain offers excellent opportunity for tactical testing of units in advanced stages of training.

The important factor considered in the selection and development of Wellfleet was that antiaircraft artillery units be able to operate under all types of field conditions. This permits complete freedom in the selection of positions, maintenance of field sanitation, and the conduct of bivouac areas by unit commanders. The variety of locations offered at the new firing point makes possible an accurate determination of the ability of officers to select and occupy positions and operate successfully in the field using only TB/A equipment.

Camp Edwards' new antiaircraft artillery firing range is also at a sufficient distance from camp to enable training center staff officers to evaluate a unit's efficiency in motor movement. Combat convoys from camp to Wellfleet are carefully supervised and during trips to the range, gas attacks and strafing planes are employed to test convoy discipline.

Strong winds blowing in from the ocean across the sandy firing line provide units firing with all the problems incident to desert operation, insofar as combating the effect of sand and wind on matériel. Much valuable information on the maintenance of guns has been obtained against this ideal background for experiment.

With the first reports available from training center

Signal Corps Photo

Battle Course at Camp Edwards — those men do keep down!

Edwards men are not fair-weather soldiers.
Signal Corps Photo

units now in the theaters of operation, the requirement that troops leave this country in superior physical condition has resulted in a painstaking simulation of battle conditions at Camp Edwards during every available training hour.

All units in advanced stages of training have already undergone the rigors of the new AAATC Combat Course. An acre of shell-torn, wire-entangled ground, this training feature offers close overhead fire with machine guns, barbed-wire fences, surprise demolitions, and rifle fire from a battle trench at moving targets.

As a prelude to the battle course, an intense program of physical toughening is a regular feature of the training program, including a trip twice each week through the AAATC Obstacle Course and constant psychological hardening for combat duties.

Road marches are an important element in the progressive physical conditioning program at Camp Edwards. They form a regular part of the program and include a twenty-five mile hike under full pack, and a foot march to each firing range, with the exception of the fifty-two-mile stretch between Edwards and Wellfleet.

The continuous insistence that units operate under field conditions has resulted in the closest possible supervision of all field exercises by units at Camp Edwards. The umpire system has been developed; blank ammunition provided; midnight gas attacks with tear and smoke gas; constant strafing by low flying planes; fields of dummy land mines sown; surprise Commando raids—all have been included as regular features of tactical exercises to add realism to tactical problems.

An especially important feature of the tactical program at Camp Edwards has been the institution of follow-up measures to insure that the mistakes in an "occupation of position" will not be repeated. All organizations hold critiques at which key noncommissioned officers take an active part after each exercise. Recently, printed *Tactical Notes* have been issued following each major tactical problem, in order that all units in training may profit from mistakes and take advantage of any outstanding innovations successfully introduced. Each major tactical exercise is minutely supervised and criticized by experienced staff officers.

Brigadier General M. C. Handwerk, commanding the AAATC, has always fostered the development of junior officers in addition to the regular unit training program. A regular feature of this policy in recent weeks has been a series of conferences on leadership attended by all officers in the training center. In the groups and battalions this plan has also been followed. Special classes in military discipline and leadership are conducted for noncommissioned officers in each tactical unit.

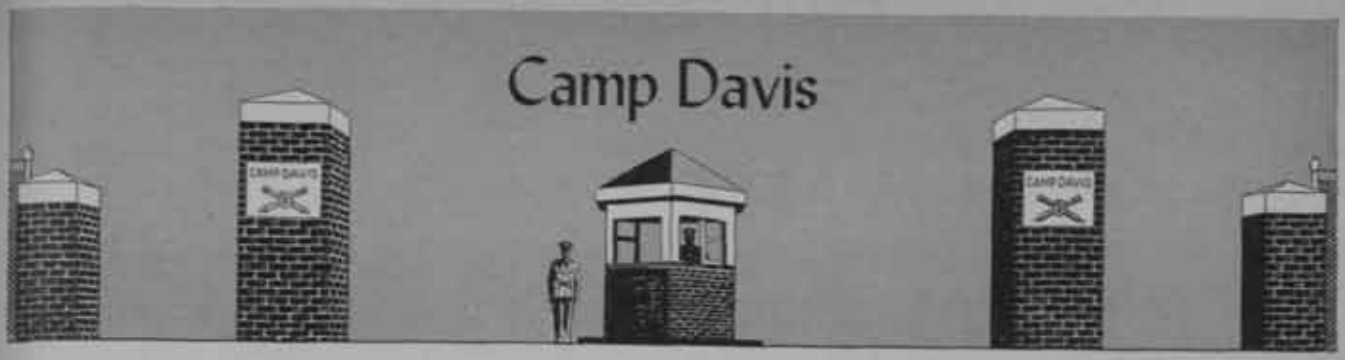
In April, Major General J. A. Green, Commanding General of the Antiaircraft Command, and his Chief of Staff, Colonel C. V. R. Schuyler, were visitors at the Training Center. While here they inspected the rapidly growing installations, toured the centralized schools, visited units in tactical position, and inspected the antiaircraft artillery firing ranges at Scorton Neck and Wellfleet.

With the advent of warm weather at Camp Edwards an extensive schedule of retreat parades is in effect. Two AAATC bands are furnishing music, definite parade areas have been indicated in Logan Field, and different battalions parade each evening.

Still, amid the rush of units readying themselves for combat, the dirt and dust of battle conditioning, the formality of retreat parade, minds are active and imaginations busy with short-cuts, streamlining, improvements.

A searchlight battalion developed a head harness for utilizing the standard field phone as a head and chest set; an automatic weapons battalion worked out a water chest to be installed on a machine gun mount; a young records section officer improved the slide rule for computing firing data, and an aircraft recognition officer is now perfecting a simple shadowgraph device for accurately portraying the shape of an airplane in the sky.

All this unified activity is a further indication that on Cape Cod antiaircraft artillerymen are not only being toughened and trained, but are looking ahead as well.



Brigadier General James R. Townsend, *Commanding*

By *Lieutenant R. B. Doulens*

The Antiaircraft Artillery Training Center, a major phase of activity at this camp, underwent another change in commanding generals since the last issue of the Journal.

On April 26, Brigadier General James R. Townsend, who had been in command of the Antiaircraft Artillery Training Center at Camp Haan, California, assumed command of the AAATC here. Major General Homer R. Oldfield, who has been in command of the AAATC here since but the latter part of February, was assigned to command of AAATC at Camp Haan. Camp administrative machinery assimilated the change without a sputter in the engine.

Among outstanding developments at Camp Davis recently was the establishment of an "infiltration course" as part of the extensive training setup. The infiltration course, similar to those created at other centers of training, will be enhanced considerably by the end of spring with the addition of a number of other interlocking features.

The infiltration course is seventy-five yards long and is cleverly dotted with gullies and barbed wire obstacles. Land mines are implanted at strategic spots. The mines are set off from a control station in a tower overlooking the course. Machine gun posts sweep the course and actual battle conditions are thus created to inure trainees to warfare sounds and other sensations.

Nearing completion also is an arduous obstacle course to be used as a warm-up for the infiltration course. This contains all the bugbears of ordinary obstacle courses, with "added attractions." Plan of training officers here is for batteries to be sent through this course on the double and then, while still tired, to be "processed" in the infiltration course.

Other phases of actual combat simulation being constructed in conjunction with the infiltration course are grenade courses for both live and dummy grenade throwing practice. Another feature is a combat range sprinkled ingeniously with targets. Soldiers will advance through this area, warned to be on the *qui vive* every second. Targets, controlled from a tower, will fly up suddenly from all directions. The soldier will be expected to register hits, no matter whether his weapon is pistol, rifle or submachine gun and at whatever angle the target.

On April 21, the second anniversary of the establishment of Camp Davis was officially noted. Beyond the fact it was noted by camp officials, however, business went on as "usual." Since the first camp headquarters unit moved in on April 21, 1941, the camp has mushroomed into the status of one of the nation's largest training centers and is the hub of Antiaircraft Artillery Training. Many thousands of men trained here are now in action all over the world. Original cost of the camp was estimated at $17,000,000, but numerous additions have since brought the figure much beyond the initial estimate.

Inasmuch as this camp is situated thirty miles from an urban center, Wilmington, N. C., considerable effort has been expended in establishing recreational facilities for the thousands of men stationed at Camp Davis. Three service clubs are in continuous operation and a fourth is nearing completion. Five movies provide diversion of an evening. In the post's huge gymnasium, Farnsworth Hall, weekly boxing shows are staged and these attract large and enthusiastic audiences. The camp has entered a baseball team in the Cape Fear League, a baseball organization centering in near-by Wilmington and considered to be of minor league class. A very nominal admission price is charged soldiers at games in Wilmington and games played on the camp diamond are played gratis.

Another week-end diversional feature recently arranged was the visit of a large number of Camp Davis soldiers to Orton Gardens, one of the show spots of this part of the South and which every spring has a noteworthy exhibition of azaleas and camellias, regarded as comparable to those of the famed Charleston, S. C. gardens.

As Mother's Day neared, Colonel Adam E. Potts, Camp Commander, issued instructions that mothers of military personnel stationed at Camp Davis should be given preference for accommodations over the May 9 week end, at the Guest House. Although the number of rooms was not expected to accommodate more than a small percentage of mothers who desired to visit their sons, Colonel Potts felt that the move would make it possible for more than the ordinary number of soldiers to see their maternal parents over the Mother's Day week end.

Camp Stewart

BRIGADIER GENERAL OLIVER L. SPILLER,
Commanding AAATC

By Captain Walter H. Dustmann, Jr.

"Get tough—tough enough to lick the enemy hands down!" has become the new fighting motto at this Antiaircraft Artillery Training Center in the past two months.

Stewart, already all out in learning to "Shoot 'Em Down," has also gone all out in training for physical fitness.

Its toughest obstacle course, modeled on the famed "killer course" of the Rangers at Ft. George G. Meade, Md., was officially dedicated in March, with Major General Joseph A. Green, Commanding the Antiaircraft Command, and General Spiller looking on as picked soldiers romped through its eighteen tough obstacles.

Colonel Kenyon P. Flagg, Stewart's Director of Training, told the troops at the dedication that courses of this type were designed to make them the "hardest, toughest and meanest fighters in this man's Army!"

The training center commander in a special message to the antiaircraft troops in April, compared the accelerated physical hardening program to the ability of a professional boxer to "take it" in the ring.

In summing up the physical fitness program he stated:

"The best tactical organization in the Army must be trained to take it physically if it is to carry on efficiently and victoriously on the field when the going gets tough. Each unit on this post is taking steps to put its men in proper physical trim to accomplish this task. Anything short of this goal will result in unnecessary losses and weaken the effectiveness of the group as a fighting unit."

The troops are being trained to do the obstacle courses—Stewart now has close to twenty of them—in an average time of a minute and a half. In addition, all soldiers get three weekly periods of twenty minutes each of difficult and strenuous developing exercises: an hour a week on the bayonet course, which also has installed movable dummies to make it tougher; regular long marches in full war pack; games and sports as time permits; and as a climax to this toughening up, a run through the famous "Infiltration Course," where on a miniature battlefield live bullets are fired over the heads of the men as they crawl through barbed wire and shell holes while dynamite explodes all around them to simulate shell fire and bombs!

The first Stewart unit to receive official recognition for its high physical efficiency was the Antiaircraft Battalion commanded by Lieutenant Colonel A. S. Mills. General Spiller officially commended the unit for its physical rating of ninety-two per cent of all personnel qualified in its fourth week physical proficiency tests, and then for jumping this percentage to ninety-seven in its eighth week tests. This was the highest percentage made by any unit on the post. In his commendation, General Spiller wrote to Colonel Mills that "In these times, when physical conditioning is so vital, you and your officers are to be congratulated on a training program which has made possible the best physical efficiency rating of all units at present in this training center."

Another vital phase of the physical program has been initiation of judo courses for all soldiers, so that they can learn to beat the Japs at their own game. The judo classes are given to picked officers and men from each unit, who in turn go back and open unit classes for all the soldiers. The judo school was begun under tutelage of Lt. Eugene F. Morris, who learned the art at a Jap school near Inglewood, Calif. Morris' precepts were that the Americans can easily beat the Japs when they master judo, because of faster brain work, longer and heavier arms and because "the American body is better adapted for making speed." Another physical conditioner opened in the past two months are two mock-ups of ship's side and cargo nets. Each is a massive twenty-eight-foot tower with a side wall over which a thick cargo net has been stretched. The net, tied loosely so that the men going down get the simulated effect of a rolling ship, is wide enough for six men to clamber down abreast.

A "Fighting Men" series of films has also been instituted as an adjunct to physical conditioning. It is designed to teach the fundamental lessons which already have been learned from World War Two warfare and to precondition soldiers for actual combat. According to Lieutenant John Sidun, AAATC Training Aids Coordinator, these films pull no punches and demonstrate the importance of each technique learned in training by showing the consequences of failure to apply it against the enemy. These excellent films include such titles as *Kill or Get Killed, Crack that Tank, How to Get Killed in One Easy Lesson, Wise Guy, Curiosity Killed a Cat,* and *On Your Toes.*

A particularly efficacious aid to antiaircraft training was staged in March—a model airplane contest to foster the aircraft recognition programs of the AAATC. A total of twenty-four models of friendly and enemy planes were mounted on jeeps and paraded around the camp as officers pointed out distinguishing characteristics to the men. The top winner received an engraved loving cup, the men who built the plane received three-day passes, and the unit and men were presented letters of commendation from the training center com-

mander. Runners-up received passes and commendatory letters.

A giant Transportation Show to be held early in May kept troops busy getting in their entries. The show, one of the biggest events ever held at Stewart, will feature all types of G. I. transportation and is designed to stimulate friendly rivalry on the post and emphasize the vital part vehicles play in modern war.

Each battalion will enter five types of standard vehicles and one "original" entry for the show, with suitable prizes and honors to be given the winners. The "original" contest is a sort of side show in which any type of transportation may be entered, such as a pogo stick, a squaw and papoose, or crutches.

G. I. vehicles will be judged on appearance of vehicle, engine and operator, and also on performance; "original" entries will be selected for performance, originality, appeal and technique.

Stewart continued all out in its scrap salvage drive in March and April. Approximately 20,000 pounds of excellent scrap metal was secured from old abandoned REA electric lines on the reservation and another ton and a half was taken from the Stewart firing ranges.

In the Army-Navy Salvage Day Drive, Camp Stewart sent sixty trucks to neighboring communities to assist in their drives, with the result that Stewart was directly responsible for another 500,000 tons of scrap and rubber being collected.

Other highlights of the March-April period at Camp Stewart: Outdoor religious services for Easter were attended by thousands of soldiers—the Red Cross drive at Stewart netted from military and civilian personnel the record total of $5,440.85—Blackstone, world famous magician, and Slim Summerville, famous movie comedian, were featured in two separate USO-Camp shows that played to jammed audiences—Stewart opened a Recreation Area at near-by Savannah (42 miles north) to accommodate 500 soldiers on week-end passes—a special convoy takes the soldiers to the area and they receive excellent sleeping and shower accommodations for only nominal cost, and there is neither taps nor reveille—Cator Woolford, retired head of the Retail Credit Company, was a guest of Colonel Ochs on a visit to Stewart. Mr. Woolford entertains numbers of Stewart soldiers each week end at his huge Altama Plantation near Brunswick, Ga., and has been noted for his hospitality to Stewart troops since founding of the camp in the winter of 1940-41—Private William H. Miesel of Chicago was the first Stewart soldier to leave for Army Specialized Training. He went to Georgia Tech, Atlanta, for an advanced engineering course—many others have followed him to colleges in many parts of the country under the ASTP—a colored glee club was organized and has made a big hit with the troops, singing everything from spirituals to modern variety numbers and the classics—eight mules were placed in service with the Provisional Guard detachment to be used in place of trucks as a conservation measure, and the

Six Camp Stewart, Ga., soldiers in full war pack descend the "mock-up of ship's side" course.

Guard detachment started a three-acre Victory Garden, using the mules and a plow a former farmer member of the Guard brought back from furlough. Major Deuward S. Waldrep estimated that the Guard will be able to supply half of its mess from the garden when it starts producing.

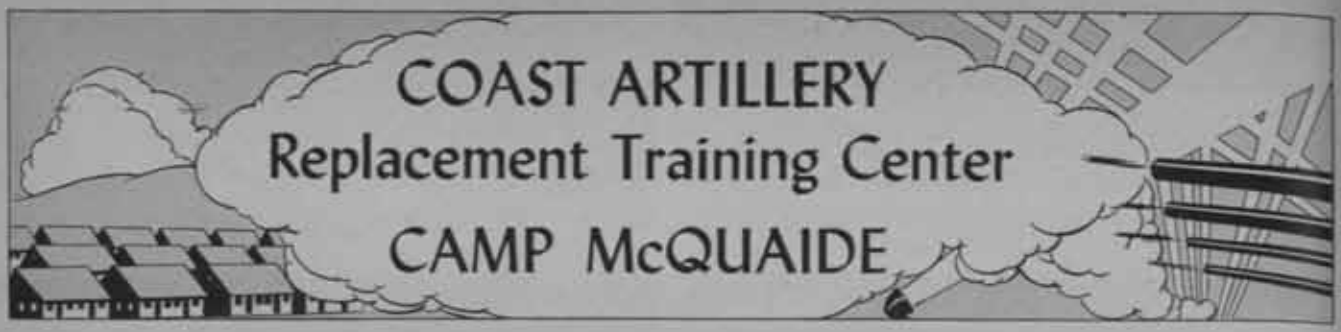
The christening of vehicles, power plants, supply tents, guns and other equipment started at Camp Stewart, Ga., with the first warm breezes of spring.

The quarter-ton jeeps appeared first with their feminine nom de plumes, and from the first day "Daisy" and "Marie" showed up on a jeep bumper or hood, it was a race among drivers to get their girls' names on their vehicles.

Sentimental gentlemen from Georgia, Texas, New York, Pennsylvania, Wisconsin and forty-three other states are in the "naming" game hot and heavy at this antiaircraft artillery training center, where it is a commonplace sight to see a lumbering two and one-half ton dump truck chugging along under the banner of a favorite girl friend or famed movie actress.

One of the antiaircraft units adopted the "bee" theme for vehicles and power plants. They painted a bumble bee on their supply tent; a "busy bee" is a power plant and "honey bee" is a director attached to the fire unit.

Each gun section has a related name—Wasp, Hornet and Yellow Jacket, for example. There also is a "lazy bee" section.



BRIGADIER GENERAL C. D. Y. OSTROM, *Commanding*

By Lieutenant Franklin L. Deibert

The biggest recent event at the Nation's Seacoast Training Center has been the arrival of Brigadier General Ostrom from the South Pacific Area, to assume command of the Center. General Ostrom received his commission in 1916 and has served in France during the last war in addition to his service in command of a Task Force "somewhere in the South Pacific." Keynote of General Ostrom's policy will be serious and tougher training of men with more of a slant toward immediate combat duty upon completion of training here.

In line with the tougher training of the men, a new Infiltration Course has been constructed and is now put to use under the direction of Lieutenant T. F. Buesching who is a graduate of the Close Combat School of Camp Hood, Texas. The course is a miniature no-man's land, complete with fox-holes, barbed wire and trenches. During the progress of the trainee through the course, live ammunition is fired over the trainee's head by carefully trained machine gun experts.

Physical Training and Calisthenics have also taken on a more strenuous slant with the addition of hikes and marches up and down the sands of the beach and climbing, slipping and sliding up and down the steep gravel cliffs which line the beach.

New officers assigned to this camp are required to undergo a very intensive Refresher Course which emphasizes physical conditioning, practice lectures, and actual artillery drill on the various types of matériel which are in use at CARTC.

The regular training program is being made as practical as possible with numerous devices and "gadgets" made by the ever-expanding Library and Shop of the Training Aids section of S-3. Actual field demonstrations are conducted in the construction and detonation of booby traps. In communications courses, the Telephone School students put on a field demonstration to supplement lectures held in the battery areas. Each student of the school takes a small group of trainees and gives practical lessons in the use of the field telephone and field switchboard. Other field demonstrations and demonstration areas being planned include such subjects as Camouflage and Field Sanitation. The Camouflage area shows proper concealment and protection against enemy observation by presenting both sides of the picture. In one part of the area, a trainee is shown how an ordinary installation, fox hole or bivouac area stands out and is easily detected while in another part of the area, the correct way of protective concealment and camouflage is shown.

Another course recently added to the Schools of the CARTC is the Cadre School where noncommissioned officer material is given instruction and guidance in how to conduct training demonstrations and lectures. Evening Mathematics courses are held several nights a week with the assistance of two high school teachers from a near-by city for those trainees who intend to apply for OCS or one of the various Enlisted Specialists Courses at Fort Monroe.

The CARTC recently opened its own meteorological station under the direction of Lieutenant Sprang. Distribution to near-by posts is made of daily met messages. When any firing is held at the artillery range, hourly messages are compiled. This means that the Met Station is kept very busy as the Artillery Range receives almost daily use between the various training units of the CARTC and near-by field units who come in to use the facilities for their target practice.

The CARTC Band is now playing concerts on Sunday afternoons on the main parade ground. These concerts are very popular with the men and their guests. Other recreation takes the form of dances at the Post Service Club and at the newly opened USO Building in the near-by city. A "Girls' Battalion," formed by the City USO furnishes partners for these dances.

Overnight marches have taken on a more practical aspect by actual practice in reconnaissance and occupation of positions, defense against air attack, camouflage discipline and the like. Mobile weapons are taken along on the marches and actual emplacement and concealment is done.

Night training is held by each unit, and a corresponding number of hours off are given during the same week. This system has helped considerably to solve such problems as the shortage of help in the post barber shops and also allows trainees to get to town during the day in order to do any personal shopping they may wish to do.

An Easter Sunrise Service was held on the edge of the reservation by the Post Chaplains and the City Ministers. Many of the towns people attended to swell the crowd of trainees who were able to resist the temptation to turn over and sleep.

Camp Wallace

BRIGADIER GENERAL HUGH N. HERRICK,
Commanding AARTC

By Lieutenant James C. McDaniel

"This is absolutely the nicest camp I have ever seen" were the words of Brigadier General Clare H. Armstrong on the morning following his arrival to temporarily assume command of Camp Wallace during the absence of Brigadier General Hugh N. Herrick due to illness.

General Armstrong, who has obtained wide and varied experience at many posts in the States as well as in the Philippines and Panama, "dropped" into Camp Wallace out of the sky to carry out the policy of the camp and give necessary supervision to this AARTC, concentrating on training of the hardened individuals necessary for combat service.

General Herrick returned to duty in the latter part of May.

The newest invention in Camp Wallace is the "Kirk" adapter for firing the 90mm gun excaliber with a .50 caliber water-cooled machine gun. The firing is single shot, all tracer ammunition, with the primary purpose of training in firing for antimechanized defense.

Four of the important features of this adapter are the simplicity of construction, the availability of materials used, the ease with which it may be mounted on the gun, and results obtained.

Major Robert D. Kirk, AARTC, Camp Wallace gunnery officer, designer of the adapter built it in one day's time. The machine gun is mounted by removing the breech block, thus allowing the adapter to be placed with a snug fit in the breech ring. The machine gun is then placed and locked in the cradle of the M2A1 machine gun mount. The cradle of the mount M2A1 with the machine gun, is removed from the pedestal and legs so that the pintle may be placed through a 4½ inch diameter hole in the adapter on the 90mm gun, thus mounting the .50 caliber machine gun as an excaliber gun. The cradle of the M2A1 mount permits adjustment in elevation and the adapter permits adjustment in azimuth for bore-sighting.

This adapter is made from two pieces of 4" x 8" x 17" blocks of wood, placed together to form an 8" x 8" square 17 inches long and shaped to fit snugly in the breech ring in place of the breech block. A 4½ inch hole is cut longitudinally through the center of the adapter to accommodate the pintle of the cradle holding the machine gun. Around the top of the adapter block is clamped a strap of iron which serves two purposes: (1) to reinforce the wooden block to prevent splitting and (2) to hold the yoke which prevents the machine gun from getting out of orientation in azimuth.

The machine gun is oriented in azimuth by using its sights and in elevation by using a ½ inch rod placed in the barrel and extending from it to form a surface parallel to the axis of the bore to support a gunner's quadrant.

The Kirk adapter has been tried and tested with excellent results. When the preliminary test firing was conducted on the beach at Fort San Jacinto, Galveston, Texas, a few weeks ago, the results were most encouraging. A sled-carried target, four by six feet, towed by a jeep at a speed of 18 to 20 miles per hour provided a course with a range of 450 yards at midpoint and 750 yards at the flank limits of fire. Firing on one course were two NCO's, without previous antimechanized firing experience, who succeeded in making 7 hits out of the 10 rounds fired on that course.

To insure single shot fire, the ammunition belt may be loaded alternately tracer and empty cartridge case. However, this necessitates the pulling back of the bolt handle to load after each shot is fired.

The .50 caliber tracer ammunition follows very closely the same trajectory as the 90mm ammunition up to 900 yards. Thus the firing of 90mm excaliber by the use of the Kirk adapter will greatly aid the training of firing in antimechanized defense.

Major Robert D. Kirk (on right), orienting the Machine Gun in elevation by using a gunner's quadrant.

Camp Tyson

BRIGADIER GENERAL JOHN B. MAYNARD, *Commanding*
Barrage Balloon Training Center

By Lieutenant F. R. Alexander

The largest balloon barrage ever assembled here flew over Camp Tyson April 28 and 29, as the Barrage Balloon Training Center was host to newsreel cameramen, press photographers, and representatives of national news services and pictorial magazines.

More than 160 balloons, both low altitude and very low altitude types, made up the barrage that strung its lethal cables into a network of protection about the camp. It was an impressive sight for the visitors as these silvery sentinels pointed their noses skyward and arose from their hidden places in the woods and fields about the camp.

Cameramen were placed at a vantage point on the Weather Station tower right in the center of the barrage. They heard the "red alert" command given by the barrage control officer and saw the instantaneous response as balloons climbed into the air from the many sites about the camp.

Having seen a barrage as a whole, the press representatives were taken to individual sites to see the actual handling and operation of both types of balloons used in the demonstration.

The most photogenic event on the program was a demonstration of the mobile use for the very low altitude balloons; in this instance a truck convoy and a column of troops marching along a road. Charges of TNT were exploded to simulate bombing and strafing of the road by "enemy planes." With newsreels grinding out their film, the men took to cover and sprayed the "enemy planes" with rifle fire, while balloon crews on the truck convoy sent their balloons scampering aloft to protect the unit from being strafed.

The two-day demonstration was arranged by Brigadier General John B. Maynard, Commanding General of the Barrage Balloon Training Center, and Colonel Falkner Heard of the War Department Bureau of Pub-

Signal Corps Photo

"ALERT!" There is no hesitation about getting off the road.

Signal Corps Photo

The enemy strafer finds few and fleeting targets.

lic Relations in Washington. Newsreel cameramen were present from Paramount, M-G-M, All American News, and Twentieth Century-Fox. Photographers were also present as representatives of *Life* Magazine, *Newsweek*, the Associated Press, International News Photos, and Acme News Pictures.

Colonel F. G. L. Weijerman of the Netherlands Embassy in Washington, and Colonel Zioojin Radoychich of the Yugoslavian Army visited the Barrage Balloon Training Center the end of April.

Early in April; Camp Tyson received certificates entitling this Camp to fly the "Minute Man" flag with the "T" superimposed, and also the Special War Department "Minute Man" flag with the word "Army" superimposed, as a recognition of the splendid record of war bond purchases at this Camp.

The fifteenth class of officers was graduated from the Barrage Balloon School, April 10. They were addressed by Colonel J. H. Cochran, Executive Officer of the BBTC. The sixteenth class will receive its diplomas soon.

A new Book Store has been opened at the Barrage Balloon School at which soldiers may buy texts, drill manuals, and pamphlets published by the Publications Division of BBTC. Officers and men can thus keep abreast of new material as it is developed into textbook form.

The generosity of Camp Tyson soldiers was reflected in their response to the Red Cross Drive and the March of Dimes appeal. A total of $12,500 was contributed to the Red Cross and $1,050.25 to President Roosevelt's Infantile Paralysis Fund. The latter was a one-day drive.

The Gas Bag, official camp paper, entered its second year of publication April 21. It started as a four-page tabloid and is now a twelve-page paper appearing each Wednesday and is distributed free to all units on the Post. It is edited by the BBTC Public Relations Officer.

Camp Tyson will have its first official baseball team this year. A Service Team League is being planned for Tennessee and Kentucky and a strong Camp Tyson team is being groomed for the schedule. Last season the Camp had no official team; each battalion had its own club and played an Inter-Battalion schedule. This activity will be continued by Lieutenant Robert Dossett, Special Services Officer for BBTC. The schedule is arranged so as not to interfere with training.

The attractive Amphitheater, built late last summer in a natural dell, has been enlarged for this year's concerts and shows and will now seat some 7,000 spectators.

Morale among the battalions and VLA batteries is high and competition keen in both sports and training program. Records fell thick and fast as the organizations took their turns on the rifle range and the physical proficiency course.

The Barrage Balloon Board which is constantly testing equipment has numerous projects under consideration. These include a tent hangar; American VLA balloons, both single and in tandem; communications requirement; fabrics and proofing for fabrics; winch modifications; winch loading equipment and load lugger; equipment for water borne sites, and a mobile hydrogen generator.

General Maynard started his second year as commanding general of the BBTC last February 16.

Bermuda Base Command

Brigadier General A. G. Strong, *Commanding*

By Captain George E. Myers

A great deal of the history of the Bermuda Base Command will have to remain locked in War Department files until after the war is over—at least the military secrets of the Command will have to remain so. But other events of the Command are news—and some of them are big news for they affect the very mode of life of the several thousand people who inhabit this nineteen square-mile vacation isle. That news is being written every day for the observant individual to see—and a great deal is written in the headlines of local newspapers where even the most unobserving cannot fail to catch the import of what he sees.

The first annual Lily Bowl Football game played in Hamilton, the capital of the island, January 3, 1943, was just such an event. It introduced to this British dominion American football in all its color and enthusiasm. While some 7,000 people watched, a United States Army team captained by Lieutenant R. W. Murphy, CAC, pounded out a 19 to 18 victory over a United States Navy team. The game was complete with the thrills of the great American sport—even to a blocked kick for point after touchdown in the final minutes of the struggle by which the Army retained its lead and the narrow victory. Former college players on both service teams presented an excellent brand of play considering conditions such as a restricted training period and the use of a revamped cricket field for a gridiron. The Bermuda Base Band maneuvered in true collegiate style between halves, and even the Army mule and the Navy goat gave authentic touches to the scene. The trophy—a football poised on a pedestal—is appropriately enough carved out of famed Bermuda cedar and will become the permanent possession of the team that wins it three years in a row.

Local residents, including the popular governor of the island, Viscount Knollys, enjoyed the spectacle—and thus American football bowed its way onto the island, presumably for a stay of another ninety-seven years. The sports activities of the States are finding their ways into the life of the island in other fields too, with British troops finding American softball an enjoyable pastime, for instance.

The economic influence of the American base with its troops is something one can also read in the headlines; the past year has been one of the most prosperous in the island's history. This is somewhat of a surprise to local people who felt that Bermuda's prosperity was hopelessly tied up in the tourist trade. But with tourist income abolished, the island has found in the American base personnel a new source of income—an income that will be a steadying influence of the economic life here. And with the return of the tourist and vacationist after the war, Bermudians can contemplate a bright financial future. What that tourist trade will be, can be left to the wildest of imaginations, for air travel will bring this vacationers' paradise within a few short hours of the mainland and make of the island a crossroads of international travel.

Other changes are in the air—the result of the war and the American bases. A Parliamentary committee is already sounding public reaction to the introduction of private motor vehicles. (Heretofore, motor vehicles owned by the Colonial government were the only ones in use until defense forces placed others in operation on the narrow, white coral roadways of the island.) This is only one of the straws in the wind. More changes are bound to come in the quiet, easy going life of the island where an auto is still more of a novelty than a horse and carriage to the native population.

One of the important events of the past few months as far as the local defense forces was concerned was the visit of Lieutenant General Drum, commanding Eastern Defense Command and First Army of which the Bermuda Base Command is a part. In his short stay on the island, General Drum thoroughly inspected the base and the outposts of the island's defenses. His commendatory comments and his remarks about the vital part such bases as Bermuda play in the war effort brought encouragement to troops who are only too anxious to get to a theater where "something is doing."

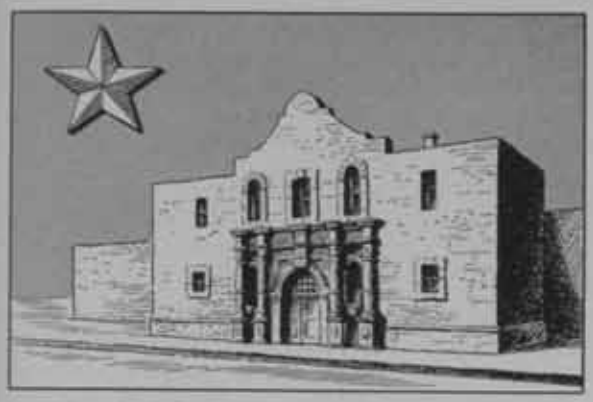
Probably the biggest morale builder of all for the American troops on the island was the introduction late in 1942 of USO Camp Shows to the command. Since that time, several units have played the island including

Scenes from Bermuda's first football game.

such name stars as Kay Francis, Carole Landis, Martha Raye, Mitzi Mayfair and several others prominent in stage, screen and radio. Their performances—and each troupe literally gave dozens of performances—were presented to troop concentrations all over the island. Makeshift stages and hastily erected tents for dressing rooms were features of many open air performances which brought cheer and entertainment not only to our own troops but also to those of our Allies stationed on the island. The shows bring a little bit of life from home to the men—and they really like it.

Meanwhile, the rigid training programs, the target practices, the drills, the exercises, the practice alerts are still the order of the day for uppermost in all minds is the job at hand—the maintenance of a capable, alert defense of a vital Atlantic base.

Fort Bliss



BRIGADIER GENERAL DALE D. HINMAN,
Commanding AAATC

The first representative of an AAATC-trained Airborne unit—Captain (now Major) Thomas H. Corey—returned recently from the South Pacific area to give the benefit of his battle experience to other Airborne units in training.

Major Corey, whose outfit left the AAATC last summer, told how his unit defended a jungle airdrome against Japanese attack from land, sea, and air. He said that on one occasion a force of 1500 Japs came ashore but during the furious fighting which followed only six Japs were captured. It was presumed the rest were killed.

"The Jap soldier," said Major Corey, "is just as tough as you've heard he is but intelligence and initiative are not necessarily part of his equipment. At one point during a battle a party of eighty Japs moved down a road in column of fours. Australians opened fire on them with Bren guns. Instead of dispersing, the Japs dropped to one knee and awaited orders. Sixty were killed before they dispersed."

Major Corey's organization took part in an engagement which netted twelve out of fourteen Jap planes. The fourteen Zeros approached the Allied Airdrome, evidently thinking it had been captured according to plan. Ground troops opened fire and knocked down seven while P-40s arose and got three. Two were unclaimed.

On a greatly expanded scale, Airborne training continues at AAATC, to add to the units that are already in action on practically every front. Applications for assignment to the Airborne AA, which are essentially volunteer outfits, have received a decided impetus since Major Corey's arrival. In addition to an unusually rigorous training schedule, a full sized mock-up of a military transport plane is used to teach loading and unloading operations.

Lieutenant Forrest A. Lees, USN, with a detachment of eighteen Naval officers and enlisted men, all veterans of Pearl Harbor or other South Pacific actions, left AAATC in February after a three-weeks course in the latest antiaircraft methods.

Recognizing the increasing use of aircraft against naval, as well as land targets, many valuable ideas were exchanged.

Commanding Officers of every antiaircraft station in Texas gathered early in February to meet with their Chief, Major General Joseph A. Green, Commanding General of the AA Command, Army Ground Forces.

The training schedule was relieved on several occasions by visits of distinguished visitors during January and February. Major William B. Smithers, a wounded veteran of Guadalcanal, spoke to an audience of several thousand officers and men. He told them that "Discipline is the most important element of success in combat." Lieutenant Colonel L. B. Puller, USMC, also addressed a large audience. Colonel Puller, in the

The Naval detachment which studied antiaircraft methods at Fort Bliss AAATC in February.
Signal Corps Photo

course of his remarks, said, "When we got in the last war, it was over. We just pushed it over! When we got into the war in Europe this time, the war was also over—Hitler had won it!"

Commenting on the Japs, Colonel Puller said: "The Japs can't take it! I myself have seen a company of Japs cowering in a ravine while undergoing an intense artillery barrage. They were screaming and whimpering, much as we would expect our more timid womenfolk to do."

He continually emphasized the need for the killer instinct in the American soldier. "Our enemies do not know the meaning of the words 'chivalry' and 'sportsmanship.' They are out to kill, to exterminate, to annihilate, by any manner or method. We must remember that, too. If we don't learn to hate and to kill, well, it will just be—too bad!"

Airborne troops practice unloading operations from a full-sized mock-up transport plant at Fort Bliss AAATC.
Signal Corps Photo

Colonel Luis Lennon, M., of the Chilean Army, member of a military mission to the United States, spent a week as guest of Brigadier General James B. Crawford, inspecting the firing points and other installations. Colonel Lennon expressed himself as most favorably impressed with the matériel available and the training methods of the United States Army.

Commander Roane Waring, National American Legion Commander, and Brigadier General E. W. Smith of the War Department, visited the Training Center. Commander Waring noted that "Training for combat conditions is far better now than it was in the last war."

During the month of April both the Secretary and the Under Secretary of War visited AAATC. On April 4th Under Secretary Robert P. Patterson and his party, arriving by plane, were taken to Hueco Firing Range where various types of AA Artillery were observed in action against radio-controlled planes and simulated tank targets.

Secretary of War Henry L. Stimson visited the Training Center April 21st during a routine training inspection tour and witnessed the same show that was staged during Under Secretary Patterson's visit. Secretary Stimson said he was greatly interested in seeing the latest training methods to come out of Africa and observing how they were being developed in this country.

Fort Eustis

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

By Lieutenant Gould M. Beech

With a mounting tempo throughout every phase of training, emphasis at this Antiaircraft Replacement Training Center in recent weeks has been on physical and psychological hardening. The arrival of hot weather will not be a signal for a let-down, and, in fact, the toughening process will be even more rigorous, Brigadier General Edward A. Stockton, Jr., states. He has pointed out that the hot, humid climate here is mild by comparison with the weather in the African theatre, and that a replacement training center has the difficult task of turning out men prepared for the physical and mental shock of combat. As more and more American troops meet the enemy, both officers and men here are being impressed with the seriousness of the job ahead.

There have been a number of important additions to training routines in the last two months. "Every possible technique will be used to duplicate, as nearly as possible under training conditions, the shock of actual combat," says Lt. Col. Jack R. Lehmkuhl, S-3, in summing up the objectives of the training program.

Some officers and men report they expect to have

Women of a WAAC Post Headquarters Company arrive at Fort Eustis preparatory to taking over duties formerly performed by soldiers.

callouses on their stomachs after crawling over the new infiltration course a few more times. The course is located near the James River in a realistic setting, the terrain varying from hard clay to a muddy slush. Groups of fifty approach the course through a trench with a leader in charge of parties of six or eight. Crawling over the first trench, they move across a cleared area directly toward the machine gun nests, with bullets whining overhead and land mines detonating on the flanks. A final barrier is crossed, and once abreast of the machine guns the troops charge through a bayonet course. This routine comes at the climax of the training increment and those who complete it have a new air of confidence.

A new firing range has been opened at New Point Comfort, Virginia, for 40mm and 90mm guns. The area will also be used for bivouacs, with each unit remaining for three days or until firing has been completed. Land mines and chemical agents are also being used during range periods and on bivouacs. Camp Wallace, which was used during World War I, has been reactivated as a bivouac area. Weekly night marches, including gun drills and other missions, have become a routine for all units. Hand grenade courts have been constructed, and additions have been made to obstacle courses, including embarkation nets.

To stimulate pride and to develop smartness and precision among gun crews, each battalion has organized demonstration crews for its guns, automatic weapons, or searchlights. These crews, to be composed of cadre and highly qualified selectees, will be used to demonstrate the standards expected of all troops.

All officers and cadres are attending classes three nights a week. The two-hour sessions for battalion cadre schools will cover various phases of antiaircraft artillery and will continue through July.

The series of orientation films which began with *Prelude to War* has proved to be one of the most popular phases of training. Men attended the first of the series expecting another "lesson." Since that time they have been looking forward to each succeeding film and frequently inquiries are heard about when the next one may be expected.

Many of the officers and cadremen now being assigned here are returning from foreign duty. They are relieving troop age officers and men who are prepared for combat. Two schools for officers on the post are helping to accelerate the process of making troop age officers available for combat duty and training others for their replacement. OCS graduates from Camp Davis attend an intensive troop school while here awaiting assignments. A Defense Command School has been set up for the primary purpose of training over-age officers for assignments with defense sectors.

Notes: A WAAC Post Headquarters has moved in and the sight of "soldiers in skirts" is no longer a novelty. Members of the unit are relieving men for combat duty. . . . A post boxing team has been organized and Langley Field was scheduled as the first competition. An all-post meet has been arranged to follow. . . . The 5th Battalion baseball team has scheduled games with collegiate and service teams in this area. Two veterans of the Isthmian League are on the roster, Sergeant Stephen Patrick, and First Sergeant

A picture of a "classroom" session of the Fort Eustis telephone school shows high-perched students, their climbing irons dug deeply into wood and safety belts suspending them from the poles on which they practice climbing and stringing wire.

James J. McLean. Three members of the Holy Cross eleven which upset Boston College last year are also on the team—Privates Johnny Bezemes, William Swiacki, and Bob Sullivan. . . . A new USO club has been opened at Williamsburg, adding to the recreation facilities in this area. . . . "The Sky Watch" is the title of a song by Lieutenant George Sumner and dedicated to the antiaircraft artillery. General Stockton and Colonel Andrew G. Gardner, post commander, were present when the song was played on a radio broadcast for the first time recently. . . . The post's theatrical talent is busy with the production of *On Furlough*, an original musical comedy. . . . Digging up facts for a historical feature on Fort Eustis, Private Herbert M. Furlow learned that this post was a center for a balloon school in World War I, was an original site for antiaircraft gunnery training, that the efficiency of 155mm guns for firing at moving targets on water was proven in tests at Camp Eustis in 1922. . . . By a coincidence Mr. Frederic A. Eustis and Mrs. Eustis were in this area and were invited to visit the post named in honor of the former's great-grandfather, Brigadier General Abraham Eustis, who was the first commandant of the Coast Artillery School at Fort Monroe.

The Coast Artillery School

BRIGADIER GENERAL L. B. WEEKS, *Commandant*

Army Day came and went without anyone noticing it. The Coast Artillery School continues its busy way, that of turning out as many trained graduates as possible from its various courses. Normally Army Day calls for dress parades and open house to the civilian dignitaries, but this past April 6 went by in the usual everyday manner.

The Battery Officers and Field Officers Courses have been renamed "Officers Basic and Officers Advanced Courses," respectively. Consideration is being given to extending the Advanced Course to five weeks study instead of four.

Four more batteries of Officer Candidates have graduated in Seacoast Artillery and gone forth to join units spread out over the world. Group Nineteen, under the command of Captain Daniel Ayres, graduated almost a year to the day after the first Battery A graduated.

Starting with Group Fifty-one of the Officers Basic Course, the School is now giving an officers' pre-course to incoming student officers. This pre-course covers all the subjects normally given in basic training, such as military courtesy, discipline, and customs of the service, courts-martial procedure, military sanitation, physical training, manual of arms, inspections, small arms firing, mess management and reviews in algebra, geometry, and trigonometry. This pre-course is under the direction of Lieutenant Colonel Jason E. Jennings, Commanding Officer of the Officer Candidate School.

Incoming officer students enter the pre-course three to six weeks before their basic courses are scheduled to start. Students are showing a great deal of enthusiasm for the pre-course, especially those officers who have had no military training since the first World War.

The School is preparing scenarios for a number of training films on submarine mine planting. Writing the scenarios here at the School is Mr. Frank Leon Smith, internationally known author. Directing the motion picture production will be Lieutenant Charles E. Skinner of the Signal Corps, while Lieutenant Ray Ritchie, C.A.C., has been assigned as technical adviser.

The Coast Artillery School's own newspaper, *P.E.M.* made its welcome appearance two months ago. Dis-

tributed to the officers and men of the School Staff every two weeks, *P.EM* brings the news of the Post to its readers in rapid, breezy style. *P.EM* is photo offset produced and carries eight pages, including a page of pictures of events on the Post.

Enlisted men are again reminded to see their BC to take advantage of the many excellent and varied courses offered by the Department of Enlisted Specialists of the School.

Colonel Granger Anderson has been appointed Director of the Department of Training Publications succeeding Lieutenant Colonel D. C. Tredennick, who is now with the Army Ground Forces in Washington. The Secretary of the School, Colonel Harry F. Meyers, is on temporary duty with the Army Ground Forces as an observer.

The new Commanding General of the Replacement and School Command at Birmingham, Major General Harry Hazlett, made an inspection of the School and its activities recently.

The bowling team representing the Coast Artillery School Detachment walked off with the honors in the playoffs marking the end of the season for the School officers' bowling league. Individual honors for the season went to Major Howard Michelet, of the Submarine Mine Depot team, with an average fall of 189 for the season in ten pins. Voted a great success, the league's first year of play met with enthusiastic response, and at the banquet held at the Casemate Club, plans were formulated for next season's rolling.

Several more Coast Artillery Bulletins are scheduled for distribution shortly to units in the field. Among the new bulletins are the following:

Theory and Use of Logarithms
Introduction to Trigonometry
Trigonometric Tables
Antiaircraft Defense of Minor Craft
Operation of Special Radio Equipment.

These training bulletins are mailed out upon publication to Harbor Defenses, Coast Artillery Regiments not assigned to Harbor Defenses, U. S. Forces that have APO addresses, and Seacoast Artillery Commands. If there are any units that fall in the above category not receiving these bulletins, it is suggested that they communicate with the Commandant of the Coast Artillery School at Fort Monroe, Virginia.

Eighteen film strips on Fire Control and Position Finding for Seacoast Artillery have been completed and sent out to the field. These film strips cover the subject thoroughly and are a valuable aid to the instructor in the training of range sections.

Corporal Alfred Bogdonski and Captain M. J. Burke of the 2nd Training Battery of the School detachment examining a model searchlight constructed of scrap material by Corporal Bogdonski, the battery mechanic.

Film strips currently in production are: *Theory of Special Radio Equipment; Nomenclature and Function of Component Parts of Special Radio Equipment; Operation of This Equipment; Cloke and the M1 Plotting Boards and their Orientation;* and the *Met Message.*

When an officer candidate or enlisted man attends classes on mobile searchlights, taught by Captain W. T. Grenier of the Officer Candidate School Staff, he sees a scale model of the searchlight in question. The model is made of scrap wood, except for the mirror, and simplified so that the main parts of the light may be easily seen and identified. Eliminating a few minor details that possibly would confuse the student instead of helping him, the model is a duplicate of the original subject and eliminates the necessity of using a manufacturer's model, so scarce nowadays due to priorities. Construction of the searchlight model was by Corporal Alfred Bogdonski, battery mechanic for the 2nd Training Battery of the School Detachment.

BRIGADIER GENERAL OLIN H. LONGINO, *Commanding AAATC*

By Lieutenant Thomas E. Deacy, Jr.

With the coming of spring to Fort Sheridan, activities of units in the field have increased so that at all times one or more units are engaged in tactical problems at distant points. As the relatively small area which Fort Sheridan occupies is almost completely covered by cantonment and permanent installations, the acquisition and use of additional areas by the AAATC has been necessitated. The result has been highly advantageous, in that most of these areas lie at a considerable distance from the post, and also present excellent terrain for tactical problems. The latter is particularly true in that the areas are new and unfamiliar to the commanders, and their use necessitates complete reconnaissance and problem planning.

Dunes Park, a large tract of sand duned lake-front property about fifteen miles north of the post, recently leased, not only is an excellent bivouac area, but provides the AAATC with an additional antiaircraft firing point. Similarly, the use of Edythton Beach, a like piece of lake-front property located about thirty miles distant, provides an antiaircraft firing point, bivouac area and, still under construction, an antimechanized range for firing by both 90mm guns and automatic weapons. In addition portions of the following areas are available for use, and have been employed for field problems: Camp Grant, Illinois, eighty-five miles; Fort Custer, Michigan, 230 miles; Ordnance Depot, Savanna, Illinois, 200 miles; and Kankakee Ordnance Works, Kankakee, Illinois, eighty-five miles. On all of these areas are situated installations of military importance, thereby rendering more realistic the tactical employment for antiaircraft defense. The use of these areas and the long motor convoys en route have proven invaluable in the training of the units at Fort Sheridan.

The most noteworthy activity of the AAATC Schools Section is the establishment and operation of the centralized Special Training School. This school is provided for the education of those troops who, because of their inability to read, write and speak the English language, are unable to absorb training as soldiers and artillerymen. Half of the school time is devoted to basic training, the rest to fundamental education. The success of the school is exemplified in the increase of pride and the high degree of enthusiasm among the students attending. A high desire to learn is the invariable student attitude, attested by their eagerness to write home every day, when they have advanced sufficiently to do so.

A new grenade course is nearing completion. This course will be used for training in the use of hand and rifle-grenades, against both stationary and moving targets. Also under construction is an aircraft mock-up, to be employed in training airborne troops. The mock-up is an exact replica of the interior of the C-47, transport plane, and is so constructed that the problems of loading the actual airplane will be met and studied.

With the season at hand, softball occupies the major rôle in the out-of-doors recreational activity. There has been organized an interbattery softball league throughout the Training Center, and tournament play began on the 1st of May.

The troops at Fort Sheridan have recently enjoyed several outstanding entertainment features. The entire Jack Benny show entertained with two complete performances, and the Kate Smith Hour was broadcast from the stage of the Fort Sheridan gymnasium. The U.S.O. has brought several shows to the Post, including *Junior Miss*, which was presented on April 13. Other highlights have been visits by the bands of Griff Williams, Fred Nagle, Eddie Howard, Lawrence Welk, Jimmie Joy and Jay McShann. The AAATC Band has commenced its series of spring concerts, which are given every Sunday afternoon. The Band also played on the Fort Sheridan radio show, *Make Way for the Army*, broadcast every Saturday night from station WLS, Chicago.

The JOURNAL can supply any book in print, at the usual Association discount.

How To Do It

Courts . . .

MILITARY LAW AND COURT-MARTIAL PROCEDURE: ARMY OFFICERS' BLUE BOOK. By Colonel F. Granville Munson and Major Walter H. E. Jaeger. Washington: National Law Book Company, 1942. 113 Pages; Index; Illustrated. $1.50.

In the two years since the original edition of this book went on sale, it has had a comparatively small but steady sale, small because it was never advertised extensively, and steady because it is the sort of book that a purchaser recommends to his friends and associates.

Designed especially for officers who have not had wide court-martial experience, it clears up the questions that are most annoying to inexperienced members of courts. A notched index divides the book into logical portions, and makes immediate reference possible. The Outline of Procedure for Court-Martial is printed on detachable pages for the convenience especially of the Trial Judge Advocate.

Military legal experts will insist that everything the officer needs to know can be found in the official Manual for Courts Martial—*if* the amateur knows where to find it. The principal virtue of Colonel Munson's book is that the most puzzling points can be found without detective work and research—they are outlined in plain view, and in plain English.

* * *

. . . Martial

MILITARY JUSTICE FOR THE FIELD SOLDIER. By Lieutenant Colonel Frederick Bernays Wiener. Washington: The Infantry Journal, 1943. 122 Pages; $1.00.

Colonel Wiener, who has just returned from an assignment as staff JA in an overseas department, is a master of the difficult art of putting legal knowledge into layman's language. In colloquial terms that can be understood by anybody who can read English, the author steers the military legal novice around the common pitfalls that trap so many officers. Colonel Wiener has reviewed the records of many courts-martial, and is qualified to point out the common errors, and explain how they may be avoided.

This book is *not* a substitute for the Manual For Courts-Martial. There are numerous references to the MCM—the author insists that the answers are in the MCM, and he attempts to help the novice find the answers; in some cases, he explains the answers that might be confusing.

As far as is known, the table of *Lesser Included Offenses* in the back is the only such compilation in print.

Any young officer, inexperienced in court-martial procedure, will feel more confident, and have good reason for that feeling, if he reads (and studies) this book, and the cross-references to the MCM that the book mentions. The book itself is pleasant reading, and in spots, even amusing.

* * *

20th Century Methods

HOW TO SHOOT THE U. S. ARMY RIFLE. Washington: The Infantry Journal, 1943. 122 Pages; Illustrated. 25¢.

"The last war proved that if you hit a German in the right place with a caliber .30 rifle bullet, he falls over dead. This is also true in this war. It applies, moreover, to Japs as well as to Nazis."

* * *

"If you have worked hard, studied hard, and treated your rifle right . . . you'll get bull's-eyes.

"You'll win."

Quoting the first paragraph of the foreword, and the last two paragraphs of the text, we hoped to hint at the type of instruction in this modern book. This is something new in service instruction. Repetitive flash camera shots, humanized instruction photos, modern down-to-the-ground language, and the time-honored principles of shooting the rifle are blended into a harmonious little book that is as close to the student as a well-loved sergeant. This is the farthest possible departure from the dryness of the field manual, as well as from the error-bearing pages of the so-called "popular" military instruction books. The accuracy of the field manuals, the ease of style that the popular books strive for, and the terseness that is made possible by twentieth-century visual education methods merge into a book that every soldier would like to have, and that every officer would like him to have.

The reviewer is enthusiastic in his praise for this book, and hopes that it is the beginning of a new trend in military instruction methods.

The Old Master

CLAUSEWITZ ON THE ART OF WARFARE. Introduction by Colonel Joseph I. Greene. New York: Longmans, Green and Co., 1943. 185 Pages; $1.50.

In choosing Clausewitz as the subject for the twenty-first book in their *Living Thoughts* series, Longmans-Green has done the military a great service. By condensing the huge *On War* to 40,000 words, the publishers have brought it down to a size that can be read by an officer during wartime, and that still loses not too much of the thoughts of this military master.

Colonel Greene (editor of the *Infantry Journal*) writes in his introduction, "Clausewitz . . . wrote largely soldiers' hard horse sense in a philosophical manner. He chose, however, to use no complex system of terminology and he had a feeling for effective and compact sentence structure. This kept his style a clear one, though the formal manner in which he develops his thought has been enough to prevent *On War* from becoming a book very generally read by others than students among soldiers." The introduction is very helpful in explaining the background and the application of *On War*.

For the benefit of those who might confuse this work with *Principles of War*, by Clausewitz, *Principles* was written twenty years before *On War*. *Principles* was prepared as a list of instructions for the Crown Prince, while *On War* is the larger picture, a full-dress discourse on the art of war.

Hush!

CRYPTOGRAPHY. By Laurence Dwight Smith. New York: W. W. Norton & Company, Inc. 160 Pages; Index. $2.50.

In wartime, interest in secret writing seems to strike those to whom in normal times even crossword puzzles are too much trouble. For our readers who desire an elementary, but serious discussion of the science of secret writing, *Crytography* should be very useful. The author makes no attempt to be dramatic or sensational; he has written an elementary text explaining how messages may be enciphered and deciphered, and has included information on codes.

The Body Useful

HOW TO PREPARE FOR MILITARY FITNESS. By Lieutenant Colonel Francois D'Eliscu. New York: W. W. Norton & Company, Inc. 216 Pages; Illustrated. $1.96.

Without going into the question of whether there is too much or not enough emphasis being placed in the Army on physical fitness and personal combat, here is *the* book for officers interested in organizing programs of this type in their units.

Colonel D'Eliscu is the former head of the Ranger and Combat School, and what he doesn't know about physical conditioning and personal combat methods is a negligible quantity. He is no faddist—he opens his book with emphasis on the necessity for complete physical examinations before the start of a strenuous course, then goes into exercises that will toughen men for the still more strenuous program he outlines, and ends in a blaze of instruction in methods of combat (with illustrations) that should result in his students being able to take care of themselves in any circumstances.

Super-obstacle courses, tree fighting, *savate*, wartime wrestling, alertness exercises, elementary judo, rough and tumble games, aquatic testing—all these and more too, all well illustrated, and all reasonably expressed, omitting faddism. It is seldom we go so "all-out" in recommending a book, but this is it.

Two on Radio

ELEMENTS OF RADIO. By A. Marcus and William Marcus, with Ralph E. Horton. New York: Prentice-Hall, 1943. 672 Pages; Appendix; Index; Illustrated. One Volume: $4.00; Two Volumes: $2.45 each.

FUNDAMENTALS OF RADIO. Edited by William L. Everitt. New York: Prentice-Hall, 1942. 392 Pages; Index; Illustrated. $5.00.

Elements is the home-study course, designed at the request of the War Department and the U. S. Office of Education for pre-induction training in radio. The jacket carries the notation, "Requires no previous experience in mathematics or physics." It is written in simple language, and the illustrations are easy to understand. A summary, glossary, and list of questions and problems appear at the end of each chapter; at the end of the book is a list of instructions for demonstrations tied to each chapter. The appendix is most complete, showing diagrams, notations, etc.

Fundamentals opens with a chapter on the mathematics needed in radio, and goes on from there to cover much the same ground as the above text, but in a more mature manner. Less wordage is spent on the very elementary items, and thus more ground is covered, but not as intensely, as in the more basic book.

"Attack," Jr.

PARATROOPS. By Major F. O. Miksche. New York: Random House, 1943. 237 Pages; Notes; Map; Index; Illustrated. $2.50.

Major Miksche's *Attack* has been recognized as an intelligent, thorough, and sane appraisal of the so-called *blitz* warfare. *Paratroops* will undoubtedly take the same rank in the literature on air-borne operations. Although the title seems restrictive, the book does take into account the broad picture of air-borne warfare.

Major Miksche deals a little with the history of paratroops and air-borne operations, much with the German employment of the vertical envelopment, and mostly with the applications of the lessons of the Germans. He points out how even the *herrenvolk* have made costly mistakes in their employment of air-borne troops, and how the Allies can profit from those mistakes.

The author goes into detail regarding the composition of the forces, the air move, defense against air-borne operations, and the use of the air arm in conjunction with the operations.

"Dooz Oofs, Quick"

BLITZ FRENCH. By Georges Nicot. Harrisburg: The Military Service Publishing Company, 1943. 136 Pages; 75¢.

In North Africa, in New Caledonia, and in other widely separated places our soldiers are in close contact with the French. It is a safe guess that before the war is over many more of us will be in France itself. French is not a language to learn overnight, and this pocket-size book does not aim to teach the language in a few hours. Instead, it is designed to refer to when you want to make your needs known in a hurry. The vocabulary fits the needs of the soldier, rather than the needs of a diplomat or dress designer. Military terms; transportation and communications; food, drink and utensils; and plain every day conversation, including slang, can be found with a minimum of trouble. The student type of soldier, who wishes to memorize the vocabulary and phraseology, will get along very well among French people.

✓ ✓ ✓

For Gun Cranks

GUN CARE AND REPAIR. By Charles Edward Chapel. New York: Coward-McCann, Inc., 1943. 447 Pages; Index; Illustrated. $3.75.

Mr. Chapel's previous books, *Gun Collecting*, and *The Gun Collector's Handbook*, are now considered standard works in their field. The present book may take rank with the first two.

The book opens with a discussion of the type of shop, bench, and tools required, and then branches out into the use of the tools. From there, the author talks about guns, and covers everything from blueing to remodeling. Finally, he takes up several better-known weapons, including the M-1, and gives us a Field Manual-type résumé of their operation.

The book is a workmanlike job, well illustrated, and not too difficult to understand. Any person who contemplates performing any gunsmithing, amateur or professional, will find this volume valuable.

✓ ✓ ✓

Trig

PLANE AND SPHERICAL TRIGONOMETRY. By William C. Brenke. New York: Dryden Press, 1943. 259 Pages; Tables; Illustrated; Index. With 4-place tables and tables of haversines, $1.90; with 5-place tables and 4-place tables and tables of haversines, $2.50; Spherical Trigonometry with 4-place tables and tables of haversines, 80¢.

This new textbook presents a full and authentic treatment of a number of topics which are of current interest and particularly useful to students preparing for service in a number of different branches of the armed forces. These topics include a treatment of vectors; the mil as a unit of angular measure; the use of haversines; plane and great circle sailing; problems in surveying, navigation, and nautical astronomy; the construction and use of Mercator charts; and other material highly desirable for students at this time.

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and logarithmic values of haversines is presented. In the solution of spherical triangles, special methods which have been developed in astronomy and navigation are illustrated. Among these are an alternative method for solving the case in which the given parts are two sides and the included angle, the "vertex method" in great circles sailing, and the development and use of the haversine formulas. Napier's rules and his analogies are included.

In connection with the mil unit of angle, the text gives the definition and some simple applications to problems in the artillery service. Because of the importance of this unit in gunnery, Professor Brenke has given a considerable amount of drill in problem-solving based on a brief table of the functions at intervals of forty mils.

Complete Math Course

MATHEMATICS FOR THE PRACTICAL MAN. By J. E. Thompson. New York: D. Van Nostrand Co., 1943. Five volumes; Illustrated; Tables. $8.95.

This five-volume set has reached its twenty-second printing. The books are written for self-study or to review without a teacher in order to give a comprehensive knowledge of practical mathematics to the practical man. These volumes present mathematics in a manner that is easy to understand, for the man who wishes a good basic knowledge of mathematics from books that he can *read* while *studying*.

Arithmetic: 269 pages with necessary tables and index. Covers all arithmetical operations to include logarithms, progressions, dimensions, interest, etc.

Algebra: 291 pages with index. Covers all divisions of algebra to include quadratic, cubic, quartic equations as well as combinations and probability.

Geometry: 358 pages. Covers all of plane geometry, with some basic study of the principal figures in solid geometry.

Trigonometry: 204 pages with four-place tables and index. Trigonometric problems are presented clearly in a readable form.

Calculus: 323 pages with index. Covers both Differential and Integral Calculus and their use in solving problems.

The books are written in a manner that prevents the student from getting too rapidly into deep water.

Snow Soldiers

SKI TRACK ON THE BATTLEFIELD. By V. A. Virsoff. New York: A. S. Barnes and Company, 1943. 153 Pages; Illustrated; Bibliography. $2.00.

Skiing has long been part of the training of specialized troops in European armies, but our own army's venture into this form of instruction is very recent. Mr. Virsoff gives us some of the history of skiing, more of the development of military skiing, and then discusses military skiing in Scandinavia, the Alps, Russia, and other parts of Europe. His description of the war in Finland and the Norwegian campaign is probably the best part of the book, although the discussion of general military problems as related to skiing should be valuable as a reference for our own ski troops.

Communications

WHAT YOU SHOULD KNOW ABOUT THE SIGNAL CORPS. By Harry M. Davis and F. G. Fasset, Jr. New York: W. W. Norton, 1943. 204 Pages; Illustrated; Index. $2.50.

One more book in the growing series of "What You Should Know" books (formerly What the Citizen Should Know), the present work describes very well the history and functions of the Signal Corps. Radio, telephone, telegraph, signal flags, heliograph, torches, pigeons, photographs—the Signal Corps is responsible for much that is important in the Army. Considering that there was no Signal Corps until after the Civil War, and very little of it immediately prior to the World War, the present size and efficiency of this branch are a tribute to the caliber of the men who handle out messages and take our pictures. Brief mention is made in the book about the Corps' part in early military aviation.

P.O.W.

PRISONERS OF WAR. By William E. S. Flory. Washington: American Council on Public Affairs, 1943. 161 Pages; Bibliography; Index. Cloth: $3.25; Paper: $2.75.

The subject of Prisoners of War is one that many soldiers think they know, and few actually do know much about. At a time like this, the misconceptions held by many officers and enlisted men can be serious, both to their own persons if captured, and to the nation if they are in charge of prisoners.

Mr. Flory goes into the subject deeply and completely, citing authority for all his statements, yet managing to avoid, in large part, the legal language that is so confusing to the layman. The eight chapters are titled: Concepts of International Law; Prisonership Categories; Status and Maintenance; Activities and Compensation; Police Power Limitations; Release By Consent; Release By Other Means; and Dynamics of the Law.

Air-Minds

BEFORE YOU FLY. By Robinson, Middleton, Rawlins and Phillips. New York: Henry Holt and Company, 1943. 568 Pages; Illustrated; Aeronautical Terms; Aeronautical Readings; Index. $2.75.

This is another pre-flight manual, slanted at the high school level, that should have wide appeal to air-minded youngsters. With check questions at the end of each chapter, illustrations that are easily understood and that tell their story well, and a completeness rarely found in books of the type, this is one of the better of its sort.

Physical Side

FLYING MEN AND MEDICINE. By E. Osmun Barr, M.D. New York: Funk and Wagnalls Company, 1943. 243 Pages; Index. $2.50.

Written for the prospective flyer, this book has been written in layman's language to explain the effects of flying upon the human body.

Popular Technical Books

Electricity

ELEMENTS OF ELECTRICITY. By Timbie.
This text is used at the Coast Artillery School at Fort Monroe. **$3.00**

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Come, Josephine

THE FIRST CENTURY OF FLIGHT IN AMERICA. By Jeremiah Milbank, Jr. Princeton: The Princeton University Press, 1943. 193 Pages; Chronology; Notes; Index; Illustrated. $2.75.

The first century of flight in America was almost exclusively a century of lighter-than-air development. Free ballooning, with a few attempts at motor-driven direction control, took up practically the entire stage. One of the interesting points raised in the book is that a large proportion of the aviation enthusiasts were not adventure-seekers or circus types, but educated and sincere men who were consciously attempting to develop a new science.

The Balloon Corps in the Civil War takes up much of the author's attention.

The illustrations, most of them taken from contemporary periodicals, handbills, and other publications, are profuse and pertinent.

A Gift for the Doctor

VICTORIES OF ARMY MEDICINE. By Edgar Erskine Hume. Philadelphia: J. B. Lippincott Company, 1943. 217 Pages; Tables; References; Index; Illustrated. $3.00.

Colonel Hume has done the Medical Department a great service by writing this book. The achievements of the Medical Department and the Medical Corps are many. From the days of the Continental Army to the present time, hard-working officers and men have been adding to the store of medical knowledge, saving lives of soldiers and civilians alike, preventing disease, and performing many other functions that would be of immeasurable benefit to the world even if the wars had never been fought.

Practically every literate American knows something of the story of Walter Reed, but comparatively few know of the contributions of such medical officers as Letterman, Beaumont, Rodriguez, and scores of others whose contributions to medicine and surgery have made life easier and surer for millions outside the army.

Colonel Hume has done prodigies of research for this book. The tables of personnel who have held key assignments in the Department, and the lists of installations, should save future historians much labor. It is safe to predict that this book will soon be on the shelf of practically every medical officer of the army.

Volume II

LEE'S LIEUTENANTS: A STUDY IN COMMAND. Vol. II: Cedar Mountain to Chancellorsville. By Douglas Southall Freeman. New York: Charles Scribner's Sons, 1943. 714 Pages; Appendix; Index; Illustrated. $5.00.

This second volume of the three-volume series follows the form of its widely-acclaimed predecessor. Dr. Freeman, whose detailed familiarity with the Civil War seems beyond the capacity of the human mind, writes history in the framework of a multiple biographical work. The present volume deals largely with Jackson, because it covers the period of Jackson's greatest services. To one who has a

merely nodding acquaintance with the Civil War, it is astonishing to learn that even the great Stonewall made mistakes in tactics, put up with sloppy staff work, permitted personal differences to color his relations with subordinates, and was otherwise quite human. Dr. Freeman brings out his greatness as a commander without whitewashing his weaknesses.

The other Confederate generals who cross the pages seem to do so in Jackson's shadow. General Pendleton, who did not count his men; A. P. Hill; Longstreet; General Barksdale, who halted his work to assure a Southern lady that her cow (killed by a shell) would not be left for the Federals; and many others whose part in the picture is of varying intensity.

Early Blitz

MASTERS OF MOBILE WARFARE. By Elbridge Colby. Princeton: Princeton University Press, 1943. 152 Pages; Illustrated. $2.00.

Here is a book that in all probability few civilians will ever read because it is not sensational, nor does it kowtow to any of the current military fads as boomed by the "experts." And yet, Colonel Colby's book should be read by every civilian whose budding military awareness has been distorted by reading (and believing without critical judgment) the works of the sensationalists.

Using Marlborough, Frederick and Napoleon as his examples, Colonel Colby has written what is in effect a study of military mobility in relation to both strategy and tactics. Early in the book he makes the point that mobility by itself does not win battles—that mobility is but one of the many factors that enter into the art of war. Military readers know this, but too many others believe that the battle is won by the fastest tanks or the fastest planes. Another point the author makes early in this study is that mobility is merely relative—that it is not how fast we can move our troops, but how much faster than the enemy, other things being equal (which they seldom are).

The maps and charts are well done, and any literate person can learn not only how fast and where these masters moved, but what is more important, *why*, and with what effect.

Pacific Theater

Pacific Background

FROM PERRY TO PEARL HARBOR. By Edwin A. Falk. New York: Doubleday, Doran and Company. 323 Pages; Bibliography; Index. $3.00.

The reviewer, surfeited by an enforced diet of books on Japan and the Pacific, found this work a welcome change from the usual run of its type. Crammed with facts instead of opinions, and reading like a novel instead of like a tax return, the book covers the period from a few years before Perry to the attack on Pearl Harbor.

Mr. Falk, with a world of anecdote that indicates a thorough knowledge of his subject as well as a talent for writing, proves that war with Japan was inevitable, and that any concessions we might have made (in addition to the too numerous concessions we did make) would not

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have averted the war, but merely weakened us in the prosecution of war. Mr. Falk recounts the wars without declaration that Japan inflicted on Russia and China, he details the diplomatic defeats that we have met as a result of our dealings with Japan, and explains how America's very international morality and honest naïvete have reacted against us in dealing with an upstart power that recognizes nothing but its own ambitions.

The author, a lawyer, is a student of the United States Navy. The book is more of a naval study than a political treatise, since our relations with Japan have revolved about the axis of our naval power. We can believe, after reading this history, that the United States has been very fortunate in the caliber of the senior officers of the Navy who dealt with Japan in the past, and less fortunate with some of our political leaders who believed more in the Golden Rule than the reports of the man on the spot.

Australia and New Zealand

LANDS DOWN UNDER. By C. Hartley Grattan. New York: Institute of Pacific Relations, 1943. 93 Pages; Illustrated. 40¢.

A paper-bound pamphlet of text and pictures about Australia and New Zealand, evidently designed for group study.

Report

WAR AND PEACE IN THE PACIFIC. New York: American Council, Institute of Pacific Relations, 1943. 164 Pages; Paper Cover. $1.25.

This book is a preliminary report of the eighth conference of the Institute of Pacific relations on Wartime and Post-war coöperation of the United Nations in the Pacific and the Far East, held at Mont Tremblant, Quebec, in December of last year. The book consists of round table summaries, a bibliography, a list of conference documents, and a list of the membership.

Peace?

PACIFIC CHARTER. By Hallett Abend. New York: Doubleday, Doran and Company, 1943. 302 Pages; $2.50.

Hallett Abend, recognized as one of the journalistic experts on Oriental affairs, has written a restrained plea that when Japan is beaten, we do not make the mistake of offering her a soft peace. In fact, Abend writes, Konoye and Matsuoka, to name but two Japanese leaders, are purposely being kept clear of the present war in order that, when the war is over, they may come forth as the avowed representatives of the Japanese "liberals" to wheedle an easy peace from the victorious allies.

Leading up to his main theme, Abend takes up each of the Pacific nations and territories in turn, and outlines the difficulties that will have to be solved before there can be anything like permanent peace in that section of the globe. Among the questions raised are the peoples' capacity or lack of capacity for self-government, their attitudes toward the European powers that have governed them in recent

centuries, the ability of the European powers to control the territories if given the opportunity, and other difficult nuts to crack. It is significant that Abend himself merely states the problems, and does not attempt to answer them.

* * *

Personal Experiences

Cameras in Africa

TUNIS EXPEDITION. By Darryl F. Zanuck. New York: Random House, 1943. 160 Pages; Illustrated. $2.00.

Colonel Zanuck, Mexican Border and World War I private, former Hollywood "boy wonder," more lately one of the top-rung Hollywood executives, and today a Signal Corps colonel, has written a highly personal account of the beginnings of the North African campaign. Colonel Zanuck was in charge of the picture-taking for the expedition, and filled in also as a random staff officer for various errands. In both capacities he covered wide areas of the rather liquid front.

The book tells much of what he saw and did, and a little of what he thought. A movie expert, the author makes no pretense of being a military expert, in spite of his rank. One quotation, "War is very complicated, as I am learning day by day," should endear him to the hearts of every experienced officer who has spent boring hours listening to casual citizens and earnest newspaper men tell him what's wrong with our airplanes and why we should open a second front next Tuesday at 1430 hours.

The author's duty was to take pictures and supervise the rest of the cameramen, to take their exposed film and to resupply them with new film. In the process he saw the war beginnings of the campaign both in the "big picture" and in many of the little pictures. What he saw was good, in the main, and adds to our confidence in our Army and its leadership. That he confuses bomb and shell fragments with shrapnel is beside the point—he has written an honest, succinct, and well-written series of impressions of the first part of our first big campaign in the Atlantic theater.

* * *

Those Japs

TOKYO RECORD. By Otto D. Tolischus. New York: Reynal and Hitchcock, 1943. 449 Pages; Index. $3.00.

Writing in diary form, beginning with January 24, 1941, the author has prepared a factual account of what he learned of Japanese thought and political moves up to December 7 of undying memory. From December 7 to the return of the *Gripsholm* to friendly shores with the exchanged diplomats and other civilians from Japan, the diary is an account of the tortures inflicted upon the author and others by our highly civilized enemies.

The first part of the book, of course, tells little that has not appeared elsewhere as regards the facts of the tension between America and Japan, but it does explain, as much as such a subject can be explained, some of the devious Japanese reasoning that made the international differences irreconcilable. Other authors have written of the split personality of the Jap and of Japan, but Tolischus applies this psychopathic manifestation to Japan's actions. Part of

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Japan's trouble was that she was (in her own opinion) a super race, but still felt very inferior to the white race.

The last part of the book recounts the tortures Tolischus went through while the Jap police atempted to make him incriminate himself as a spy. Tolischus was not the only newspaperman to get the same, or worse, treatment, and thousands of Americans and Europeans received worse. Japan has certainly made an overdraft on the bank of good will.

Tank Battalion

WHITE MAMMOTHS. By Alexander Poliakov. New York: E. P. Dutton and Company, Inc., 1943. 189 Pages; Illustrated. $2.50.

Alexander Poliakov wrote *Russians Don't Surrender*, the book that explained in part how our allies held the Germans during the darkest days of this war. A correspondent with the Red Army, he was reported killed in action October 3 of last year.

White Mammoths is the story of a Russian tank battalion, and its action against the Nazis over a period of several months. It tells a bit about tank tactics, more about the fanatical hate of the Russians for the Nazis, and even more, between the lines, about how that hate is fanned by everything the Russian leaders do and say. Every conversation reported in the book deals with this subject—if the Russian people hate the Nazi armies with the intensity and single-mindedness that this book indicates, we can begin to understand why Hitler has had such hard going lately. War is no clean, recreational sport with the Russians; it is a serious grim business, with the object of killing Nazis and moving them back from Russian soil.

Some of the dramatic effect of the tales of tank action is lost by the propagandizing asides and the almost childish habit of pointing out the obvious, but most of the translations from the Russian have this fault, and this book is no worse in that respect than the others. It is a corking good tale of tank action.

Out of Burma

RETREAT WITH STILWELL. By Jack Belden. New York: Alfred A. Knopf, 1943. 368 Pages; $3.00.

This, as far as the reviewer knows, is the first complete story of that melancholy interlude in the United Nations' effort—the retreat from Burma. General Stilwell does not appear in the story until very late, after the war was lost. Faced with impossible conditions that were a compound of inept previous handling, lack of equipment, conflicting orders, poorly trained troops, and many other causes, General Stilwell could do nothing but try to extricate his Chinese troops as he and his pitifully small headquarters, with an exotic assortment of refugees, retreated to India to try again.

Belden can write. Aside from a few pages in which he strings out words in ponderous fashion about the broad political picture, his book is a tense tale of the fog of war; of excellent Japanese military intelligence and an absence of United Nations knowledge of both the enemy's and their own situations; of local terrorists and fifth columnists; of the bravery and doggedness of the individual British soldier; of stupidity in high places; and most of all, of the

superb personal leadership of General Stilwell. Through the wanderings of the hundred-odd, ill-assorted members of Stilwell's party, Belden gives us a stirring picture of a little-known battle front.

Reissue

REMEMBER PEARL HARBOR. By Blake Clark. New York: Harper and Brothers, 1943. 300 Pages; Illustrated. $2.50.

The original edition of this book was in the best-seller class when it came out early in 1942. Now that much more information on the extent of the attack has been released for publication, Mr. Clark has doubled the size of his book, added a section of pictures, and in general tells a more complete story, since the need for secrecy is past. The account is fragmentary—the author tells his story in short "takes," as they concern a particular incident or particular individual. The overall picture is presented by tying together the incidents with broader chapters.

Under the Microscope

THROUGH HELL TO DUNKIRK. By Henry de la Falaise. Harrisburg: Military Service Publishing Company, 1943. 166 Pages; $2.50.

The Marquis de la Falaise was French liaison officer with a British armored car squadron which fought a delaying action against the Germans through Belgium and France to Dunkirk. This book is his diary for the twenty-three days from the break-through to the embarkation at the Channel.

Because he was a liaison officer, ranging over the countryside, and because his mobile unit was in contact with the Nazis during the entire period, the author is able to give us a little more of the big picture than would a soldier who fought on foot. Writing vividly, his descriptions of the local actions bring out once more the difficulties of penetrating the fog of war. The usual accidents of allies killing each other due to faulty instruction in identification; the futility of opposing armored cars against tanks; and the destruction the Germans wrought on the Allied supply lines, with its effect up forward, are brought out almost as side issues to the main story, which is the tale of the action of one brave British unit.

This is *not* one of the "Why France Fell" books; it is a soldier's account of small unit fighting.

Exploring in Comfort

THE FRIENDLY ARCTIC. By Vilhjalmur Stefansson. New York: The Macmillan Company, 1943. 786 Pages; Index; Illustrated; Appendices. $5.00.

Stefansson believed, even before he started on his expedition of 1914, that the Arctic was far from a desert region—that a normal man, with proper equipment and instruction, could exist almost indefinitely on the resources of the area. During the four-year expedition, the explorer proved his thesis, in spite of what might be called sabotage by other members of the expedition.

The present book is a reprint of one that appeared in

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HANDS OFF! By Major W. E. Fairbairn. *Get Tough!* for women. How to protect yourself in physical encounters. When war work takes women to tough sections of town, or the swing shift lets out at odd hours, the wise woman will know how to turn the tables on any attacker. 75c

1921, and with a new chapter necessitated by the development of air travel and air routes over the Arctic. Those who look forward to the development of commerce after the war realize that the air routes connecting the important cities of the world will, in large part, pass over the Arctic areas that popular imagination holds to be waste and lifeless regions. The story of Stefansson's explorations will prove that popular imagination is wrong, and that the Arctic practically teems with vegetable and animal life. Minerals, also, are not lacking.

There will be much emphasis on the Far North after the war, and this book should be one of the most important guides to the new territory. The serious student, reading for what he can learn about the North, will enjoy some fine writing about exploration as an added dividend. He will learn that discomfort, hunger, and even great danger are not necessarily included among the attending factors of Arctic travel.

Rickenbacker

SEVEN CAME THROUGH. By Captain Edward V. Rickenbacker. New York: Doubleday, Doran and Company, 1943. 118 Pages; $1.50.

Many persons, reading the fragments of Rickenbacker's story that have appeared in newspapers and magazines, have commented on the famous pilot's "luck." After reading Rickenbacker's own story of his trip, we can realize that it was not luck that saved the lives of the party, but old-fashioned guts and Yankee ingenuity. Luck was a small part of the whole.

Prisoner's Thoughts

BARRACKS 3, ROOM 12. By Marcel Haedrich. New York: Reynal and Hitchcock, 1943. 229 Pages; $2.50.

Marcel Haedrich is believed to be the pseudonym of some well-known French writer. The story he tells here is a lightly-brushed picture of life in a German prison camp for officers—for officers, by the way, who were captured and imprisoned *after* the armistice between France and Germany was signed.

There is nothing in the book about Nazi brutality, which in itself is enough to label the book as different. Hunger and boredom seem to be the main enemies of the prisoners. Packages from home arrive often, money is a help in purchasing things from the prison personnel, and it is even possible, with a bit of management, to keep fairly warm. Most of the book is taken up with the thoughts of the prisoners, and their efforts to escape deadly boredom.

Coastal Command

I SEEK MY PREY IN THE WATERS. By Squadron Leader Tom Dudley-Gordon. New York: Doubleday, Doran and Company, 1943. 297 Pages; Illustrated. $3.00.

Dudley-Gordon is the pen name of three R.A.F. Coastal Command public relations officers who collaborated to give us the story of the so-far unsung Cinderella branch of the R.A.F. The Coastal Command is the most independent branch of the R.A.F., and probably the hardest working

section of that hard working service. Patrolling vast areas of stormy seas, protecting convoys, reconnoitering enemy ports, hunting submarines, and occasionally lending its support to Bomber Command for a super-raid, Coastal Command flies when the others are grounded.

"I Seek My Prey in the Waters" is the Command's motto, suggested by Aircraftsman Shaw of the Coastal Command—known better, perhaps, as Lawrence of Arabia.

The book tells of the Command's work in general, and describes individual actions and flights to give the reader a good picture of the sort of men who fly the Hudsons, Catalinas, Blenheims, Liberators, and many others. Coastal Command should not be confused with the Fleet Air Arm —Coastal Command is part of the R.A.F.; the Fleet Air Arm is part of the Royal Navy.

* * *

Miscellany

Kernan's Second

WE CAN WIN THIS WAR. By Colonel W. F. Kernan. Boston: Little, Brown & Company, 1943. 176 Pages; $1.50.

The warm (in places, hot) reception accorded Colonel Kernan's *Defense Will Not Win the War* practically guaranteed that this book would be written. In a short book, the author covers a lot of ground in a vigorous combination of barrack-room and classical language. As well as a slightly bewildered reviewer can do so in a short review, we will attempt to present a synopsis of the colonel's thoughts.

Starting with the usual blast against too-perfect administration and the burdens it brings, he slides into estimates of our sloppy thinking about "global war" and other catchphrases (with many a sideswipe at the "military experts"), inveighs against the type of military planning that leaves no margin for error and results in stagnation and delay, explains how German thoroughness and staff work has its foundation in an unimaginative and erroneous analysis of ancient campaigns, and then lambastes our strategical concepts of war and insists that our ineptitude plays into Hitler's hands. Colonel Kernan believes that we should stop trying to hold everything, and concentrate on a real invasion to rock Hitler on his heels, forgetting Japan for the moment. Guadalcanal and North Africa are dismissed as strategical mistakes—attacks around the periphery when we should be driving at the center. All this he blames on the fact that the United Nations are thinking tactically under the impression that they are thinking strategically. He says we are imitating the Germans, a step behind them, and making the same mistakes they made. And finally, the author begins to describe democracy, and somehow ends the book on a very religious note that left the reviewer on the platform as the train pulled out.

We need a book like this every so often, to jolt us out of our complacency, to start our mental processes in new directions, and to enjoy the pleasures of disagreeing with the author in a violent way if we do disagree, or to spread his gospel if we find his thoughts our own. The book is mental exercise for soldiers, but might be slightly hard on the cerebral digestion of civilians who are not serious students of things military.

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A New Angle

IS GERMANY INCURABLE? By Richard M. Brickner, M.D. Philadelphia: J. B. Lippincott Company, 1943. 309 Pages; Bibliography. $3.00.

"This book is an attempt to apply psychiatrists' and neurologists' understanding of human conduct to the world scene in an effort to make sense for the present and hope for the future out of 'German aggression' which, for the second time in most of our lives, is terrorizing the world." This quotation, from the first chapter, tells the story of the book.

Dr. Brickner, writing for laymen and omitting the hocus-pocus of his profession as a psychiatrist, explains the symptoms and effects of paranoia in individuals, develops his theme to prove that the actions of Germany as a nation parallels the actions of individual paranoiacs, and puts forth the idea that so many Germans are paranoiacs because their training for centuries could bring no other result. A paranoiac, incidentally, has delusions of persecution and of grandeur at the same time, and often turns into a murderer. They are experts in rationalizing to prove that their actions are necessary to defend themselves from persecution and to prove their superiority.

Individual cases can be cured of the disease if there is a "clear" area in their personalities; Dr. Brickner believes that if proper use were made of the few normal people in Germany as a "clear" area, and the Allies took over all instruction and other government functions necessary to develop the "clear" area as a nucleus for treatment, the menace of Germany and of Europe might be removed. It's worth thinking about.

Rubber

TREES AND TEST TUBES. By Charles Morrow Wilson. New York: Henry Holt and Company, 1943. 332 Pages; Bibliography; Index. $3.50.

Rubber is one of the nation's most perplexing problems at the present time—the timeliness of Mr. Wilson's book is a point in its favor. The author tells of the history of rubber, its manufacture from the hevea tree and the other vegetable sources, and of the production of synthetic rubber. The rubber crisis with all its implications, the Baruch report, and a wealth of other information on rubber and the rubber situation are presented with much detail, and in a readable manner.

Across the Atlantic

BRITAIN AND THE BRITISH PEOPLE. By Ernest Barker. New York: The Oxford Universtiy Press, 1943. 136 Pages; Index; Illustrated. $1.25.

This is number nine in the "World Today" series. Here too, is a short, but serious, study of a nation, written by one who believes deeply in the solidity and basic decency of a great nation. The author brings out the conservatism that we have learned to believe is typically British, but he does not overlook the fact that social changes in Britain, while occurring at the expected conservative pace, do occur, and that the nation's progress is on as solid a base as the nation itself.

Land of Lafayette

FRANCE. By Pierre Maillard. New York: Oxford University Press, 1943. 134 Pages; Index; Illustrated. $1.25.

This eighth book in the "World Today" series is a short, serious study of France, past and present, written from the standpoint of reason and understanding, rather than scandalmongering and sensationalism. France, bled by World War I, went into World War II before it had fully recovered. Maillard explains that France is not the collaboration crowd, but the respected nation of old, that with patient understanding, will take its rightful and honorable place in the councils of nations.

Lighter Moments

Peninsular Days

RIFLEMAN DODD *and* THE GUN. By C. S. Forester. Boston: Little, Brown and Company, 1943. 340 Pages; $2.50.

Forester's *Horatio Hornblower* fans will not be disappointed in these two new stories, bound in one volume. Rifleman Dodd, a private in the Rifle Brigade during the Peninsular Campaign, has much of Hornblower's unimaginative mentality coupled with Hornblower's steadfast devotion to duty. Separated from his unit during a retreat, Dodd spends several months behind Napoleon's lines carrying on a private little guerrilla war of his own, and a quite effective war it is. He is the traditional type of British soldier—wanting little for himself, ignoring discomfort and danger, and fighting the war faithfully.

The Gun was an 18-pounder that was salvaged by some Spanish irregulars in the same war, and was the core of an uprising that helped to swing the tide of battle away from Napoleon to the Allies. Everywhere the gun went it brought death to both sides, and when it was finally smashed by a lucky hit from a besieged fortress, the army of ten thousand that was built around it disintegrated in a night.

Little Soldier

ARMY BRAT. By Tommy Wadelton. New York: Coward-McCann, 1943. 186 Pages. $1.75.

Although this book is labeled fiction, it reads more like autobiography. It is the story of an army brat's first twenty-three years. Jim Tucker grew up with the memory of his mother, under the guidance of a Chinese family servant and an army father who almost lost his grip when the mother died. Young Jim's life was far from normal, even using the usual army brat's life as the standard of normalcy, but by the time he graduated from the Academy and married another service child, he fitted into the picture.

IT'S 'ARD TO GO WRONG IN THE CACTUS. By Kay Grant. New York: William Morrow and Company, 1943. 64 Pages; Illustrated. $1.00.

These are poems of every-day subjects, written with a definitely humorous and only slightly bawdy slant, peppered with Australian slang, and salted with complimentary references to the USAFIA.

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